

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (131.6, -48, 610)
Data Point: (131.6, -70, 855)
Data Point: (182.3, -48, 610)
Data Point: (182.3, -70, 855)
Data Point: (200, -48, 900)
Data Point: (200, -70, 900)
Data Point: (242.5, -48, 610)
Data Point: (242.5, -70, 855)
Data Point: (310, -48, 610)
Data Point: (310, -70, 855)

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,32,33,36	214.17643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	9301.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	6123.7
Region 9	Fill (Protected), EL. -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13	Sheet Pile	28,29,23,19,24	7.65
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11

Points

	X (ft)	Y (ft)
Point 1	31.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	31.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14

Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	31.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	31.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.68	(176.974, 11.541)	17.13905	(198.938, 3.09389)	(162.26, -11.2199)
2	11484	2.02	(176.974, 11.541)	24.431	(197.309, 2.93364)	(165.029, -9.77102)

Slices of Slip Surface: **Optimized**

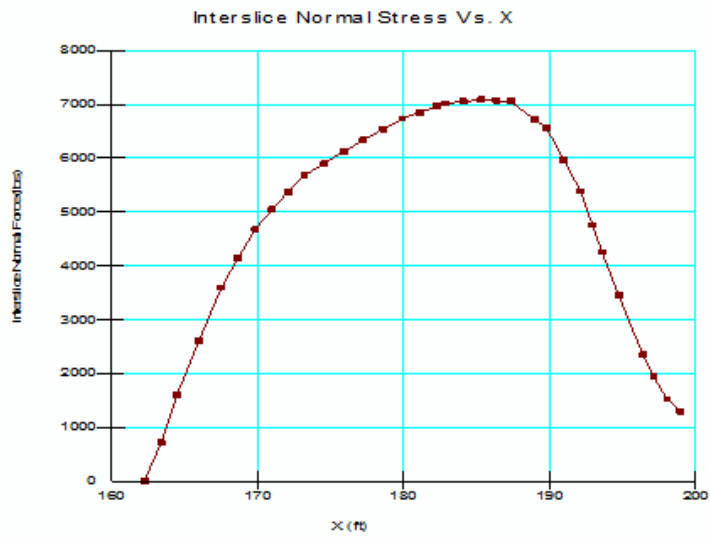
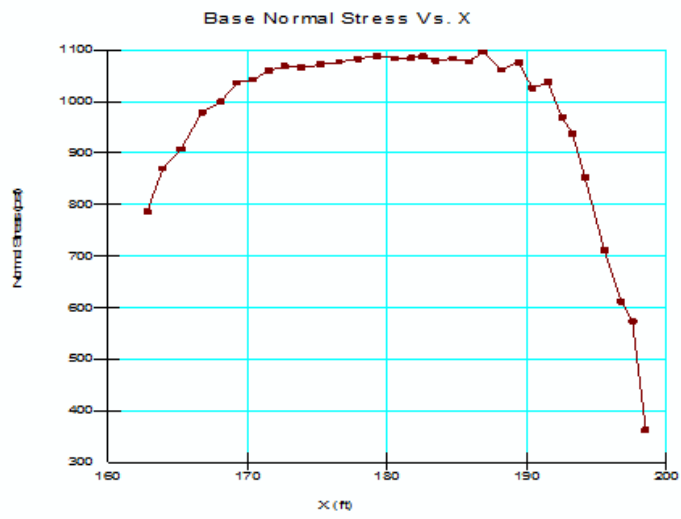
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	162.8301	-11.43036	645.98141	786.11264	0	190
2	Optimized	163.93925	-11.83993	662.84935	869.98651	0	190
3	Optimized	165.2378	-12.21905	677.91875	908.07793	0	190
4	Optimized	166.75635	-12.57903	693.55317	978.88136	0	190
5	Optimized	168.09375	-12.81683	703.64815	999.83907	0	190
6	Optimized	169.25	-12.93245	707.70155	1036.6725	0	190
7	Optimized	170.41405	-12.98923	708.66491	1042.8168	0	190
8	Optimized	171.55	-12.987235	706.48053	1059.8163	0	190

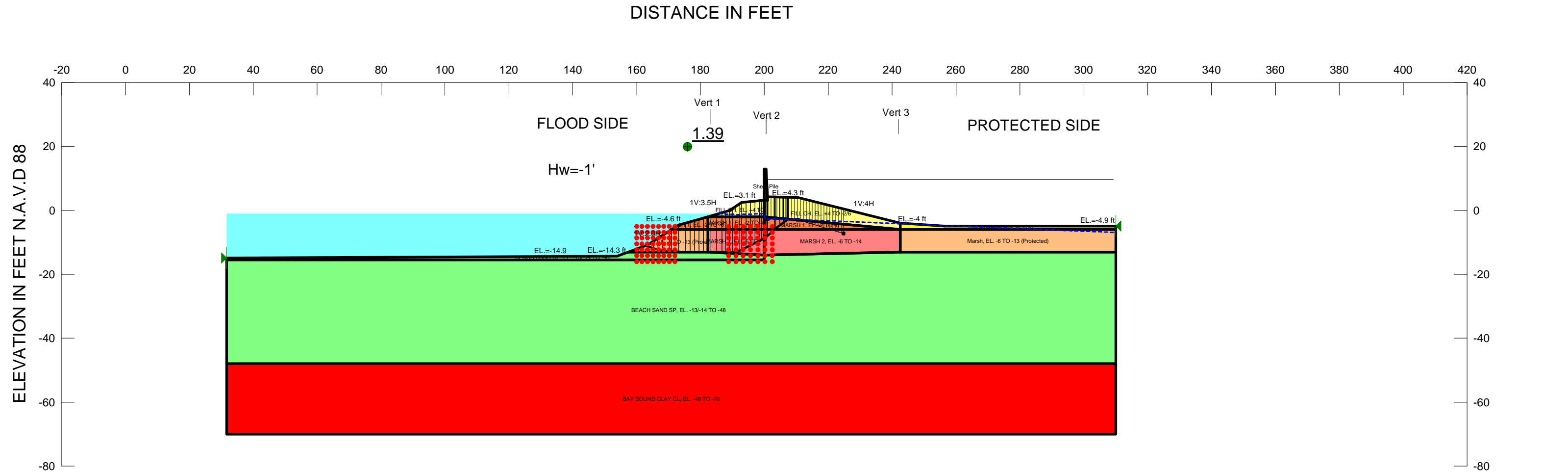
9	Optimized	172.65	-12.985305	704.40781	1068.5435	0	190
10	Optimized	173.87165	-12.98316	702.15848	1066.0647	0	190
11	Optimized	175.2149	-12.9808	699.75388	1071.7971	0	190
12	Optimized	176.55815	-12.97844	697.40139	1077.455	0	190
13	Optimized	177.9014	-12.97608	695.12335	1083.1128	0	190
14	Optimized	179.24465	-12.97372	692.91231	1088.8452	0	190
15	Optimized	180.5122	-12.951605	689.76476	1084.0227	0	190
16	Optimized	181.70405	-12.90974	685.66445	1085.0289	0	190
17	Optimized	182.56485	-12.879505	682.81466	1087.7377	0	190.15
18	Optimized	183.4497	-12.816825	678.29227	1079.5853	0	190.65
19	Optimized	184.68965	-12.71007	670.88398	1083.7635	0	191.35
20	Optimized	185.81915	-12.59552	663.2236	1077.5411	0	191.99
21	Optimized	186.83825	-12.473185	655.3028	1095.6625	0	192.56
22	Optimized	188.1739	-12.163495	636.74886	1061.2481	0	193.32
23	Optimized	189.3977	-11.79532	615.36098	1076.8336	0	194.01
24	Optimized	190.36605	-11.329245	588.86403	1026.7557	0	194.56
25	Optimized	191.5073	-10.636395	550.37193	1037.242	0	195.2
26	Optimized	192.48895	-9.918562	511.15451	969.96161	0	195.76
27	Optimized	193.2452	-9.235227	473.69376	937.32883	0	196.18
28	Optimized	194.1527	-8.374585	426.21029	853.03153	0	196.7
29	Optimized	195.5468	-6.912935	346.18564	711.68254	0	197.48
30	Optimized	196.74115	-5.60207	271.91752	612.09307	0	200
31	Optimized	197.56225	-4.7404325	222.25255	573.31927	0	200
32	Optimized	198.47935	-3.8130175	169.05086	362.27595	0	200

Slices of Slip Surface: **11484**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	11484	165.52675	-10.035001	559.59457	741.2704	0	190
2	11484	166.5219	-10.53456	582.93492	805.9348	0	190
3	11484	167.51705	-10.97908	603.94141	864.49676	0	190
4	11484	168.51215	-11.37177	622.98918	917.37437	0	190
5	11484	169.5073	-11.715265	639.43381	964.92495	0	190

6	11484	170.50245	-12.01172	653.79211	1007.3546	0	190
7	11484	171.55	-12.27369	666.39957	1039.2965	0	190
8	11484	172.65	-12.497875	676.92867	1060.3489	0	190
9	11484	173.76875	-12.672085	684.735	1063.8632	0	190
10	11484	174.90625	-12.795685	689.77056	1070.4303	0	190
11	11484	176.04375	-12.86567	691.84108	1071.6623	0	190
12	11484	177.18125	-12.882505	690.95532	1067.5659	0	190
13	11484	178.31875	-12.846305	687.0875	1058.1718	0	190
14	11484	179.45625	-12.756825	680.23879	1043.4468	0	190
15	11484	180.59375	-12.61347	670.35934	1023.4706	0	190
16	11484	181.73125	-12.41528	657.41152	998.09005	0	190
17	11484	182.85835	-12.163725	641.62613	971.69989	0	190.32
18	11484	183.975	-11.858055	622.89	944.07691	0	190.95
19	11484	185.09165	-11.494225	600.96353	910.65574	0	191.58
20	11484	186.20835	-11.06942	575.68557	877.95366	0	192.21
21	11484	187.325	-10.58011	546.78565	851.50356	0	192.84
22	11484	188.44165	-10.021894	514.12347	818.09082	0	193.47
23	11484	189.4875	-9.4340995	480.58774	798.74822	0	194.06
24	11484	190.4625	-8.8202925	445.67721	793.51304	0	194.61
25	11484	191.4375	-8.139041	406.90674	780.90457	0	195.16
26	11484	192.4125	-7.383026	364.65403	760.15087	0	195.71
27	11484	193.43955	-6.4926515	314.3721	698.71111	0	196.29
28	11484	194.534	-5.425652	253.23271	602.78626	0	200
29	11484	195.64385	-4.192807	181.81776	504.06614	0	200
30	11484	196.7537	-2.767155	97.927956	315.2769	0	200





Name: FILL CH, EL. +4 TO -2/6 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -2 TO -6 Model: Undrained (Phi=0) Unit Weight: 80 pcf Cohesion: 200 psf

Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: CLAY Phi: 0 °

Name: MARSH 2, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Marsh 1 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill (Protected), EL -4 to -6 Model: Undrained (Phi=0) Unit Weight: 107 pcf Cohesion: 600 psf

Name: Marsh, EL. -6 TO -13 (Protected) Model: Undrained (Phi=0) Unit Weight: 101 pcf Cohesion: 190 psf

Name: FS Thru Sheetpile (block) -1.0
File Name: Reach 12A el -1.gsz Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443380\
Last Edited By: Schroeder, Danielle MVN

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A, STA. 85+90 TO STA. 89+50
FLOOD SIDE STABILITY ANALYSIS,
CASE: FS Thru Sheetpile (block) -1.0
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Thru Sheetpile (block) -1.0

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File Information

Created By: Liljegren, James
Revision Number: 554
Last Edited By: Schroeder, Danielle MVN
Date: 6/18/2013
Time: 2:48:10 PM
File Name: Reach 12A el -1.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443380\
Last Solved Date: 6/18/2013
Last Solved Time: 2:48:34 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Thru Sheetpile (block) -1.0

Kind: SLOPE/W
Parent: Global Analysis (Seepage) -1.0
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Block
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 1
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Phi: 0 °
Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

Fill (Protected), EL -4 to -6

Model: Undrained (Phi=0)
Unit Weight: 107 pcf
Cohesion: 600 psf

Marsh, EL. -6 TO -13 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 190 psf

Slip Surface Limits

Left Coordinate: (31.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Slip Surface Block

Left Grid
 Upper Left: (160, -5) ft
 Lower Left: (160, -16) ft
 Lower Right: (172, -16) ft
 X Increments: 7
 Y Increments: 6
 Starting Angle: 135 °
 Ending Angle: 155 °
 Angle Increments: 4
Right Grid
 Upper Left: (188.80558, -5) ft
 Lower Left: (188.80558, -16) ft
 Lower Right: (202.50167, -16) ft
 X Increments: 6
 Y Increments: 6
 Starting Angle: 25 °
 Ending Angle: 45 °
 Angle Increments: 4

FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 4000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +4 TO -2/6

Model: Spatial Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion Fn: Fill
Phi: 0 °
Phi-B: 0 °

MARSH 1, EL. -2 TO -6

Model: Undrained (Phi=0)
Unit Weight: 80 pcf
Cohesion: 200 psf

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion Spatial Fn: CLAY
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -14

Model: Spatial Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion Fn: Marsh 1

Tension Crack Line

X (ft)	Y (ft)
201	-2.7
210.5	-3
224.8	-7.2

Cohesion Functions

Marsh 1

Model: Spline Data Point Function
Function: Cohesion vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 190
Data Points: X (ft), Cohesion (psf)
 Data Point: (182.3, 190)
 Data Point: (200, 200)
 Data Point: (242.5, 190)

Fill

Model: Spline Data Point Function
Function: Cohesion vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
 Data Point: (182.3, 600)
 Data Point: (200, 700)
 Data Point: (242.5, 600)

Spatial Functions

CLAY

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
 Data Point: (131.6, -48, 610)
 Data Point: (131.6, -70, 855)
 Data Point: (182.3, -48, 610)
 Data Point: (182.3, -70, 855)
 Data Point: (200, -48, 900)
 Data Point: (200, -70, 900)
 Data Point: (242.5, -48, 610)

Data Point: (242.5, -70, 855)
Data Point: (310, -48, 610)
Data Point: (310, -70, 855)

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,32,33,36	214.17643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	9301.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	6123.7
Region 9	Fill (Protected), EL. -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13	Sheet Pile	28,29,23,19,24	7.65
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11

Points

	X (ft)	Y (ft)
Point 1	31.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	31.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14

Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	31.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	31.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.39	(183.852, -0.849)	20.01139	(207.214, 4.10377)	(162.827, -11.0112)
2	6272	1.46	(183.852, -0.849)	19.773	(207.422, 4.09719)	(162.537, -11.1181)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal	Frictional	Cohesive
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					Stress (psf)	Strength (psf)	Strength (psf)
1	Optimized	163.1134	-11.11256	628.64698	766.0602	0	190
2	Optimized	164.35765	11.552655	646.48044	858.62683	0	190
3	Optimized	166.0087	-12.05073	666.83064	915.55952	0	190
4	Optimized	167.39555	12.369435	680.59074	979.15957	0	190
5	Optimized	169.1895	-12.66886	693.15936	1021.8016	0	190
6	Optimized	170.645	12.822105	698.87657	1044.6483	0	190
7	Optimized	172.1	12.876105	699.24575	1066.8562	0	190
8	Optimized	174.3005	12.957775	699.97889	1079.1398	0	190
9	Optimized	176.0909	12.998425	699.30222	1081.0231	0	190
10	Optimized	177.4707	12.998035	697.06277	1087.0384	0	190
11	Optimized	178.8505	12.997645	694.88855	1093.0538	0	190
12	Optimized	180.2303	12.997255	692.77955	1099.0691	0	190
13	Optimized	181.6101	12.996865	690.77202	1105.157	0	190
14	Optimized	182.7522	-	689.30364	1113.5313	0	190.26

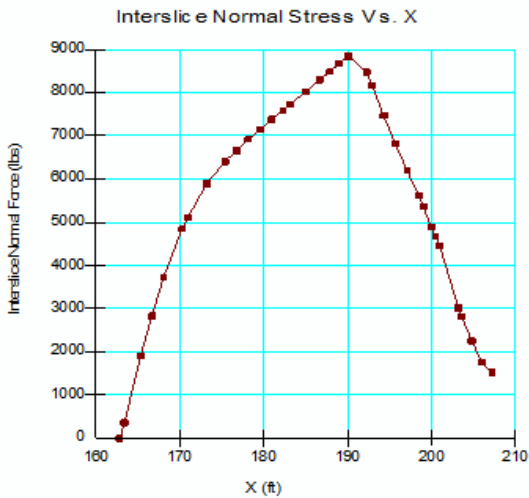
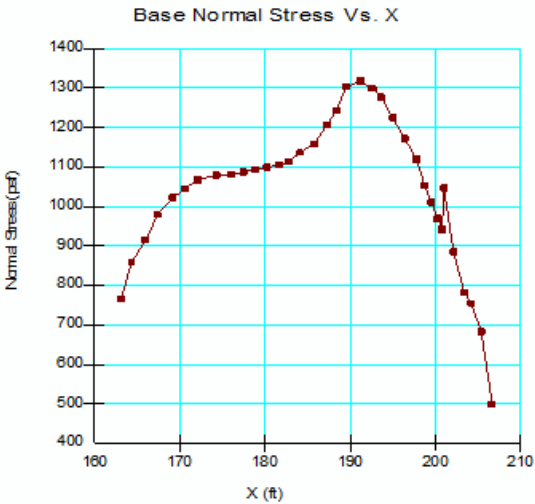
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15	Optimized	184.07435	13.010485	688.69526	1135.5081	0	191
16	Optimized	185.81425	-13.03861	688.52286	1159.4148	0	191.99
17	Optimized	187.26315	13.063185	688.61572	1206.4526	0	192.8
18	Optimized	188.42105	-13.08421	688.8575	1243.8412	0	193.46
19	Optimized	189.5424	-13.10457	689.26456	1302.2852	0	194.09
20	Optimized	191.1879	12.855095	674.56929	1317.7663	0	195.02
21	Optimized	192.5955	12.443565	652.2219	1297.3207	0	195.82
22	Optimized	193.59635	11.943305	626.41136	1276.933	0	196.38
23	Optimized	194.9891	11.247195	591.84515	1224.3322	0	197.17
24	Optimized	196.38185	10.551085	560.70859	1171.7315	0	197.96
25	Optimized	197.77455	-9.854975	531.58229	1119.1307	0	198.74
26	Optimized	198.73545	-9.346136	509.45531	1052.2487	0	199.29
27	Optimized	199.5	-8.881441	487.73151	1010.9944	0	199.72
28	Optimized	200.25	8.4255745	377.65103	969.6353	0	199.94
29	Optimized	200.75	-	340.92333	941.91434	0	199.82

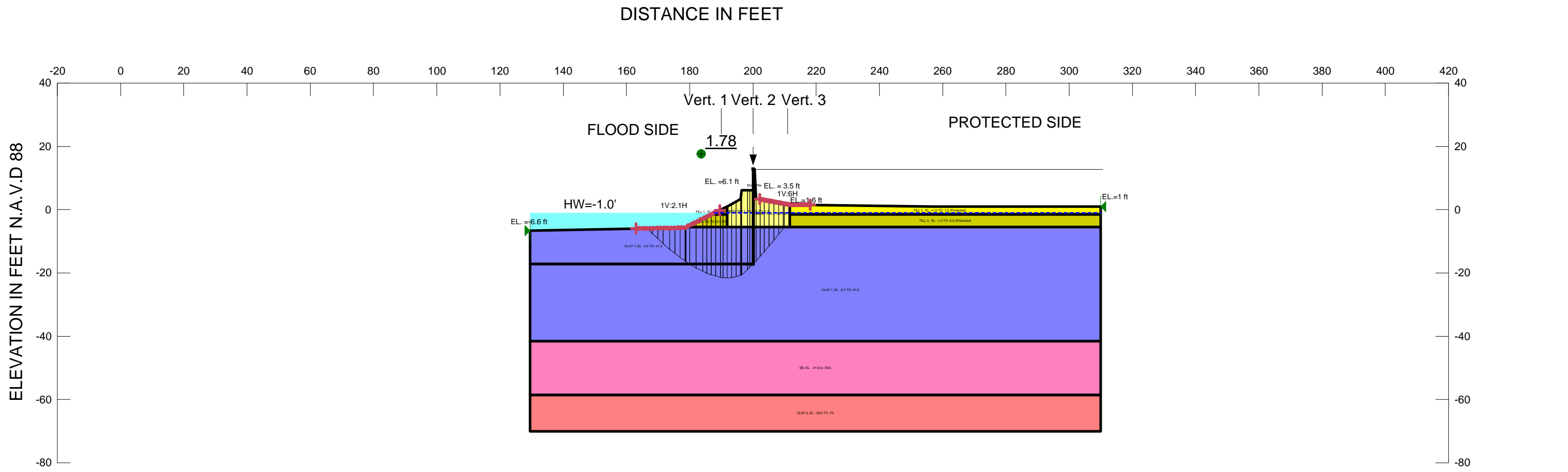
	d		8.121663 5				
30	Optimize d	201.00345	-7.967599	330.98879	1046.9594	0	199.76
31	Optimize d	202.0997	-6.982745	267.54949	884.99339	0	199.51
32	Optimize d	203.38	-5.831375	193.38574	782.31464	0	200
33	Optimize d	204.1768	- 5.173522 5	151.1863	754.97172	0	200
34	Optimize d	205.39545	- 4.195067 5	88.447954	682.79542	0	200
35	Optimize d	206.60945	- 3.301036 5	30.801136	499.70074	0	200

Slices of Slip Surface: 6272

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	6272	162.96835	-	639.76553	812.33352	0	190
2	6272	164.27145	-	666.18825	924.99857	0	190
3	6272	165.875	-	682.53743	884.52666	0	190
4	6272	167.33925	-	678.74718	915.59982	0	190
5	6272	168.80355	-	675.42816	946.67299	0	190
6	6272	170.26785	-	672.27304	977.74615	0	190
7	6272	172.1	-	668.68182	1002.2273	0	190
8	6272	173.95835	-	665.20865	1004.3075	0	190
9	6272	175.475	-	662.57128	1010.9668	0	190
10	6272	176.99165	-	659.99985	1017.6261	0	190
11	6272	178.50835	-	657.58667	1024.2855	0	190
12	6272	180.025	-	655.24601	1030.9448	0	190
13	6272	181.54165	-	653.00425	1037.5382	0	190

14	6272	183.1375	-	650.98507	1050.9851	0	190.47
15	6272	184.8125	-	649.19403	1071.1642	0	191.42
16	6272	186.4875	-	647.64179	1103.4627	0	192.37
17	6272	188.1625	-	646.38806	1154.3881	0	193.31
18	6272	190.04415	-	645.60864	1254.3924	0	194.38
19	6272	191.99415	-	616.67818	1177.047	0	195.48
20	6272	193.6625	-	565.58568	1153.83	0	196.42
21	6272	195.1875	-	522.27304	1085.6837	0	197.28
22	6272	196.7125	-	479.16484	1017.5374	0	198.14
23	6272	198.2375	-	437.14699	949.39117	0	199
24	6272	199.5	-	400.81372	888.1087	0	199.72
25	6272	200.25	-	289.7028	848.77413	0	199.94
26	6272	200.75	-	253.72811	822.41232	0	199.82
27	6272	201.52895	-	224.75865	899.41117	0	199.64
28	6272	202.72845	-	180.24092	840.82723	0	200
29	6272	204.0696	-	130.29238	782.06425	0	200
30	6272	205.41075	-	80.227613	723.30127	0	200
31	6272	206.75185	-	29.876779	529.64818	0	200





Name: EMBANKMENT FILL1, EL. +6 TO -1.5 Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 825 psf
Name: CLAY 1, EL. -5.5 TO -41.5 Model: Spatial Mohr-Coulomb Unit Weight: 117 pcf Cohesion Spatial Fn: Clay 1 Phi: 0 °
Name: Silt, EL. -41.5 to -58.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 200 psf Phi: 15 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: FILL 1, EL. +1.6 TO -1.5 (Protected) Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 900 psf
Name: FILL 2, EL. -1.5 TO -5.5 (Protected) Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 500 psf
Name: CLAY 2, EL. -58.5 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 118 pcf Cohesion Spatial Fn: Clay 2 Phi: 0 °



**US Army Corps
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New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 22, STA. 10+00 TO 11+85
AND STA. 13+55 TO 21+00
FLOOD SIDE STABILITY ANALYSIS,
CASE: FS Global Stability Circular Around S/P Seep/W EI -1.0
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Global Stability Circular Around S/P Seep/W El -1.0

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File Information

Created By: Liljegren, James
Revision Number: 447
Last Edited By: Schroeder, Danielle MVN
Date: 1/19/2013
Time: 5:40:52 PM
File Name: Reach 22 Q-Case FS el -1.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/19/2013
Last Solved Time: 5:51:54 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Global Stability Circular Around S/P Seep/W El -1.0

Kind: SLOPE/W
Parent: FS Analysis (Seepage) El -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

3/1/2013

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL1, EL. +6 TO -1.5

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 825 psf

CLAY 1, EL. -5.5 TO -41.5

Model: Spatial Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion Spatial Fn: Clay 1
Phi: 0 °
Phi-B: 0 °

Silt, EL. -41.5 to -58.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 200 psf
Phi: 15 °
Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

FILL 1, EL. +1.6 TO -1.5 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 900 psf

FILL 2, EL. -1.5 TO -5.5 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 500 psf

3/1/2013

FS Global Stability Circular Around S/P Seep/W El -1.0

Page 3 of 8

FS Global Stability Circular Around S/P Seep/W El -1.0

Page 4 of 8

CLAY 2, EL. -58.5 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion Spatial Fn: Clay 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (163, -5.98469) ft
Left-Zone Right Coordinate: (189.5, -0.15865) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (202.12632, 3.3) ft
Right-Zone Right Coordinate: (218.1, 1.51467) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (129.5, -6.6) ft
Right Coordinate: (310, 1) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.8) ft
Inside Point: (200, -17.2) ft
Slip Surface Intersection: (200, -17.201) ft
Total Length: 30 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs
Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft
FullySpecFixedPoints
[1]
flag: Yes
[2]
flag: Yes

3/1/2013

Spatial Functions

Clay 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (191.8, -58.5, 715)
Data Point: (191.8, -70, 855)
Data Point: (200, -58.5, 765)
Data Point: (200, -70, 905)
Data Point: (211.7, -58.5, 715)
Data Point: (211.7, -70, 855)
Data Point: (149.5, -58.5, 715)
Data Point: (149.5, -70, 855)
Data Point: (310, -58.5, 715)
Data Point: (310, -70, 855)

Clay 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (191.8, -5.5, 165)
Data Point: (191.8, -41, 520)
Data Point: (200, -5.5, 175)
Data Point: (200, -41.5, 550)
Data Point: (211.7, -5.5, 165)
Data Point: (211.7, -41.5, 520)
Data Point: (149.5, -5.5, 165)
Data Point: (149.5, -41.5, 520)
Data Point: (310, -5.5, 165)
Data Point: (310, -41.5, 520)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	6,16,17,18,12	6.975
Region 2	FILL 1, EL. +1.6 TO -1.5 (Protected)	19,26,27,2,13	259.25
Region 3	FILL 2, EL. -1.5 TO -5.5 (Protected)	26,25,23,27	393.2
Region 4	Silt, EL. -41.5 to -58.5	28,4,5,3	3068.5
Region 5	FILL 2, EL. -1.5 TO -5.5 (Protected)	31,30,29,24,33	35.73137
Region 6	EMBANKMENT FILL1, EL. +6 TO -1.5	7,32,6,12,19,26,25	95.135
Region 7	CLAY 2, EL. -58.5 TO -70	9,4,5,8	2075.75
Region 8	CLAY 1, EL. -5.5 TO -41.5	28,11,10,7,25,23,3	5673.15
Region 9	CLAY 1, EL. -5.5 TO -41.5	11,14,15,24,29,7,10	792.9603
Region 10	FILL 1, EL. +1.6 TO -1.5 (Protected)	31,35,34,1,30	6.2033695
Region 11	EMBANKMENT FILL1, EL. +6 TO -1.5	29,30,1,20,21,22,16,6,32,7	77.715

3/1/2013

Points

	X (ft)	Y (ft)
Point 1	191.8	1
Point 2	310	1
Point 3	310	-41.5
Point 4	129.5	-58.5
Point 5	310	-58.5
Point 6	200	3.5
Point 7	200	-5.5
Point 8	310	-70
Point 9	129.5	-70
Point 10	200	-17.2
Point 11	129.5	-17.2
Point 12	201	3.5
Point 13	256.7	1
Point 14	129.5	-6.6
Point 15	178.5	-5.7
Point 16	200	6.1
Point 17	200	12.8
Point 18	200.5	12.8
Point 19	211.7	1.6
Point 20	196.1	3.3
Point 21	196.4	6.1
Point 22	199	6.1
Point 23	310	-5.5
Point 24	178.89701	-5.5
Point 25	211.7	-5.5
Point 26	211.7	-1.5
Point 27	310	-1.5
Point 28	129.5	-41.5
Point 29	191.8	-5.5
Point 30	191.8	-1.5
Point 31	186.83731	-1.5
Point 32	200	-1.5
Point 33	184.0582	-2.9
Point 34	190.60895	0.4
Point 35	188.22686	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.78	(188.716, 2.764)	20.0682	(209.849, 1.92872)	(166.524, -5.91996)

3/1/2013

30	Optimized	201.6363	-15.483455	903.76099	1909.9647	0	276.82
31	Optimized	202.9089	-14.015825	812.18028	1732.1571	0	260.04
32	Optimized	204.3057	-12.384515	710.4145	1529.4271	0	241.63
33	Optimized	205.82665	-10.589525	598.37354	1312.8684	0	221.63
34	Optimized	207.3382	-8.7479475	483.45498	1079.6401	0	201.43
35	Optimized	208.8404	-6.8597825	365.65194	854.88435	0	181.04
36	Optimized	209.72015	-5.70785	293.76004	395.68931	0	168.76

Slices of Slip Surface: 3120

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	3120	168.15875	-7.3436655	395.84324	718.84011	0	183.29
2	3120	169.57545	-9.8585445	552.77173	987.87788	0	208.27
3	3120	170.99215	-11.79507	673.61986	1195.2664	0	227.52
4	3120	172.40885	-13.373265	772.09515	1363.1692	0	243.23
5	3120	173.82555	-14.69332	854.47044	1502.1838	0	256.39
6	3120	175.24225	-15.811365	924.24938	1618.4077	0	267.55
7	3120	176.65895	-16.762595	983.5847	1715.5826	0	277.06
8	3120	177.93365	-17.50135	1029.7122	1789.6042	0	284.46
9	3120	178.6985	-17.89894	1054.486	1839.418	0	288.45
10	3120	179.54215	-18.276485	1078.0593	1896.816	0	292.25
11	3120	180.83245	-18.793735	1110.3598	1977.03	0	297.45
12	3120	182.12275	-19.223155	1137.1347	2046.9612	0	301.79
13	3120	183.41305	-19.569825	1158.7443	2107.2602	0	305.31
14	3120	184.753	-19.84482	1175.9027	2159.7793	0	308.11
15	3120	186.14255	-20.045025	1188.3794	2204.2728	0	310.18
16	3120	187.5321	-20.15933	1195.5559	2238.6038	0	311.39
17	3120	188.8224	-20.19248	1197.5907	2293.675	0	311.78
18	3120	190.0134	-20.15603	1195.3561	2345.1947	0	311.47
			-				

3/1/2013

2	3120	2.00	(188.716, 2.764)	22.964	(210.142, 1.87659)	(167.45, -5.90295)
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Slices of Slip Surface: Optimized

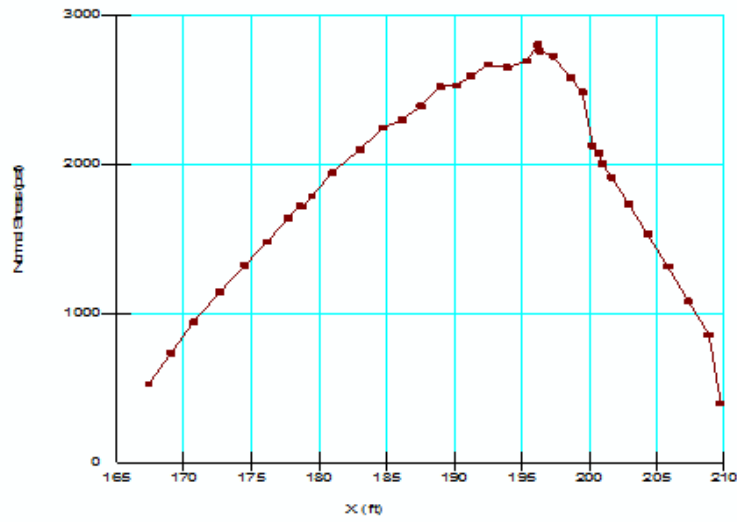
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	167.3652	-6.726406	357.32955	524.91535	0	177.17
2	Optimized	169.0468	-8.3392955	457.96514	733.31931	0	193.18
3	Optimized	170.72845	-9.952185	558.60503	941.72328	0	209.21
4	Optimized	172.64455	-11.65862	665.08845	1139.6219	0	226.2
5	Optimized	174.5165	-13.17399	759.67273	1320.5243	0	241.3
6	Optimized	176.1099	-14.40475	836.45952	1477.1773	0	253.58
7	Optimized	177.7033	-15.63551	913.24632	1633.8303	0	265.88
8	Optimized	178.5587	-16.29624	954.49647	1726.1539	0	272.49
9	Optimized	178.7572	-16.42912	962.78722	1713.4575	0	273.82
10	Optimized	179.4427	-16.858325	989.56768	1784.8253	0	278.12
11	Optimized	180.96945	-17.8143	1049.2232	1943.3307	0	287.7
12	Optimized	183.00435	-18.939335	1119.4243	2097.9546	0	299
13	Optimized	184.7022	-19.76218	1170.7383	2242.7565	0	307.29
14	Optimized	186.09175	-20.30899	1204.884	2297.3719	0	312.81
15	Optimized	187.5321	-20.76241	1233.2009	2389.0394	0	317.41
16	Optimized	188.97285	-21.21597	1261.4656	2518.0723	0	322.01
17	Optimized	190.16385	-21.45751	1276.5084	2526.7318	0	324.49
18	Optimized	191.20445	-21.47318	1277.5513	2588.3469	0	324.7
19	Optimized	192.5036	-21.492745	1278.7682	2667.8841	0	326.36
20	Optimized	193.9304	-21.310975	1267.3984	2648.5146	0	327.44
21	Optimized	195.3768	-20.92625	1243.4121	2691.3425	0	326.45
22	Optimized	196.1871	-20.71072	1229.9654	2801.6095	0	325.87
23	Optimized	196.3371	-20.630645	1224.9727	2756.6454	0	325.35
24	Optimized	197.3175	-19.743655	1169.5883	2724.5806	0	318.18
25	Optimized	198.6175	-18.542445	1094.6567	2575.9331	0	308.27
26	Optimized	199.5	-17.686195	1041.239	2483.5288	0	301.02
27	Optimized	200.25	-16.958505	995.80849	2122.3819	0	294.01
28	Optimized	200.713	-16.509285	967.77764	2074.1823	0	288.7
29	Optimized	200.963	-16.25995	952.24693	2003.3562	0	285.77

3/1/2013

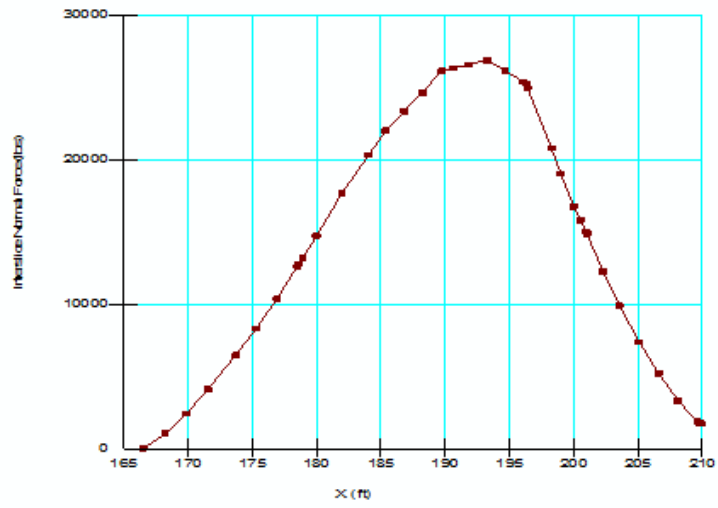
19	3120	191.20445	20.057405	1189.2093	2389.1856	0	310.55
20	3120	192.51665	-19.872165	1177.5901	2430.8652	0	310.13
21	3120	193.95	-19.58402	1159.6264	2468.0187	0	310.02
22	3120	195.38335	-19.19864	1135.5769	2493.1956	0	308.87
23	3120	196.25	-18.929	1118.7565	2652.2802	0	307.77
24	3120	197.05	-18.62364	1099.6998	2764.1935	0	306.16
25	3120	198.35	-18.06981	1065.1749	2682.9059	0	302.88
26	3120	199.5	-17.50321	1029.8038	2601.7444	0	299.12
27	3120	200.25	-17.091955	1004.1323	2254.6368	0	295.4
28	3120	200.75	-16.792915	985.48574	2213.1909	0	291.59
29	3120	201.76185	-16.11257	943.04274	2106.0406	0	283.15
30	3120	203.2856	-14.959785	871.09939	1922.6343	0	269.26
31	3120	204.80935	-13.583525	785.20711	1712.6392	0	253.25
32	3120	206.33305	-11.91947	681.38433	1467.9849	0	234.53
33	3120	207.85675	-9.8492965	552.1929	1173.7214	0	211.97
34	3120	209.3805	-7.0965915	380.43007	755.63134	0	182.9

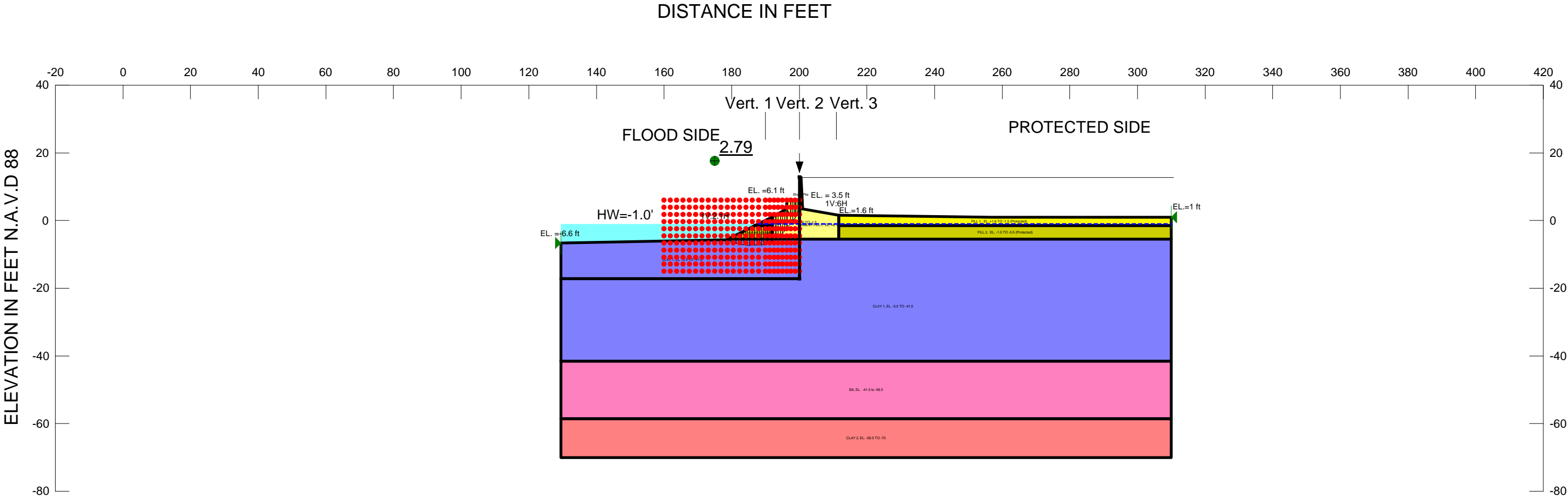
3/1/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X





Name: EMBANKMENT FILL1, EL. +6 TO -1.5 Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 825 psf
Name: CLAY 1, EL. -5.5 TO -41.5 Model: Spatial Mohr-Coulomb Unit Weight: 117 pcf Cohesion Spatial Fn: Clay 1 Phi: 0 °
Name: Silt, EL. -41.5 to -58.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 200 psf Phi: 15 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: FILL 1, EL. +1.6 TO -1.5 (Protected) Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 900 psf
Name: FILL 2, EL. -1.5 TO -5.5 (Protected) Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 500 psf
Name: CLAY 2, EL. -58.5 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 118 pcf Cohesion Spatial Fn: Clay 2 Phi: 0 °



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New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 22, STA. 10+00 TO 11+85
AND STA. 13+55 TO 21+00
FLOOD SIDE STABILITY ANALYSIS,
CASE: FS Global Stability Block In Front S/P Seep/W EI -1.0
APRIL 2013

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
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BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

FS Global Stability Block In Front S/P Seep/W El -1.0

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File Information

Created By: Liljegren, James
Revision Number: 447
Last Edited By: Schroeder, Danielle MVN
Date: 1/19/2013
Time: 5:40:52 PM
File Name: Reach 22 Q-Case FS el -1.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/19/2013
Last Solved Time: 5:45:10 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Global Stability Block In Front S/P Seep/W El -1.0

Kind: SLOPE/W
Parent: FS Analysis (Seepage) El -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

3/1/2013

FS Global Stability Block In Front S/P Seep/W El -1.0

Page 3 of 8

Cohesion: 500 psf

CLAY 2, EL. -58.5 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion Spatial Fn: Clay 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (129.5, -6.6) ft
Right Coordinate: (310, 1) ft

Slip Surface Block

Left Grid
Upper Left: (160, 6) ft
Lower Left: (160, -15) ft
Lower Right: (188, -15) ft
X Increments: 15
Y Increments: 10
Starting Angle: 135 °
Ending Angle: 155 °
Angle Increments: 4
Right Grid
Upper Left: (190, 6) ft
Lower Left: (190, -15) ft
Lower Right: (200, -15) ft
X Increments: 8
Y Increments: 10
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.8) ft
Inside Point: (200, -17.2) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 30 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs

3/1/2013

FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL1, EL. +6 TO -1.5

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 825 psf

CLAY 1, EL. -5.5 TO -41.5

Model: Spatial Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion Spatial Fn: Clay 1
Phi: 0 °
Phi-B: 0 °

Silt, EL. -41.5 to -58.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 200 psf
Phi: 15 °
Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

FILL 1, EL. +1.6 TO -1.5 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 900 psf

FILL 2, EL. -1.5 TO -5.5 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 114 pcf

3/1/2013

FS Global Stability Block In Front S/P Seep/W El -1.0

Page 4 of 8

Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft
FullySpecFixedPoints
[1] flag: Yes
[2] flag: Yes

Tension Crack Line

X (ft)	Y (ft)
196.4	2.1
200	2.1

Spatial Functions

Clay 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (191.8, -58.5, 715)
Data Point: (191.8, -70, 855)
Data Point: (200, -58.5, 765)
Data Point: (200, -70, 905)
Data Point: (211.7, -58.5, 715)
Data Point: (211.7, -70, 855)
Data Point: (149.5, -58.5, 715)
Data Point: (149.5, -70, 855)
Data Point: (310, -58.5, 715)
Data Point: (310, -70, 855)

Clay 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (191.8, -5.5, 165)
Data Point: (191.8, -41, 520)
Data Point: (200, -5.5, 175)
Data Point: (200, -41.5, 550)
Data Point: (211.7, -5.5, 165)
Data Point: (211.7, -41.5, 520)
Data Point: (149.5, -5.5, 165)
Data Point: (149.5, -41.5, 520)
Data Point: (310, -5.5, 165)
Data Point: (310, -41.5, 520)

3/1/2013

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	6,16,17,18,12	6.975
Region 2	FILL 1, EL. +1.6 TO -1.5 (Protected)	19,26,27,2,13	259.25
Region 3	FILL 2, EL. -1.5 TO -5.5 (Protected)	26,25,23,27	393.2
Region 4	Silt, EL. -41.5 to -58.5	28,4,5,3	3068.5
Region 5	FILL 2, EL. -1.5 TO -5.5 (Protected)	31,30,29,24,33	35.73137
Region 6	EMBANKMENT FILL1, EL. +6 TO -1.5	7,32,6,12,19,26,25	95.135
Region 7	CLAY 2, EL. -58.5 TO -70	9,4,5,8	2075.75
Region 8	CLAY 1, EL. -5.5 TO -41.5	28,11,10,7,25,23,3	5673.15
Region 9	CLAY 1, EL. -5.5 TO -41.5	11,14,15,24,29,7,10	792.9603
Region 10	FILL 1, EL. +1.6 TO -1.5 (Protected)	31,35,34,1,30	6.2033695
Region 11	EMBANKMENT FILL1, EL. +6 TO -1.5	29,30,1,20,21,22,16,6,32,7	77.715

Points

	X (ft)	Y (ft)
Point 1	191.8	1
Point 2	310	1
Point 3	310	-41.5
Point 4	129.5	-58.5
Point 5	310	-58.5
Point 6	200	3.5
Point 7	200	-5.5
Point 8	310	-70
Point 9	129.5	-70
Point 10	200	-17.2
Point 11	129.5	-17.2
Point 12	201	3.5
Point 13	256.7	1
Point 14	129.5	-6.6
Point 15	178.5	-5.7
Point 16	200	6.1
Point 17	200	12.8
Point 18	200.5	12.8
Point 19	211.7	1.6
Point 20	196.1	3.3
Point 21	196.4	6.1
Point 22	199	6.1
Point 23	310	-5.5
Point 24	178.89701	-5.5
Point 25	211.7	-5.5

Point 26	211.7	-1.5
Point 27	310	-1.5
Point 28	129.5	-41.5
Point 29	191.8	-5.5
Point 30	191.8	-1.5
Point 31	186.83731	-1.5
Point 32	200	-1.5
Point 33	184.0582	-2.9
Point 34	190.60895	0.4
Point 35	188.22686	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.79	(187.131, 4.044)	12.45739	(199.974, 6.1)	(178.506, -5.69712)
2	24265	3.13	(187.131, 4.044)	12.302	(199.95, 6.1)	(178.55, -5.67499)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	178.70135	-5.777272	298.09512	411.84661	0	167.76
2	Optimized	179.31285	-6.027799	313.73019	460.05306	0	170.26
3	Optimized	180.12115	-6.3278475	332.45889	504.57347	0	173.25
4	Optimized	180.90605	-6.5872025	348.64453	556.84414	0	175.83
5	Optimized	181.71345	-6.80636	362.31602	581.41603	0	178.02
6	Optimized	182.5433	-6.98532	373.48306	623.32774	0	179.81
7	Optimized	183.2332	-7.112232	381.39897	638.72167	0	181.08
8	Optimized	183.7832	-7.187096	386.08314	660.66517	0	181.83
9	Optimized	184.3012	-7.257604	390.48132	681.32385	0	182.53
10	Optimized	184.9264	-7.2856755	392.22232	667.44379	0	182.82
11	Optimized	185.69075	-7.275666	391.60749	683.52095	0	182.72
12	Optimized	186.4551	-7.2656565	390.97958	699.5981	0	182.63
13	Optimized	187.1459	-7.256611	390.41001	714.11803	0	182.54
14	Optimized	187.8407	-7.2275235	388.6033	715.54014	0	182.25
15	Optimized	188.5009	-7.1847055	385.924	747.97697	0	181.83
16	Optimized	189.04895	-7.149162	383.70259	774.90698	0	181.48
17	Optimized	189.6445	-7.033626	376.49531	742.75355	0	180.33
18	Optimized	190.28745	-6.838098	364.29414	756.01116	0	178.37

3/1/2013

3/1/2013

19	Optimized	190.8576	-6.664707	353.4793	767.76004	0	176.64
20	Optimized	191.45315	-6.404943	337.26317	725.28071	0	174.05
21	Optimized	192.0962	-6.063552	315.97164	723.8333	0	171.01
22	Optimized	192.6886	-5.749044	296.33524	723.46055	0	168.59
23	Optimized	193.0357	-5.545895	283.66038	655.08272	0	166.97
24	Optimized	193.4213	-5.1984575	261.9879	504.91911	0	825
25	Optimized	194.0907	-4.5953725	224.35177	481.46728	0	825
26	Optimized	194.71295	-3.9960125	186.95381	412.5086	0	825
27	Optimized	195.28805	-3.4003775	149.77804	385.59904	0	825
28	Optimized	195.8378	-2.792941	111.87962	313.09631	0	825
29	Optimized	196.23905	-2.319151	82.316129	400.97068	0	825
30	Optimized	196.38905	-2.141288	71.217493	490.97728	0	825
31	Optimized	196.88055	-1.528088	32.952573	444.93815	0	825
32	Optimized	197.7181	-0.482855	32.269559	350.47629	0	825
33	Optimized	198.43215	0.408595	87.894866	270.14604	0	825
34	Optimized	198.8946	0.9656485	122.65733	273.93101	0	825
35	Optimized	199.4698	1.5730935	160.56372	217.36585	0	825
36	Optimized	199.95695	2.084605	192.48007	-2352.3211	0	825

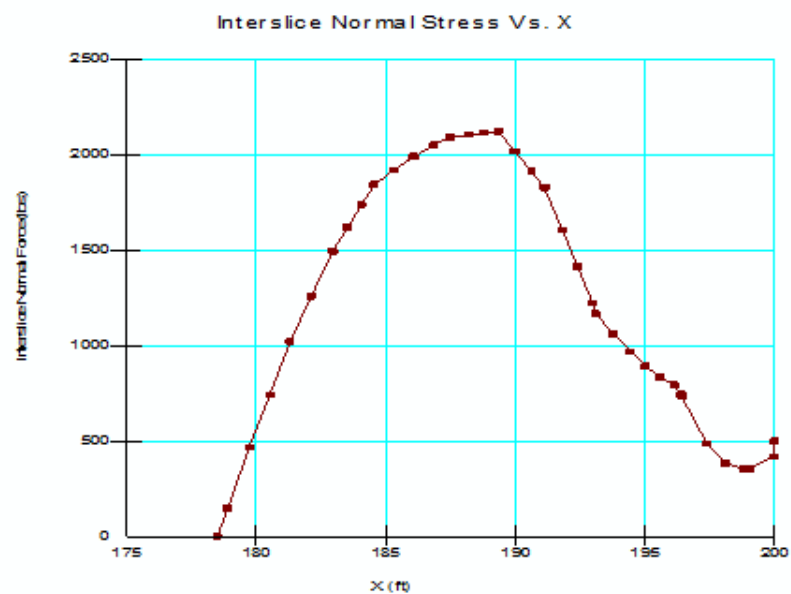
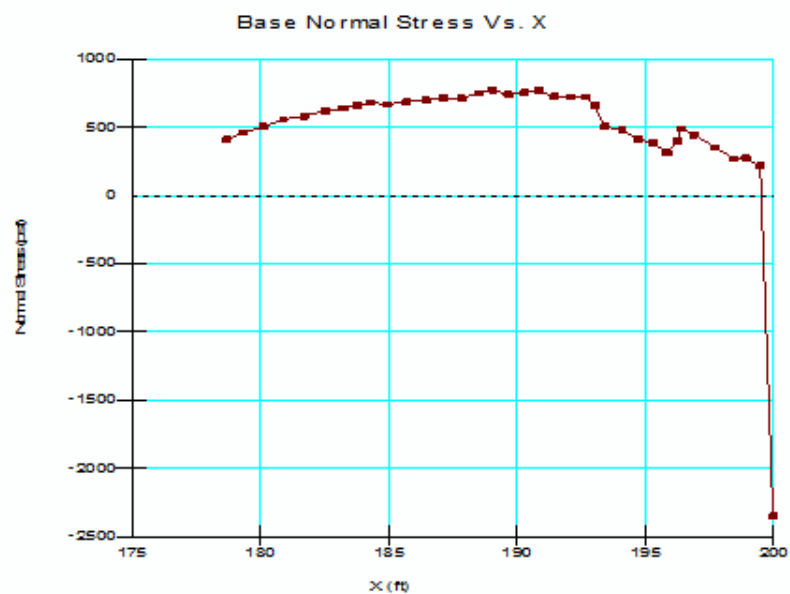
Slices of Slip Surface: 24265

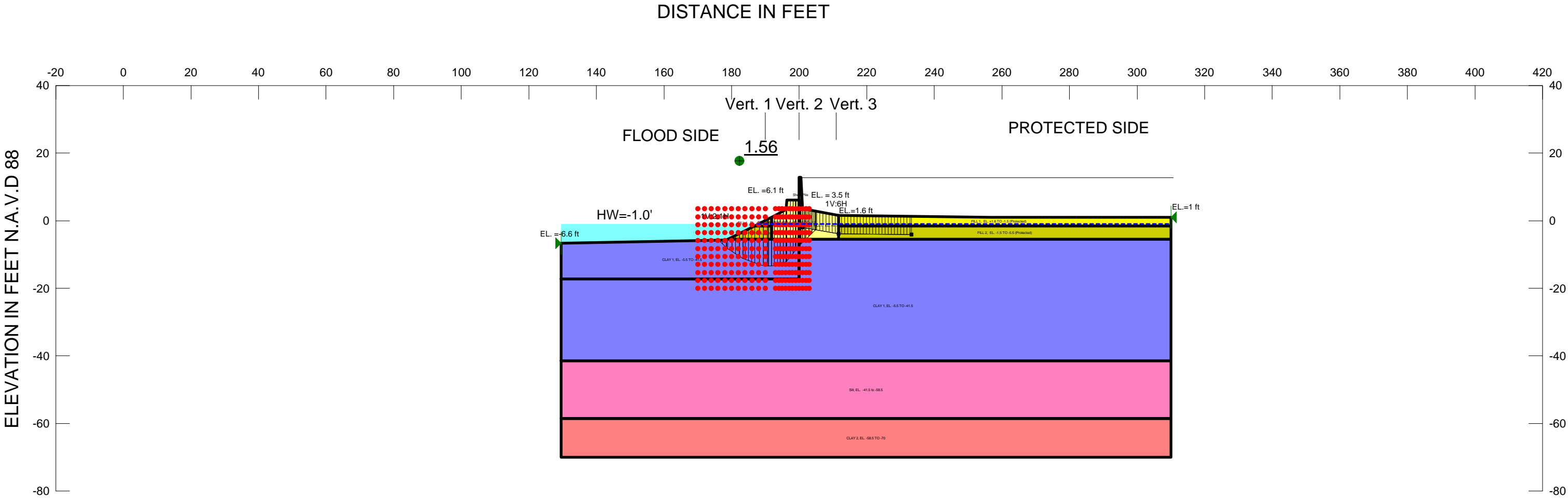
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	24265	178.7233	-5.7559805	296.78406	434.25705	0	167.55
2	24265	179.3061	-6.0277275	313.73322	485.91983	0	170.26
3	24265	180.12425	-6.4092425	337.53849	558.04458	0	174.06
4	24265	180.8858	-6.6	349.44586	504.11838	0	175.96
5	24265	181.5908	-6.6	349.44586	519.56578	0	175.96
6	24265	182.2958	-6.6	349.44586	535.01317	0	175.97
7	24265	183.00075	-6.6	349.44586	550.44638	0	175.97
8	24265	183.7057	-6.6	349.44586	565.89377	0	175.97
9	24265	184.4056	-6.6	349.43561	581.22205	0	175.97
10	24265	185.1004	-6.6	349.43561	596.44994	0	175.98
11	24265	185.79515	-6.6	349.43561	611.66345	0	175.98

12	24265	186.4899	-6.6	349.43561	626.89134	0	175.98
13	24265	187.1847	-6.6	349.43687	642.10716	0	175.98
14	24265	187.8795	-6.6	349.43687	659.09107	0	175.99
15	24265	188.6239	-6.6	349.44524	701.83746	0	175.99
16	24265	189.4179	-6.6	349.44524	747.44027	0	175.99
17	24265	190.2119	-6.6	349.44524	793.04308	0	175.99
18	24265	190.92945	-6.6	349.44232	834.2407	0	176
19	24265	191.525	-6.325	332.27589	620.46688	0	173.25
20	24265	192.075	-5.775	297.96193	596.18098	0	168.09
21	24265	192.725	-5.125	257.39634	444.56282	0	825
22	24265	193.475	-4.375	210.60472	412.95986	0	825
23	24265	194.225	-3.625	163.80367	381.34746	0	825
24	24265	194.975	-2.875	117.00262	349.7445	0	825
25	24265	195.725	-2.125	70.199687	318.14153	0	825
26	24265	196.25	-1.6	37.438944	415.59019	0	825
27	24265	196.725	-1.125	7.8000406	499.39145	0	825
28	24265	197.375	-0.475	32.759174	440.50577	0	825
29	24265	198.025	0.175	73.320447	381.6201	0	825
30	24265	198.675	0.825	113.87683	322.72354	0	825
31	24265	199.475	1.625	163.80313	142.38896	0	825

3/1/2013

3/1/2013





Name: EMBANKMENT FILL1, EL. +6 TO -1.5 Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 825 psf
Name: CLAY 1, EL. -5.5 TO -41.5 Model: Spatial Mohr-Coulomb Unit Weight: 117 pcf Cohesion Spatial Fn: Clay 1 Phi: 0 °
Name: Silt, EL. -41.5 to -58.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 200 psf Phi: 15 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: FILL 1, EL. +1.6 TO -1.5 (Protected) Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 900 psf
Name: FILL 2, EL. -1.5 TO -5.5 (Protected) Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 500 psf
Name: CLAY 2, EL. -58.5 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 118 pcf Cohesion Spatial Fn: Clay 2 Phi: 0 °



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 22, STA. 10+00 TO 11+85
AND STA. 13+55 TO 21+00
FLOOD SIDE STABILITY ANALYSIS,
CASE: FS Global Stability Block Thru S/P Seep/W El -1.0
APRIL 2013

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

FS Global Stability Block Thru S/P Seep/W El -1.0

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File Information

Created By: Liljegren, James
Revision Number: 448
Last Edited By: Schroeder, Danielle MVN
Date: 1/19/2013
Time: 6:00:36 PM
File Name: Reach 22 Q-Case FS el -1.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/19/2013
Last Solved Time: 6:02:28 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Global Stability Block Thru S/P Seep/W El -1.0

Kind: SLOPE/W
Parent: FS Analysis (Seepage) El -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

3/1/2013

FS Global Stability Block Thru S/P Seep/W El -1.0

Cohesion: 500 psf

CLAY 2, EL. -58.5 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion Spatial Fn: Clay 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (129.5, -6.6) ft
Right Coordinate: (310, 1) ft

Slip Surface Block

Left Grid
Upper Left: (170, 3.5) ft
Lower Left: (170, -20) ft
Lower Right: (190, -20) ft
X Increments: 10
Y Increments: 10
Starting Angle: 135 °
Ending Angle: 155 °
Angle Increments: 4
Right Grid
Upper Left: (193, 3.5) ft
Lower Left: (193, -20) ft
Lower Right: (203, -20) ft
X Increments: 10
Y Increments: 10
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4
FullySpecFixedPoints
[1]
flag: Yes
[2]
flag: Yes

Tension Crack Line

X (ft)	Y (ft)
201	-2
211.7	-3.9
233.2	-4.1

3/1/2013

FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL1, EL. +6 TO -1.5

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 825 psf

CLAY 1, EL. -5.5 TO -41.5

Model: Spatial Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion Spatial Fn: Clay 1
Phi: 0 °
Phi-B: 0 °

Silt, EL. -41.5 to -58.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 200 psf
Phi: 15 °
Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

FILL 1, EL. +1.6 TO -1.5 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 900 psf

FILL 2, EL. -1.5 TO -5.5 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 114 pcf

3/1/2013

FS Global Stability Block Thru S/P Seep/W El -1.0

Spatial Functions

Clay 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (191.8, -58.5, 715)
Data Point: (191.8, -70, 855)
Data Point: (200, -58.5, 765)
Data Point: (200, -70, 905)
Data Point: (211.7, -58.5, 715)
Data Point: (211.7, -70, 855)
Data Point: (149.5, -58.5, 715)
Data Point: (149.5, -70, 855)
Data Point: (310, -58.5, 715)
Data Point: (310, -70, 855)

Clay 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (191.8, -5.5, 165)
Data Point: (191.8, -41, 520)
Data Point: (200, -5.5, 175)
Data Point: (200, -41.5, 550)
Data Point: (211.7, -5.5, 165)
Data Point: (211.7, -41.5, 520)
Data Point: (149.5, -5.5, 165)
Data Point: (149.5, -41.5, 520)
Data Point: (310, -5.5, 165)
Data Point: (310, -41.5, 520)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	6,16,17,18,12	6.975
Region 2	FILL 1, EL. +1.6 TO -1.5 (Protected)	19,26,27,2,13	259.25
Region 3	FILL 2, EL. -1.5 TO -5.5 (Protected)	26,25,23,27	393.2
Region 4	Silt, EL. -41.5 to -58.5	28,4,5,3	3068.5
Region 5	FILL 2, EL. -1.5 TO -5.5 (Protected)	31,30,29,24,33	35.73137
Region 6	EMBANKMENT FILL1, EL. +6 TO -1.5	7,32,6,12,19,26,25	95.135
Region 7	CLAY 2, EL. -58.5 TO -70	9,4,5,8	2075.75
Region 8	CLAY 1, EL. -5.5 TO -41.5	28,11,10,7,25,23,3	5673.15
Region 9	CLAY 1, EL. -5.5 TO -41.5	11,14,15,24,29,7,10	792.9603
Region 10	FILL 1, EL. +1.6 TO -1.5 (Protected)	31,35,34,1,30	6.2033695
Region 11	EMBANKMENT FILL1, EL. +6 TO -1.5	29,30,1,20,21,22,16,6,32,7	77.715

3/1/2013

Points

	X (ft)	Y (ft)
Point 1	191.8	1
Point 2	310	1
Point 3	310	-41.5
Point 4	129.5	-58.5
Point 5	310	-58.5
Point 6	200	3.5
Point 7	200	-5.5
Point 8	310	-70
Point 9	129.5	-70
Point 10	200	-17.2
Point 11	129.5	-17.2
Point 12	201	3.5
Point 13	256.7	1
Point 14	129.5	-6.6
Point 15	178.5	-5.7
Point 16	200	6.1
Point 17	200	12.8
Point 18	200.5	12.8
Point 19	211.7	1.6
Point 20	196.1	3.3
Point 21	196.4	6.1
Point 22	199	6.1
Point 23	310	-5.5
Point 24	178.89701	-5.5
Point 25	211.7	-5.5
Point 26	211.7	-1.5
Point 27	310	-1.5
Point 28	129.5	-41.5
Point 29	191.8	-5.5
Point 30	191.8	-1.5
Point 31	186.83731	-1.5
Point 32	200	-1.5
Point 33	184.0582	-2.9
Point 34	190.60895	0.4
Point 35	188.22686	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.56	(190.141, -1.994)	13.6588	(204.923, 2.80333)	(176.158, -5.74301)

3/1/2013

2	23830	1.64	(190.141, -1.994)	13.747	(205.204, 2.75357)	(175.537, -5.75442)
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Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	176.74365	-6.287556	329.94494	491.94383	0	172.84
2	Optimized	177.91455	-7.376644	397.90255	633.98756	0	183.68
3	Optimized	178.5236	-7.943144	433.25138	715.97994	0	189.32
4	Optimized	178.7221	-8.098725	442.9502	714.11777	0	190.87
5	Optimized	179.49425	-8.68865	479.77265	809.59971	0	196.76
6	Optimized	180.64255	-9.4768635	528.95976	910.11267	0	204.62
7	Optimized	181.7446	-10.140689	570.3808	1021.7295	0	211.25
8	Optimized	182.84665	-10.804515	611.80185	1133.2687	0	217.89
9	Optimized	183.72795	-11.26623	640.60989	1170.4569	0	222.51
10	Optimized	184.5214	-11.578075	660.06985	1229.0159	0	225.63
11	Optimized	185.44775	-11.942165	682.79555	1297.3336	0	229.29
12	Optimized	186.3741	-12.30625	705.51119	1365.6514	0	232.94
13	Optimized	187.5321	-12.761355	733.88265	1451.0207	0	237.51
14	Optimized	188.25955	-13.04726	751.75193	1518.8303	0	240.38
15	Optimized	188.8714	-13.14302	757.72569	1507.709	0	241.36
16	Optimized	190.02975	-13.308855	768.07448	1594.4474	0	243.04
17	Optimized	190.74835	-13.41173	774.49994	1648.2711	0	244.09
18	Optimized	191.3439	-13.383485	772.72892	1619.8266	0	243.82
19	Optimized	192.2525	-13.28746	766.74065	1662.2073	0	243.61
20	Optimized	193.15745	-13.19182	760.77358	1705.9438	0	244.11
21	Optimized	194.0249	-12.980295	747.57515	1665.1882	0	243.37
22	Optimized	194.85495	-12.652885	727.14415	1677.7405	0	241.37
23	Optimized	195.685	-12.32547	706.71315	1690.1806	0	239.35
24	Optimized	196.166	-12.13572	694.87175	1762.3482	0	238.16
25	Optimized	196.316	-12.009805	687.02872	1719.1045	0	237.11
26	Optimized	196.9282	-11.281745	641.60946	1727.5694	0	230.59
27	Optimized	197.82785	-10.158508	571.49066	1580.7464	0	220.37

3/1/2013

28	Optimized	198.5708	-9.1684025	509.70527	1479.1979	0	211.21
29	Optimized	198.97115	-8.6390665	476.67485	1452.8158	0	206.28
30	Optimized	199.5	-8.0110305	437.48937	1387.4646	0	200.48
31	Optimized	200.0163	-7.397904	399.23288	1044.8476	0	194.75
32	Optimized	200.2663	-7.145532	383.47539	1050.5004	0	191.89
33	Optimized	200.75	-6.663269	353.39362	999.47852	0	186.43
34	Optimized	201.2698	-6.145017	321.05215	939.46667	0	180.59
35	Optimized	201.73775	-5.688015	292.53034	889.69056	0	175.46
36	Optimized	202.3996	-5.059965	253.34355	450.99251	0	825
37	Optimized	203.32705	-4.179895	198.42325	337.30388	0	825
38	Optimized	204.25455	-3.299825	143.51077	223.60744	0	825
39	Optimized	204.8208	-2.7782295	110.9614	12.866423	0	825

Slices of Slip Surface: **23830**

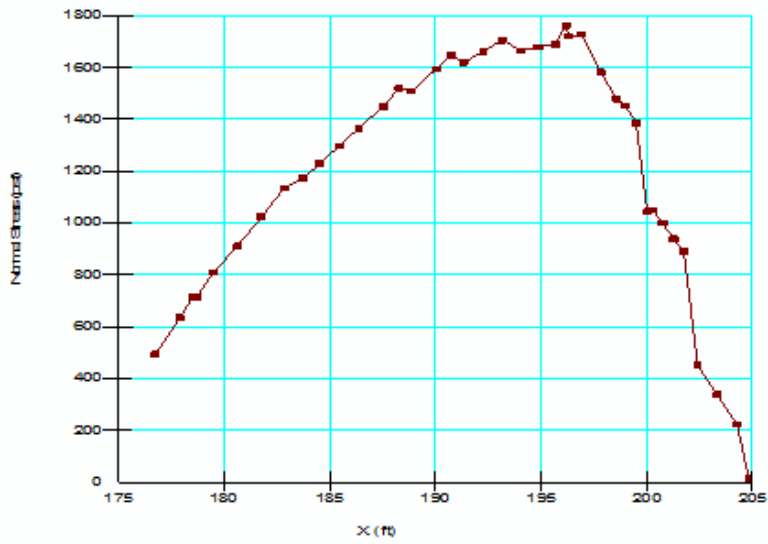
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	23830	176.03075	-6.039549	314.46761	408.61939	0	170.37
2	23830	177.01845	-6.6097985	350.04853	480.71064	0	176.04
3	23830	178.00615	-7.1800475	385.63822	552.80189	0	181.72
4	23830	178.6985	-7.579779	410.57728	616.36764	0	185.71
5	23830	179.4131	-7.9923675	436.32742	686.63659	0	189.82
6	23830	180.44535	-8.5883305	473.51094	787.69991	0	195.77
7	23830	181.4776	-9.1842935	510.70285	888.72967	0	201.72
8	23830	182.50985	-9.7802575	547.88636	989.82655	0	207.67
9	23830	183.5421	-10.37622	585.07827	1090.9234	0	213.63
10	23830	184.5214	-10.94162	620.35375	1186.8035	0	219.28
11	23830	185.44775	-11.47646	653.72822	1277.4849	0	224.64
12	23830	186.3741	-12.0113	687.10268	1368.1662	0	230
13	23830	187.41865	-12.61436	724.73537	1470.4754	0	236.04
14	23830	188.11345	-12.95	745.65812	1408.6661	0	239.41
15	23830	188.8224	-12.95	745.68131	1449.3995	0	239.43
16	23830	190.0134	-12.95	745.68131	1517.7428	0	239.46
17	23830	191.20445	-12.95	745.67818	1586.1635	0	239.49
18	23830	192.33335	-12.95	745.67789	1652.9057	0	240.35
19	23830	193.4	-12.95	745.67789	1717.9682	0	242.06

3/1/2013

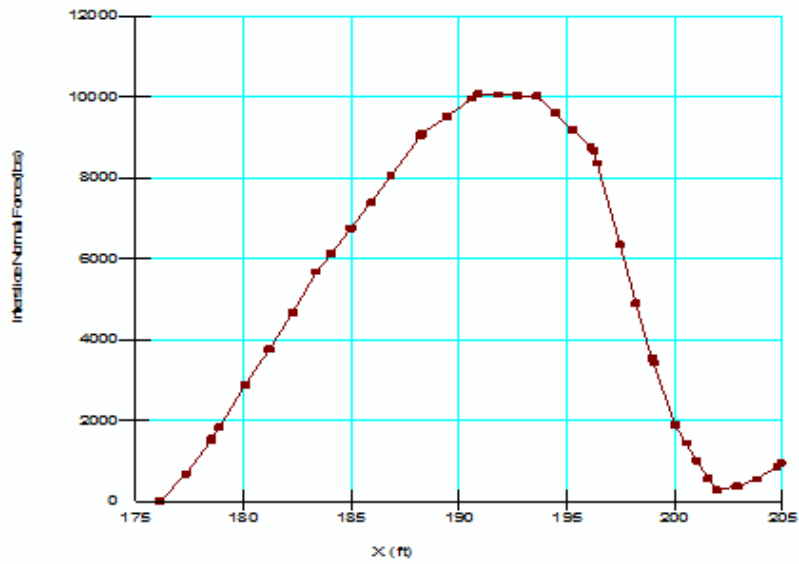
20	23830	194.46665	-12.95	745.67789	1783.1244	0	243.77
21	23830	195.55	-12.4	711.34938	1556.2777	0	239.9
22	23830	196.25	-11.7	667.67374	1665.2363	0	233.84
23	23830	196.83335	-11.116665	631.28033	1754.8211	0	228.75
24	23830	197.7	-10.249999	577.20299	1662.6253	0	221.12
25	23830	198.56665	-9.3833335	523.11749	1570.5926	0	213.42
26	23830	199.5	-8.45	464.88014	1471.418	0	205.05
27	23830	200.25	-7.7	418.08394	1111.5294	0	197.68
28	23830	200.75	-7.2	386.88639	1058.6378	0	192.01
29	23830	201.725	-6.225	326.03957	941.91484	0	181.02
30	23830	202.90895	-5.0410715	252.16364	436.29425	0	825
31	23830	203.8268	-4.1232145	194.88524	319.2722	0	825
32	23830	204.74465	-3.2053575	137.61454	150.56477	0	825

3/1/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X



Global Stability through(Block)

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File Information

Created By: Liljegren, James
Revision Number: 202
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 9:38:38 AM
File Name: Reach 26B - filled.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0441021\
Last Solved Date: 6/24/2013
Last Solved Time: 9:53:43 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability through(Block)

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL., 0.5 TO -4 (Protected Side)

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: Spatial Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 500 psf
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -11 (protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion Fn: Bay Sound (Protected)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (100, -8.4) ft
Right Coordinate: (310, 1.8) ft

Slip Surface Block

Left Grid
Upper Left: (125, -1) ft

FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: Undrained (Phi=0)
Unit Weight: 110 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -2.5 TO -11

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: MARSH
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -11 TO -42

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -44 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound
Cohesion Spatial Fn: Bay Sound
Phi: 0 °

Lower Left: (125, -46) ft
Lower Right: (175, -46) ft
X Increments: 10
Y Increments: 9
Starting Angle: 135 °
Ending Angle: 155 °
Angle Increments: 4

Right Grid
Upper Left: (185, -1) ft
Lower Left: (185, -46) ft
Lower Right: (215, -46) ft
X Increments: 6
Y Increments: 9
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	-1
310	-1

Tension Crack Line

X (ft)	Y (ft)
201	-3
206.3	-3
212.9	-3
221.3	-3

Cohesion Functions

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-11, 295)
Data Point: (-4, 235)

Bay Sound (Protected)
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: Y (ft), Cohesion (psf)
Data Point: (-70, 785)
Data Point: (-42, 500)

Shear/Normal Strength Functions

Beach Sand
Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Bay Sound
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109
Data Points: X (ft), Unit Weight (pcf)
Data Point: (184.4, 109)

Data Point: (200, 110)
Data Point: (229.1, 109)

Spatial Functions

Bay Sound
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -42, 500)
Data Point: (184.4, -70, 785)
Data Point: (200, -44, 640)
Data Point: (200, -70, 910)
Data Point: (229.1, -42, 500)
Data Point: (229.1, -70, 785)

MARSH
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -4, 235)
Data Point: (184.4, -11, 295)
Data Point: (229.1, -4, 235)
Data Point: (229.1, -11, 295)
Data Point: (200, -2.5, 237)
Data Point: (200, -11, 313)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND SP, EL. -11 TO -42	20,24,14,17,1,2,41	1027.08
Region 2	BEACH SAND SP, EL. -11 TO -42	17,14,24,38,8,10,16,11,42,9	5729.7
Region 3	MARSH, EL. -4 TO -11 (protected)	15,7,8,38	566.3
Region 4	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	25,30,4,31,12,23,27	9.23
Region 5	Fill, EL., 0.5 TO -4 (Protected Side)	15,35,6,7	469.22
Region 6	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	25,27,23,13,40,39,29	52.06
Region 7	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	23,26,5,34,35,15,13	151.06
Region 8	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	23,12,32,22,33,26	17.1
Region 9		12,36,37,22,32	7.1
Region 10	MARSH, MH, EL. -2.5 TO -11	13,40,39,41,20,24,45	132.6
Region	MARSH, MH, EL. -2.5 TO -11	13,15,38,24,45	225.525

11			
Region 12	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	9,18,43,42	2363.2
Region 13	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	16,44,19,10	2265.2
Region 14	BAY SOUND CLAY CL, EL. -44 TO -70	42,43,44,16,11	1206.9
Region 15	MARSH, EL. -4 TO -11 (protected)	2,3,28,39,41	62.36

Point 25	192.3	2
Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	199	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	1.9
Point 35	229.1	1.8
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8

Points

	X (ft)	Y (ft)
Point 1	100	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	1.9
Point 6	310	1.8
Point 7	310	-4
Point 8	310	-11
Point 9	100	-42
Point 10	310	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42
Point 17	100	-19.2
Point 18	100	-70
Point 19	310	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.49	(183.506, -1.674)	17.20692	(203.038, 3.88676)	(163.44, -8.30643)
2	5572	1.63	(183.506, -1.674)	16.795	(203.856, 3.84131)	(164.221, -8.30528)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimiz	164.0859	-	461.22023	478.21058	9.8093794	-1.1236e-

		ed		8.39133 25				007
2	Optimiz ed	165.3767	8.56113 75	471.81231	500.86181	16.771733	-1.9202e- 007	
3	Optimiz ed	166.91105	8.76914 45	484.79662	529.40642	25.755481	-2.9488e- 007	
4	Optimiz ed	168.72145	9.01985 45	500.44154	593.06096	53.473845	3.5517e- 006	
5	Optimiz ed	170.4072	9.26355 15	515.64322	643.11489	73.595804	2.0257e- 006	
6	Optimiz ed	171.93575	9.49573 4	530.13158	688.19697	91.259096	-4.847e- 007	
7	Optimiz ed	172.774	9.62306 25	538.07635	712.82905	100.89352	-5.3599e- 007	
8	Optimiz ed	173.58855	9.74174 5	545.48625	734.6515	109.2146	-5.8017e- 007	
9	Optimiz ed	175.06965	9.95663 5	558.8964	776.81294	125.81417	3.4627e- 006	
10	Optimiz ed	176.42515	10.1582 45	571.4761	818.15106	142.41785	-1.0108e- 005	
11	Optimiz ed	177.6551	10.3465 75	583.22597	854.55798	156.6536	-8.3216e- 007	
12	Optimiz ed	178.88505	10.5349 1	594.97585	891.04526	170.93576	-1.2133e- 005	
13	Optimiz ed	180.02215	10.7090 3	605.83917	944.55782	195.55931	-1.0387e- 006	
14	Optimiz	181.18585	-	613.01659	951.66871	195.52089	-1.0384e-	

		ed		10.8239 75				006
15	Optimiz ed	182.46895	10.8939 65	617.38233	985.75415	212.67957	-1.1293e- 006	
16	Optimiz ed	183.75525	10.9641 35	621.76378	1019.8701	229.84678	-1.2205e- 006	
17	Optimiz ed	184.78995	11.0205 8	625.28046	1030.8422	234.15117	-1.2434e- 006	
18	Optimiz ed	186.1595	11.0286 65	625.81084	1042.3716	240.50147	-1.7066e- 005	
19	Optimiz ed	187.71395	11.0077 4	624.48035	1100.2592	274.69103	1.6575e- 005	
20	Optimiz ed	188.4444	10.9979 05	623.87907	1145.4386	0	299.65	
21	Optimiz ed	188.66095	10.9949 9	623.68492	1158.4981	0	299.87	
22	Optimiz ed	189.31825	-10.8196	612.74281	1080.0328	0	299.1	
23	Optimiz ed	190.51095	10.4704 55	590.9603	1120.347	0	297.43	
24	Optimiz ed	191.70365	10.1213 1	569.16974	1160.6611	0	295.73	
25	Optimiz ed	192.3005	9.94658 95	558.26745	1180.9305	0	294.87	
26	Optimiz ed	193.0005	9.54291 35	533.07609	1099.0174	0	292.11	
27	Optimiz ed	194.22115	- 8.83872	489.13834	1093.7699	0	287.27	

			75					
28	Optimiz ed	195.2635	8.23740 9	451.61012	1047.2335	0	283.1	
29	Optimiz ed	195.89235	7.86457 15	428.36829	988.67278	0	280.49	
30	Optimiz ed	196.75	7.28952 35	392.46608	942.3217	0	276.32	
31	Optimiz ed	198.25	6.28378 5	329.70739	860.81402	0	268.98	
32	Optimiz ed	199.1101	5.70709 8	293.72291	813.38013	0	264.74	
33	Optimiz ed	199.6101	5.35388 8	271.68523	768.89921	0	262.11	
34	Optimiz ed	200.25	4.89535 45	243.07654	727.81524	0	258.28	
35	Optimiz ed	200.75	4.53707 2	220.70673	695.98379	0	254.8	
36	Optimiz ed	201.5843	3.93924 55	183.40551	689.0975	0	249.01	
37	Optimiz ed	202.60345	-3.26028	141.04364	407.41446	0	242.4	

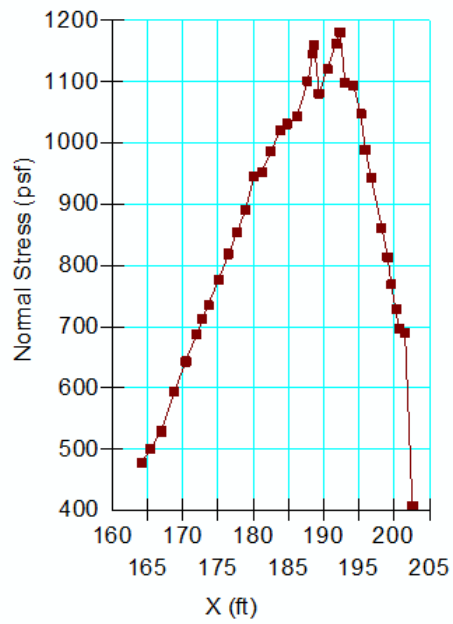
			9.139701					007
3	5572	167.20355	9.695982 5	542.63018	709.97376	96.615859	2.662e-006	
4	5572	168.35	10.23059 1	575.99142	821.37831	141.67419	-7.5335e- 007	
5	5572	169.45	- 10.74353	607.99231	911.25107	175.08652	-9.3089e- 007	
6	5572	170.675	-11	624	836	122.39826	-6.4983e- 007	
7	5572	172.025	-11	624	847.18519	128.85603	-6.843e-007	
8	5572	173.38	-11	624	858.45588	135.36317	-7.1875e- 007	
9	5572	174.74	-11	624	869.77941	141.90081	-7.5338e- 007	
10	5572	176.1	-11	624	881.02941	148.396	-7.8801e- 007	
11	5572	177.46	-11	624	892.35294	154.93364	-8.2263e- 007	
12	5572	178.82	-11	624	903.67647	161.47129	-8.5726e- 007	
13	5572	180.1125	-11	624	932.32653	178.01241	-9.4518e- 007	
14	5572	181.3375	-11	624	955.5102	191.39751	-1.3581e- 005	
15	5572	182.5625	-11	624	978.69388	204.78261	-1.0875e- 006	
16	5572	183.7875	-11	624	1001.9592	218.21484	-1.5483e- 005	
17	5572	185.0848	-11	624.00105	1018.7906	0	295.79	
18	5572	186.45435	-11	624.00105	1050.9176	0	297.37	
19	5572	187.86955	-11	623.99803	1111.0503	0	299	
20	5572	189.3	-11	624	1201	0	300.65	
21	5572	190.575	- 10.66802 5	603.28818	1055.9482	0	299.23	
22	5572	191.725	-	561.85453	1063.4036	0	294.72	

Slices of Slip Surface: 5572

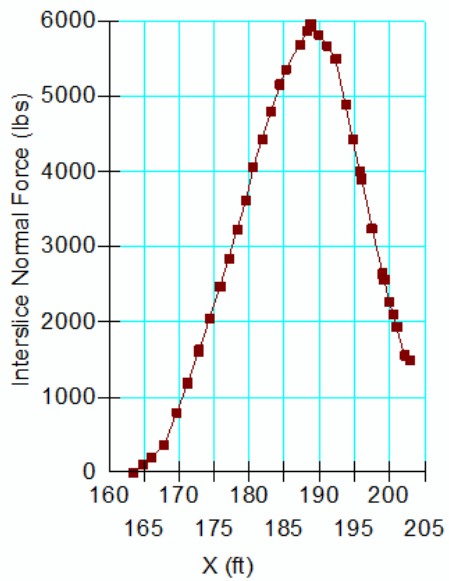
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	5572	164.81765	8.583419 5	473.20695	541.10314	39.199888	2.6082e- 006
2	5572	166.0106	-	507.91856	625.53845	67.907874	-3.6115e-

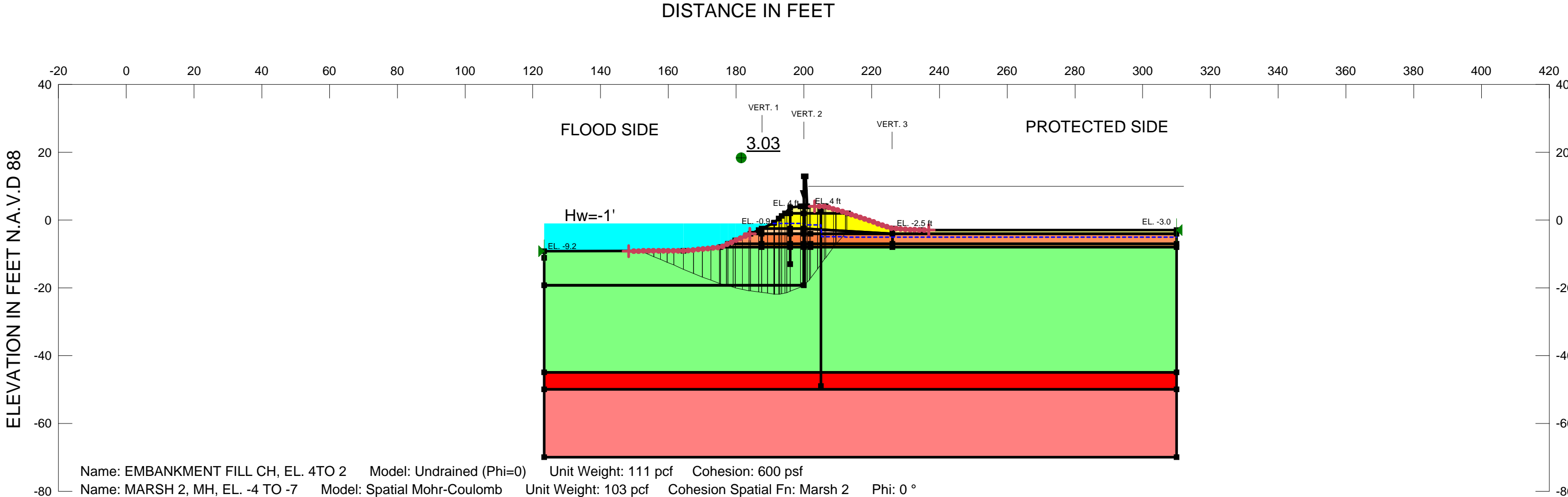
			10.00407 2				
23	5572	193	- 9.267949	515.92218	1085.1915	0	289.69
24	5572	194.275	- 8.531827 5	469.98809	1077.3353	0	284.62
25	5572	195.425	- 7.867874 5	428.55443	1025.5244	0	280.01
26	5572	196.75	- 7.102885 5	380.8202	964.23258	0	274.66
27	5572	198.25	- 6.236860 5	326.78022	893.56491	0	268.56
28	5572	199.5	- 5.515172 5	281.74393	831.28879	0	263.44
29	5572	200.25	- 5.082159 5	254.7327	791.0622	0	259.95
30	5572	200.75	- 4.793484 5	236.71937	764.47522	0	257.09
31	5572	201.7141	- 4.236860 5	201.97714	759.96864	0	251.59
32	5572	203.1423	- 3.412287	150.5263	539.69113	0	243.47

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. 4 TO 2 Model: Undrained (Phi=0) Unit Weight: 111 pcf Cohesion: 600 psf

Name: MARSH 2, MH, EL. -4 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

Name: BEACH SAND SP, EL. -14 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Beach Sand

Name: Fill (Protected), EL., -2.5 TO -4 Model: Undrained (Phi=0) Unit Weight: 105 pcf Cohesion: 400 psf

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, El, -7 to -8 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Fn: Marsh (protected) Phi: 0 °

Name: EMBANKMENT FILL CH, EL. 2 TO -2.5 Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion Fn: Fill 2 Phi: 0 °

Name: Marsh1, El., -2.5 TO -4 Model: Undrained (Phi=0) Unit Weight: 103 pcf Cohesion: 315 psf

Name: BAY SOUND CLAY 1, EL. -45 to -50 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound 1 Cohesion Spatial Fn: Bay Sound Phi: 0 °

Name: BAY SOUND CLAY 2, EL. -50 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound 2 Cohesion Spatial Fn: Bay Sound Phi: 0 °

Name: MARSH 1 , El, -4 to -7 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Marsh (protected) Phi: 0 °

Name: MARSH 2, EL. -7 TO -8 Model: Spatial Mohr-Coulomb Weight Fn: Marsh2 Cohesion Spatial Fn: Marsh 2 Phi: 0 °



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
CASE: FS Entry/Exit Around -1.0
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Entry/Exit Around -1.0

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File Information

Created By: Lijjegren, James
Revision Number: 425
Last Edited By: Johnson, Jehu B MVN
Date: 2/6/2013
Time: 12:50:19 PM
File Name: Reach 27 rapid drawdown -1.0.gsz
Directory: G:\F&MH\HOME\London Ave Reeevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/6/2013
Last Solved Time: 1:45:20 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Entry/Exit Around -1.0

Kind: SLOPE/W
Parent: FS Analysis (Seepage) -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

3/1/2013

Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

Marsh1, EL., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf

BAY SOUND CLAY 1, EL. -45 to -50

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 1 , El, -4 to -7 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -7 TO -8

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (148.3, -9.13932) ft
Left-Zone Right Coordinate: (184.019, -4.1) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (203.2, 4) ft
Right-Zone Right Coordinate: (236.9, -3) ft
Right-Zone Increment: 25
Radius Increments: 25

3/1/2013

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf

MARSH 2, MH, EL. -4 TO -7

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

Fill (Protected), EL., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

MARSH 2, El, -7 to -8 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL CH, EL. 2 TO -2.5

3/1/2013

Slip Surface Limits

Left Coordinate: (123.3, -9.2) ft
Right Coordinate: (310, -3) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 4) ft
Inside Point: (200, -19.3) ft
Slip Surface Intersection: (200, -19.3) ft
Total Length: 23.3 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs
Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Cohesion Functions

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

3/1/2013

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL., -2.5 TO -4	5,26,16,20,27,50,4,56	21.149997
Region 2	Marsh1, EL., -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,18,23,1,24,2,25,51	809.5
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,17,14,22,11,13,12	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6	Sheet Pile	15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876

3/1/2013

3/1/2013

Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,57,58,46,5,26,16,38,39	38.211002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, EL. -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3734
Region 16	MARSH 1, EL. -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1, EL. -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, EL. -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	123.3	-45
Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	123.3	-19.2
Point 24	123.3	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8

Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3
Point 44	123.3	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	123.3	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4
Point 54	205	3
Point 55	205	-49
Point 56	186.67467	-2.9
Point 57	192.52381	0.4
Point 58	191.20952	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.03	(185.894, 5.208)	27.90425	(212.72, 2.08483)	(151.811, -9.1308)
2	6316	3.47	(185.894, 5.208)	28.3	(212.904, 2.02921)	(161.482, -9.10733)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	152.7907	-9.541665	533.00834	581.68189	28.101688	-3.2152e-007
2	Optimized	154.7497	-10.363401	584.27091	691.40921	61.856327	-3.2836e-007

3/1/2013

3/1/2013

3	Optimized	156.7087	-11.185135	635.53348	801.13653	95.610966	-5.0756e-007
4	Optimized	158.6677	-12.00687	686.84312	910.91093	129.3656	-9.1773e-006
5	Optimized	160.6267	-12.828605	738.1057	1020.6382	163.12024	-8.6595e-007
6	Optimized	163.0531	-13.874605	803.35886	1163.9195	208.16979	-1.105e-006
7	Optimized	165.95745	-15.14951	882.9242	1349.1868	269.19686	-1.9097e-005
8	Optimized	168.73815	-16.30504	955.04356	1510.0018	320.40528	-6.4792e-005
9	Optimized	171.32115	-17.284445	1016.1517	1650.9252	366.48667	-7.4108e-005
10	Optimized	173.84065	-18.21173	1073.9972	1790.0822	413.43189	-8.3597e-005
11	Optimized	175.2502	-18.71854	1105.6401	1840.5524	424.3018	-3.0102e-005
12	Optimized	176.28215	-19.01597	1124.1713	1908.6568	452.92288	-3.213e-005
13	Optimized	177.38715	-19.33446	1144.0568	1968.878	476.21075	-9.6296e-005
14	Optimized	178.37225	-19.618395	1161.8064	2024.8572	498.28261	-3.5351e-005
15	Optimized	179.47725	-19.91116	1180.0427	2057.6948	506.71265	-0.00010247
16	Optimized	180.81595	-20.19653	1197.8382	2120.6195	532.76801	-3.2138e-005
17	Optimized	182.80785	-20.621145	1224.3521	2214.1055	571.43437	-0.00011555
18	Optimized	184.0219	-20.86299	1239.4335	2238.1096	576.58594	-3.4783e-005
19	Optimized	185.45735	-21.05741	1251.5767	2289.0218	598.96923	-3.9767e-005
20	Optimized	187.11735	-21.28225	1265.5945	2347.7355	624.77438	-1.0391e-005
21	Optimized	188.445	-21.46208	1276.8159	2391.9443	643.81969	-1.0708e-005
22	Optimized	190.215	-21.70182	1291.7641	2461.8708	675.56138	-4.4851e-005
23	Optimized	191.15475	-21.829105	1299.6743	2510.4958	699.06816	-4.6408e-005
24	Optimized	191.2656	-21.84412	1300.6625	2524.2285	706.42613	-1.1749e-005
25	Optimized	191.92275	-21.83901	1300.3712	2522.5621	705.63224	-1.1736e-005
26	Optimized	192.71165	-21.822325	1299.2968	2601.4947	751.82427	-4.9915e-005
27	Optimized	193.14975	-21.768205	1295.9148	2559.5077	729.53567	-1.2134e-005
28	Optimized	193.92	-21.61387	1286.2612	2608.6317	763.47094	-1.2698e-005
29	Optimized	194.68165	-21.46126	1276.7605	2661.6168	799.54717	-1.3298e-005
30	Optimized	195.46165	-21.193655	1260.0998	2627.5519	789.49884	-5.2419e-005
31	Optimized	197.5	-20.36377	1208.2644	2607.3837	807.78192	-1.3435e-005
32	Optimized	199.4609	-19.56542	1158.4668	2531.3454	792.63184	-5.2627e-005
33	Optimized	199.9609	-19.339005	1144.3543	2291.7963	662.47594	-4.3988e-005
34	Optimized	200.25	-19.052335	1126.4412	2262.1703	655.71349	-1.0907e-005
35	Optimized	200.75	-18.55653	1095.496	2209.3404	643.07839	-4.2699e-005

3/1/2013

36	Optimized	201.30715	-18.004035	1061.0156	2150.4417	628.98047	-4.1766e-005
37	Optimized	201.80715	-17.432995	1025.3875	1984.1894	553.56455	-0.00011196
38	Optimized	203.0011	-15.783305	922.4337	1817.3417	516.67536	-0.0001045
39	Optimized	205.00325	-13.016815	747.11829	1537.165	456.13367	-9.2256e-005
40	Optimized	206.20215	-11.37082	397.61205	1336.8308	542.25822	-0.00010967
41	Optimized	207.5701	-9.554035	284.25046	1122.7366	484.10021	-9.7913e-005
42	Optimized	209.05555	-7.581175	161.424	943.8621	0	280.61
43	Optimized	209.44355	-7.081175	130.60076	919.40106	0	275.38
44	Optimized	210.8586	-5.5	32.750172	732.00423	0	258.76
45	Optimized	212.46055	-3.709995	-78.542012	363.61044	0	315

Slices of Slip Surface: 6316

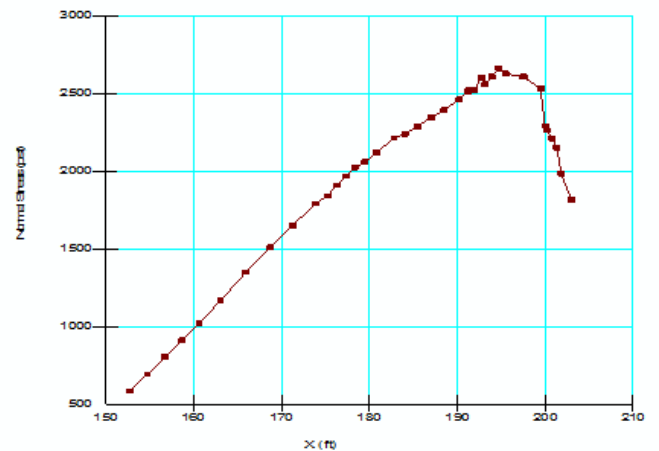
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	6316	162.2362	-10.261398	577.89886	772.76794	112.50771	3.0942e-006
2	6316	163.7454	-12.3665	709.24848	1067.2705	206.7041	-1.0972e-006
3	6316	165.39735	-14.26221	827.55313	1323.3943	286.27401	1.7269e-005
4	6316	167.19205	-15.99829	935.88	1548.4332	353.65776	-7.1513e-005
5	6316	168.9867	-17.45904	1027.0338	1731.1516	406.52259	-2.8841e-005
6	6316	170.78135	-18.695735	1104.224	1881.5043	448.76298	-3.1838e-005
7	6316	172.60905	-19.758135	1170.4852	2007.3323	483.15389	-3.4278e-005
8	6316	174.4697	-20.664005	1227.0086	2111.8787	510.87996	-0.00010331
9	6316	176.505	-21.46382	1276.941	2223.7417	546.63562	-0.00011055
10	6316	178.715	-22.142875	1319.2885	2322.4974	579.20295	-9.6334e-006
11	6316	180.55665	-22.57446	1346.2163	2389.6222	602.41069	3.9997e-005
12	6316	182.03	-22.817565	1361.4178	2430.1524	617.03416	4.0969e-005
13	6316	183.50335	-22.981625	1371.614	2460.5325	628.68741	4.1739e-005
14	6316	185.45735	-23.06292	1376.6956	2482.2985	638.32015	-1.0617e-005
15	6316	187.11735	-23.06258	1376.7293	2491.4287	643.57199	-1.0705e-005
16	6316	188.445	-22.9633	1370.4951	2483.9625	642.86073	-1.0693e-005
17	6316	190.215	-22.746375	1356.937	2473.7314	644.78155	-1.0724e-005
18	6316	191.15475	-22.59922	1347.8063	2474.7314	650.6305	4.32e-005
19	6316	191.86665	-22.44694	1338.2508	2517.4198	680.79353	-1.1324e-005

3/1/2013

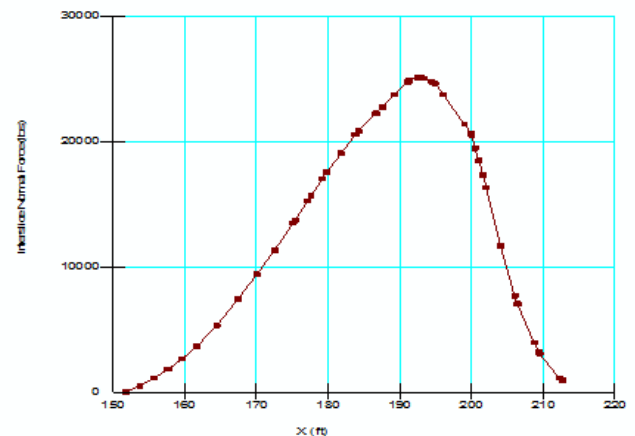
20	6316	192.9619	-22.192015	1322.3999	2579.2655	725.65171	-1.207e-005
21	6316	193.92	-21.9252	1305.7113	2618.8911	758.16473	5.0337e-005
22	6316	195.22	-21.499015	1279.1285	2680.0212	808.80575	5.3702e-005
23	6316	196.75	-20.914965	1242.6987	2682.8896	831.4946	5.5209e-005
24	6316	198.25	-20.239125	1200.4992	2594.9446	805.08341	-1.3391e-005
25	6316	199.5	-19.60074	1160.7007	2507.7202	777.70208	-1.2936e-005
26	6316	200.25	-19.179355	1134.3679	2447.2604	757.99887	-1.2608e-005
27	6316	200.75	-18.877995	1115.551	2403.7439	743.73852	4.9381e-005
28	6316	201.5	-18.39318	1085.291	2334.9062	721.4657	-1.1999e-005
29	6316	202.73335	-17.519205	1030.7398	2213.5568	682.89973	-1.1358e-005
30	6316	204.2	-16.35323	958.00864	2055.1032	633.40782	4.2054e-005
31	6316	205.66665	-15.013545	624.922	1845.9549	704.9637	-1.1725e-005
32	6316	207.1539	-13.43685	526.51073	1616.7028	629.42269	4.1788e-005
33	6316	208.66165	-11.55316	409.0023	1334.5066	534.34018	-0.00010805
34	6316	210.1694	-9.26455	266.17643	1011.6022	430.37178	-8.7021e-005
35	6316	211.17465	-7.5	156.35778	822.57592	0	278.58
36	6316	212.0403	-5.5	32.497127	580.22873	0	258.08
37	6316	212.7791	-3.6207935	84.190942	116.40864	0	315

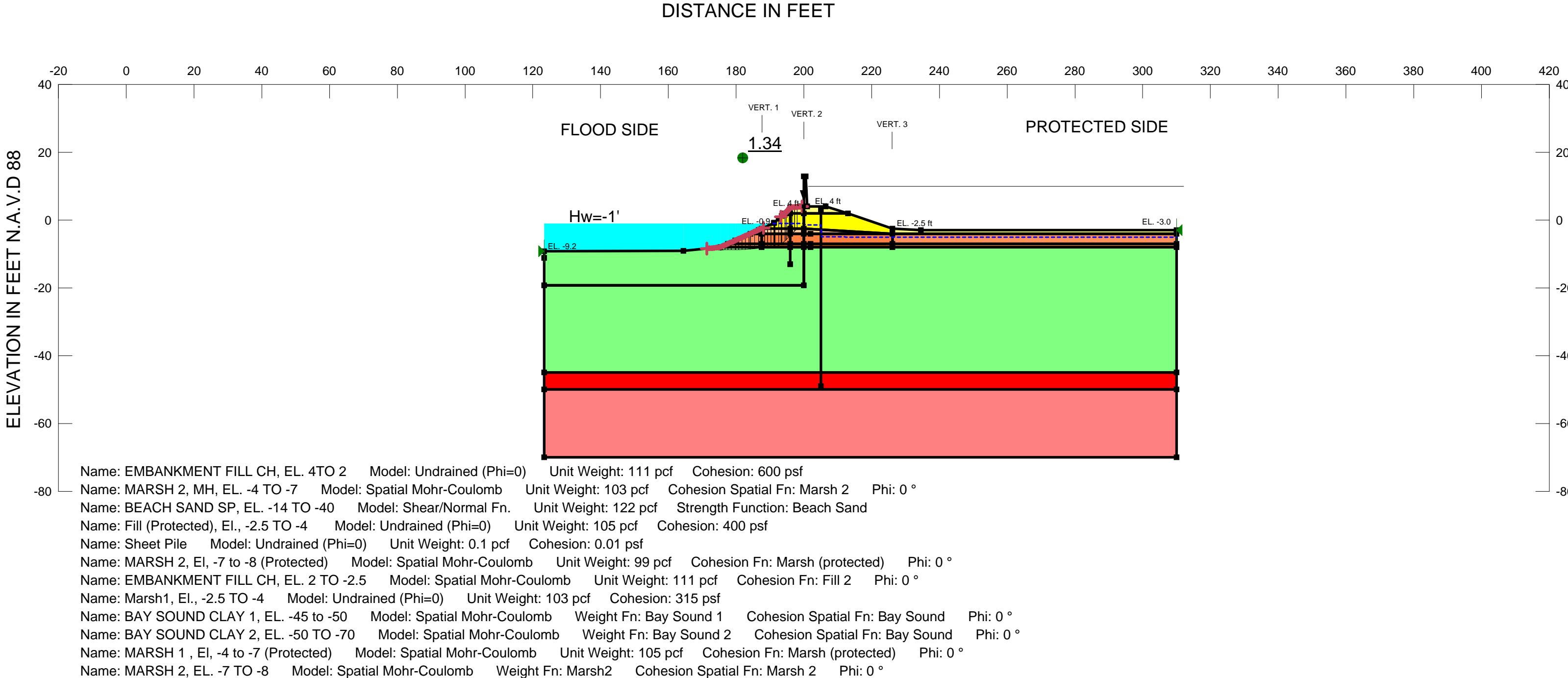
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Base Normal Stress Vs. X



Interslice Normal Stress Vs. X





**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
CASE: FS Entry/Exit In Front -1.0
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Entry/Exit In Front -1.0

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File Information

Created By: Lijegren, James
Revision Number: 425
Last Edited By: Johnson, Jehu B MVN
Date: 2/6/2013
Time: 12:50:19 PM
File Name: Reach 27 rapid drawdown -1.0.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/6/2013
Last Solved Time: 1:59:58 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Entry/Exit In Front -1.0

Kind: SLOPE/W
Parent: FS Analysis (Seepage) -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

3/1/2013

FS Entry/Exit In Front -1.0

Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

Marsh1, EL., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf

BAY SOUND CLAY 1, EL. -45 to -50

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 1 , El, -4 to -7 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -7 TO -8

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (171.4, -8.40367) ft
Left-Zone Right Coordinate: (188.1, -2.25593) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (193.18095, 1) ft
Right-Zone Right Coordinate: (199.5, 4) ft
Right-Zone Increment: 25
Radius Increments: 25

3/1/2013

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf

MARSH 2, MH, EL. -4 TO -7

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

Fill (Protected), EL., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

MARSH 2, El, -7 to -8 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL CH, EL. 2 TO -2.5

3/1/2013

FS Entry/Exit In Front -1.0

Slip Surface Limits

Left Coordinate: (123.3, -9.2) ft
Right Coordinate: (310, -3) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 4) ft
Inside Point: (200, -19.3) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 23.3 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs
Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Cohesion Functions

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

3/1/2013

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL., -2.5 TO -4	5,26,16,20,27,50,4,56	21.149997
Region 2	Marsh1, EL., -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,18,23,1,24,2,25,51	809.5
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,17,14,22,11,13,12	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6	Sheet Pile	15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876

3/1/2013

3/1/2013

Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,57,58,46,5,26,16,38,39	38.211002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, EL. -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3734
Region 16	MARSH 1, EL. -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1, EL. -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, EL. -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	123.3	-45
Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	123.3	-19.2
Point 24	123.3	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8

3/1/2013

Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3
Point 44	123.3	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	123.3	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4
Point 54	205	3
Point 55	205	-49
Point 56	186.67467	-2.9
Point 57	192.52381	0.4
Point 58	191.20952	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.34	(183.43, 6.389)	12.28235	(197.985, 3.89854)	(171.478, -8.39578)
2	4729	1.71	(183.43, 6.389)	16.246	(198.343, 3.9343)	(175.664, -7.88052)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	171.968	-8.4469445	464.69264	498.96917	19.789562	-7.4107e-007
2	Optimized	172.9476	-8.549283	471.07888	519.83358	28.148542	-1.0539e-

3/1/2013

						006
3	Optimized	173.9272	-8.6516215	477.46511	540.69799	36.507521
4	Optimized	174.9068	-8.7539605	483.8412	561.56241	44.872363
5	Optimized	175.3983	-8.8051235	487.02888	551.33106	37.124878
6	Optimized	176.04915	-8.8025785	486.87889	601.03675	65.909068
7	Optimized	177.15415	-8.7957485	486.45456	615.52355	74.51802
8	Optimized	178.0847	-8.7869885	485.9007	629.74761	83.050054
9	Optimized	179.1897	-8.765314	484.54524	642.46293	91.173821
10	Optimized	179.8293	-8.747854	483.45568	651.58314	97.068431
11	Optimized	180.29965	-8.7289025	482.27016	654.19913	99.263232
12	Optimized	181.22175	-8.6915075	479.94036	665.67478	107.23382
13	Optimized	182.21025	-8.642105	476.85471	672.14843	112.75288
14	Optimized	183.26515	-8.580695	473.02208	682.75677	121.09038
15	Optimized	184.0163	-8.535829	470.21363	688.77965	126.18915
16	Optimized	184.83985	-8.483694	466.96537	695.87273	132.15973
17	Optimized	186.0572	-8.3995725	461.71959	701.93005	138.68558
18	Optimized	187.11735	-8.320343	456.77011	709.22593	145.75544
19	Optimized	188.0025	-8.254191	452.64731	710.84253	149.06908
20	Optimized	188.8875	-8.188051	448.52321	720.6119	157.09047
21	Optimized	189.7725	-8.121911	444.38785	730.39253	165.12488
22	Optimized	190.6575	-8.055771	440.26376	740.1619	173.14627
23	Optimized	191.15475	-8.0186085	437.94059	757.68447	184.60422
24	Optimized	191.30665	-8.007258	437.23753	772.55599	193.5962
25	Optimized	191.4122	-7.99937	436.74298	792.16928	0
26	Optimized	191.9722	-	418.29149	654.52807	0

3/1/2013

			7.7036235				
27	Optimized	192.90555	-7.2042535	387.12665	694.81398	0	273.49
28	Optimized	193.3381	-6.97284	372.69141	713.34529	0	271.7
29	Optimized	193.39445	-6.9412875	370.7196	635.69967	0	271.45
30	Optimized	193.92	-6.5264655	344.83617	638.82396	0	267.93
31	Optimized	194.62095	-5.973218	310.30276	648.30416	0	263.25
32	Optimized	195.40095	-5.17942	260.77506	579.02914	0	256.25
33	Optimized	196.253	-4.253505	202.75303	567.21602	0	248.02
34	Optimized	196.87335	-3.6089275	162.4418	508.5097	0	315
35	Optimized	197.61305	-2.8646325	115.94952	126.7976	0	315

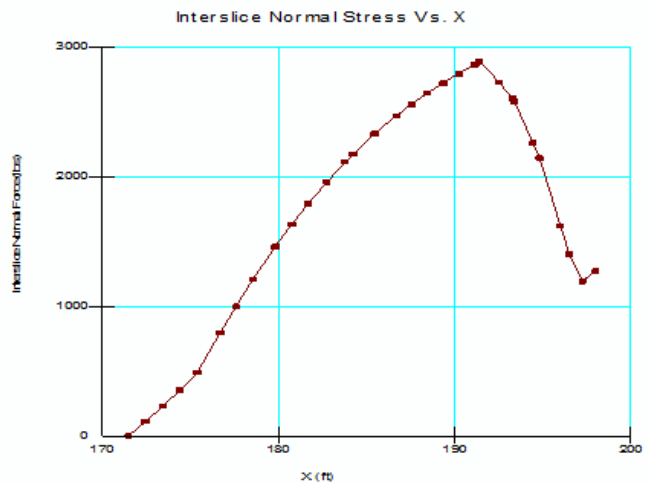
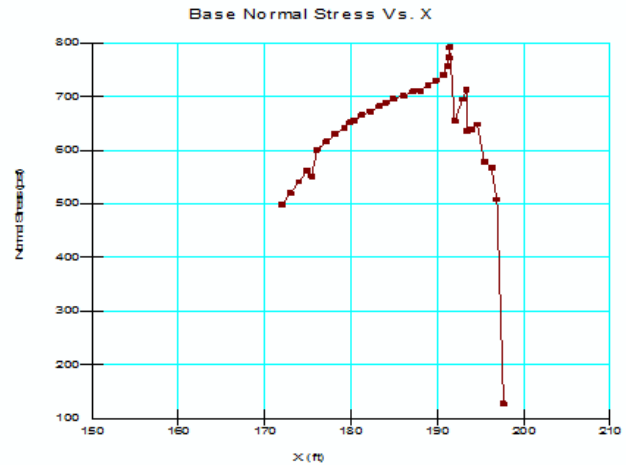
Slices of Slip Surface: 4729

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4729	175.77585	-7.9402605	433.06875	652.48184	0	274.4
2	4729	176.3183	-8.209751	449.88751	599.96833	86.649201	-4.5992e-007
3	4729	177.17945	-8.599067	474.17843	660.36865	107.49697	2.9564e-006
4	4729	177.97835	-8.909888	493.56665	707.62157	123.58466	-6.5592e-007
5	4729	178.715	-9.1528895	508.72793	744.66555	136.21865	-9.6612e-006
6	4729	179.45165	-9.357696	521.50832	775.13575	146.43186	-7.7717e-007
7	4729	180.18835	-9.5257865	531.99357	799.673	154.54479	-8.2022e-007
8	4729	180.925	-9.6583175	540.27063	818.77516	160.79467	-8.5341e-007
9	4729	181.66165	-9.7561665	546.36985	832.83282	165.38947	-8.7777e-007
10	4729	182.39835	-9.819963	550.35643	842.15033	168.46729	-1.1948e-005
11	4729	183.135	-9.8501085	552.23454	846.95959	170.15959	-1.2068e-005
12	4729	183.87165	-9.8467915	552.02677	847.43796	170.55573	-9.0518e-007
13	4729	184.6458	-9.8063235	549.50665	842.93075	169.40848	-1.2015e-005
14	4729	185.45735	-9.7248245	544.42037	833.16574	166.70722	-8.8478e-007

3/1/2013

15	4729	186.2689	-9.6017495	536.7344	818.59275	162.731	-8.6366e-007
16	4729	187.11735	-9.4265235	525.80161	798.12415	157.22549	-8.3445e-007
17	4729	187.9013	-9.22561	513.26256	770.71779	148.64185	-1.0542e-005
18	4729	188.58385	-9.013707	500.03466	749.1628	143.8342	-7.6338e-007
19	4729	189.2664	-8.7681185	484.71034	724.03025	138.17142	-7.3334e-007
20	4729	189.94895	-8.487172	467.18287	695.25238	131.67599	-6.9888e-007
21	4729	190.6315	-8.1688145	447.31527	662.71945	124.36366	-6.6006e-007
22	4729	191.0364	-7.9663015	434.6775	618.04731	0	278.85
23	4729	191.15475	-7.9030075	430.72682	617.67874	0	278.36
24	4729	191.5381	-7.6841205	417.0774	624.48872	0	276.64
25	4729	192.19525	-7.28421	392.11366	632.92656	0	273.43
26	4729	192.5778	-7.0367955	376.67465	635.88857	0	271.42
27	4729	193.0159	-6.719135	356.85385	634.85518	0	268.77
28	4729	193.92	-5.997929	311.85266	617.29201	0	262.65
29	4729	194.8101	-5.1939745	261.68576	594.70268	0	255.68
30	4729	195.55035	-4.4151805	213.08748	575.59868	0	248.79
31	4729	195.96025	-3.9518205	184.17076	526.13128	0	315
32	4729	196.51445	-3.2018205	137.01661	438.50945	0	315
33	4729	197.35745	-1.9514695	58.595873	292.75258	0	298.54
34	4729	198.0145	-0.7299789	18.449982	64.256122	0	261.9

3/1/2013



FS Block Thru -1.0

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File Information

Created By: Lijjegren, James
Revision Number: 430
Last Edited By: Johnson, Jehu B MVN
Date: 2/8/2013
Time: 10:18:34 AM
File Name: Reach 27 rapid drawdown -1.0.gsz
Directory: G:\F&M\HOME\London Ave Reeevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/8/2013
Last Solved Time: 10:23:38 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Block Thru -1.0
Kind: SLOPE/W
Parent: FS Analysis (Seepage) -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes

3/1/2013

Phi-B: 0 °

Marsh1, El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf

BAY SOUND CLAY 1, EL. -45 to -50
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 1 , El, -4 to -7 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -7 TO -8
Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (123.3, -9.2) ft
Right Coordinate: (310, -3) ft

Slip Surface Block

Left Grid
Upper Left: (170, -7) ft
Lower Left: (170, -11) ft
Lower Right: (190, -11) ft
X Increments: 10
Y Increments: 4
Starting Angle: 135 °
Ending Angle: 155 °

3/1/2013

Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2
Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf

MARSH 2, MH, EL. -4 TO -7
Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -40
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

Fill (Protected), El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf

MARSH 2, El, -7 to -8 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL CH, EL. 2 TO -2.5
Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °

3/1/2013

Angle Increments: 2
Right Grid
Upper Left: (192, -7) ft
Lower Left: (192, -11) ft
Lower Right: (195, -11) ft
X Increments: 3
Y Increments: 4
Starting Angle: 45 °
Ending Angle: 55 °
Angle Increments: 2

Cohesion Functions

Fill 2
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand
Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100

3/1/2013

Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)

Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL., -2.5 TO -4	5,26,16,20,27,50,4,56	21.149997
Region 2	Marsh1, EL., -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,18,23,1,24,2,25,51	809.5
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,17,14,22,11,13,12	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6		15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,57,58,46,5,26,16,38,39	38.211002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, El, -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3734
Region 16	MARSH 1, El, -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1, El, -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, El, -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

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3/1/2013

3/1/2013

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	123.3	-45
Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	123.3	-19.2
Point 24	123.3	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8
Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3

Point 44	123.3	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	123.3	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4
Point 54	205	3
Point 55	205	-49
Point 56	186.67467	-2.9
Point 57	192.52381	0.4
Point 58	191.20952	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.32	(184.946, 4.615)	16.05717	(204.63, 4)	(172.523, -8.2903)
2	856	1.48	(184.946, 4.615)	17.817	(204, 4)	(170.842, -8.45999)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	173.0028	- 8.3057945	455.87861	471.56585	9.0570346	-1.0356e-007
2	Optimized	173.96165	- 8.3367795	457.81737	481.80165	13.847333	-3.3804e-007
3	Optimized	174.92055	- 8.3677645	459.7457	492.04787	18.649668	-2.1331e-007
4	Optimized	175.41025	- 8.3835885	460.73361	526.56382	38.007092	5.5108e-007
5	Optimized	176.11695	-8.358125	459.14718	525.37406	38.236105	5.542e-007
6	Optimized	177.2117	- 8.3279995	457.26539	541.80934	48.811471	3.239e-006
7	Optimized	177.9295	- 8.3201945	456.76755	552.82784	55.460435	3.6798e-006
8	Optimized	179.0345	-8.29385	455.12736	566.8906	64.526532	-3.4238e-007
9	Optimized	180.532	-8.25025	452.40925	588.56233	78.608017	-4.1711e-007
10	Optimized	181.90455	- 8.2155175	450.23863	610.55925	92.561148	2.5449e-006
			-				2.8987e-

3/1/2013

3/1/2013

11	Optimized	183.2257	8.1875125	448.49059	631.10444	105.43215	006
12	Optimized	184.06315	-8.170942	447.46037	645.67511	114.43933	3.1466e-006
13	Optimized	184.8474	-8.159553	446.7462	657.9621	121.94556	-6.4707e-007
14	Optimized	186.0622	-8.141911	445.64325	676.76172	133.43632	-7.0802e-007
15	Optimized	186.67215	-8.133088	445.08832	689.52835	141.12752	-7.4885e-007
16	Optimized	187.11735	-8.1327685	445.06558	697.26527	145.60756	-7.7261e-007
17	Optimized	188.15	-8.132028	445.02542	711.23729	153.69749	-8.1554e-007
18	Optimized	189.33	-8.1311815	444.9661	736.76271	168.46885	-8.9389e-007
19	Optimized	190.51	-8.130335	444.91525	762.27966	183.23043	-1.2992e-005
20	Optimized	191.15475	-8.1298725	444.88678	788.3309	198.28756	-1.406e-005
21	Optimized	191.3232	-8.1297515	444.86455	806.81733	208.97353	-1.1088e-006
22	Optimized	191.98035	-8.0619575	440.64696	828.72595	224.05751	-1.1887e-006
23	Optimized	192.54435	-7.9916875	436.26151	878.61477	0	280.93
24	Optimized	192.98245	-7.8336385	426.39849	820.92846	0	279.87
25	Optimized	193.92	-7.4845135	404.61756	869.85161	0	277.51
26	Optimized	194.64825	-7.21333	387.68358	909.79984	0	275.68
27	Optimized	194.96665	-7.06789	378.61896	851.02321	0	274.61
28	Optimized	195.5384	-6.7155035	356.6258	881.70691	0	271.78
29	Optimized	196.0729	-6.3860635	336.04081	903.07065	0	269.13
30	Optimized	196.6215	-5.9789895	310.51371	826.63152	0	265.72
31	Optimized	197.5729	-5.254729	265.25973	772.41205	0	259.62
32	Optimized	198.5243	-4.5304685	220.01412	718.19258	0	253.53
33	Optimized	199.11055	-4.084169	192.1246	683.70219	0	249.77
34	Optimized	199.47425	-3.807315	174.83078	632.77331	0	315
35	Optimized	199.8637	-3.4922755	155.13656	563.56966	0	315
36	Optimized	200.25	-3.145541	127.90609	532.75102	0	315
37	Optimized	200.70545	-2.7367565	100.72882	496.45408	0	315

3/1/2013

38	Optimized	200.95545	-2.5123765	85.942363	476.23782	0	315
39	Optimized	201.3022	-2.2011705	62.351695	450.59006	0	306.04
40	Optimized	202.05255	-1.5418325	12.007537	404.42888	0	286.25
41	Optimized	202.94885	-0.7656175	47.942433	340.09406	0	262.97
42	Optimized	204.01325	0.07157	-113.71795	251.56565	0	237.85

Slices of Slip Surface: 856

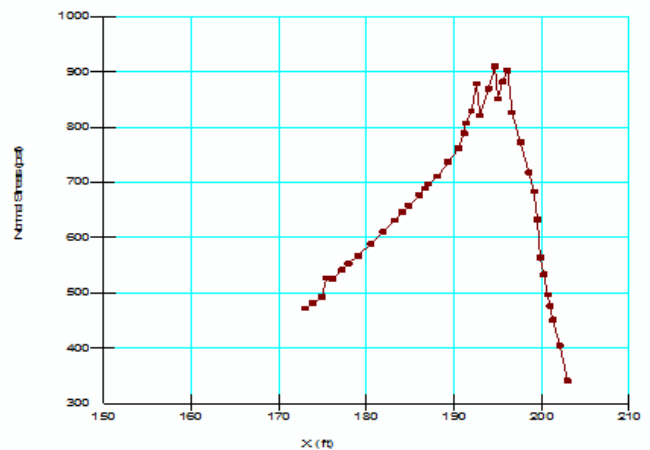
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	856	171.42095	-8.729994	482.35296	576.44599	54.324635	7.8657e-007
2	856	172.56665	-9	499.20015	552.6531	30.861079	-3.529e-007
3	856	173.7	-9	499.20015	559.80899	34.992531	5.0712e-007
4	856	174.83335	-9	499.20015	566.96487	39.123983	2.5958e-006
5	856	175.9525	-9	499.19457	605.82805	61.564871	-3.2661e-007
6	856	177.0575	-9	499.19457	622.91403	71.429462	-3.7896e-007
7	856	178.1625	-9	499.19457	641.61086	82.224083	2.2604e-006
8	856	179.2675	-9	499.19457	661.90045	93.938285	2.5825e-006
9	856	180.3725	-9	499.19457	682.1991	105.65771	-5.6057e-007
10	856	181.4775	-9	499.18552	702.48869	117.37714	-6.2274e-007
11	856	182.5825	-9	499.18552	722.77828	129.09134	-6.8492e-007
12	856	183.6875	-9	499.18552	743.07692	140.81077	-7.4709e-007
13	856	184.84865	-9	499.1888	763.77497	152.75889	-8.105e-007
14	856	186.066	-9	499.1888	784.92773	164.97145	-1.1697e-005
15	856	187.11735	-9	499.1811	803.19203	175.52079	-9.3127e-007
16	856	188.15	-9	499.18644	817.22034	183.61696	-9.7422e-007
17	856	189.33	-9	499.18644	842.69492	198.32471	-1.0523e-006
18	856	190.51	-9	499.18644	868.13559	213.01289	-1.1303e-006
19	856	191.15475	-9	499.17823	894.0011	227.95109	-1.6162e-005

3/1/2013

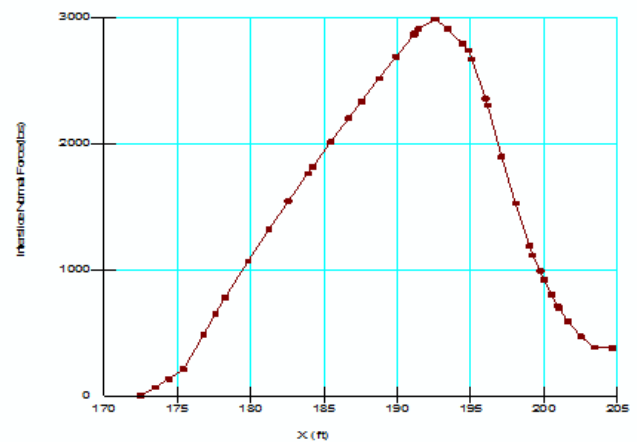
20	856	191.86665	-9	499.18207	971.32292	272.59065	1.6435e-005
21	856	192.7619	-9	499.1915	1068.5441	328.71586	-6.6433e-005
22	856	193.2	-8.8	486.70162	813.13748	188.46783	-1.3372e-005
23	856	193.7	-8.3	455.50642	796.24941	196.72806	-1.0445e-006
24	856	194.22	-7.78	423.05875	742.87992	0	280.83
25	856	194.72	-7.28	391.8508	746.85628	0	276.43
26	856	195.5	-6.5	343.18003	762.61443	0	269.57
27	856	196.5	-5.5	280.58696	735.10798	0	260.78
28	856	197.5	-4.5	218.11409	660.40924	0	251.99
29	856	198.5	-3.5	155.63415	550.70873	0	315
30	856	199.25	-2.75	108.76575	489.06332	0	315
31	856	199.75	-2.25	77.32071	446.72177	0	307.5
32	856	200.25	-1.75	31.832532	406.30355	0	292.5
33	856	200.75	-1.25	8.5566989	365.88532	0	277.5
34	856	201.5	-0.5	64.954809	305.27205	0	255
35	856	202.5	0.5	-141.888	224.44977	0	225
36	856	203.5	1.5	-221.0698	126.11953	0	195

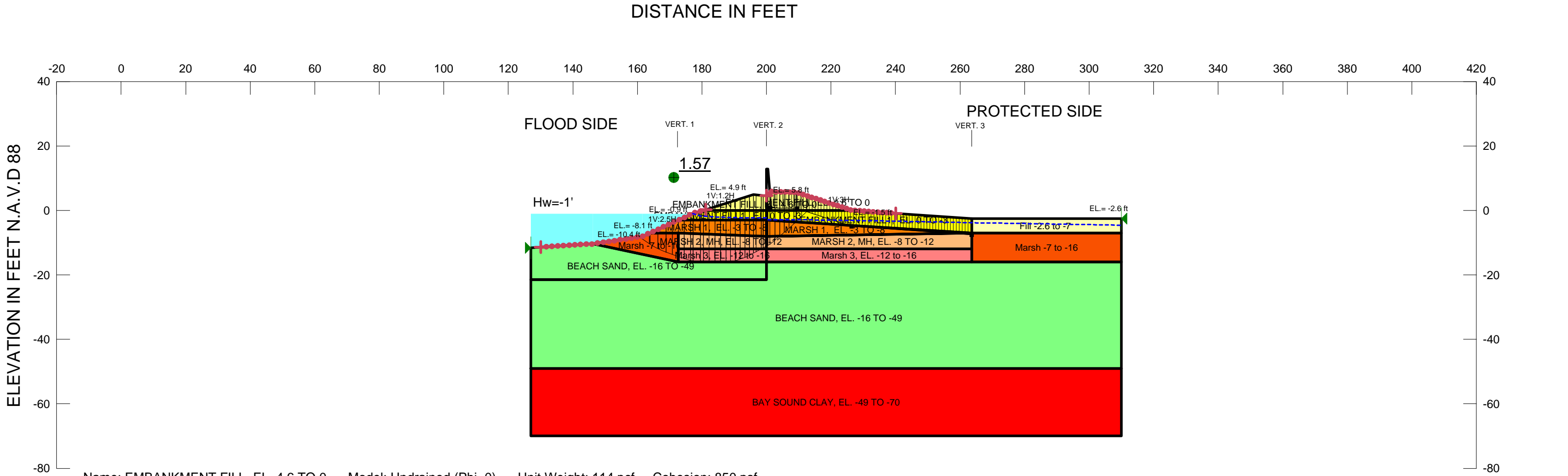
3/1/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X





Name: EMBANKMENT FILL, EL. 4.6 TO 0 Model: Undrained (Phi=0) Unit Weight: 114 pcf Cohesion: 850 psf
Name: MARSH 1, EL. -3 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 260 psf Phi: 0 °
Name: BEACH SAND, EL. -16 TO -49 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Beach Sand
Name: BAY SOUND CLAY, EL. -49 TO -70 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Clay Gamma Cohesion Spatial Fn: Clay Cohesion Phi: 0 °
Name: EMBANKMENT FILL1, EL. 0 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Fn: Fill 2 Phi: 0 °
Name: MARSH 2, MH, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Unit Weight: 97 pcf Cohesion Spatial Fn: Marsh 2/3 Cohesion Phi: 0 °
Name: Marsh 3, EL. -12 to -16 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Spatial Fn: Marsh 2/3 Cohesion Phi: 0 °
Name: Fill -2.6 to -7 Model: Undrained (Phi=0) Unit Weight: 100 pcf Cohesion: 400 psf
Name: Marsh -7 to -16 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 220 psf Phi: 0 °



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

LONDON AVE OUTFALL CANAL, REACH 29,
FLOOD SIDE STABILITY ANALYSIS,
CASE: Name: Thru Sheetpile (Entry/Exit)
STA. 69+09 TO 70+50
ORLEANS PARISH, LOUISIANA

Thru Sheetpile (Entry/Exit)

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: Lijegren, James
Revision Number: 271
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 10:09:16 AM
File Name: Reach 29 - filled.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0441021\
Last Solved Date: 6/24/2013
Last Solved Time: 10:19:30 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Thru Sheetpile (Entry/Exit)

Kind: SLOPE/W
Method: Spencer
Settings
PWP Conditions Source: Other GeoStudio Analysis
PWP Other Analysis: Steady-State Seepage [(last)]
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

MARSH 2, MH, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Unit Weight: 97 pcf
Cohesion Spatial Fn: Marsh 2/3 Cohesion
Phi: 0 °
Phi-B: 0 °

Marsh 3, EL. -12 to -16

Model: Spatial Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion Spatial Fn: Marsh 2/3 Cohesion
Phi: 0 °
Phi-B: 0 °

Fill -2.6 to -7

Model: Undrained (Phi=0)
Unit Weight: 100 pcf
Cohesion: 400 psf

Marsh -7 to -16

Model: Spatial Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 220 psf
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -11.41152) ft
Left-Zone Right Coordinate: (181.2, 0.24173) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (200, 4.6) ft
Right-Zone Right Coordinate: (240.10888, -0.95746) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (127, -11.6) ft
Right Coordinate: (310, -2.6) ft

Tension Crack Line

	X (ft)	Y (ft)
--	--------	--------

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.6 TO 0

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 850 psf

MARSH 1, EL. -3 TO -8

Model: Spatial Mohr-Coulomb
Unit Weight: 93 pcf
Cohesion: 260 psf
Phi: 0 °
Phi-B: 0 °

BEACH SAND, EL. -16 TO -49

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

BAY SOUND CLAY, EL. -49 TO -70

Model: Spatial Mohr-Coulomb
Weight Spatial Fn: Clay Gamma
Cohesion Spatial Fn: Clay Cohesion
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL1, EL. 0 TO -3

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

	201.1	0.8
	209.5	0.6
	226.4	-5
	263.6	-7.6

Cohesion Functions

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 400
Data Points: X (ft), Cohesion (psf)
Data Point: (172.7, 400)
Data Point: (200, 850)
Data Point: (263.6, 400)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Spatial Functions

Marsh 2/3 Cohesion

Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (172.7, -7, 220)
Data Point: (172.7, -16, 220)
Data Point: (200, -8, 260)
Data Point: (200, -16, 260)
Data Point: (263.6, -7, 220)
Data Point: (263.6, -16, 220)

Clay Cohesion

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (172.7, -49, 544)
Data Point: (172.7, -70, 773)
Data Point: (200, -49, 900)
Data Point: (200, -70, 900)
Data Point: (263.6, -49, 544)
Data Point: (263.6, -70, 773)
Data Point: (310, -49, 544)
Data Point: (310, -70, 773)
Data Point: (127.5, -49, 544)
Data Point: (127.5, -70, 773)

Clay Gamma

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (127.5, -49, 112)
Data Point: (127.5, -70, 112)
Data Point: (172.7, -49, 112)
Data Point: (172.7, -70, 112)
Data Point: (200, -49, 106)
Data Point: (200, -70, 106)
Data Point: (231, -49, 112)
Data Point: (231, -70, 112)
Data Point: (310, -49, 112)
Data Point: (310, -70, 112)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -16 TO -49	25,10,14,1,13,27	571.48
Region 2	BEACH SAND, EL. -16 TO -49	8,14,10,25,28,26,9	5637.5
Region 3	BAY SOUND CLAY, EL. -49 TO -70	15,8,9,16	3843
Region 4		4,18,5,19,20	6.45

Region 5	Marsh -7 to -16	13,2,38,29,37,27	128.94137
Region 6	EMBANKMENT FILL, EL. 4.6 TO 0	4,18,5,17,33,21	99.833372
Region 7	EMBANKMENT FILL1, EL. 0 TO -3	21,33,6,30,22	269.66014
Region 8	MARSH 1, EL. -3 TO -8	23,22,30	159
Region 9	MARSH 2, MH, EL. -8 TO -12	23,30,34,24,39	286.2
Region 10	Marsh 3, EL. -12 to -16	25,28,34,24	254.4
Region 11	Fill -2.6 to -7	6,7,31,30	204.16
Region 12	Marsh -7 to -16	28,34,30,31,26	417.6
Region 13	EMBANKMENT FILL, EL. 4.6 TO 0	4,32,11,36,21	56.9916
Region 14	EMBANKMENT FILL1, EL. 0 TO -3	21,36,3,35,22	71.5206
Region 15	Marsh 3, EL. -12 to -16	25,24,37,27	109.2
Region 16	MARSH 2, MH, EL. -8 TO -12	24,39,23,29,37	122.85
Region 17	MARSH 1, EL. -3 TO -8	23,22,35,38,29	140.41862

Points

	X (ft)	Y (ft)
Point 1	127	-11.6
Point 2	161.5	-8.1
Point 3	177.3	-0.9
Point 4	200	4.6
Point 5	201	5.8
Point 6	263.6	-2.6
Point 7	310	-2.6
Point 8	127	-49
Point 9	310	-49
Point 10	200	-21.5
Point 11	196	4.9
Point 12	231	-1.5
Point 13	146.1	-10.4
Point 14	127	-21.5
Point 15	127	-70
Point 16	310	-70
Point 17	209.3	5.6
Point 18	201	4.6
Point 19	200.5	12.8

Point 20	200	12.8
Point 21	200	0
Point 22	200	-3
Point 23	200	-8
Point 24	200	-12
Point 25	200	-16
Point 26	310	-16
Point 27	172.7	-16
Point 28	263.6	-16
Point 29	172.7	-7
Point 30	263.6	-7
Point 31	310	-7
Point 32	199	4.6
Point 33	226.41549	0
Point 34	263.6	-12
Point 35	172.7	-3
Point 36	180.432	0
Point 37	172.7	-12
Point 38	163.91569	-7
Point 39	200	-8.3

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.57	(181.197, 23.634)	23.92492	(212.52, 4.54639)	(160.579, -8.23761)
2	10680	1.61	(181.197, 23.634)	39.611	(212.65, 4.50379)	(158.17, -8.59731)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimize d	161.0393	-8.546163	467.43417	622.96602	0	220

2	Optimize d	162.62365	9.6072615	520.85971	766.24202	0	220
3	Optimize d	163.8315	-10.40636	562.09675	846.18559	0	220
4	Optimize d	165.13185	-11.12534	599.85658	938.89501	0	220
5	Optimize d	167.61005	12.381885	666.5159	1082.9355	0	220
6	Optimize d	169.82905	13.302325	716.21409	1182.1722	0	220
7	Optimize d	171.743	13.974975	752.44378	1276.7145	0	220
8	Optimize d	173.60555	14.629555	787.81789	1330.8622	0	221.33
9	Optimize d	175.47975	-15.22057	819.22618	1402.3932	0	224.07
10	Optimize d	176.8742	15.563325	837.25396	1429.896	0	226.12
11	Optimize d	178.4023	-15.81453	849.91592	1499.9859	0	228.36
12	Optimize d	179.9683	15.995655	858.58934	1521.0757	0	230.65
13	Optimize d	181.3165	-15.99541	856.83113	1566.4006	0	232.62
14	Optimize d	183.08545	15.995095	854.56992	1629.7146	0	235.22
15	Optimize d	184.8544	-15.99478	852.36523	1692.9721	0	237.81
16	Optimize d	186.62335	-15.99446	850.27361	1756.2862	0	240.4
17	Optimize	188.20195	-	842.12717	1762.2106	0	242.71

	d		15.89155 5				
18	Optimize d	189.5902	15.68606 5	828.08934	1792.9228	0	244.75
19	Optimize d	191.05115	-15.34363	805.57737	1767.9763	0	246.89
20	Optimize d	192.5849	-	774.77314	1779.0534	0	249.14
21	Optimize d	194.01385	-14.28487	738.0659	1722.3329	0	251.23
22	Optimize d	195.33795	-	695.73327	1708.4908	0	253.17
23	Optimize d	196.39025	-	662.10037	1679.6176	0	254.71
24	Optimize d	197.5636	-	623.00038	1600.6438	0	256.43
25	Optimize d	198.67335	-11.81952	585.31315	1533.5564	0	258.06
26	Optimize d	199.5	-	557.05374	1486.8362	0	259.27
27	Optimize d	200.25	-	511.88051	1448.0436	0	259.84
28	Optimize d	200.75	-10.67211	490.5062	1422.6956	0	259.53
29	Optimize d	201.00745	-	481.51479	1541.2647	0	259.37
30	Optimize d	201.7994	-	440.41302	1409.4101	0	258.87
31	Optimize d	203.36835	-	358.69013	1288.0643	0	257.88
			8.582460				

			5				
32	Optimize d	204.8213	-7.382712	282.94444	1176.3831	0	260
33	Optimize d	206.24925	-6.153505	205.54283	1050.6123	0	260
34	Optimize d	207.7682	-4.799075	120.14158	929.09485	0	260
35	Optimize d	208.82195	-	60.183479	835.25739	0	260
36	Optimize d	209.2081	-3.487686	37.508696	532.17146	0	784.85
37	Optimize d	210.10505	-	-	426.26641	0	778.5
38	Optimize d	211.71515	-	-	199.27114	0	767.11
			5				

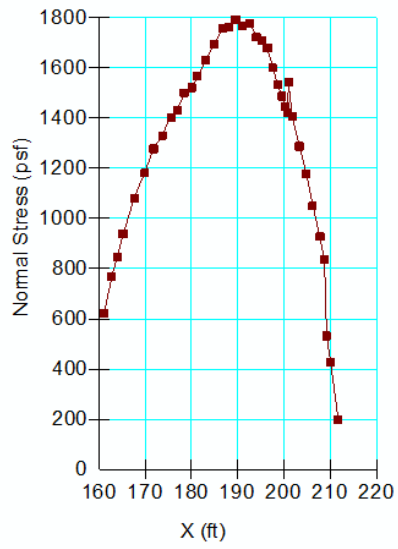
Slices of Slip Surface: 10680

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona l Strength (psf)	Cohesiv e Strength (psf)
1	10680	159.00265	-9.160685	502.84901	673.21778	0	220
2	10680	160.66755	-	557.58263	780.74922	0	220
3	10680	162.70785	-	616.26536	918.65121	0	220
4	10680	164.79415	-	671.42153	1042.7757	0	220
5	10680	166.551	-	711.55162	1131.1846	0	220
6	10680	168.30785	-	746.86671	1209.5613	0	220
7	10680	170.0647	-	777.30637	1278.5952	0	220

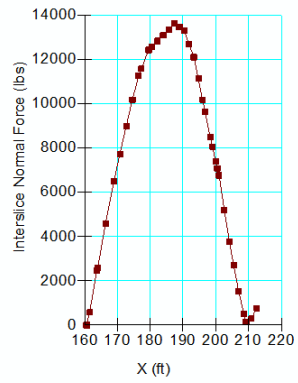
8	10680	171.82155	-14.84158	802.70314	1338.5759	0	220
9	10680	173.46665	-15.2082	821.86103	1343.0318	0	221.12
10	10680	175	-	835.38653	1385.9983	0	223.37
11	10680	176.53335	-	845.49002	1423.1822	0	225.62
12	10680	178.083	-	852.27038	1470.8476	0	227.89
13	10680	179.649	-	855.66779	1515.8911	0	230.18
14	10680	181.2969	-	855.19398	1562.2191	0	232.6
15	10680	183.0267	-	850.47184	1609.1225	0	235.13
16	10680	184.75645	-	841.19834	1648.7142	0	237.67
17	10680	186.4862	-	827.25217	1680.9737	0	240.2
18	10680	188.216	-	808.65632	1705.7852	0	242.73
19	10680	189.9458	-	785.23773	1722.9899	0	245.27
20	10680	191.67555	-	756.92154	1732.3284	0	247.8
21	10680	193.4053	-	723.57006	1733.5544	0	250.34
22	10680	195.1351	-	685.32326	1726.322	0	252.87
23	10680	197.2485	-	630.47114	1646.7224	0	255.97
24	10680	198.7485	-	588.74573	1556.2064	0	258.17
			5				

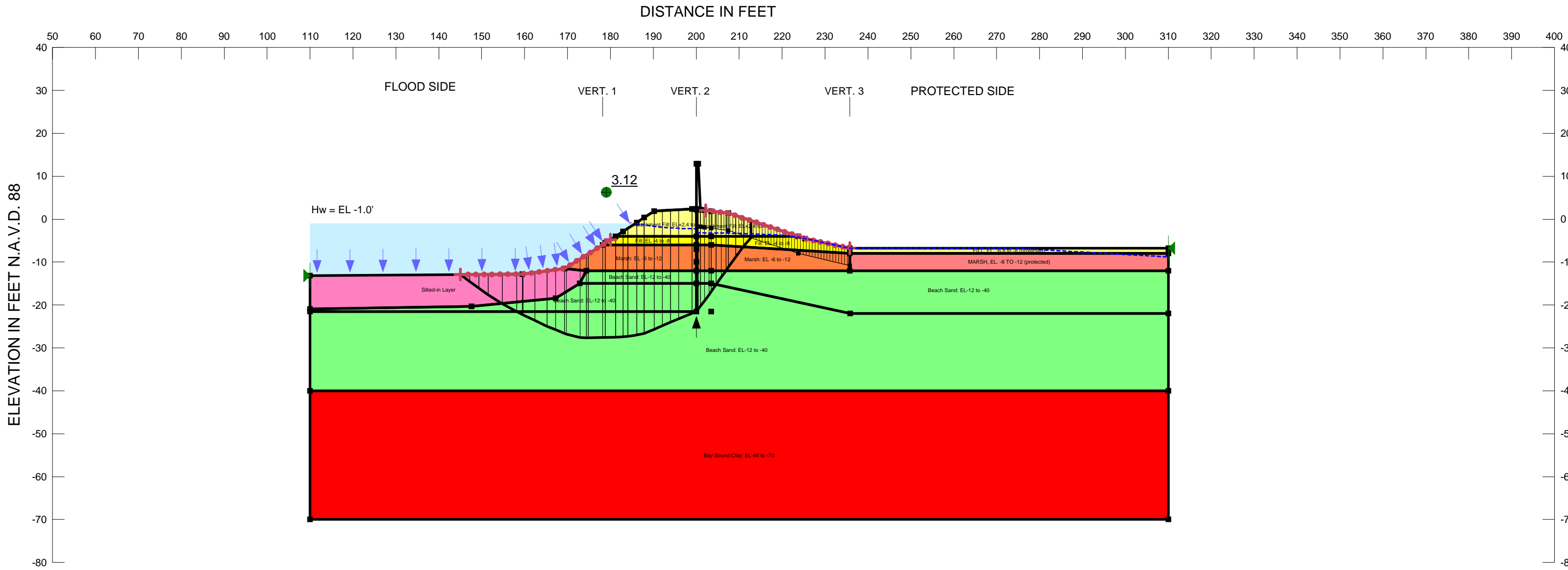
25	10680	199.5	-11.49082	564.91298	1510.0765	0	259.27
26	10680	200.25	-	520.94219	1465.7746	0	259.84
27	10680	200.75	-	499.43228	1435.3504	0	259.53
28	10680	202.03605	-	449.98484	1479.2544	0	258.72
29	10680	204.10815	-	362.93865	1325.7057	0	257.42
30	10680	206.18315	-	263.13216	1153.6902	0	260
31	10680	208.26105	-	148.39212	962.72953	0	260
32	10680	209.6187	-	66.318032	816.82713	0	260
33	10680	211.2939	-	-54.36687	208.40235	0	770.09
			5				

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 °
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 °
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 °
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
FLOOD SIDE STABILITY ANALYSIS
CASE: E/E Around (Piezo: EL-1.0)
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

E/E Around (Piezo: EL-1.0)

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File Information

Created By: [Johnson, Jehu](#)
Revision Number: 138
Last Edited By: [Johnson, Jehu](#) 8 MVN
Date: 1/21/2013
Time: 3:11:17 PM
File Name: [Reach 35B_Q-Case_FS EL -1.0.gsz](#)
Directory: [G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet](#)
[Pile\Water El -1 Based on SeepW\](#)
Last Solved Date: 1/21/2013
Last Solved Time: 3:13:56 PM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

E/E Around (Piezo: EL-1.0)

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Other GeoStudio Analysis](#)
PWP Other Analysis: [Steady-State Seepage \(EL -1.0\) \(Open Connection\) \[\(last\)\]](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Entry and Exit](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Tension Crack Line](#)
Percentage Wet: [1](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced

3/1/2013

Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

Embankment Fill: EL+2.4 to -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [110 pcf](#)
Cohesion: [450 psf](#)

Fill: EL -4 to -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill -4 to -8](#)
Cohesion Fn: [Fill -4 to -8](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Marsh: EL -6 to -12

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [88 pcf](#)
Cohesion Fn: [Marsh](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: [90 pcf](#)
Cohesion: [0 psf](#)
Phi: [20 °](#)
Phi-B: [0 °](#)

Beach Sand: EL-12 to -40

Model: [Shear/Normal Fn.](#)
Unit Weight: [122 pcf](#)
Strength Function: [Sand](#)
Phi-B: [0 °](#)

Bay Sound Clay: EL-40 to -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay](#)
Cohesion Spatial Fn: [Bay Sound Clay](#)

3/1/2013

Phi: [0 °](#)
Phi-B: [0 °](#)

FILL, EL. -6.8 to -8 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [600 psf](#)

MARSH, EL. -8 TO -12 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [150 psf](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(145, -12.91717\) ft](#)
Left-Zone Right Coordinate: [\(180, -4.8\) ft](#)
Left-Zone Increment: [20](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(202.2, 2.0525\) ft](#)
Right-Zone Right Coordinate: [\(235.8, -6.8\) ft](#)
Right-Zone Increment: [20](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(110, -13.2\) ft](#)
Right Coordinate: [\(310, -6.8\) ft](#)

Reinforcements

Reinforcement 1

Type: [Fabric](#)
Outside Point: [\(200, -21.5\) ft](#)
Inside Point: [\(200, 2.2\) ft](#)
Slip Surface Intersection: [\(0, 0\) ft](#)
Total Length: [23.7 ft](#)
Reinforcement Direction: [270 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [Yes](#)
Bond Skin Friction: [1000000 psf](#)
Bond Safety Factor: [1](#)
Bond Resistance: [1000000 lbs/ft](#)
Fabric Capacity: [100000 lbs](#)
Fabric Safety Factor: [1](#)
Fabric Load: [100000 lbs](#)
Load Distribution: [Conc. in 1 slice](#)

3/1/2013

Load Orientation: [0](#)
Applied Load: [100000 lbs](#)
Fabric Load Used: [0 lbs](#)
Resisting Force Used: [0 lbs/ft](#)
Available Bond Length: [0 ft](#)
Required Bond Length: [0 ft](#)
Governing Component: [Bond](#)

Tension Crack Line

X (ft)	Y (ft)
201	-1.8
201.9	-1.9
203.5	-2.1
207.5	-2.6
223.8	-8
235.8	-10.8

Cohesion Functions

Fill -4 to -8

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [600](#)
Data Points: [X \(ft\), Cohesion \(psf\)](#)
Data Point: [\(110, 600\)](#)
Data Point: [\(178.1, 600\)](#)
Data Point: [\(178.3, 450\)](#)
Data Point: [\(200, 450\)](#)
Data Point: [\(235.7, 450\)](#)
Data Point: [\(235.9, 600\)](#)
Data Point: [\(310, 600\)](#)

Marsh

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [150](#)
Data Points: [X \(ft\), Cohesion \(psf\)](#)
Data Point: [\(178.2, 150\)](#)
Data Point: [\(200, 275\)](#)
Data Point: [\(235.8, 150\)](#)

3/1/2013

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (0, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (110, 96)
Data Point: (178.1, 96)
Data Point: (178.3, 88)
Data Point: (200, 88)
Data Point: (235.7, 88)
Data Point: (235.9, 96)
Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)

Data Point: (235.8, 107)
Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)
Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1
Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	446.445
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	158.45
Region 8	Fill: EL -4 to -8	32,33,37,35,31	40.6
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	87.02
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40

3/1/2013

3/1/2013

Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-13.2
Point 17	159.5	-12.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-11.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6
Point 31	200	-6
Point 32	178.2	-6
Point 33	178.8	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.2	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9

3/1/2013

	200.5	12.9
Point 49	187.9	0.4
Point 50	182.9	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.12	(177.661, 8.473)	31.93995	(212.73, -0.332582)	(145.037, -12.9169)
2	605	3.33	(177.661, 8.473)	37.499	(212.887, -0.384573)	(146.851, -12.9022)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	146.1177	13.710085	792.53641	852.50529	21.826885	0
2	Optimized	148.27945	15.296515	890.2096	1006.6044	42.364247	0
3	Optimized	150.4412	16.882945	987.47255	1160.7408	63.064496	0
4	Optimized	153.15675	18.687595	1097.5317	1323.9569	82.412049	0
5	Optimized	156.4708	20.599515	1212.9868	1553.8794	196.79857	6.526e-006
6	Optimized	158.8251	21.861885	1288.4321	1731.6204	255.85424	8.4836e-006
7	Optimized	159.5442	-22.24746	1311.3825	1791.4315	277.13407	-9.0012e-006
8	Optimized	160.99235	22.942245	1352.472	1882.5426	306.01173	-5.0113e-005
9	Optimized	163.80025	-24.28443	1431.0331	2081.6926	375.62814	-6.1516e-005
10	Optimized	166.2021	-25.36246	1493.4057	2223.1275	421.2711	-0.00012429
11	Optimized	168.25	-26.19759	1540.9817	2367.0304	476.881	-7.8096e-005
12	Optimized	169.50805	26.710625	1570.2011	2487.0418	529.29559	-8.6673e-005
13	Optimized	171.3274	27.182775	1595.7509	2558.8737	556.01435	-9.1056e-005
14	Optimized	173.66935	-27.62167	1617.5188	2678.8213	612.69393	-1.4684e-005
15	Optimized	174.6161	-27.68852	1619.5359	2746.3492	650.51351	-1.5589e-005
16	Optimized	176.5161	27.636225	1612.0366	2729.3126	645.0076	-1.5458e-005
17	Optimized	178.5	27.556635	1602.2443	2749.6213	662.38498	-1.5876e-005
18	Optimized	180	27.496455	1594.8002	2765.858	676.05603	-1.6203e-005
19	Optimized	182.05	-27.41421	1584.5484	2799.5119	701.40295	4.1428e-005

3/1/2013

20	Optimized	183.4854	-27.356625	1577.2962	2835.1562	726.16728	4.289e-005
21	Optimized	185.0854	-27.15237	1560.4911	2806.7881	719.49188	4.2497e-005
22	Optimized	186.9871	-26.81355	1534.4875	2870.9839	771.5643	-1.8492e-005
23	Optimized	187.8871	-26.649935	1522.0023	2821.732	750.33879	-1.7984e-005
24	Optimized	189.05	-26.14886	1487.8096	2839.9789	780.61242	-1.8709e-005
25	Optimized	191.1456	-25.245915	1426.1885	2816.1019	802.40218	-1.9231e-005
26	Optimized	193.0368	-24.431045	1370.5861	2732.2855	786.11416	-1.8841e-005
27	Optimized	194.92795	-23.616175	1315.0809	2648.5178	769.79811	4.5469e-005
28	Optimized	197.43675	-22.57427	1243.6273	2550.3221	754.35979	-1.808e-005
29	Optimized	199.5	-21.736865	1183.9945	2461.667	737.60513	-1.7678e-005
30	Optimized	200.04715	-21.514795	1167.9653	2415.5378	720.22824	4.2539e-005
31	Optimized	200.29715	-21.222105	1146.8653	2130.589	567.90737	-9.3002e-005
32	Optimized	200.75	-20.61143	1103.2824	2065.5124	555.49897	-9.0981e-005
33	Optimized	201.45	-19.667495	1040.6187	1961.3774	531.55739	-8.7056e-005
34	Optimized	202.43445	-18.34002	954.36066	1811.4741	494.81476	-8.1038e-005
35	Optimized	203.23445	-17.239465	883.81614	1673.0729	455.64088	-7.4618e-005
36	Optimized	204.0647	-16.05179	808.34256	1540.8428	422.8751	-6.9257e-005
37	Optimized	205.23515	-14.37752	701.64752	1354.5354	376.91458	-0.0001122
38	Optimized	206.38505	-12.755515	598.02324	1179.0767	335.44433	-5.494e-005
39	Optimized	207.2146	-11.603705	524.21474	1084.201	0	249.81
40	Optimized	208.3549	-10.020412	422.26903	922.84618	0	245.83
41	Optimized	210.1074	-7.587097	266.19012	665.43461	0	239.71
42	Optimized	211.8674	-5.336681	121.76179	356.50256	0	450

Slices of Slip Surface: 605

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	605	147.8755	-14.24598	825.53478	931.35967	38.517112	0
2	605	149.9255	-16.71822	977.44324	1164.6537	68.139034	0
3	605	151.97545	-18.811595	1105.6001	1356.9326	91.477547	0
4	605	154.06355	-20.638245	1216.8482	1579.3525	209.27508	-6.7978e-006

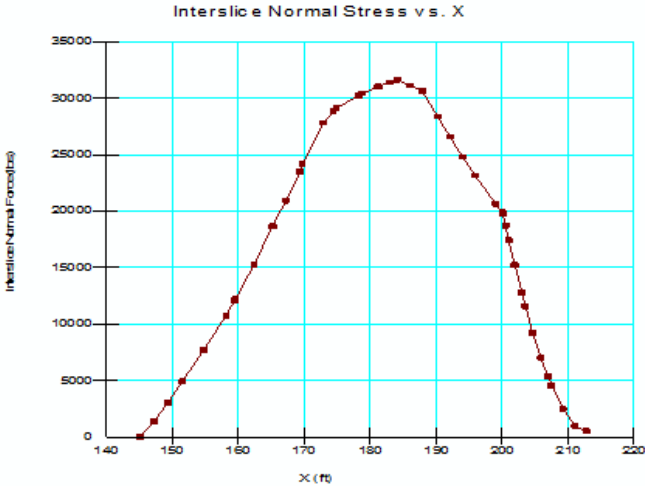
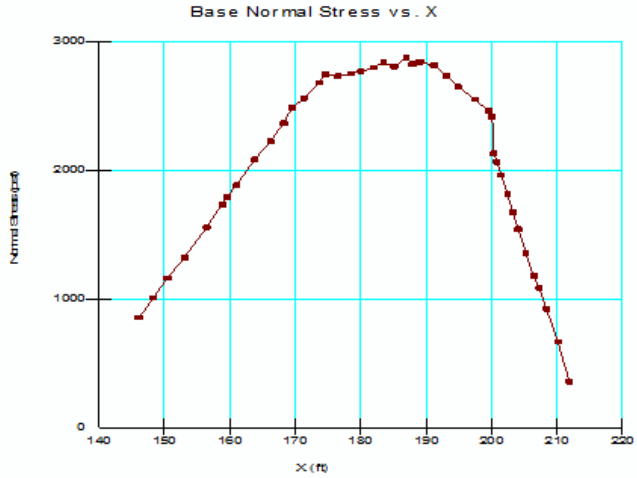
3/1/2013

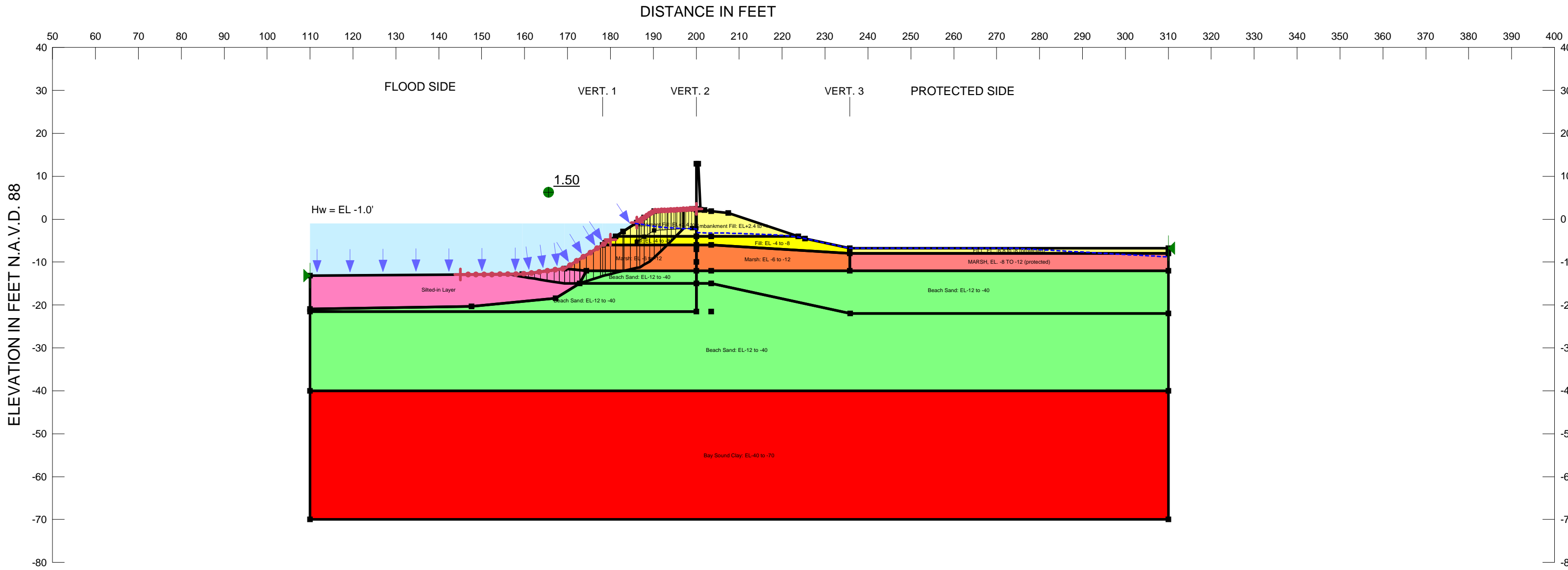
5	605	156.22005	-22.262675	1315.1814	1790.8207	274.58833	-8.9187e-006
6	605	158.4067	-23.68005	1400.3947	1970.4086	329.07112	-5.389e-005
7	605	160.78335	-24.98216	1477.7156	2140.6545	382.71706	-6.2676e-005
8	605	163.35	-26.159855	1546.7622	2291.985	430.21991	-7.0454e-005
9	605	165.91665	-27.113655	1601.5859	2412.7014	468.26	-7.6686e-005
10	605	168.25	-27.809515	1640.1097	2517.9201	506.76321	-8.2992e-005
11	605	170.175	-28.260175	1664.3075	2630.6742	557.8871	-9.1366e-005
12	605	171.925	-28.57396	1680.1536	2717.9038	599.09708	-1.4359e-005
13	605	173.6	-28.796595	1690.2469	2824.037	654.54124	-1.5688e-005
14	605	175.35	-28.942435	1695.4014	2902.2074	696.69359	4.1152e-005
15	605	177.25	-29.01152	1695.4246	2922.1405	708.18765	4.183e-005
16	605	178.5	-29.015215	1692.5756	2930.9325	714.9078	4.2225e-005
17	605	180	-28.93346	1683.8379	2931.1079	720.05477	4.2532e-005
18	605	182.05	-28.758215	1667.8623	2934.7951	731.405	-1.753e-005
19	605	184.5	-28.360935	1636.9905	2935.7002	749.74994	-1.7969e-005
20	605	187	-27.83235	1597.7088	2970.0866	792.27882	-1.8989e-005
21	605	189.05	-27.23404	1555.1579	3018.1512	844.59151	-2.0243e-005
22	605	191.3	-26.437485	1499.7007	2982.4238	855.98157	-2.0515e-005
23	605	193.5	-25.49481	1435.1875	2858.9637	821.95131	-1.97e-005
24	605	195.7	-24.37786	1359.8373	2715.3318	782.53201	-1.8755e-005
25	605	197.9	-23.067995	1272.2818	2549.5368	737.3641	-1.7672e-005
26	605	199.5	-22.003875	1200.5043	2413.5265	700.28227	-1.6784e-005
27	605	200.25	-21.45691	1163.1334	2322.4035	669.25097	3.9531e-005
28	605	200.75	-21.072865	1134.4366	2272.1195	656.78858	-1.574e-005
29	605	201.45	-20.508125	1095.0128	2193.5467	634.18776	3.7459e-005
30	605	202.7	-19.420625	1022.5723	2039.9355	587.32755	3.4691e-005
31	605	204.9459	-17.16364	876.73644	1732.7538	494.18202	-8.0928e-005
32	605	206.9459	-14.93149	733.57788	1439.0994	407.30021	-0.00012017
33	605	208.28895	-13.1191	617.3092	1196.0206	334.09225	-5.471e-005
34	605	210.5533	-9.264046	370.25384	757.04348	0	238.15

3/1/2013

35	605	212.45775	-5.4563325	128.00512	167.40497	0	450
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3/1/2013





Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 °
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 °
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 °
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
FLOOD SIDE STABILITY ANALYSIS
CASE: E/E IN front (Piezo: EL-1.0)
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

E/E IN front (Piezo: EL-1.0)

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File Information

Created By: [Johnson, Jehu](#)
Revision Number: 162
Last Edited By: [Johnson, Jehu](#) 8 MVN
Date: 2/11/2013
Time: 9:26:11 AM
File Name: [Reach 35B_Q-Case_FS EL -1.0.gsz](#)
Directory: [G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet](#)
[Pile\Water El -1 Based on SeepW\](#)
Last Solved Date: 2/11/2013
Last Solved Time: 9:29:46 AM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

E/E IN front (Piezo: EL-1.0)

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Other GeoStudio Analysis](#)
PWP Other Analysis: [Steady-State Seepage \(EL -1.0\) \(Open Connection\) \[\(last\)\]](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Entry and Exit](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Tension Crack Line](#)
Percentage Wet: [1](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced

3/1/2013

Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

Embankment Fill: EL+2.4 to -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [110 pcf](#)
Cohesion: [450 psf](#)

Fill: EL -4 to -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill -4 to -8](#)
Cohesion Fn: [Fill -4 to -8](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Marsh: EL -6 to -12

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [88 pcf](#)
Cohesion Fn: [Marsh](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: [90 pcf](#)
Cohesion: [0 psf](#)
Phi: [20 °](#)
Phi-B: [0 °](#)

Beach Sand: EL-12 to -40

Model: [Shear/Normal Fn.](#)
Unit Weight: [122 pcf](#)
Strength Function: [Sand](#)
Phi-B: [0 °](#)

Bay Sound Clay: EL-40 to -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay](#)
Cohesion Spatial Fn: [Bay Sound Clay](#)

3/1/2013

E/E IN front (Piezo: EL-1.0)

E/E IN front (Piezo: EL-1.0)

Phi: [0 °](#)
Phi-B: [0 °](#)

FILL, EL. -6.8 to -8 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [600 psf](#)

MARSH, EL. -8 TO -12 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [150 psf](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(145, -12.91717\) ft](#)
Left-Zone Right Coordinate: [\(180, -4.8\) ft](#)
Left-Zone Increment: [20](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(186.1, -0.8\) ft](#)
Right-Zone Right Coordinate: [\(200, 2.4\) ft](#)
Right-Zone Increment: [20](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(110, -13.2\) ft](#)
Right Coordinate: [\(310, -6.8\) ft](#)

Tension Crack Line

X (ft)	Y (ft)
186.1	-5.3
187.9	-4.1
190.2	-2.6
199	-2.1
200	-2.1

Cohesion Functions

Fill -4 to -8

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [600](#)

3/1/2013

Data Points: [X \(ft\), Cohesion \(psf\)](#)
Data Point: [\(110, 600\)](#)
Data Point: [\(178.1, 600\)](#)
Data Point: [\(178.3, 450\)](#)
Data Point: [\(200, 450\)](#)
Data Point: [\(235.7, 450\)](#)
Data Point: [\(235.9, 600\)](#)
Data Point: [\(310, 600\)](#)

Marsh

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [150](#)
Data Points: [X \(ft\), Cohesion \(psf\)](#)
Data Point: [\(178.2, 150\)](#)
Data Point: [\(200, 275\)](#)
Data Point: [\(235.8, 150\)](#)

Shear/Normal Strength Functions

Sand

Model: [Spline Data Point Function](#)
Function: [Shear Stress vs. Normal Stress](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [0](#)
Data Points: [Normal Stress \(psf\), Shear Stress \(psf\)](#)
Data Point: [\(-10000, 0\)](#)
Data Point: [\(0, 0\)](#)
Data Point: [\(10000, 5773\)](#)
Estimation Properties
Intact Rock Param.: [10](#)
Geological Strength: [100](#)
Disturbance Factor: [0](#)
SigmaC: [600000 psf](#)
Sigma3: [300000 psf](#)
Num. Points: [20](#)

Unit Weight Functions

Fill -4 to -8

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [96](#)

3/1/2013

Data Points: X (ft), Unit Weight (pcf)
Data Point: (110, 96)
Data Point: (178.1, 96)
Data Point: (178.3, 88)
Data Point: (200, 88)
Data Point: (235.7, 88)
Data Point: (235.9, 96)
Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)
Data Point: (235.8, 107)
Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)
Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1

3/1/2013

Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	446.445
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	158.45
Region 8	Fill: EL -4 to -8	32,33,37,35,31	40.6
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	87.02
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40
Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-13.2
Point 17	159.5	-12.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-11.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6

3/1/2013

Point 31	200	-6
Point 32	178.2	-6
Point 33	178.8	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.2	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	187.9	0.4
Point 50	182.9	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.50	(171.275, 17.693)	19.70392	(197.038, 2.2885)	(156.551, -12.8238)
2	3960	1.54	(171.275, 17.693)	32.543	(197.019, 2.28746)	(159.802, -12.76)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	157.28855	-12.972335	746.84178	764.06329	6.2681177	0
2	Optimized	158.76285	-13.26935	764.8612	792.25604	9.9709054	0
3	Optimized	159.52685	-13.423265	774.07175	814.17512	14.596433	0
4	Optimized	160.2369	-13.54189	780.99279	825.32389	16.135203	0
5	Optimized	161.6033	-13.768325	794.13328	851.67707	20.944229	0
6	Optimized	162.9697	-13.99476	807.05717	878.03025	25.832092	0
7	Optimized	164.46125	-14.23758	820.54521	905.92832	31.076914	0
8	Optimized	166.0779	-14.496775	834.53143	936.34377	37.056663	0
			-				

3/1/2013

9	Optimized	167.48965	14.715785	845.20295	961.01674	42.152771	0
10	Optimized	168.69655	-14.894615	853.56318	982.32713	46.866244	0
11	Optimized	169.3105	-14.985585	857.80842	1017.9534	58.287993	0
12	Optimized	169.90935	-14.97334	855.74364	1005.7027	54.58063	0
13	Optimized	171.086	-14.945745	851.0707	1019.8065	61.414805	0
14	Optimized	172.26265	-14.91815	846.49971	1033.8253	68.180948	0
15	Optimized	172.9094	-14.90298	843.83781	1046.4366	116.96106	3.9644e-008
16	Optimized	173.6839	-14.672175	826.21823	1030.0134	117.65172	3.9019e-006
17	Optimized	175.22335	-14.17895	788.46393	1030.659	139.82009	4.6368e-006
18	Optimized	176.8701	-13.65137	748.04026	990.40878	139.92025	4.641e-006
19	Optimized	177.94675	-13.32341	723.79841	976.24083	145.73595	-4.7344e-006
20	Optimized	178.5	-13.183235	713.02046	968.27186	147.35759	4.8868e-006
21	Optimized	179.4	-12.95521	695.44242	954.02196	149.27893	-4.8496e-006
22	Optimized	180.6	-12.65117	672.55721	935.03846	151.5314	-4.9233e-006
23	Optimized	182.05	-12.28379	645.14437	922.78339	160.28204	-5.2061e-006
24	Optimized	182.90805	-12.06639	628.94822	920.18028	168.12936	5.5767e-006
25	Optimized	183.06555	-12.032175	626.33888	926.84939	173.48584	5.7532e-006
26	Optimized	183.93625	-11.844705	612.71362	933.74276	0	182.89
27	Optimized	185.37875	-11.53411	590.01726	947.63572	0	191.16
28	Optimized	186.45335	-11.30273	573.13341	986.20003	0	197.32
29	Optimized	187.35335	-10.907815	546.89839	942.6531	0	202.48
30	Optimized	188.529	-10.222105	502.15844	964.24474	0	209.23
31	Optimized	189.679	-9.377784	448.09554	902.8986	0	215.82
32	Optimized	190.9452	-8.217424	373.86913	842.66481	0	223.08
33	Optimized	192.46655	-6.767255	281.47907	713.33016	0	231.8
34	Optimized	193.69445	-5.553415	205.81457	495.95266	0	450
35	Optimized	194.6918	-4.553415	145.53269	411.70567	0	450
36	Optimized	195.81745	-3.41165	76.064795	312.61669	0	450
37	Optimized	196.71755	-2.517399	20.993694	176.65646	0	450

3/1/2013

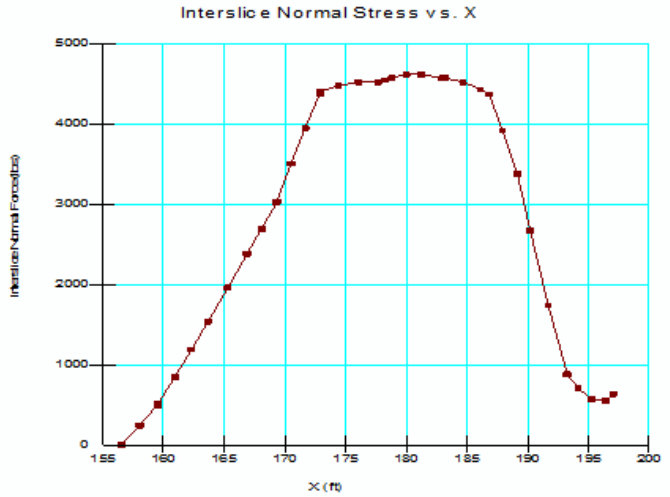
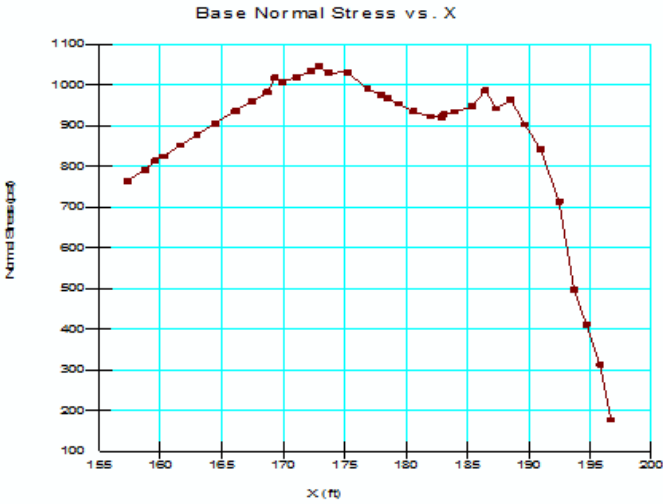
Slices of Slip Surface: 3960

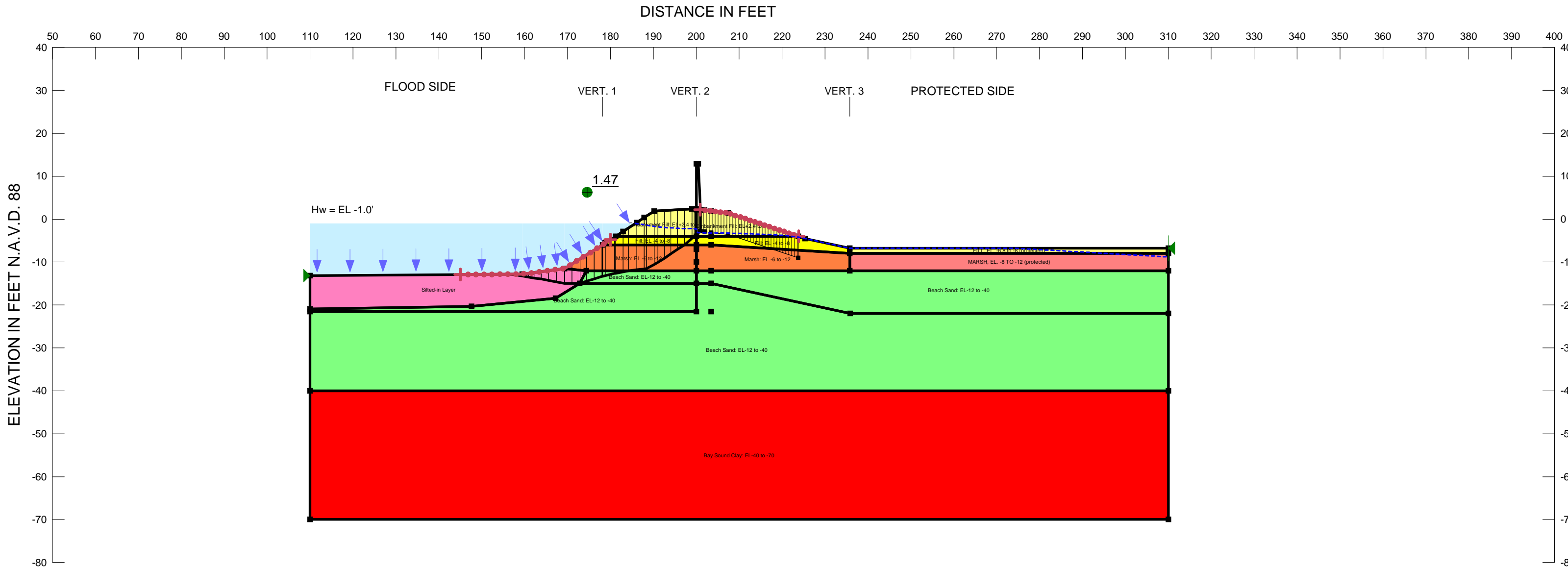
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	3960	160.39535	-12.9706	746.38713	786.44104	14.578432	0
2	3960	161.58265	-13.366465	769.86409	825.80772	20.361816	0
3	3960	162.7699	-13.712465	790.18482	859.96225	25.396906	0
4	3960	163.95715	-14.01024	807.31716	889.20439	29.804515	0
5	3960	165.14445	-14.26114	821.37176	913.77495	33.632009	0
6	3960	166.33175	-14.466265	832.47796	933.79053	36.874759	0
7	3960	167.51905	-14.62649	839.88689	949.48464	39.890319	0
8	3960	168.70635	-14.742475	844.41149	961.03549	42.447664	0
9	3960	169.90035	-14.814855	846.26938	998.71437	55.485437	0
10	3960	171.101	-14.843435	844.93154	1014.251	61.62724	0
11	3960	172.30165	-14.82768	840.94263	1025.4139	67.142055	0
12	3960	173.651	-14.753865	831.16122	1075.5029	141.05937	-4.5797e-006
13	3960	175.03335	-14.62535	816.0263	1115.5078	172.89178	5.7308e-006
14	3960	176.3	-14.45268	799.11018	1104.4802	176.29128	-5.7247e-006
15	3960	177.56665	-14.228835	780.7671	1087.2647	176.94219	-5.7459e-006
16	3960	178.5	-14.035685	765.40499	1072.477	177.27383	5.877e-006
17	3960	179.4	-13.81263	748.30646	1053.447	176.15878	5.8401e-006
18	3960	180.6	-13.478395	723.83653	1023.9129	173.23518	-5.6258e-006
19	3960	182.05	-13.0005	689.62111	990.05725	173.4429	-5.6323e-006
20	3960	183.7457	-12.35105	644.27424	949.07454	175.96235	-5.7143e-006
21	3960	185.3457	-11.63815	596.32805	906.89965	0	190.97
22	3960	187	-10.77923	540.14886	915.38867	0	200.46
23	3960	188.475	-9.924047	484.27776	929.80445	0	208.92
24	3960	189.625	-9.1731985	435.83191	931.32	0	215.51
25	3960	190.7638	-8.3586825	383.03922	890.26208	0	222.04
26	3960	191.8914	-7.4750535	326.22968	806.57001	0	228.51

3/1/2013

27	3960	193.01905	-6.5066025	264.20952	714.53261	0	234.97
28	3960	194.07025	-5.5214615	202.96263	505.5801	0	450
29	3960	195.0449	-4.5214615	142.88847	402.73153	0	450
30	3960	196.27575	-3.1062695	56.998007	209.69659	0	450

3/1/2013





Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 °
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 °
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 °
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
FLOOD SIDE STABILITY ANALYSIS
CASE: E/E Through (Piezo: EL-1.0)
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

E/E Through (Piezo: EL-1.0)

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File Information

Created By: [Johnson, Jehu](#)
Revision Number: 162
Last Edited By: [Johnson, Jehu](#) 8 MVN
Date: 2/11/2013
Time: 9:26:11 AM
File Name: [Reach 35B_Q-Case_FS EL -1.0.gsz](#)
Directory: [G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet](#)
[Pile\Water El -1 Based on SeepW\](#)
Last Solved Date: 2/11/2013
Last Solved Time: 9:31:00 AM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

E/E Through (Piezo: EL-1.0)

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Other GeoStudio Analysis](#)
PWP Other Analysis: [Steady-State Seepage \(EL -1.0\) \(Open Connection\) \[\(last\)\]](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Entry and Exit](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Tension Crack Line](#)
Percentage Wet: [1](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced

3/1/2013

Phi: 0 °
Phi-B: 0 °

FILL, EL. -6.8 to -8 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [600 psf](#)

MARSH, EL. -8 TO -12 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [150 psf](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(145, -12.91717\) ft](#)
Left-Zone Right Coordinate: [\(180, -4.8\) ft](#)
Left-Zone Increment: [20](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(200.9, 2.2\) ft](#)
Right-Zone Right Coordinate: [\(223.9, -4.03333\) ft](#)
Right-Zone Increment: [20](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(110, -13.2\) ft](#)
Right Coordinate: [\(310, -6.8\) ft](#)

Tension Crack Line

X (ft)	Y (ft)
201	-2.8
201.9	-2.9
203.5	-3.1
207.5	-3.6
223.8	-9

Cohesion Functions

Fill -4 to -8

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [600](#)

3/1/2013

Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

Embankment Fill: EL+2.4 to -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [110 pcf](#)
Cohesion: [450 psf](#)

Fill: EL -4 to -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill -4 to -8](#)
Cohesion Fn: [Fill -4 to -8](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Marsh: EL -6 to -12

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [88 pcf](#)
Cohesion Fn: [Marsh](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: [90 pcf](#)
Cohesion: [0 psf](#)
Phi: [20 °](#)
Phi-B: [0 °](#)

Beach Sand: EL-12 to -40

Model: [Shear/Normal Fn.](#)
Unit Weight: [122 pcf](#)
Strength Function: [Sand](#)
Phi-B: [0 °](#)

Bay Sound Clay: EL-40 to -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay](#)
Cohesion Spatial Fn: [Bay Sound Clay](#)

3/1/2013

Data Points: X (ft), Cohesion (psf)
Data Point: [\(110, 600\)](#)
Data Point: [\(178.1, 600\)](#)
Data Point: [\(178.3, 450\)](#)
Data Point: [\(200, 450\)](#)
Data Point: [\(235.7, 450\)](#)
Data Point: [\(235.9, 600\)](#)
Data Point: [\(310, 600\)](#)

Marsh

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [150](#)
Data Points: X (ft), Cohesion (psf)
Data Point: [\(178.2, 150\)](#)
Data Point: [\(200, 275\)](#)
Data Point: [\(235.8, 150\)](#)

Shear/Normal Strength Functions

Sand

Model: [Spline Data Point Function](#)
Function: [Shear Stress vs. Normal Stress](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [0](#)
Data Points: [Normal Stress \(psf\), Shear Stress \(psf\)](#)
Data Point: [\(-10000, 0\)](#)
Data Point: [\(0, 0\)](#)
Data Point: [\(10000, 5773\)](#)
Estimation Properties
Intact Rock Param.: [10](#)
Geological Strength: [100](#)
Disturbance Factor: [0](#)
SigmaC: [600000 psf](#)
Sigma3: [300000 psf](#)
Num. Points: [20](#)

Unit Weight Functions

Fill -4 to -8

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [96](#)

3/1/2013

Data Points: X (ft), Unit Weight (pcf)

- Data Point: (110, 96)
- Data Point: (178.1, 96)
- Data Point: (178.3, 88)
- Data Point: (200, 88)
- Data Point: (235.7, 88)
- Data Point: (235.9, 96)
- Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 107

Data Points: X (ft), Unit Weight (pcf)

- Data Point: (111.2, 107)
- Data Point: (178.2, 107)
- Data Point: (200, 108)
- Data Point: (235.8, 107)
- Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)
Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1

3/1/2013

Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	446.445
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	158.45
Region 8	Fill: EL -4 to -8	32,33,37,35,31	40.6
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	87.02
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40
Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-13.2
Point 17	159.5	-12.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-11.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6

3/1/2013

Point 31	200	-6
Point 32	178.2	-6
Point 33	178.8	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.2	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	187.9	0.4
Point 50	182.9	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.47	(170.236, 30.875)	20.52054	(201, 2.19999)	(156.431, -12.8248)
2	2739	1.51	(170.236, 30.875)	45.931	(201.42, 2.14863)	(156.103, -12.8275)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	157.42365	-12.96586	746.43169	759.69937	4.8290406	0
2	Optimized	158.95805	-13.193175	760.22534	782.21992	8.0053733	0
3	Optimized	160.2252	-13.39486	772.04856	810.99483	14.175284	0
4	Optimized	161.67565	-13.625715	785.46187	838.02572	19.131677	0
5	Optimized	163.1261	-13.856565	798.67092	865.1247	24.187197	0
6	Optimized	164.72915	-14.125035	813.57336	897.68581	30.614429	0
7	Optimized	166.4848	-14.431125	830.23874	933.14884	37.456213	0
8	Optimized	168.3297	-	846.09051	971.48249	45.638947	0

3/1/2013

			14.757635				
9	Optimized	169.2984	-14.931105	854.55991	972.69582	42.997956	0
10	Optimized	170.1825	-14.93424	852.67093	1008.8712	56.852241	0
11	Optimized	171.9909	-14.940655	848.55325	1035.1885	67.929684	0
12	Optimized	173.6584	-14.71425	828.85204	1034.4228	118.67677	4.022e-008
13	Optimized	175.3141	-14.20144	789.27308	1035.7315	142.28137	-4.6216e-006
14	Optimized	177.14235	-13.635205	746.01092	993.30534	142.76399	-4.6381e-006
15	Optimized	178.12825	-13.33548	723.84135	983.19974	149.72856	-4.8646e-006
16	Optimized	178.5	-13.249425	717.08955	979.24138	151.34122	-4.9163e-006
17	Optimized	179.8915	-12.92733	691.93311	960.82482	155.23218	-5.0426e-006
18	Optimized	181.0915	-12.65236	671.08097	949.53218	160.75092	5.3306e-006
19	Optimized	182.05	-12.45522	655.80307	950.5745	170.17265	-5.5276e-006
20	Optimized	183.5568	-12.145315	632.00898	955.08584	186.51347	6.1854e-006
21	Optimized	185.1568	-11.89956	612.48849	992.25978	0	189.89
22	Optimized	187	-11.68329	594.53262	1078.8767	0	200.46
23	Optimized	188.1443	-11.549025	583.4107	1149.7872	0	207.02
24	Optimized	189.2943	-11.033525	549.37895	1093.2631	0	213.61
25	Optimized	190.6247	-10.318405	502.73643	1095.4842	0	221.24
26	Optimized	191.8142	-9.5895775	455.75885	1013.1986	0	228.06
27	Optimized	193.3438	-8.5884925	391.57101	934.91941	0	236.83
28	Optimized	194.88235	-7.5659625	326.08602	850.42395	0	245.66
29	Optimized	196.45885	-6.5024175	258.33092	767.02559	0	254.7
30	Optimized	198.1308	-5.219843	179.68434	534.93376	0	450
31	Optimized	199.28085	-4.239413	120.52976	458.77128	0	450
32	Optimized	199.6843	-3.895465	99.624929	428.07223	0	450
33	Optimized	199.90345	-3.710744	88.367637	415.90394	0	450
34	Optimized	200.25	-3.4229395	25.353141	365.26494	0	450
35	Optimized	200.75	-3.007703	-10.075404	322.1686	0	450

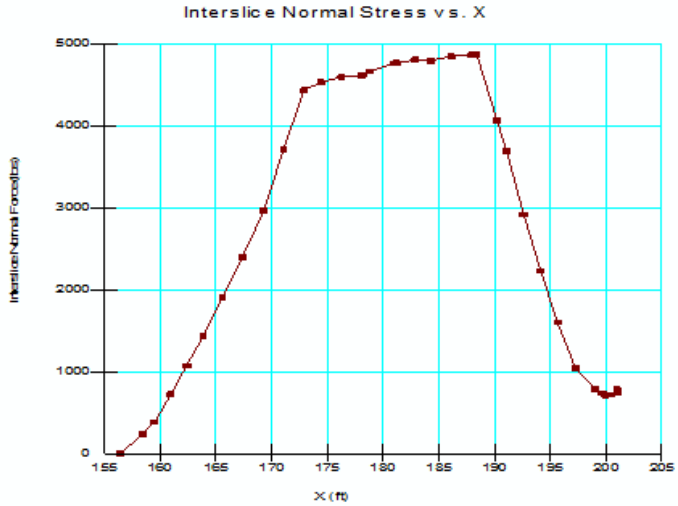
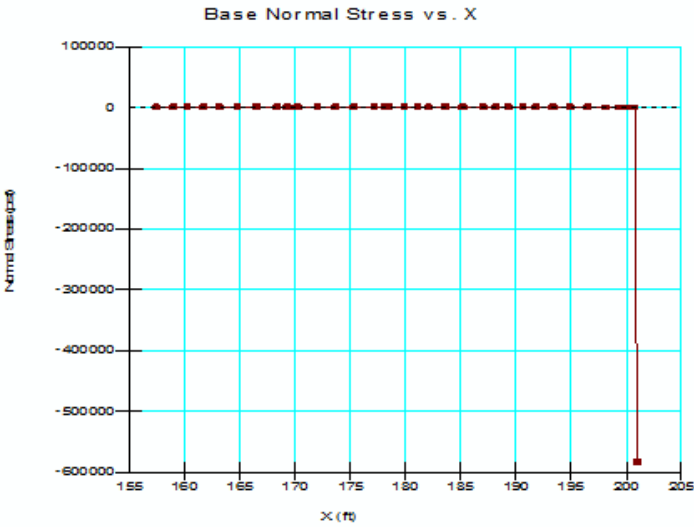
3/1/2013

36	Optimized	201.00005	-2.8000475	-23.245853	-583279.47	0	450
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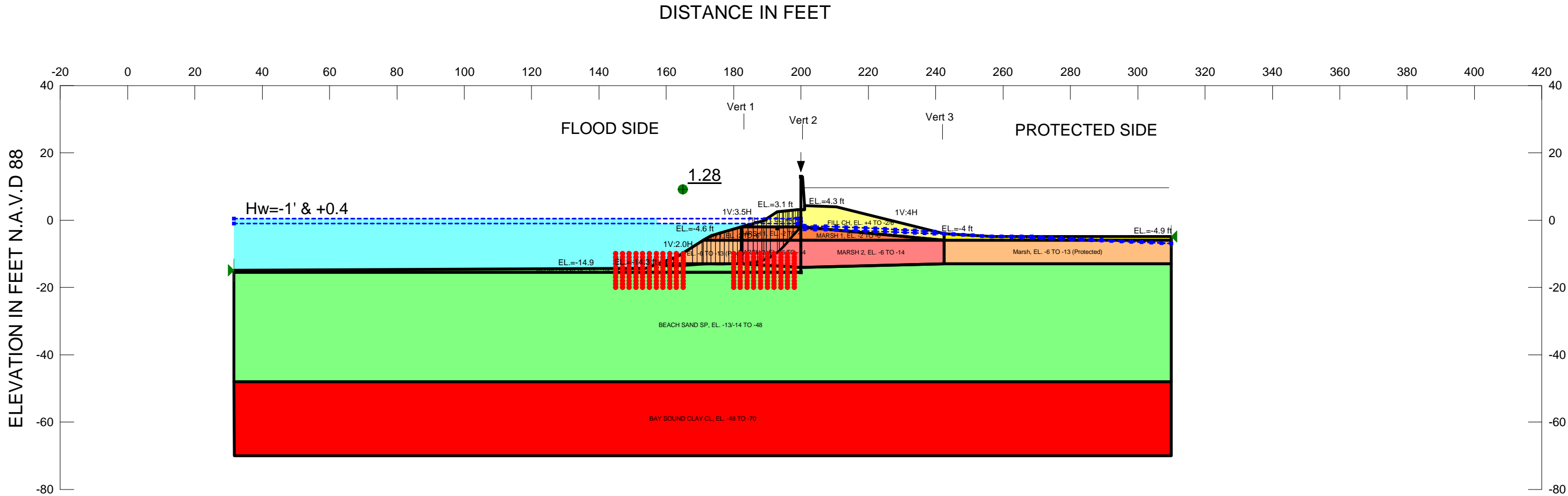
Slices of Slip Surface: 2739

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	2739	156.9524	-13.084055	753.67821	778.53404	9.0467804	0
2	2739	158.6508	-13.562045	782.66636	821.4094	14.101313	0
3	2739	160.31665	-13.96409	806.48247	866.08242	21.69261	0
4	2739	161.95	-14.294555	825.67238	900.40504	27.200462	0
5	2739	163.58335	-14.56392	840.89305	928.73218	31.970828	0
6	2739	165.21665	-14.77327	851.88683	951.20669	36.14947	0
7	2739	166.85	-14.923435	858.84027	967.95071	39.712955	0
8	2739	168.48335	-15.014995	861.22932	979.24533	42.954315	0
9	2739	170.1772	-15.0473	859.44941	1014.547	56.450916	0
10	2739	171.9316	-15.016	853.16777	1032.824	65.389523	0
11	2739	173.6044	-14.925065	841.46849	1089.409	143.13698	-4.648e-006
12	2739	175.03335	-14.800025	826.45342	1135.8042	178.58937	5.9201e-006
13	2739	176.3	-14.64913	811.12426	1130.0178	184.09842	-5.9784e-006
14	2739	177.56665	-14.462355	795.09383	1119.7714	187.43759	6.2144e-006
15	2739	178.5	-14.305075	781.97546	1110.9996	189.94688	-6.1684e-006
16	2739	179.4	-14.128015	767.8495	1099.1909	191.28465	6.3415e-006
17	2739	180.6	-13.866845	747.92068	1080.4733	191.98387	6.3646e-006
18	2739	182.05	-13.501565	720.71959	1062.52	197.32263	6.5419e-006
19	2739	183.7	-13.029935	686.62588	1044.429	206.56108	6.8476e-006
20	2739	185.3	-12.5068	649.57608	1018.9996	213.26957	-6.9257e-006
21	2739	186.40445	-12.1145	622.22131	1020.6637	230.02228	7.6259e-006
22	2739	187.30445	-11.761575	598.44042	1051.9588	0	202.2
23	2739	188.475	-11.27433	565.92134	1084.9493	0	208.92
			-				

24	2739	189.625	10.757725	531.85401	1112.6439	0	215.51
25	2739	190.94195	-10.115147	489.59462	1092.0583	0	223.06
26	2739	192.42585	-9.3308695	438.81702	1021.9043	0	231.57
27	2739	193.9097	-8.4750165	383.42116	944.89599	0	240.08
28	2739	195.39355	-7.542791	323.9219	860.61576	0	248.59
29	2739	196.87745	-6.528467	259.38461	768.52057	0	257.1
30	2739	198.3097	-5.466739	194.18978	588.85166	0	450
31	2739	199.5	-4.520084	137.01438	496.41318	0	450
32	2739	200.06245	-4.053345	97.794436	428.03858	0	450
33	2739	200.31245	-3.837514	42.177131	402.76933	0	450
34	2739	200.75	-3.452801	17.792666	355.77858	0	450
35	2739	201.21015	-3.038637	8.4545429	193.51021	0	450



APPENDIX J.3 FLOODSIDE STABILITY ANALYSES SUDDEN DRAWDOWN RESULTS



Name: FILL CH, EL. +4 TO -2/6 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Fill Phi: 0 ° Piezometric Line: 2
Name: MARSH 1, EL. -2 TO -6 Model: Undrained (Phi=0) Unit Weight: 80 pcf Cohesion: 200 psf Piezometric Line: 2
Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: CLAY Phi: 0 ° Piezometric Line: 2
Name: MARSH 2, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Marsh 1 Phi: 0 ° Piezometric Line: 2
Name: Fill (Protected), EL -4 to -6 Model: Undrained (Phi=0) Unit Weight: 107 pcf Cohesion: 600 psf Piezometric Line: 2
Name: Marsh, EL. -6 TO -13 (Protected) Model: Undrained (Phi=0) Unit Weight: 101 pcf Cohesion: 190 psf Piezometric Line: 2



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A, STA. 85+90 TO STA. 89+50
PROTECTED SIDE STABILITY ANALYSIS,
CASE: block El +0.4 & -1.0 (sudden drawdown) Floodside
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

block El +0.4 & -1.0 (sudden drawdown)

Floodside

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: Liljegren, James
Revision Number: 545
Last Edited By: Johnson, Jehu B MVN
Date: 1/23/2013
Time: 8:58:51 AM
File Name: Reach 12A el -1.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/23/2013
Last Solved Time: 8:59:50 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

block El +0.4 & -1.0 (sudden drawdown) Floodside

Kind: SLOPE/W
Parent: Seep/W water EL +0.4
Method: Spencer
Settings
 Apply Phreatic Correction: Yes
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Block
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line

3/1/2013

Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
 FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +4 TO -2/6
Model: Spatial Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion Fn: Fill
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

MARSH 1, EL. -2 TO -6
Model: Undrained (Phi=0)
Unit Weight: 80 pcf
Cohesion: 200 psf
Pore Water Pressure
 Piezometric Line: 2

BEACH SAND SP, EL. -13/-14 TO -48
Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70
Model: Spatial Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion Spatial Fn: CLAY
Phi: 0 °

3/1/2013

block El +0.4 & -1.0 (sudden drawdown) Floodside

Page 3 of 11

Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

MARSH 2, EL. -6 TO -14
Model: Spatial Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion Fn: Marsh 1
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

Fill (Protected), EL -4 to -6
Model: Undrained (Phi=0)
Unit Weight: 107 pcf
Cohesion: 600 psf
Pore Water Pressure
 Piezometric Line: 2

Marsh, EL. -6 TO -13 (Protected)
Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 190 psf
Pore Water Pressure
 Piezometric Line: 2

Slip Surface Limits

Left Coordinate: (31.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Slip Surface Block

Left Grid
 Upper Left: (145, -10) ft
 Lower Left: (145, -20) ft
 Lower Right: (165, -20) ft
 X Increments: 10
 Y Increments: 10
 Starting Angle: 135 °
 Ending Angle: 155 °
 Angle Increments: 4
Right Grid
 Upper Left: (180, -10) ft
 Lower Left: (180, -20) ft
 Lower Right: (198, -20) ft
 X Increments: 9
 Y Increments: 10
 Starting Angle: 25 °

3/1/2013

block El +0.4 & -1.0 (sudden drawdown) Floodside

Page 4 of 11

Ending Angle: 45 °
Angle Increments: 4

Piezometric Lines

Piezometric Line 1

Coordinates		
	X (ft)	Y (ft)
	31.6	0.4
	199	0.4
	200	0.4
	201	-1.71131
	201	-1.7132
	204.16667	-1.79118
	207.33333	-1.87953
	210.5	-1.97023
	213.40909	-2.06549
	216.31818	-2.18215
	219.22727	-2.31322
	222.13636	-2.45483
	225.04545	-2.60349
	227.95455	-2.75736
	230.86364	-2.91437
	233.77273	-3.07517
	236.68182	-3.24328
	239.59091	-3.4286
	242.5	-4
	245.32	-4.18
	248.14	-4.36
	250.96	-4.54
	253.78	-4.72
	256.6	-4.9
	259.56667	-4.9
	262.53333	-4.9
	265.5	-4.9
	268.46667	-4.9
	271.43333	-5.02004
	274.4	-5.15669
	277.36667	-5.29741
	280.33333	-5.44098
	283.3	-5.58581
	286.26667	-5.73127

3/1/2013

	289.23333	-5.87706
	292.2	-6.02304
	295.16667	-6.16912
	298.13333	-6.31522
	301.1	-6.46149
	304.06667	-6.60671
	307.03333	-6.75795
	310	-6.87191

Piezometric Line 2

Coordinates

X (ft)	Y (ft)
31.6	-1
199	-1
200	-1
201	-2.70604
201	-2.70756
204.16667	-2.77055
207.33333	-2.84189
210.5	-2.91508
213.40909	-2.99191
216.31818	-3.08593
219.22727	-3.19145
222.13636	-3.30523
225.04545	-3.4243
227.95455	-3.54679
230.86364	-3.6706
233.77273	-3.7953
236.68182	-3.92059
239.59091	-4.04729
242.5	-4.18373
245.32	-4.31306
248.14	-4.43229
250.96	-4.54654
253.78	-4.72
256.6	-4.9
259.56667	-4.9
262.53333	-5.01553
265.5	-5.13032
268.46667	-5.24713
271.43333	-5.36453
274.4	-5.48233
277.36667	-5.6003

3/1/2013

	280.33333	-5.71838
	283.3	-5.8365
	286.26667	-5.95464
	289.23333	-6.0728
	292.2	-6.19096
	295.16667	-6.30912
	298.13333	-6.42726
	301.1	-6.54552
	304.06667	-6.66292
	307.03333	-6.78517
	310	-6.8773

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 100000 lbs
Shear Safety Factor: 1
Shear Load Used: 100000 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
192.9	-2.5
200	-1.9

Cohesion Functions

Marsh 1

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 190
Data Points: X (ft), Cohesion (psf)

3/1/2013

Data Point: (182.3, 190)
Data Point: (200, 200)
Data Point: (242.5, 190)

Fill

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
Data Point: (182.3, 600)
Data Point: (200, 700)
Data Point: (242.5, 600)

Spatial Functions

CLAY

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (131.6, -48, 610)
Data Point: (131.6, -70, 855)
Data Point: (182.3, -48, 610)
Data Point: (182.3, -70, 855)
Data Point: (200, -48, 900)
Data Point: (200, -70, 900)
Data Point: (242.5, -48, 610)
Data Point: (242.5, -70, 855)
Data Point: (310, -48, 610)
Data Point: (310, -70, 855)

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,32,33,36	214.17643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	9301.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	6123.7
Region 9	Fill (Protected), EL. -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75

3/1/2013

Region 13		28,29,23,19,24	7.65
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11

Points

	X (ft)	Y (ft)
Point 1	31.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	31.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	31.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	31.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13

3/1/2013

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.28	(174.507, 1.039)	20.75956	(199.996, 3.1)	(157.43, -12.9995)
2	11308	1.56	(174.507, 1.039)	22.172	(199.182, 3.1)	(154.714, -14)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	158.4935	-13.299285	854.85131	855.34908	0.28738738	0
2	Optimized	160.1975	-13.59625	873.36926	888.43543	8.6984551	0
3	Optimized	161.4785	-13.59053	872.97895	905.6093	18.839141	0
4	Optimized	162.7595	-13.58481	872.6667	922.7051	28.889688	0
5	Optimized	163.4605	-13.58168	872.41797	950.79668	45.251974	0
6	Optimized	164.58375	-13.53447	869.50718	964.40097	54.786952	0
7	Optimized	166.70245	-13.41187	861.86701	991.70439	74.961643	0
8	Optimized	168.4754	-13.275975	853.3711	1011.6627	91.389708	0
9	Optimized	169.90945	-13.155505	845.86649	1028.2006	105.27067	0
10	Optimized	170.81325	-13.09363	842.00234	1056.1574	123.64248	0
11	Optimized	171.55	-13.087155	841.59514	1064.5957	128.74944	0
12	Optimized	172.65	-13.077485	840.99516	1073.1408	134.02937	0
13	Optimized	173.8689	-13.06677	840.29154	1070.9569	133.17469	0
14	Optimized	175.2067	-13.055015	839.61883	1075.7406	136.32497	0
15	Optimized	176.54455	-13.04326	838.87137	1080.5243	139.5184	0
16	Optimized	177.8824	-13.0315	838.12391	1085.3828	142.75499	0
17	Optimized	179.17605	-13.025485	837.72349	1092.7698	147.25105	0
18	Optimized	180.4256	-13.025215	837.72349	1098.6118	150.62392	0
19	Optimized	181.6752	-13.024945	837.72349	1104.4537	153.99679	0
20	Optimized	182.5209	-13.02476	837.69776	1109.8839	157.14674	0
21	Optimized	183.51295	-12.8968	742.3328	1067.795	0	190.69
22	Optimized	185.0552	-12.640985	726.40511	1060.6947	0	191.56
23	Optimized	186.45665	-12.408525	711.89168	1065.5955	0	192.35
24	Optimized	187.7173	-	698.8466	1082.342	0	193.06

3/1/2013

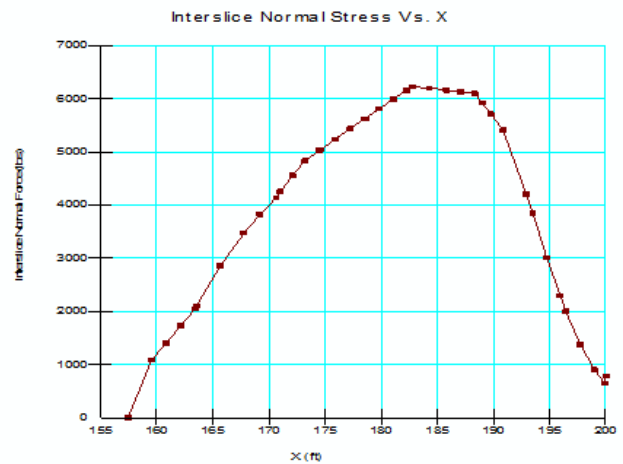
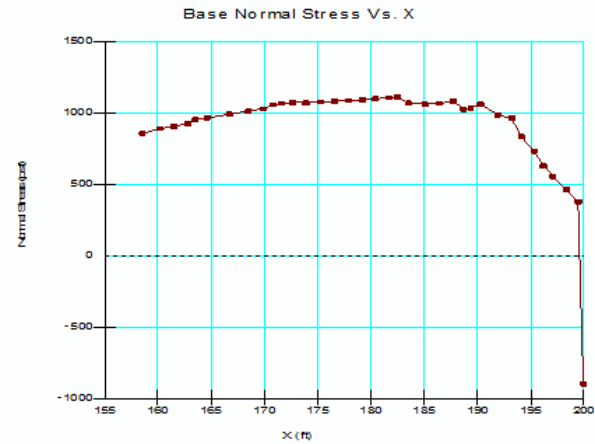
			12.199415			
25	Optimized	188.6738	-11.96222	684.04326	1025.4117	0
26	Optimized	189.375	-11.67709	666.25002	1032.8469	0
27	Optimized	190.3022	-11.30005	642.72109	1059.5852	0
28	Optimized	191.8772	-10.305441	580.66262	984.95503	0
29	Optimized	193.2025	-9.307646	518.39281	961.84283	0
30	Optimized	194.11315	-8.460585	465.54	831.63209	0
31	Optimized	195.3294	-7.221935	388.24667	730.01825	0
32	Optimized	196.19755	-6.301305	330.80086	626.07442	0
33	Optimized	197.0932	-5.263557	266.04351	553.4585	0
34	Optimized	198.3644	-3.7906715	174.13795	460.61748	0
35	Optimized	199.45495	-2.5271145	95.291713	376.70746	0
36	Optimized	199.9529	-1.950175	59.290609	-899.55808	0

Slices of Slip Surface: **11308**

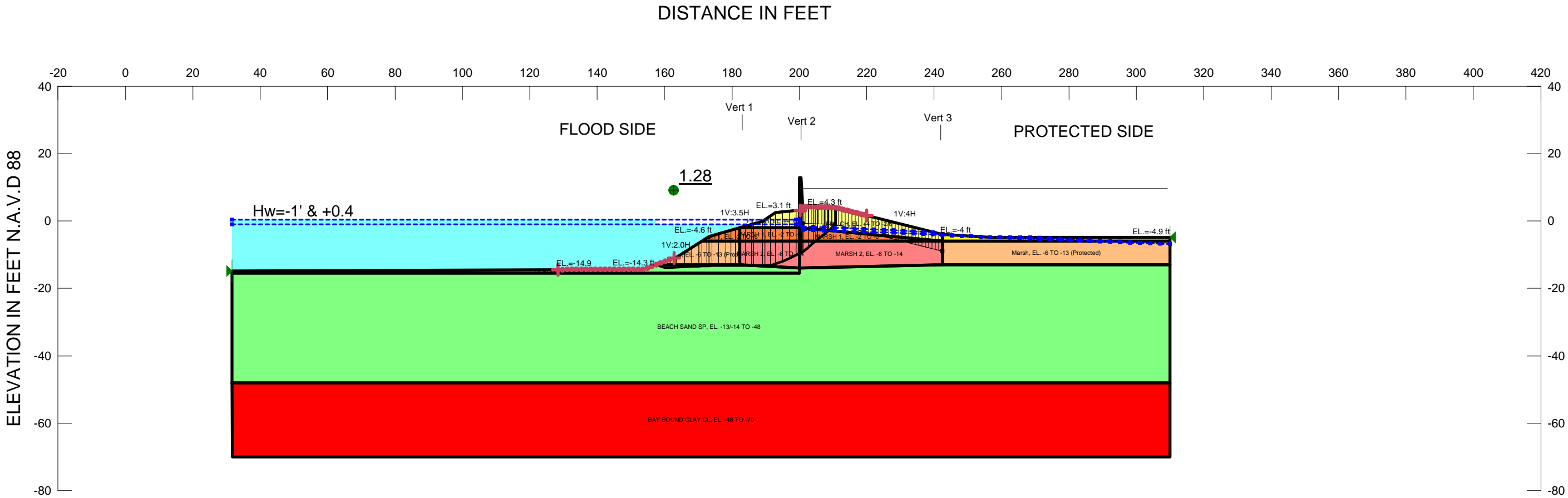
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	11308	155.39285	-14	898.57951	953.17955	31.523345	0
2	11308	156.75	-14	898.57951	982.94799	48.710161	0
3	11308	158.175	-14	898.54554	913.01444	8.3536238	0
4	11308	159.66785	-14	898.54494	933.6454	20.265259	0
5	11308	161.1607	-14	898.54494	954.34395	32.215574	0
6	11308	162.65355	-14	898.54554	974.97617	44.127244	0
7	11308	164.16	-14	898.55263	1021.7105	71.105244	0
8	11308	165.68	-14	898.55263	1055.8553	90.818717	0
9	11308	167.2	-14	898.55263	1090	110.53219	0
10	11308	168.72	-14	898.55263	1124.2105	130.28365	0
11	11308	170.24	-14	898.55263	1158.3553	149.99712	0
12	11308	172.1	-14	898.54545	1185.1364	165.46334	0
13	11308	173.93335	-14	898.56798	1188.6134	167.45778	0
14	11308	175.4	-14	898.56798	1195.4315	171.39426	0
15	11308	176.86665	-14	898.56798	1202.2497	175.33074	0
16	11308	178.33335	-14	898.56798	1209.0679	179.26722	0
17	11308	179.8	-14	898.56798	1215.8179	183.16433	0
18	11308	181.26665	-14	898.56798	1222.6361	187.10081	0
19	11308	182.15	-13.89497	892.00191	1074.1267	105.1498	0
20	11308	182.82195	-13.42446	862.60945	1029.8268	96.543004	0
21	11308	183.9645	-12.62443	725.3713	927.45363	0	190.94
22	11308	185.2057	-11.75533	671.12189	859.80687	0	191.64
23	11308	186.61975	-10.765225	609.34029	796.21016	0	192.44

3/1/2013

24	11308	188.2066	-9.6541085	540.01261	736.58731	0	193.34
25	11308	189.375	-8.8359695	488.96826	706.91732	0	194
26	11308	190.5375	-8.0219785	438.17092	707.33128	0	194.65
27	11308	192.1125	-6.9191515	369.35695	707.9554	0	195.54
28	11308	193.1626	-6.183869	323.47508	693.53969	0	196.14
29	11308	194.12205	-5.512059	281.55082	648.23163	0	200
30	11308	195.51575	-4.536177	220.65972	589.57399	0	200
31	11308	196.90945	-3.560295	159.76274	530.8752	0	200
32	11308	198.30315	-2.584413	98.865756	472.19404	0	200
33	11308	199.0689	-2.048236	65.412754	439.27976	0	200
34	11308	199.1598	-1.9845695	61.43633	-1672.1722	0	695.25



3/1/2013



Name: FILL CH, EL. +4 TO -2/6 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Fill Phi: 0 ° Piezometric Line: 2

Name: MARSH 1, EL. -2 TO -6 Model: Undrained (Phi=0) Unit Weight: 80 pcf Cohesion: 200 psf Piezometric Line: 2

Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: CLAY Phi: 0 ° Piezometric Line: 2

Name: MARSH 2, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Marsh 1 Phi: 0 ° Piezometric Line: 2

Name: Fill (Protected), EL -4 to -6 Model: Undrained (Phi=0) Unit Weight: 107 pcf Cohesion: 600 psf Piezometric Line: 2

Name: Marsh, EL. -6 TO -13 (Protected) Model: Undrained (Phi=0) Unit Weight: 101 pcf Cohesion: 190 psf Piezometric Line: 2



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A, STA. 85+90 TO STA. 89+50
PROTECTED SIDE STABILITY ANALYSIS,
CASE: entry exit El +0.4 & -1.0 (sudden drawdown) (Thru Sheetpile)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

entry exit El +0.4 & -1.0 (sudden drawdown) (Thru Sheetpile)

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File Information

Created By: Liljegren, James
Revision Number: 532
Last Edited By: Schroeder, Danielle MVN
Date: 1/19/2013
Time: 3:44:55 PM
File Name: Reach 12A el -1.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/19/2013
Last Solved Time: 5:54:44 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

entry exit El +0.4 & -1.0 (sudden drawdown) (Thru Sheetpile)

Kind: SLOPE/W
Parent: Seep/W water EL +0.4
Method: Spencer
Methods
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line

Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +4 TO -2/6

Model: Spatial Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion Fn: Fill
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

MARSH 1, EL. -2 TO -6

Model: Undrained (Phi=0)
Unit Weight: 80 pcf
Cohesion: 200 psf
Pore Water Pressure
 Piezometric Line: 2

BEACH SAND SP, EL. -13/-14 TO -48

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion Spatial Fn: CLAY
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure

3/1/2013

3/1/2013

entry exit El +0.4 & -1.0 (sudden drawdown) (Thru Sheetpile)

Page 3 of 12

entry exit El +0.4 & -1.0 (sudden drawdown) (Thru Sheetpile)

Page 4 of 12

Piezometric Line: 2

MARSH 2, EL. -6 TO -14
Model: Spatial Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion Fn: Marsh 1
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

Fill (Protected), EL -4 to -6
Model: Undrained (Phi=0)
Unit Weight: 107 pcf
Cohesion: 600 psf
Pore Water Pressure
 Piezometric Line: 2

Marsh, EL. -6 TO -13 (Protected)
Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 190 psf
Pore Water Pressure
 Piezometric Line: 2

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (128.3, -14.42559) ft
Left-Zone Right Coordinate: (162.8, -11.02105) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (200.2, 3.1) ft
Right-Zone Right Coordinate: (220, 1.625) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (31.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

--	--	--	--

	X (ft)	Y (ft)
	31.6	0.4
	199	0.4
	200	0.4
	201	-1.71131
	201	-1.7132
	204.16667	-1.79118
	207.33333	-1.87953
	210.5	-1.97023
	213.40909	-2.06549
	216.31818	-2.18215
	219.22727	-2.31322
	222.13636	-2.45483
	225.04545	-2.60349
	227.95455	-2.75736
	230.86364	-2.91437
	233.77273	-3.07517
	236.68182	-3.24328
	239.59091	-3.4286
	242.5	-4
	245.32	-4.18
	248.14	-4.36
	250.96	-4.54
	253.78	-4.72
	256.6	-4.9
	259.56667	-4.9
	262.53333	-4.9
	265.5	-4.9
	268.46667	-4.9
	271.43333	-5.02004
	274.4	-5.15669
	277.36667	-5.29741
	280.33333	-5.44098
	283.3	-5.58581
	286.26667	-5.73127
	289.23333	-5.87706
	292.2	-6.02304
	295.16667	-6.16912
	298.13333	-6.31522
	301.1	-6.46149
	304.06667	-6.60671
	307.03333	-6.75795
	310	-6.87191

3/1/2013

3/1/2013

Piezometric Line 2

Coordinates

X (ft)	Y (ft)
31.6	-1
199	-1
200	-1
201	-2.7060402
201	-2.7075631
204.16667	-2.7705516
207.33333	-2.8418871
210.5	-2.9150773
213.40909	-2.9919075
216.31818	-3.0859312
219.22727	-3.1914473
222.13636	-3.3052335
225.04545	-3.4243002
227.95455	-3.546789
230.86364	-3.6705985
233.77273	-3.7952989
236.68182	-3.9205871
239.59091	-4.0472901
242.5	-4.183733
245.32	-4.3130606
248.14	-4.4322881
250.96	-4.5465425
253.78	-4.72
256.6	-4.9
259.56667	-4.9
262.53333	-5.0155319
265.5	-5.1303172
268.46667	-5.2471281
271.43333	-5.3645316
274.4	-5.482325
277.36667	-5.6003039
280.33333	-5.7183792
283.3	-5.8365001
286.26667	-5.9546439
289.23333	-6.0727994
292.2	-6.1909594
295.16667	-6.3091237
298.13333	-6.4272602
301.1	-6.5455206

304.06667	-6.6629162
307.03333	-6.7851749
310	-6.877296

Tension Crack Line

X (ft)	Y (ft)
201	-0.7
210.5	-1
242.5	-9

Cohesion Functions

Marsh 1

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 190
Data Points: X (ft), Cohesion (psf)
Data Point: (182.3, 190)
Data Point: (200, 200)
Data Point: (242.5, 190)

Fill

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
Data Point: (182.3, 600)
Data Point: (200, 700)
Data Point: (242.5, 600)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)

3/1/2013

3/1/2013

Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Spatial Functions

CLAY

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (131.6, -48, 610)
Data Point: (131.6, -70, 855)
Data Point: (182.3, -48, 610)
Data Point: (182.3, -70, 855)
Data Point: (200, -48, 900)
Data Point: (200, -70, 900)
Data Point: (242.5, -48, 610)
Data Point: (242.5, -70, 855)
Data Point: (310, -48, 610)
Data Point: (310, -70, 855)

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,32,33,36	214.17643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	9301.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	6123.7
Region 9	Fill (Protected), EL. -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13		28,29,23,19,24	7.65
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11

	X (ft)	Y (ft)
Point 1	31.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	31.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	31.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	31.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.28	(172.66, 47.285)	25.28062	(210.689, 3.95281)	(157.431, -12.9991)
2	14725	1.39	(172.66, 47.285)	62.117	(211.444, 3.76403)	(157.533, -12.9617)

Points

3/1/2013

3/1/2013

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	158.7338	-13.430625	863.04353	862.13272	0	0
2	Optimized	160.87745	-13.828455	887.85558	915.48409	15.951328	-1.8258e-007
3	Optimized	162.55915	-13.76109	883.63703	930.33813	26.962891	-3.0864e-007
4	Optimized	164.64005	-13.677735	878.45713	972.49121	54.290598	7.8729e-007
5	Optimized	166.94395	-13.58111	872.39836	1012.508	80.892326	-4.2946e-007
6	Optimized	169.07165	-13.487205	866.57611	1049.3666	105.53412	2.9038e-006
7	Optimized	170.56775	-13.42018	862.38403	1074.7563	122.6132	3.3734e-006
8	Optimized	171.75785	-13.364925	858.96396	1085.0244	130.51609	-6.9304e-007
9	Optimized	172.85785	-13.312585	855.66333	1088.1942	134.25175	-7.1279e-007
10	Optimized	173.6232	-13.274215	853.26795	1082.5941	132.40152	-7.0294e-007
11	Optimized	175.07385	-13.246215	851.52355	1094.4545	140.25624	-9.952e-006
12	Optimized	177.1287	-13.232645	850.69626	1102.63	145.45404	-7.7233e-007
13	Optimized	178.8873	-13.223065	850.10301	1110.4265	150.29786	-7.9812e-007
14	Optimized	180.3497	-13.217475	849.76111	1116.7859	154.16684	-1.0939e-005
15	Optimized	181.69045	-13.21624	849.66827	1124.3872	158.60907	-8.423e-007
16	Optimized	183.1816	-13.22005	849.89258	1137.9543	166.31249	-8.8303e-007
17	Optimized	184.94475	-13.224555	850.17616	1158.7691	178.16623	-9.46e-007
18	Optimized	186.082	-13.227465	850.35756	1176.9834	188.57752	-1.0013e-006
19	Optimized	187.66885	-13.23152	763.23692	1225.5361	0	193.03
20	Optimized	189.375	-13.23588	763.51745	1293.1957	0	194
21	Optimized	190.5855	-13.238975	763.73201	1379.948	0	194.68
22	Optimized	192.1605	-12.986675	747.97247	1377.0903	0	195.57

3/1/2013

23	Optimized	193.9296	-12.37798	710.00863	1378.9652	0	196.57
24	Optimized	195.9694	-11.54737	658.13507	1286.4099	0	197.72
25	Optimized	197.9898	-10.59467	598.72787	1213.7065	0	198.86
26	Optimized	199.2967	-9.978415	560.25368	1163.6906	0	199.6
27	Optimized	199.7967	-9.733059	544.94985	1128.6282	0	199.89
28	Optimized	200.25	-9.4979405	503.66291	1106.3753	0	199.94
29	Optimized	200.5602	-9.337055	460.59977	1091.5462	0	199.87
30	Optimized	200.8102	-9.2073875	425.88775	1079.5797	0	199.81
31	Optimized	201.0361	-9.090219	398.23488	1192.1343	0	199.76
32	Optimized	201.8458	-8.440513	356.68566	1060.5359	0	199.57
33	Optimized	203.39305	-7.178539	276.01982	939.58226	0	199.2
34	Optimized	204.50235	-6.273776	218.13223	852.84772	0	198.94
35	Optimized	205.13345	-5.75902	185.11986	807.59784	0	200
36	Optimized	206.3811	-4.7344115	119.43299	728.02347	0	200
37	Optimized	207.83005	-3.5420015	42.970453	637.14194	0	200
38	Optimized	208.47485	-3.002456	8.3730874	584.62273	0	200
39	Optimized	208.65365	-2.844525	1.7396254	572.64243	0	200
40	Optimized	209.17745	-2.381915	-31.362116	242.3381	0	678.41
41	Optimized	210.08525	-1.5801775	82.699457	160.38934	0	676.27
42	Optimized	210.59435	-1.130535	111.51272	-184.52951	0	675.07

Slices of Slip Surface: **14725**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	14725	157.60915	-12.980855	747.62109	829.50189	0	190
2	14725	158.6382	-13.220695	849.93906	826.87235	0	0
3	14725	160.54295	-13.63082	875.52355	905.33759	17.213144	-1.9815e-007
4	14725	162.44765	-13.979	897.25345	977.05649	46.07431	3.0647e-006
5	14725	164.35	-14.266	915.17163	1061.6846	84.589321	2.3302e-006
6	14725	166.25	-14.492815	929.32726	1132.4998	117.30173	-6.2351e-007
7	14725	168.15	-14.660535	939.77621	1193.9982	146.77513	-7.8e-007
8	14725	170.05	-14.76964	946.58457	1246.53	173.1736	-9.2016e-

3/1/2013

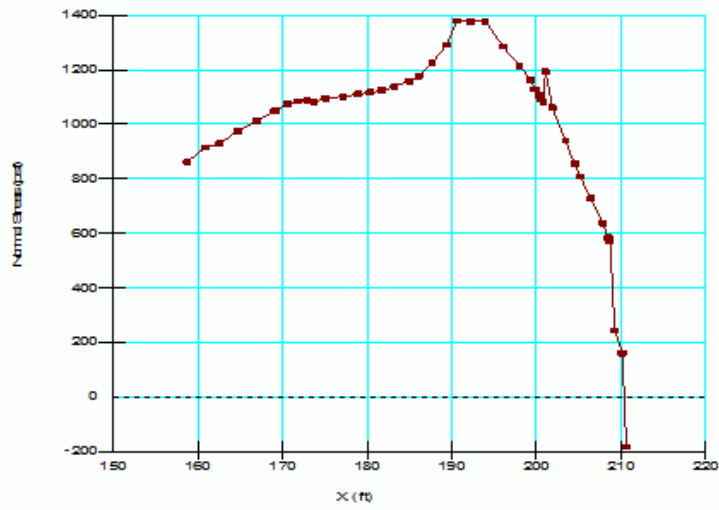
							007
9	14725	172.1	-14.819505	949.68885	1278.221	189.67813	-1.0078e-006
10	14725	174.11	-14.80816	948.97215	1278.0034	189.96626	-1.0092e-006
11	14725	175.93	-14.73892	944.67684	1271.2013	188.51899	-1.3386e-005
12	14725	177.75	-14.616105	937.0022	1258.0066	185.332	-9.8465e-007
13	14725	179.57	-14.43939	925.97345	1238.4717	180.42097	-9.5853e-007
14	14725	181.39	-14.20832	911.57301	1212.6744	173.84099	-9.2363e-007
15	14725	183.1816	-13.92759	894.06691	1186.63	168.91136	-8.9756e-007
16	14725	184.94475	-13.598165	873.46708	1160.4531	165.69145	-8.8019e-007
17	14725	186.22075	-13.33204	856.87371	1144.9435	166.31717	-8.8355e-007
18	14725	187.8076	-12.943905	745.28084	1142.5444	0	193.11
19	14725	189.375	-12.53923	720.04843	1157.905	0	194
20	14725	190.5375	-12.197765	698.71136	1200.5358	0	194.65
21	14725	192.1125	-11.701375	667.73756	1254.5555	0	195.54
22	14725	193.91665	-11.07134	628.45709	1249.6592	0	196.56
23	14725	195.95	-10.289744	579.69415	1184.3724	0	197.71
24	14725	197.98335	-9.424487	525.67457	1110.8951	0	198.86
25	14725	199.5	-8.7309195	482.41089	1046.2021	0	199.72
26	14725	200.25	-8.3674035	433.11623	1007.8271	0	199.94
27	14725	200.5602	-8.2132055	390.46914	992.11179	0	199.87
28	14725	200.8102	-8.0864485	355.93414	979.2533	0	199.81
29	14725	201.79165	-7.5695165	302.40456	1047.7118	0	199.58
30	14725	203.375	-6.698647	246.09714	954.17469	0	199.21
31	14725	204.3757	-6.1241055	208.97767	892.76806	0	198.97
32	14725	205.27185	-5.57606	173.50945	842.62218	0	200
33	14725	206.64615	-4.7028935	117.09198	767.68149	0	200
34	14725	208.3082	-3.570309	44.047831	671.25904	0	200

3/1/2013

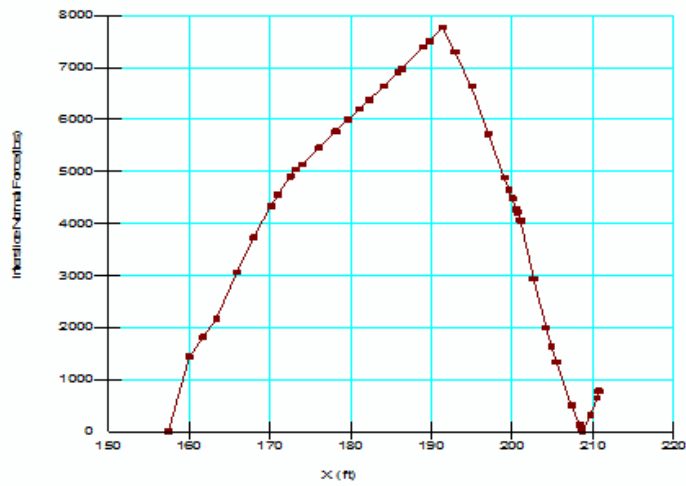
35	14725	209.89155	-2.431282	-29.311033	343.58558	0	676.73
36	14725	210.50335	-1.9730315	58.788948	286.49302	0	675.29
37	14725	210.9753	-1.6032095	82.644232	171.91828	0	674.18

3/1/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X



entry exit El +0.4 & -1.0 (sudden drawdown) (Around Sheetpile)

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File Information

Created By: Lijegren, James
Revision Number: 532
Last Edited By: Schroeder, Danielle MVN
Date: 1/19/2013
Time: 3:44:55 PM
File Name: Reach 12A el -1.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/19/2013
Last Solved Time: 5:52:36 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

entry exit El +0.4 & -1.0 (sudden drawdown) (Around Sheetpile)

Kind: SLOPE/W
Parent: Seep/W water EL +0.4
Method: Spencer
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Search for Tension Crack

Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
 FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +4 TO -2/6
Model: Spatial Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion Fn: Fill
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

MARSH 1, EL. -2 TO -6
Model: Undrained (Phi=0)
Unit Weight: 80 pcf
Cohesion: 200 psf
Pore Water Pressure
 Piezometric Line: 2

BEACH SAND SP, EL. -13/-14 TO -48
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70
Model: Spatial Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion Spatial Fn: CLAY
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure

3/1/2013

3/1/2013

entry exit El +0.4 & -1.0 (sudden drawdown) (Around Sheetpile)

Page 3 of 12

entry exit El +0.4 & -1.0 (sudden drawdown) (Around Sheetpile)

Page 4 of 12

Piezometric Line: 2

MARSH 2, EL. -6 TO -14
Model: Spatial Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion Fn: Marsh 1
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

Fill (Protected), EL -4 to -6
Model: Undrained (Phi=0)
Unit Weight: 107 pcf
Cohesion: 600 psf
Pore Water Pressure
 Piezometric Line: 2

Marsh, EL. -6 TO -13 (Protected)
Model: Undrained (Phi=0)
Unit Weight: 101 pcf
Cohesion: 190 psf
Pore Water Pressure
 Piezometric Line: 2

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (126.2, -14.4359) ft
Left-Zone Right Coordinate: (161.22857, -11.6) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (201, 4.3) ft
Right-Zone Right Coordinate: (239.82353, -3.33088) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (31.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates		

	X (ft)	Y (ft)
	31.6	0.4
	199	0.4
	200	0.4
	201	-1.71131
	201	-1.7132
	204.16667	-1.79118
	207.33333	-1.87953
	210.5	-1.97023
	213.40909	-2.06549
	216.31818	-2.18215
	219.22727	-2.31322
	222.13636	-2.45483
	225.04545	-2.60349
	227.95455	-2.75736
	230.86364	-2.91437
	233.77273	-3.07517
	236.68182	-3.24328
	239.59091	-3.4286
	242.5	-4
	245.32	-4.18
	248.14	-4.36
	250.96	-4.54
	253.78	-4.72
	256.6	-4.9
	259.56667	-4.9
	262.53333	-4.9
	265.5	-4.9
	268.46667	-4.9
	271.43333	-5.02004
	274.4	-5.15669
	277.36667	-5.29741
	280.33333	-5.44098
	283.3	-5.58581
	286.26667	-5.73127
	289.23333	-5.87706
	292.2	-6.02304
	295.16667	-6.16912
	298.13333	-6.31522
	301.1	-6.46149
	304.06667	-6.60671
	307.03333	-6.75795
	310	-6.87191

3/1/2013

3/1/2013

Piezometric Line 2

Coordinates

X (ft)	Y (ft)
31.6	-1
199	-1
200	-1
201	-2.7060402
201	-2.7075631
204.16667	-2.7705516
207.33333	-2.8418871
210.5	-2.9150773
213.40909	-2.9919075
216.31818	-3.0859312
219.22727	-3.1914473
222.13636	-3.3052335
225.04545	-3.4243002
227.95455	-3.546789
230.86364	-3.6705985
233.77273	-3.7952989
236.68182	-3.9205871
239.59091	-4.0472901
242.5	-4.183733
245.32	-4.3130606
248.14	-4.4322881
250.96	-4.5465425
253.78	-4.72
256.6	-4.9
259.56667	-4.9
262.53333	-5.0155319
265.5	-5.1303172
268.46667	-5.2471281
271.43333	-5.3645316
274.4	-5.482325
277.36667	-5.6003039
280.33333	-5.7183792
283.3	-5.8365001
286.26667	-5.9546439
289.23333	-6.0727994
292.2	-6.1909594
295.16667	-6.3091237
298.13333	-6.4272602
301.1	-6.5455206

3/1/2013

	304.06667	-6.6629162
	307.03333	-6.7851749
	310	-6.877296

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (200, -15.519) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Cohesion Functions

Marsh 1

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 190
Data Points: X (ft), Cohesion (psf)
Data Point: (182.3, 190)
Data Point: (200, 200)
Data Point: (242.5, 190)

Fill

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
Data Point: (182.3, 600)
Data Point: (200, 700)
Data Point: (242.5, 600)

3/1/2013

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Spatial Functions

CLAY

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (131.6, -48, 610)
Data Point: (131.6, -70, 855)
Data Point: (182.3, -48, 610)
Data Point: (182.3, -70, 855)
Data Point: (200, -48, 900)
Data Point: (200, -70, 900)
Data Point: (242.5, -48, 610)
Data Point: (242.5, -70, 855)
Data Point: (310, -48, 610)
Data Point: (310, -70, 855)

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, EL +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL -2 TO -6	9,10,26,35	70.8
Region 3	FILL CH, EL +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL -2 TO -6	9,14,10	85
Region 5	Marsh, EL -6 TO -13 (Protected)	26,27,36,20,34	120.62857

3/1/2013

Region 6	BEACH SAND SP, EL -13/-14 TO -48	27,12,13,1,32,33,36	214.17643
Region 7	BEACH SAND SP, EL -13/-14 TO -48	13,12,15,6,8,25,7,1	9301.75
Region 8	BAY SOUND CLAY CL, EL -48 TO -70	7,25,8,16,17	6123.7
Region 9	Fill (Protected), EL -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL -6 TO -14	26,27,12,11,10	132.75
Region 13		28,29,23,19,24	7.65
Region 14	MARSH 1, EL -2 TO -6	34,22,35,26	26.11

Points

	X (ft)	Y (ft)
Point 1	31.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	31.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	31.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9

3/1/2013

Point 32	31.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.89	(181.023, 26.028)	28.44503	(215.642, 2.71441)	(152.026, -14.3092)
2	15198	2.14	(181.023, 26.028)	45.771	(217.041, 2.36469)	(157.23, -13.0731)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	152.9629	-14.50551	930.09508	964.66683	19.960012	-7.4586e-007
2	Optimized	154.78215	-14.886635	953.90786	1071.1284	67.677314	-3.5936e-007
3	Optimized	156.54645	-15.256245	976.93035	1161.6096	106.6246	2.9324e-006
4	Optimized	157.5693	-15.470525	990.31046	1110.9731	69.664627	1.9164e-006
5	Optimized	157.97065	-15.554615	995.56665	1128.0586	76.49425	-4.0611e-007
6	Optimized	159.5235	-15.875585	1015.592	1192.9549	102.40051	-5.4359e-007
7	Optimized	162.10785	-16.408295	1048.8286	1301.6465	145.96449	-7.7492e-007
8	Optimized	163.4328	-16.681415	1065.8755	1374.6937	178.29625	-9.4653e-007
9	Optimized	164.9792	-16.90391	1079.7574	1425.0469	199.35299	-1.0583e-006
10	Optimized	167.6196	-17.170495	1096.4095	1495.0071	230.13045	-1.2218e-006
11	Optimized	169.8732	-17.2722	1102.7484	1559.859	263.91295	1.5922e-005
12	Optimized	172.1	-17.372695	1109.0077	1608.8626	288.59137	1.7409e-005
13	Optimized	173.6162	-17.441125	1113.2922	1621.8085	293.59202	-2.083e-005
14	Optimized	174.96565	-17.508045	1117.4616	1638.7654	300.97485	-6.0864e-005
15	Optimized	176.83215	-17.60431	1123.4542	1659.793	309.65533	-6.2615e-005
			-				-6.4366e-

3/1/2013

16	Optimized	178.69865	-17.700575	1129.5003	1680.7671	318.27403	005
17	Optimized	180.96595	-17.81006	1136.3041	1703.4078	327.41748	-6.621e-005
18	Optimized	183.1816	-17.91195	1142.6493	1732.7273	340.68167	-6.8887e-005
19	Optimized	184.94475	-17.99303	1147.7484	1763.2085	355.33605	-7.1856e-005
20	Optimized	186.77425	-18.07716	1152.9597	1812.9004	381.0169	-7.7046e-005
21	Optimized	188.34585	-18.110605	1155.0532	1840.1972	395.56807	-2.8064e-005
22	Optimized	188.98475	-18.0987	1154.3196	1819.7693	384.19757	-7.7695e-005
23	Optimized	189.375	-18.053585	1151.504	1840.674	397.89245	-2.8228e-005
24	Optimized	190.55165	-17.917555	1143.0214	1905.4281	440.17571	-3.1228e-005
25	Optimized	192.12665	-17.608645	1123.7634	1909.2397	453.49493	-9.1712e-005
26	Optimized	193.87875	-17.11875	1093.147	1910.9778	472.17484	-9.5484e-005
27	Optimized	195.83625	-16.57143	1059.0031	1864.4358	465.0168	-9.4035e-005
28	Optimized	197.9075	-16.039045	1025.8096	1837.1851	468.4479	-3.3235e-005
29	Optimized	199.4784	-15.66702	1002.5779	1802.714	461.9588	-9.3414e-005
30	Optimized	199.9784	-15.53629	994.42985	1606.072	353.13175	-7.142e-005
31	Optimized	200.25	-15.31701	947.80174	1578.0357	363.86573	-7.3597e-005
32	Optimized	200.5602	-15.06656	891.30419	1545.6598	377.79238	-7.6409e-005
33	Optimized	200.8102	-14.864705	845.7784	1519.5605	389.00826	-7.8675e-005
34	Optimized	201.4688	-14.33293	786.74883	1559.0589	445.8934	-3.1637e-005
35	Optimized	202.55975	-13.452095	668.52009	1554.8986	0	199.4
36	Optimized	203.6743	-12.61615	614.97425	1505.428	0	199.14
37	Optimized	205.75	-11.20972	524.37886	1370.3443	0	198.65
38	Optimized	207.92585	-9.735455	429.30526	1228.7721	0	198.14
39	Optimized	208.99405	-8.9906735	381.28926	1148.4534	0	197.88
40	Optimized	209.98485	-8.275529	335.23391	1080.0644	0	197.65
41	Optimized	211.81875	-6.9518505	249.72001	924.71017	0	197.22

3/1/2013

42	Optimized	213.2733	-5.9020035	181.81335	793.49059	0	200
43	Optimized	213.7943	-5.5259885	157.35423	753.48992	0	200
44	Optimized	214.9109	-4.3600955	82.343931	498.71431	0	200

Slices of Slip Surface: **15198**

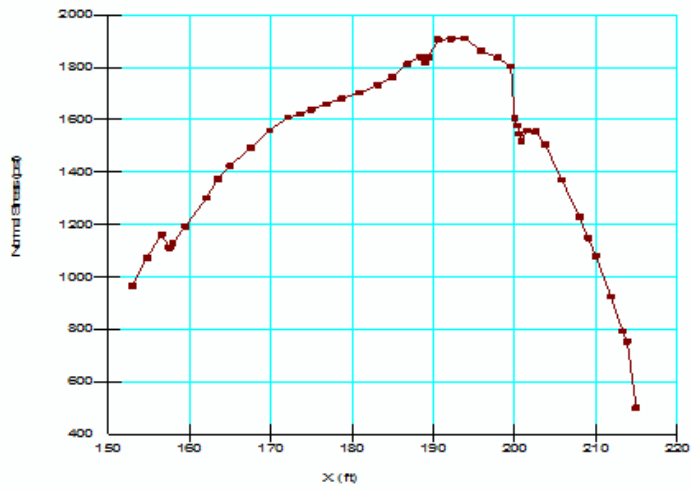
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	15198	157.32935	-13.133195	844.48051	939.42747	54.817648	3.6379e-006
2	15198	158.5156	-13.807405	886.53817	936.43773	28.809524	-1.0755e-006
3	15198	160.6896	-14.96078	958.50384	1126.4614	96.970364	-5.1466e-007
4	15198	162.5883	-15.85724	1014.448	1271.5978	148.46553	-7.8815e-007
5	15198	164.35	-16.58616	1059.9233	1414.391	204.65205	-1.0864e-006
6	15198	166.25	-17.281875	1103.3706	1544.6691	254.78377	-1.8077e-005
7	15198	168.15	-17.884395	1140.9362	1659.4333	299.35447	-6.0534e-005
8	15198	170.05	-18.39752	1172.963	1759.9043	338.87075	-2.404e-005
9	15198	172.1	-18.850855	1201.2613	1837.0003	367.04406	-7.4222e-005
10	15198	174.11	-19.20861	1223.5984	1875.1558	376.17686	-7.6069e-005
11	15198	175.93	-19.44957	1238.6315	1900.3198	382.0259	-7.7247e-005
12	15198	177.75	-19.616715	1249.0464	1915.9608	385.0432	-7.7857e-005
13	15198	179.57	-19.71086	1254.9165	1922.4369	385.39311	-7.7928e-005
14	15198	181.39	-19.732455	1256.278	1919.9927	383.19589	-7.7485e-005
15	15198	183.1816	-19.683515	1253.2271	1914.8241	381.97318	-2.7096e-005
16	15198	184.94475	-19.566045	1245.8827	1907.0233	381.7097	-2.7078e-005
17	15198	186.61975	-19.39244	1235.0791	1906.1885	387.46523	-2.7488e-005
18	15198	188.2066	-19.168555	1221.0894	1912.6044	399.24636	-8.0731e-005
19	15198	189.375	-18.97284	1208.8611	1928.0058	415.1984	-8.3957e-005
20	15198	190.5375	-18.73585	1194.0857	1968.5924	447.16171	-3.172e-005
21	15198	192.1125	-18.371765	1171.3788	2016.7108	488.05261	-3.4622e-005
22	15198	193.91665	-17.876495	1140.4743	2003.1087	498.0422	-0.00010071
23	15198	195.95	-17.22707	1099.9504	1927.1448	477.58088	-9.6572e-005
24	15198	197.98335	-16.47048	1052.7215	1839.6019	454.30562	-9.1864e-005

3/1/2013

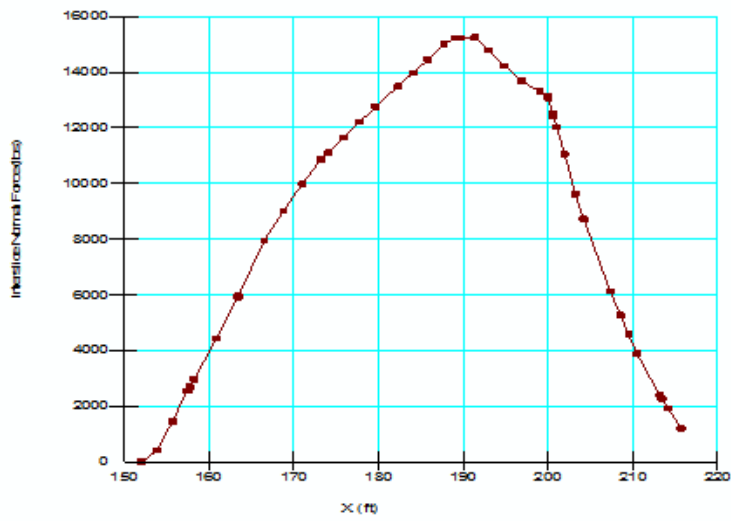
25	15198	199.5	-15.8441	1013.5997	1763.164	432.76114	-8.7505e-005
26	15198	200.25	-15.507735	959.70255	1715.9286	436.60733	-8.8285e-005
27	15198	200.5602	-15.3636	909.82644	1694.0456	452.76914	-9.1552e-005
28	15198	200.8102	-15.24419	869.45761	1675.9696	465.63989	-9.4156e-005
29	15198	202.1813	-14.537035	798.38087	1692.2717	516.08812	-0.00010436
30	15198	203.76465	-13.69068	681.90999	1648.4384	0	199.11
31	15198	204.95835	-12.97464	635.62093	1569.7813	0	198.83
32	15198	206.54165	-11.95695	569.86748	1459.0075	0	198.46
33	15198	208.4015	-10.627255	484.26849	1316.0717	0	198.02
34	15198	209.98485	-9.4083715	405.92608	1186.3277	0	197.65
35	15198	211.95455	-7.6514595	293.15304	970.5014	0	197.19
36	15198	213.56515	-6.157793	197.23625	780.61373	0	196.81
37	15198	214.85615	-4.7525205	106.94391	631.75533	0	200
38	15198	216.15465	-3.3091785	14.26051	260.56812	0	661.99
39	15198	216.32915	-3.1000215	0.85441968	231.75684	0	661.58
40	15198	216.69065	-2.6507275	-27.999471	101.16953	0	660.73

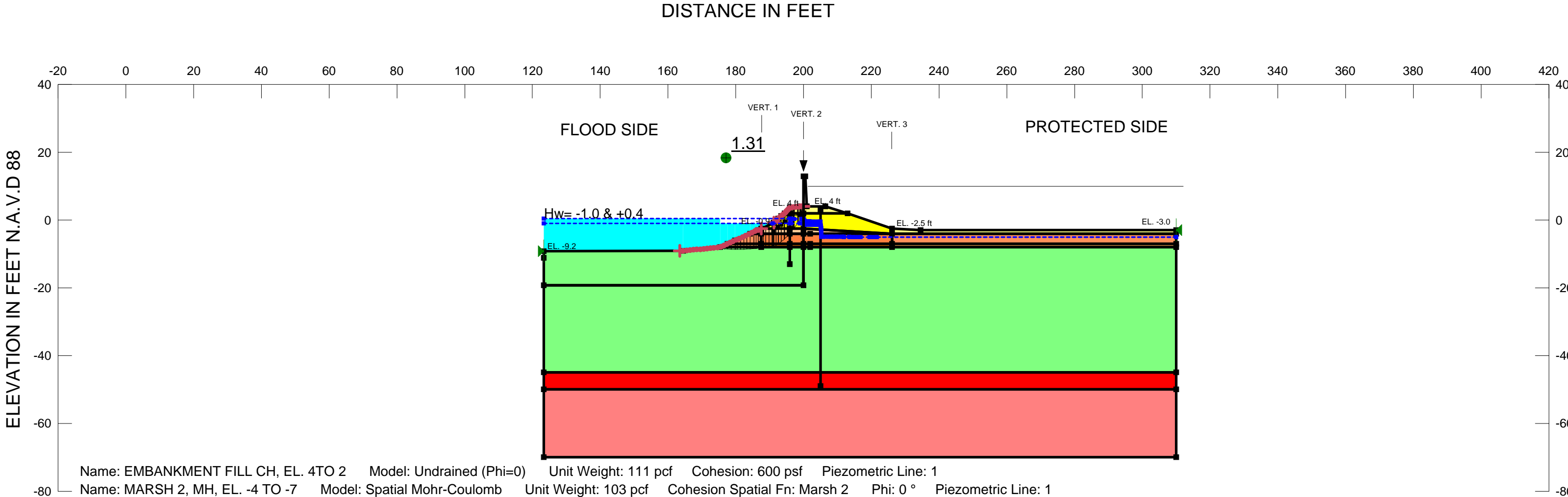
3/1/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X





Name: EMBANKMENT FILL CH, EL. 4TO 2 Model: Undrained (Phi=0) Unit Weight: 111 pcf Cohesion: 600 psf Piezometric Line: 1
Name: MARSH 2, MH, EL. -4 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -14 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Beach Sand Piezometric Line: 2
Name: Fill (Protected), EL., -2.5 TO -4 Model: Undrained (Phi=0) Unit Weight: 105 pcf Cohesion: 400 psf Piezometric Line: 1
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Piezometric Line: 1
Name: MARSH 2, El, -7 to -8 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Fn: Marsh (protected) Phi: 0 ° Piezometric Line: 1
Name: EMBANKMENT FILL CH, EL. 2 TO -2.5 Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion Fn: Fill 2 Phi: 0 ° Piezometric Line: 1
Name: Marsh1, El., -2.5 TO -4 Model: Undrained (Phi=0) Unit Weight: 103 pcf Cohesion: 315 psf Piezometric Line: 1
Name: BAY SOUND CLAY 1, EL. -45 to -50 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound 1 Cohesion Spatial Fn: Bay Sound Phi: 0 ° Piezometric Line: 1
Name: BAY SOUND CLAY 2, EL. -50 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound 2 Cohesion Spatial Fn: Bay Sound Phi: 0 ° Piezometric Line: 1
Name: MARSH 1 , El, -4 to -7 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Marsh (protected) Phi: 0 ° Piezometric Line: 1
Name: MARSH 2, EL. -7 TO -8 Model: Spatial Mohr-Coulomb Weight Fn: Marsh2 Cohesion Spatial Fn: Marsh 2 Phi: 0 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
CASE: FS Analysis +0.4 & -1 Circ In Front
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

FS Analysis +0.4 & -1 Circ In Front

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File Information

Created By: Lijegren, James
Revision Number: 425
Last Edited By: Johnson, Jehu B MVN
Date: 2/6/2013
Time: 12:50:19 PM
File Name: Reach 27 rapid drawdown -1.0.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/6/2013
Last Solved Time: 2:55:28 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Analysis +0.4 & -1 Circ In Front

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant

3/1/2013

FS Analysis +0.4 & -1 Circ In Front

Page 3 of 15

Pore Water Pressure
Piezometric Line: 1

MARSH 2, El, -7 to -8 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL CH, EL. 2 TO -2.5
Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh1, El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, EL. -45 to -50
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -50 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 , El, -4 to -7 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)

3/1/2013

Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 4 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2
Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -4 TO -7
Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -14 TO -40
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 2

Fill (Protected), El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf
Pore Water Pressure
Piezometric Line: 1

Sheet Pile
Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

3/1/2013

FS Analysis +0.4 & -1 Circ In Front

Page 4 of 15

Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -7 TO -8
Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit
Left Projection: Range
Left-Zone Left Coordinate: (163.5, -9.10243) ft
Left-Zone Right Coordinate: (187.56, -2.5) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (191.20952, -0.8) ft
Right-Zone Right Coordinate: (200, 4) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits
Left Coordinate: (123.3, -9.2) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
123.3	-1
190.9	-1
196	-1
196.2	-1.01
196.3	-1.02
198.9	-1.02
199.2	-1.03
200	-1.03
200.1	-1.15

3/1/2013

	200.1	-1.19
	200.2	-1.21
	200.2	-1.23
	200.3	-1.36
	200.5	-1.36
	200.8	-1.37
	201.4	-1.37
	201.6	-1.38
	201.9	-1.38
	202.4	-1.39
	202.6	-1.39
	203	-1.4
	203.5	-1.41
	203.7	-1.41
	204.1	-1.42
	204.3	-1.43
	204.7	-1.43
	204.8	-1.44
	205	-1.44
	205	-1.59
	205.1	-2.15
	205.1	-2.79
	205.2	-3.02
	205.2	-3.08
	205.2	-3.1
	205.2	-3.11
	205.2	-3.39
	205.2	-3.6
	205.2	-3.7
	205.2	-3.82
	205.2	-4
	205.3	-4.26
	205.3	-4.75
	205.3	-4.94
	205.8	-4.95
	207.6	-4.95
	208.2	-4.96
	209.2	-4.96
	209.8	-4.97
	211.4	-4.97
	211.9	-4.98
	214.6	-4.98
	215.1	-4.99
	219.5	-4.99

3/1/2013

	220	-5
	310	-5

Piezometric Line 2

Coordinates

X (ft)	Y (ft)
123.3	0.4
196	0.4
196.1	0.39
196.2	0.38
196.3	0.36
196.8	0.36
197.3	0.35
199.3	0.35
199.6	0.34
200	0.34
200	0.27
200.1	0.2
200.2	-0.04
200.2	-0.13
200.3	-0.25
200.3	-0.34
200.6	-0.35
200.9	-0.35
201.1	-0.36
201.5	-0.36
201.7	-0.37
202.1	-0.39
202.3	-0.4
202.7	-0.41
203.3	-0.43
203.6	-0.44
204.4	-0.47
204.7	-0.47
204.7	-0.48
204.9	-0.48
205	-0.49
205.1	-1.59
205.1	-1.84
205.2	-2.8
205.2	-3.02
205.2	-3.1
205.2	-3.2

3/1/2013

	205.2	-3.39
	205.2	-3.55
	205.2	-3.7
	205.2	-3.88
	205.2	-2.34
	205.3	-4
	205.3	-4.2
	205.3	-4.75
	205.3	-4.92
	205.8	-4.93
	206.6	-4.93
	207.2	-4.94
	208.2	-4.94
	208.7	-4.95
	209.8	-4.95
	210.3	-4.96
	211.4	-4.96
	211.9	-4.97
	213.5	-4.97
	213.8	-4.98
	216.2	-4.98
	216.8	-4.99
	221.1	-4.99
	221.7	-5
	310	-5

Reinforcements

Reinforcement 1

Type: **Pile**
Outside Point: (200, 12.9) ft
Inside Point: (200, -19.3) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 32.2 ft
Reinforcement Direction: 90 °
Applied Load Option: **Variable**
F of S Dependent: **No**
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs
Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: **Parallel to Slip**
Resisting Force Used: 0 lbs/ft

3/1/2013

Tension Crack Line

X (ft)	Y (ft)
191.1	-3.4
192.5	-2.1
193.4	-1.3
194.5	-0.5
196	1.2
199	1.5
200	1.5

Cohesion Functions

Fill 2

Model: **Spline Data Point Function**
Function: **Cohesion vs. Y**
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: **Y (ft), Cohesion (psf)**
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: **Spline Data Point Function**
Function: **Cohesion vs. Y**
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: **Y (ft), Cohesion (psf)**
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: **Spline Data Point Function**
Function: **Shear Stress vs. Normal Stress**
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: **Normal Stress (psf), Shear Stress (psf)**
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)

3/1/2013

Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1
Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2
Model: Linear Interpolation
Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL, -2.5 TO -4	5,26,16,20,27,50,4,56	21.149997
Region 2	Marsh1, EL, -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,18,23,1,24,2,25,51	809.5
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,17,14,22,11,13,12	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6	Sheet Pile	15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,57,58,46,5,26,16,38,39	38.211002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, EL, -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3734
Region 16	MARSH 1 , EL, -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1 , EL, -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, EL, -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	123.3	-45
Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	123.3	-19.2
Point 24	123.3	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8
Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7

Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3
Point 44	123.3	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	123.3	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4
Point 54	205	3
Point 55	205	-49
Point 56	186.67467	-2.9
Point 57	192.52381	0.4
Point 58	191.20952	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.31	(181.333, 10.492)	14.58735	(199.97, 4)	(175.399, -8.00011)
2	8104	1.55	(181.333, 10.492)	19.764	(198.929, 3.9929)	(174.581, -8.08261)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	175.39945	-8.000335	524.17887	579.94453	32.196318	-1.2033e-006
2	Optimized	176.01295	-8.2446085	539.42094	536.88966	0	0
3	Optimized	177.11795	-8.526008	556.98382	562.4958	3.1823447	2.2248e-008
4	Optimized	178.1373	-8.603378	561.80816	590.9779	16.841155	-1.9262e-007
5	Optimized	179.2423	-8.663135	565.53736	615.02252	28.570275	-3.2677e-007
6	Optimized	179.82895	-8.683175	566.76521	628.73243	35.776794	5.1844e-007
7	Optimized	180.1554	-8.673075	566.1575	624.94206	33.939283	-1.2681e-006
8	Optimized	180.9462	-8.643895	564.3386	634.79648	40.678877	2.6996e-006
9	Optimized	181.89285	-8.606345	561.99528	647.31529	49.25953	3.2687e-

						006
10	Optimized	182.8395	-8.568795	559.65196	659.82354	57.834088
11	Optimized	183.7764	-8.519485	556.57493	666.64586	63.549481
12	Optimized	184.78695	-8.452925	552.42682	675.96165	71.322868
13	Optimized	185.6691	-8.4033745	549.33475	689.08303	80.683707
14	Optimized	186.3395	-8.3763235	547.63559	697.23601	86.37184
15	Optimized	187.11735	-8.344936	545.67996	706.68658	92.957218
16	Optimized	187.89445	-8.313578	543.72635	711.25083	96.720303
17	Optimized	188.56335	-8.286586	542.03841	722.1403	103.98187
18	Optimized	189.3387	-8.2048175	536.93577	706.915	98.137553
19	Optimized	190.22675	-8.0673025	528.3642	708.21688	103.83799
20	Optimized	190.77635	-7.945802	433.41779	599.94234	0
21	Optimized	190.8894	-7.888123	429.82861	597.12391	0
22	Optimized	191	-7.831681	426.2956	597.16569	0
23	Optimized	191.15475	-7.752721	421.37077	599.83197	0
24	Optimized	191.5381	-7.557142	409.17137	618.17599	0
25	Optimized	192.19525	-7.2218615	388.24244	649.52871	0
26	Optimized	192.52705	-7.0525755	377.68243	665.30829	0
27	Optimized	192.56285	-7.025465	375.98531	591.50427	0
28	Optimized	192.9977	-6.685566	354.78321	600.91834	0
29	Optimized	193.85735	-6.013651	312.85315	612.89828	0
30	Optimized	194.37735	-5.5894265	286.37932	543.89402	0
31	Optimized	194.79725	-5.142012	258.46555	548.43236	0
32	Optimized	195.5242	-4.3673755	210.12447	559.63167	0
33	Optimized	195.94695	-3.909821	181.57382	486.49925	0
34	Optimized	196.05	-3.7862995	173.70705	481.61489	0
35	Optimized	196.15	-3.666434	165.91726	472.08266	0
36	Optimized	196.25	-3.546568	157.96733	462.55042	0
37	Optimized	196.55	-3.186971	135.2194	433.94742	0
38	Optimized	196.9494	-2.7082335	105.34571	395.86919	0
39	Optimized	197.11015	-2.51458	93.260963	358.48359	0
40	Optimized	197.21075	-2.385179	85.186185	350.00627	0
41	Optimized	197.78605	-1.645179	39.011411	302.67844	0
42	Optimized	198.3857	-0.8739	9.1167385	253.36011	0
						266.22

3/1/2013

43	Optimized	198.69965	-0.4242565	-37.174435	181.74107	0	252.73
44	Optimized	198.95	-0.044961585	-60.948637	159.39523	0	241.35
45	Optimized	199.1	0.18229267	-75.439363	145.10282	0	234.53
46	Optimized	199.20535	0.34189775	-85.603951	134.74343	0	229.74
47	Optimized	199.25535	0.41764915	-90.331662	129.82863	0	227.47
48	Optimized	199.45	0.71255255	-108.73507	110.687	0	218.62
49	Optimized	199.7849	1.2199034	-140.39349	13.685665	0	203.4

Slices of Slip Surface: 8104

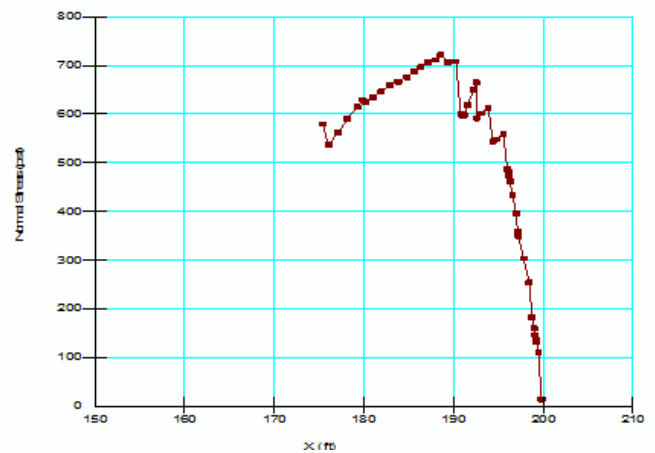
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	8104	174.9907	-8.221336	537.96575	601.60905	36.744474	-1.3734e-006
2	8104	175.76835	-8.4681655	553.37723	557.71463	2.5042015	1.7528e-008
3	8104	176.505	-8.6690825	565.91288	594.33226	16.407936	-1.8772e-007
4	8104	177.24165	-8.839849	576.57214	625.51072	28.254701	-3.2323e-006
5	8104	177.97835	-8.9812595	585.39012	652.85332	38.949899	5.6465e-007
6	8104	178.715	-9.093951	592.42288	676.65107	48.629169	3.2273e-006
7	8104	179.45165	-9.1784175	597.69304	695.98652	56.74977	3.7661e-006
8	8104	180.262	-9.237644	601.38814	712.19781	63.975993	-3.3953e-007
9	8104	181.146	-9.2658255	603.15171	724.61686	70.127935	1.9285e-006
10	8104	182.03	-9.2544115	602.43034	731.56939	74.558466	2.0501e-006
11	8104	182.914	-9.2033335	599.24911	733.27506	77.379917	-4.1064e-007
12	8104	183.798	-9.112281	593.56193	729.89801	78.713668	-4.1771e-007
13	8104	184.6458	-8.9877005	585.79356	721.71302	78.473137	-4.1645e-007
14	8104	185.45735	-8.8320905	576.07886	709.25003	76.886408	-4.08e-007
15	8104	186.2689	-8.640806	564.15071	692.7231	74.231301	-3.9397e-007

3/1/2013

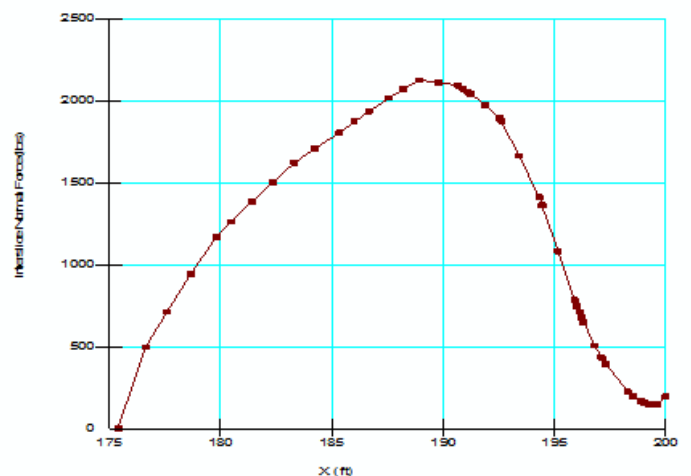
16	8104	187.11735	-8.400596	549.15514	671.03721	70.368646	1.9351e-006
17	8104	187.93395	-8.1325335	532.43007	642.26338	63.412294	7.0365e-007
18	8104	188.6787	-7.8515175	427.5367	590.24926	0	274.86
19	8104	189.4203	-7.5367075	407.88651	563.13241	0	272.61
20	8104	190.16185	-7.18519	385.95516	532.42099	0	269.99
21	8104	190.7057	-6.9067755	368.57427	507.63539	0	267.86
22	8104	190.8894	-6.807682	362.39791	498.87484	0	267.09
23	8104	191	-6.7457325	358.53403	496.28614	0	266.61
24	8104	191.15475	-6.658292	353.07559	495.14255	0	265.92
25	8104	191.5381	-6.428767	338.75022	502.52206	0	264.08
26	8104	192.19525	-6.014381	312.90233	512.64372	0	260.73
27	8104	192.9619	-5.479176	279.49646	518.58112	0	256.31
28	8104	193.92	-4.7302125	232.76166	509.58435	0	249.97
29	8104	194.6056	-4.1501165	196.56771	498.84036	0	245
30	8104	195.0784	-3.7025225	168.64098	463.93517	0	315
31	8104	195.6928	-3.080017	129.78824	451.30174	0	315
32	8104	196.05	-2.6992055	105.8777	436.49941	0	315
33	8104	196.15	-2.5867765	98.549616	423.63364	0	315
34	8104	196.21315	-2.5150655	93.832966	415.44176	0	315
35	8104	196.26315	-2.457536	89.928458	409.25009	0	313.73
36	8104	196.55	-2.113273	68.219612	373.53013	0	303.4
37	8104	197.05	-1.483362	28.913834	309.65948	0	284.5
38	8104	197.3489	-1.087625	4.2197807	270.54362	0	272.63
39	8104	197.8469	-0.335	42.744022	198.69442	0	250.05
40	8104	198.598	0.8932025	119.38666	88.397612	0	213.2
41	8104	198.9145	1.464653	155.07186	-778.47707	0	196.06

3/1/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X



FS Analysis +0.4 & -1 Circ Thru

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File Information

Created By: Lijegren, James
Revision Number: 425
Last Edited By: Johnson, Jehu B MVN
Date: 2/6/2013
Time: 12:50:19 PM
File Name: Reach 27 rapid drawdown -1.0.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/6/2013
Last Solved Time: 2:58:06 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Analysis +0.4 & -1 Circ Thru

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
 Apply Phreatic Correction: [Yes](#)
 PWP Conditions Source: [Piezometric Line](#)
 Use Staged Rapid Drawdown: [No](#)
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: [No](#)
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: [1](#)
 Optimize Critical Slip Surface Location: [Yes](#)
 Tension Crack
 Tension Crack Option: [Tension Crack Line](#)
 Percentage Wet: [1](#)
 Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
 FOS Calculation Option: [Constant](#)

3/1/2013

Advanced
Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [111 pcf](#)
Cohesion: [600 psf](#)
Pore Water Pressure
 Piezometric Line: [1](#)

MARSH 2, MH, EL. -4 TO -7

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [103 pcf](#)
Cohesion Spatial Fn: [Marsh 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BEACH SAND SP, EL. -14 TO -40

Model: [Shear/Normal Fn.](#)
Unit Weight: [122 pcf](#)
Strength Function: [Beach Sand](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [2](#)

Fill (Protected), EL., -2.5 TO -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [105 pcf](#)
Cohesion: [400 psf](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Sheet Pile

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [0.1 pcf](#)
Cohesion: [0.01 psf](#)

3/1/2013

Pore Water Pressure
 Piezometric Line: [1](#)

MARSH 2, El. -7 to -8 (Protected)
Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [99 pcf](#)
Cohesion Fn: [Marsh \(protected\)](#)
Phi: [0 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

EMBANKMENT FILL CH, EL. 2 TO -2.5
Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [111 pcf](#)
Cohesion Fn: [Fill 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Marsh1, El., -2.5 TO -4
Model: [Undrained \(Phi=0\)](#)
Unit Weight: [103 pcf](#)
Cohesion: [315 psf](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BAY SOUND CLAY 1, EL. -45 to -50
Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 1](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: [0 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BAY SOUND CLAY 2, EL. -50 TO -70
Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 2](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: [0 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

MARSH 1 , El. -4 to -7 (Protected)
Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [105 pcf](#)
Cohesion Fn: [Marsh \(protected\)](#)

3/1/2013

Phi: [0 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

MARSH 2, EL. -7 TO -8
Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh2](#)
Cohesion Spatial Fn: [Marsh 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Slip Surface Entry and Exit
Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(163.5, -9.10243\) ft](#)
Left-Zone Right Coordinate: [\(187.56, -2.5\) ft](#)
Left-Zone Increment: [25](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(201.3, 4\) ft](#)
Right-Zone Right Coordinate: [\(215.8, 1.03817\) ft](#)
Right-Zone Increment: [25](#)
Radius Increments: [25](#)

Slip Surface Limits

Left Coordinate: [\(123.3, -9.2\) ft](#)
Right Coordinate: [\(310, -3\) ft](#)

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
123.3	-1
190.9	-1
196	-1
196.2	-1.01
196.3	-1.02
198.9	-1.02
199.2	-1.03
200	-1.03
200.1	-1.15

3/1/2013

	200.1	-1.19
	200.2	-1.21
	200.2	-1.23
	200.3	-1.36
	200.5	-1.36
	200.8	-1.37
	201.4	-1.37
	201.6	-1.38
	201.9	-1.38
	202.4	-1.39
	202.6	-1.39
	203	-1.4
	203.5	-1.41
	203.7	-1.41
	204.1	-1.42
	204.3	-1.43
	204.7	-1.43
	204.8	-1.44
	205	-1.44
	205	-1.59
	205.1	-2.15
	205.1	-2.79
	205.2	-3.02
	205.2	-3.08
	205.2	-3.1
	205.2	-3.11
	205.2	-3.39
	205.2	-3.6
	205.2	-3.7
	205.2	-3.82
	205.2	-4
	205.3	-4.26
	205.3	-4.75
	205.3	-4.94
	205.8	-4.95
	207.6	-4.95
	208.2	-4.96
	209.2	-4.96
	209.8	-4.97
	211.4	-4.97
	211.9	-4.98
	214.6	-4.98
	215.1	-4.99
	219.5	-4.99

3/1/2013

	220	-5
	310	-5

Piezometric Line 2

Coordinates

X (ft)	Y (ft)
123.3	0.4
196	0.4
196.1	0.39
196.2	0.38
196.3	0.36
196.8	0.36
197.3	0.35
199.3	0.35
199.6	0.34
200	0.34
200	0.27
200.1	0.2
200.2	-0.04
200.2	-0.13
200.3	-0.25
200.3	-0.34
200.6	-0.35
200.9	-0.35
201.1	-0.36
201.5	-0.36
201.7	-0.37
202.1	-0.39
202.3	-0.4
202.7	-0.41
203.3	-0.43
203.6	-0.44
204.4	-0.47
204.7	-0.47
204.7	-0.48
204.9	-0.48
205	-0.49
205.1	-1.59
205.1	-1.84
205.2	-2.8
205.2	-3.02
205.2	-3.1
205.2	-3.2

3/1/2013

	205.2	-3.39
	205.2	-3.55
	205.2	-3.7
	205.2	-3.88
	205.2	-2.34
	205.3	-4
	205.3	-4.2
	205.3	-4.75
	205.3	-4.92
	205.8	-4.93
	206.6	-4.93
	207.2	-4.94
	208.2	-4.94
	208.7	-4.95
	209.8	-4.95
	210.3	-4.96
	211.4	-4.96
	211.9	-4.97
	213.5	-4.97
	213.8	-4.98
	216.2	-4.98
	216.8	-4.99
	221.1	-4.99
	221.7	-5
	310	-5

Tension Crack Line

X (ft)	Y (ft)
201	1
206.4	1
213	-1
226.1	-5.5

Cohesion Functions

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)

3/1/2013

Data Point: (2, 180)

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y

3/1/2013

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL., -2.5 TO -4	5,26,16,20,27,50,4,56	21.149997
Region 2	Marsh1, EL., -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,18,23,1,24,2,25,51	809.5
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,17,14,22,11,13,12	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6	Sheet Pile	15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,57,58,46,5,26,16,38,39	38.211002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, El, -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3734
Region 16	MARSH 1, El, -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1, El, -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, El, -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	123.3	-45
Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4

3/1/2013

3/1/2013

Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	123.3	-19.2
Point 24	123.3	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8
Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3
Point 44	123.3	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	123.3	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4
Point 54	205	3
Point 55	205	-49
Point 56	186.67467	-2.9
Point 57	192.52381	0.4
Point 58	191.20952	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.15	(183.671, 19.216)	15.99437	(205.496, 4)	(175.397, -8.00034)

3/1/2013

2	7735	1.20	(183.671, 19.216)	28.772	(205.942, 4)	(174.581, -8.08261)
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Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	175.39835	-8.000922	524.20593	569.72624	26.281165	-3.0031e-007
2	Optimized	176.14475	-8.263599	540.60935	532.15461	0	0
3	Optimized	177.24975	-8.5398435	557.85157	560.04265	1.2650202	-4.1168e-009
4	Optimized	178.1625	-8.575702	560.08399	581.2351	12.2116	-1.3964e-007
5	Optimized	179.2675	-8.619112	562.79683	608.19169	26.208736	-2.9981e-007
6	Optimized	180.5702	-8.6702885	565.98672	639.97091	42.714793	6.1925e-007
7	Optimized	181.8842	-8.727715	569.57109	674.40491	60.525832	6.7167e-007
8	Optimized	183.01185	-8.783625	573.06083	703.59824	75.365809	-4.0002e-007
9	Optimized	183.60245	-8.810915	574.75728	705.31095	75.375194	2.073e-006
10	Optimized	183.9346	-8.781506	572.9264	696.3495	71.258362	1.96e-006
11	Optimized	184.6507	-8.714106	568.72214	700.42162	76.036731	2.0913e-006
12	Optimized	185.4647	-8.653565	564.93713	713.57418	85.815637	-4.5548e-007
13	Optimized	186.27135	-8.6097955	562.21371	722.02917	92.269499	-4.8978e-007
14	Optimized	187.11735	-8.5638905	559.3411	730.90034	99.049775	-5.2574e-007
15	Optimized	187.7112	-8.531665	557.3296	731.53844	100.57952	2.7663e-006
16	Optimized	188.36515	-8.514304	556.25773	750.74606	112.28789	-5.9603e-007
17	Optimized	189.3706	-8.495992	555.11414	770.35599	124.26994	3.418e-006
18	Optimized	190.38665	-8.4774865	553.95684	790.18023	136.38364	-9.674e-006
19	Optimized	191	-8.4663155	553.25816	806.0162	145.92992	-1.035e-005
20	Optimized	191.15475	-8.463497	553.08559	816.8931	152.30934	-8.0845e-007
21	Optimized	191.42775	-8.458525	552.77321	845.67521	169.10705	-8.9764e-007
22	Optimized	192.0849	-8.3656335	546.9767	852.31406	176.28661	-9.3577e-007
23	Optimized	192.79635	-8.2214985	537.98587	903.62496	211.10183	-1.1206e-

3/1/2013

						006
24	Optimized	193.23445	-8.0992645	530.34698	875.62409	199.34583
25	Optimized	193.43985	-8.0161245	525.16574	883.52261	206.89744
26	Optimized	193.95985	-7.8056005	424.66571	888.87538	0
27	Optimized	194.67315	-7.5168155	406.65316	927.37436	0
28	Optimized	195.23645	-7.211215	387.57762	882.98861	0
29	Optimized	195.7833	-6.8613745	365.74197	912.14885	0
30	Optimized	196.05	-6.690763	354.06005	921.14075	0
31	Optimized	196.15	-6.626791	349.77235	916.33919	0
32	Optimized	196.25	-6.562819	342.75534	911.53764	0
33	Optimized	196.55	-6.370903	333.90199	896.99834	0
34	Optimized	196.9224	-6.1326715	319.03022	878.99171	0
35	Optimized	197.1724	-5.9616	308.35564	838.17509	0
36	Optimized	197.7	-5.578015	284.42389	809.02885	0
37	Optimized	198.5	-4.9963855	248.12779	764.8467	0
38	Optimized	198.95	-4.669219	227.35306	740.00351	0
39	Optimized	199.1	-4.560163	220.24347	730.69392	0
40	Optimized	199.25	-4.4511075	213.47359	720.90712	0
41	Optimized	199.45	-4.3057	204.40401	707.83128	0
42	Optimized	199.7411	-4.094052	191.19571	688.82958	0
43	Optimized	199.9411	-3.939575	181.55456	594.43048	0
44	Optimized	200.05	-3.843638	70.420939	586.41598	0
45	Optimized	200.15	-3.7555335	153.32878	578.34999	0
46	Optimized	200.25	-3.667429	55.033288	570.28401	0
47	Optimized	200.4	-3.5352725	135.73742	558.20378	0
48	Optimized	200.55	-3.4031155	127.2475	546.01101	0
49	Optimized	200.7	-3.2709585	118.69756	533.66818	0
50	Optimized	200.85	-3.1388015	110.37271	521.33285	0
51	Optimized	200.95	-3.050697	104.87283	513.10929	0
52	Optimized	201.05	-2.9625925	99.380457	504.96827	0
53	Optimized	201.25	-2.7863835	88.383204	488.8363	0
54	Optimized	201.4393	-2.619602	77.658132	473.56664	0
55	Optimized	201.4893	-2.5755495	74.760516	469.46645	0
56	Optimized	201.5433	-2.527986	71.632252	464.74681	0
57	Optimized	201.5933	-2.483754	68.721418	452.62963	0
58	Optimized	201.65	-2.432268	65.661577	448.4626	0
59	Optimized	201.8	-2.2960985	57.163821	437.43781	0
60	Optimized	202	-2.114539	45.691075	422.77757	0
61	Optimized	202.2	-1.932979	34.118002	408.08031	0
62	Optimized	202.35	-1.796809	25.436994	397.06292	0
63	Optimized	202.5	-1.6606395	16.88778	386.05293	0
64	Optimized	202.65	-1.52447	8.3074681	375.03554	0

3/1/2013

65	Optimized	202.7464	-1.43695	2.6996283	367.95418	0	283.11
66	Optimized	202.8964	-1.30078	-6.0260253	356.94069	0	279.02
67	Optimized	203.15	-1.0705702	-20.735352	338.32078	0	272.12
68	Optimized	203.37125	-0.8697152	33.539787	322.07651	0	266.09
69	Optimized	203.47125	-0.7797642	-39.27561	321.81386	0	263.39
70	Optimized	203.55	-0.7105502	43.645625	316.14518	0	261.32
71	Optimized	203.65	-0.6226538	49.130152	308.94965	0	258.68
72	Optimized	203.77365	-0.51398885	55.989362	300.0585	0	255.42
73	Optimized	203.97365	-0.3381961	67.266453	285.6692	0	250.15
74	Optimized	204.2	-0.13922372	80.033379	269.3855	0	244.18
75	Optimized	204.35	0.00737914	88.772418	258.59596	0	240.22
76	Optimized	204.55	0.16841362	99.740996	244.20746	0	234.95
77	Optimized	204.75	0.3442064	109.92337	229.82134	0	229.67
78	Optimized	204.85	0.4321028	116.81846	222.62581	0	227.04
79	Optimized	204.95	0.51999915	122.30149	215.43028	0	224.4
80	Optimized	205.05	0.6078955	4.7781178	208.24226	0	221.76
81	Optimized	205.15	0.6957919	35.721528	201.04673	0	219.13
82	Optimized	205.25	0.7836883	39.512326	193.8512	0	216.49
83	Optimized	205.39805	0.91381825	365.25306	9.8172222	0	212.59

Slices of Slip Surface: 7735

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	7735	174.9907	-8.212148	537.39321	584.37523	27.12508	-3.1055e-007
2	7735	175.9525	-8.4955735	555.08721	545.33186	0	0
3	7735	177.0575	-8.7799815	572.8307	600.19517	15.798883	-1.8093e-007
4	7735	178.1625	-9.018294	587.69765	650.51331	36.266635	-1.3555e-

3/1/2013

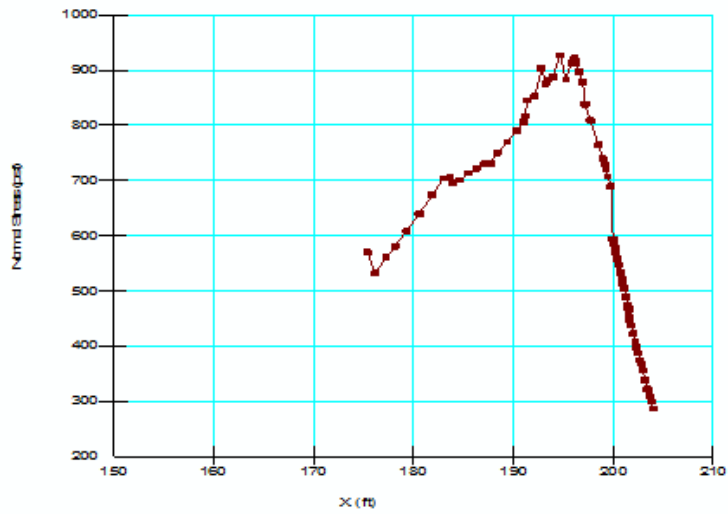
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5	7735	179.2675	-9.2116725	599.7698	694.53102	54.710413
6	7735	180.3725	-9.3610305	609.08699	731.01947	70.397745
7	7735	181.4775	-9.4670565	615.70418	760.48499	83.589238
8	7735	182.5825	-9.5302305	619.64637	783.35709	94.518426
9	7735	183.6875	-9.5508355	620.93213	799.9638	103.36399
10	7735	184.84865	-9.5255795	619.3592	810.22296	110.19524
11	7735	186.066	-9.4497865	614.62406	813.80937	114.9997
12	7735	187.11735	-9.3455195	608.11764	811.8851	117.6452
13	7735	188.1131	-9.205656	599.39447	801.28251	116.56011
14	7735	189.21935	-9.01048	587.21735	792.97936	118.79675
15	7735	190.33625	-8.7674765	572.05002	779.04856	119.51066
16	7735	191	-8.6068575	562.02783	772.11135	121.29178
17	7735	191.15475	-8.5657645	559.46713	776.0086	125.02028
18	7735	191.86665	-8.355676	546.35427	811.88805	153.306
19	7735	192.76445	-8.0801695	529.15456	853.87378	187.47673
20	7735	193.20255	-7.930673	432.46591	858.50456	0
21	7735	193.92	-7.663069	415.77159	885.32387	0
22	7735	194.98335	-7.232396	388.90473	934.92815	0
23	7735	195.76335	-6.89038	367.56044	980.7938	0
24	7735	196.05	-6.7569295	358.17807	991.35834	0
25	7735	196.15	-6.709031	354.88638	986.37617	0
26	7735	196.25	-6.6606575	348.80092	981.29769	0
27	7735	196.55	-6.5112015	342.64411	965.5521	0
28	7735	197.05	-6.2547325	326.63971	938.68193	0
29	7735	197.7	-5.899985	304.51523	901.71603	0
30	7735	198.5	-5.4359405	275.55029	853.64354	0
31	7735	198.95	-5.1639895	258.19534	825.59634	0
32	7735	199.1	-5.069121	251.96749	814.80913	0
33	7735	199.25	-4.9733855	246.07109	803.43654	0
34	7735	199.45	-4.8428045	237.91811	787.97814	0
35	7735	199.8	-4.6090295	223.33499	760.49414	0

3/1/2013

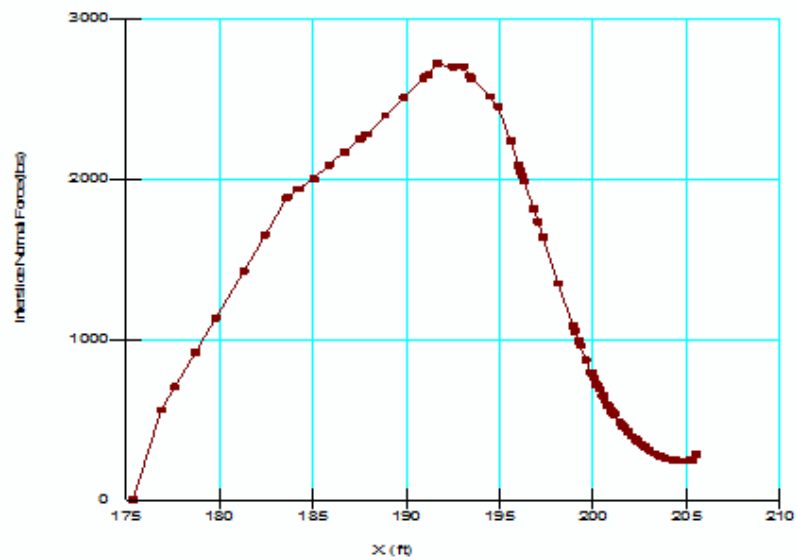
36	7735	200.05	-4.439012	85.643369	741.48068	0	254.36
37	7735	200.15	-4.369456	190.16977	733.50493	0	253.61
38	7735	200.25	-4.2992695	69.68978	725.47037	0	252.85
39	7735	200.4	-4.192552	176.7524	713.27425	0	251.7
40	7735	200.55	-4.084866	169.74271	700.94994	0	250.53
41	7735	200.63335	-4.024323	165.78884	693.9378	0	249.88
42	7735	200.73335	-3.9508935	161.00721	653.99179	0	315
43	7735	200.85	-3.8645715	155.66403	643.21612	0	315
44	7735	200.95	-3.7898025	150.99385	633.90389	0	315
45	7735	201.05	-3.7143535	146.29069	624.60451	0	315
46	7735	201.25	-3.560687	136.70012	605.86725	0	315
47	7735	201.45	-3.4056195	126.55212	587.00183	0	315
48	7735	201.55	-3.3266665	121.32338	577.40839	0	315
49	7735	201.65	-3.2469905	116.49903	567.73956	0	315
50	7735	201.8	-3.1258265	108.94114	553.07265	0	315
51	7735	202	-2.9620365	98.553475	533.25481	0	315
52	7735	202.2	-2.7952105	87.90126	513.13986	0	315
53	7735	202.3433	-2.6740955	80.16587	498.54161	0	315
54	7735	202.3933	-2.6314185	77.44098	493.36046	0	315
55	7735	202.5	-2.5391255	71.706987	481.53735	0	315
56	7735	202.65	-2.408692	63.448734	466.46319	0	312.26
57	7735	202.85	-2.230668	52.034804	446.9497	0	306.92
58	7735	203.15	-1.958537	34.651225	417.4338	0	298.76
59	7735	203.4	-1.7263395	19.856419	392.54278	0	291.79
60	7735	203.55	-1.5843465	10.879427	377.47252	0	287.53
61	7735	203.65	-1.488312	4.8867032	367.33927	0	284.65
62	7735	203.7151	-1.425409	0.93737536	360.72645	0	282.76
63	7735	203.9151	-1.227649	-11.706994	340.12344	0	276.83
64	7735	204.2	-0.94270495	-30.02028	310.7334	0	268.28
65	7735	204.35	-0.7891823	-39.987207	295.0839	0	263.68
66	7735	204.5271	-0.60374885	-51.558475	276.35516	0	258.11
67	7735	204.6771	-0.44553535	-61.431046	260.52613	0	253.37
68	7735	204.75	-0.3672512	-65.967522	252.73903	0	251.02
69	7735	204.85	-0.25905645	-73.691015	242.02899	0	247.77
70	7735	204.95	-0.14974082	-80.512881	231.28102	0	244.49
71	7735	205.05	-0.039285245	-3.5302062	220.47894	0	241.18
72	7735	205.15	0.07233003	-29.536401	209.63313	0	237.83
73	7735	205.25	0.1851254	-34.698796	198.7409	0	234.45
74	7735	205.55	0.53461535	-341.78795	165.46547	0	223.96
75	7735	205.87115	0.913705	-365.89422	-67.113914	0	212.59

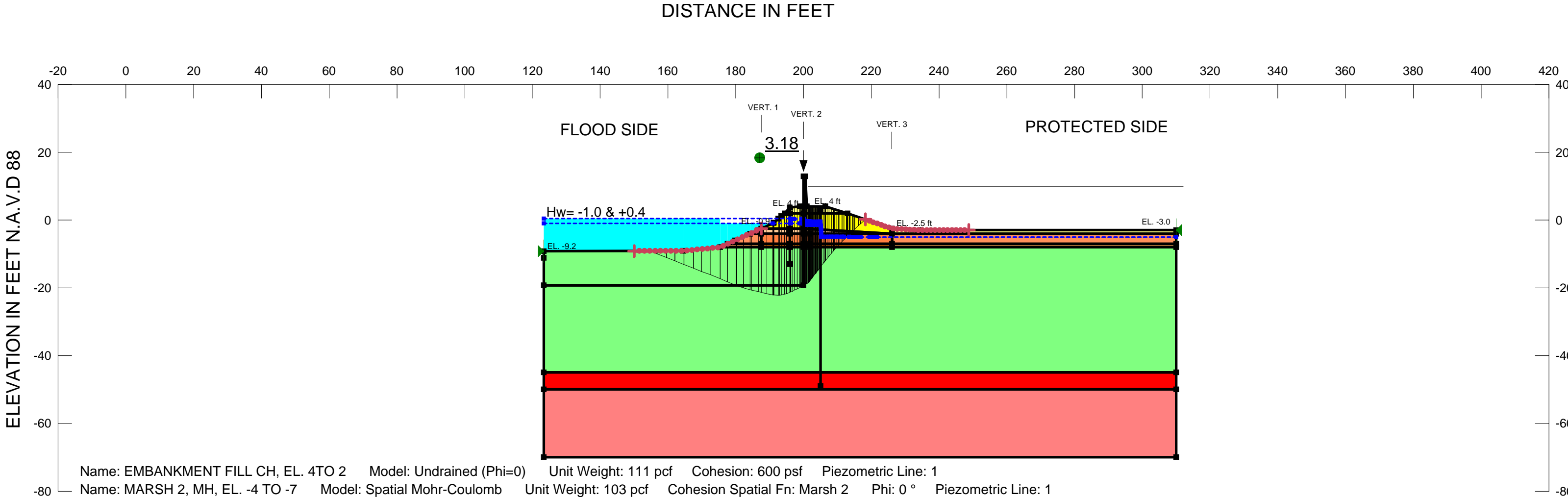
3/1/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X





**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
CASE: FS Analysis +0.4 & -1Circ Around
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Analysis +0.4 & -1Circ Around

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File Information

Created By: Lijegren, James
Revision Number: 425
Last Edited By: Johnson, Jehu B MVN
Date: 2/6/2013
Time: 12:50:19 PM
File Name: Reach 27 rapid drawdown -1.0.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/6/2013
Last Solved Time: 3:30:16 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Analysis +0.4 & -1Circ Around

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant

3/1/2013

Pore Water Pressure
Piezometric Line: 1

MARSH 2, El, -7 to -8 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL CH, EL. 2 TO -2.5
Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh1, El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, EL. -45 to -50
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -50 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 , El, -4 to -7 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)

3/1/2013

Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -4 TO -7

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -14 TO -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 2

Fill (Protected), El., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf
Pore Water Pressure
Piezometric Line: 1

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

3/1/2013

Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -7 TO -8
Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit
Left Projection: Range
Left-Zone Left Coordinate: (150, -9.13519) ft
Left-Zone Right Coordinate: (187.56, -2.5) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (218.24, 0.2) ft
Right-Zone Right Coordinate: (248.8, -3) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (123.3, -9.2) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
123.3	-1
190.9	-1
196	-1
196.2	-1.01
196.3	-1.02
198.9	-1.02
199.2	-1.03
200	-1.03
200.1	-1.15

3/1/2013

	200.1	-1.19
	200.2	-1.21
	200.2	-1.23
	200.3	-1.36
	200.5	-1.36
	200.8	-1.37
	201.4	-1.37
	201.6	-1.38
	201.9	-1.38
	202.4	-1.39
	202.6	-1.39
	203	-1.4
	203.5	-1.41
	203.7	-1.41
	204.1	-1.42
	204.3	-1.43
	204.7	-1.43
	204.8	-1.44
	205	-1.44
	205	-1.59
	205.1	-2.15
	205.1	-2.79
	205.2	-3.02
	205.2	-3.08
	205.2	-3.1
	205.2	-3.11
	205.2	-3.39
	205.2	-3.6
	205.2	-3.7
	205.2	-3.82
	205.2	-4
	205.3	-4.26
	205.3	-4.75
	205.3	-4.94
	205.8	-4.95
	207.6	-4.95
	208.2	-4.96
	209.2	-4.96
	209.8	-4.97
	211.4	-4.97
	211.9	-4.98
	214.6	-4.98
	215.1	-4.99
	219.5	-4.99

3/1/2013

	220	-5
	310	-5

Piezometric Line 2

Coordinates	
X (ft)	Y (ft)
123.3	0.4
196	0.4
196.1	0.39
196.2	0.38
196.3	0.36
196.8	0.36
197.3	0.35
199.3	0.35
199.6	0.34
200	0.34
200	0.27
200.1	0.2
200.2	-0.04
200.2	-0.13
200.3	-0.25
200.3	-0.34
200.6	-0.35
200.9	-0.35
201.1	-0.36
201.5	-0.36
201.7	-0.37
202.1	-0.39
202.3	-0.4
202.7	-0.41
203.3	-0.43
203.6	-0.44
204.4	-0.47
204.7	-0.47
204.7	-0.48
204.9	-0.48
205	-0.49
205.1	-1.59
205.1	-1.84
205.2	-2.8
205.2	-3.02
205.2	-3.1
205.2	-3.2

3/1/2013

	205.2	-3.39
	205.2	-3.55
	205.2	-3.7
	205.2	-3.88
	205.2	-2.34
	205.3	-4
	205.3	-4.2
	205.3	-4.75
	205.3	-4.92
	205.8	-4.93
	206.6	-4.93
	207.2	-4.94
	208.2	-4.94
	208.7	-4.95
	209.8	-4.95
	210.3	-4.96
	211.4	-4.96
	211.9	-4.97
	213.5	-4.97
	213.8	-4.98
	216.2	-4.98
	216.8	-4.99
	221.1	-4.99
	221.7	-5
	310	-5

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: (200, 12.9) ft
Inside Point: (200, -19.3) ft
Slip Surface Intersection: (200, -19.302) ft
Total Length: 32.2 ft
Reinforcement Direction: 90 °
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs
Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: [Parallel to Slip](#)
Resisting Force Used: 0 lbs/ft

3/1/2013

Cohesion Functions

Fill 2

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. Y](#)
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: [Y \(ft\), Cohesion \(psf\)](#)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. Y](#)
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: [Y \(ft\), Cohesion \(psf\)](#)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: [Spline Data Point Function](#)
Function: [Shear Stress vs. Normal Stress](#)
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: [Normal Stress \(psf\), Shear Stress \(psf\)](#)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

3/1/2013

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL, -2.5 TO -4	5,26,16,20,27,50,4,56	21.149997
Region 2	Marsh1, EL, -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,18,23,1,24,2,25,51	809.5
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,17,14,22,11,13,12	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6	Sheet Pile	15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,57,58,46,5,26,16,38,39	38.211002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), EL, -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, EL, -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3734
Region 16	MARSH 1, EL, -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1, EL, -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, EL, -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4

Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	123.3	-45
Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	123.3	-19.2
Point 24	123.3	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8
Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3
Point 44	123.3	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	123.3	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8

	187.56	-7
Point 53	199	4
Point 54	205	3
Point 55	205	-49
Point 56	186.67467	-2.9
Point 57	192.52381	0.4
Point 58	191.20952	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.18	(186.261, 11.462)	30.76133	(218.266, 0.19099)	(154.561, -9.12412)
2	4075	3.85	(186.261, 11.462)	33.904	(218.24, 0.2)	(159.312, -9.11259)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	155.8131	-9.6017465	624.11043	671.87779	27.578499	-3.156e-007
2	Optimized	158.3167	-10.55699	683.70767	796.85661	65.326569	1.7968e-006
3	Optimized	160.8014	-11.529065	744.35738	925.93917	104.8363	-5.564e-007
4	Optimized	163.26715	-12.51797	806.08916	1055.7265	144.12818	-7.6513e-007
5	Optimized	164.7504	-13.11284	843.19523	1139.3163	170.96556	-9.0757e-007
6	Optimized	166.23515	-13.69772	879.70314	1224.4955	199.06596	-1.0567e-006
7	Optimized	168.70385	-14.66664	940.14738	1367.5557	246.76428	-1.31e-006
8	Optimized	171.17255	-15.63556	1000.6293	1510.6535	294.46261	-2.089e-005
9	Optimized	173.90345	-16.72627	1068.6808	1674.3348	349.67446	-2.4807e-005
10	Optimized	176.505	-17.780145	1134.4354	1753.6149	357.48343	-2.5359e-005
11	Optimized	178.715	-18.6754	1190.2975	1913.3585	417.45948	-8.4412e-005
12	Optimized	180.00655	-19.198605	1222.9538	2008.6965	453.6488	-9.173e-005
13	Optimized	180.2784	-19.30873	1229.8081	2028.7624	461.27643	-9.3271e-005
14	Optimized	181.3328	-19.656425	1251.5085	2071.1677	473.23049	-9.5691e-005
15	Optimized	183.27095	-20.28271	1290.589	2191.4532	520.11418	-0.00010517
16	Optimized	184.41565	-20.65261	1313.6852	2262.2863	547.6751	-0.00011074
			-				

17	Optimized	185.633	20.934815	1331.2929	2286.0164	551.20985	-0.0001146
18	Optimized	187.11735	-21.25606	1351.363	2354.646	579.24569	-9.6334e-006
19	Optimized	188.3897	-21.53142	1368.543	2410.5441	601.59959	-1.0005e-005
20	Optimized	190.0597	-21.89284	1391.0754	2494.7471	637.20518	-1.0597e-005
21	Optimized	191	-22.096345	1403.7517	2545.9096	659.42517	4.3777e-005
22	Optimized	191.1312	-22.12474	1405.5433	2558.3389	665.56681	-1.1069e-005
23	Optimized	191.18595	-22.13215	1406.0083	2495.5264	629.03354	4.1762e-005
24	Optimized	191.86665	-22.15116	1407.2081	2568.3715	670.39802	4.4506e-005
25	Optimized	192.7024	-22.174495	1408.6616	2657.6989	721.13204	4.7875e-005
26	Optimized	193.1405	-22.128425	1405.7727	2611.8255	696.31485	4.6227e-005
27	Optimized	193.92	-21.975055	1396.2111	2661.9431	730.77072	-1.2154e-005
28	Optimized	194.7163	-21.818375	1386.4224	2718.5483	769.10328	5.1063e-005
29	Optimized	195.4963	-21.536525	1368.8703	2678.6651	756.21037	-1.2578e-005
30	Optimized	196.05	-21.28646	1352.9216	2706.0255	781.21489	5.1866e-005
31	Optimized	196.15	-21.2413	1349.4584	2701.8332	780.79395	5.1837e-005
32	Optimized	196.25	-21.196135	1345.7218	2697.5498	780.47824	-1.2981e-005
33	Optimized	196.55	-21.060645	1336.6441	2685.0631	778.51006	5.1687e-005
34	Optimized	197.05	-20.83483	1322.2446	2664.284	774.82682	5.1441e-005
35	Optimized	197.7294	-20.52799	1302.8291	2636.0083	769.7114	5.1102e-005
36	Optimized	198.5294	-20.126365	1277.6969	2559.8661	740.26078	4.9148e-005
37	Optimized	198.95	-19.89065	1262.9794	2537.3865	735.77928	4.8849e-005
38	Optimized	199.1	-19.806585	1257.7884	2528.4002	733.58809	-1.2201e-005
39	Optimized	199.25	-19.72252	1252.5113	2518.8928	731.14572	4.8542e-005
40	Optimized	199.45	-19.61043	1245.2123	2506.1849	728.02289	-1.2109e-005
41	Optimized	199.8	-19.414275	1232.6649	2483.9979	722.45747	4.7965e-005
42	Optimized	200.05	-19.27417	1217.3558	2468.3841	722.28151	-1.2013e-005
43	Optimized	200.15	-19.218125	1204.1834	2461.3181	725.80705	-1.2071e-005
44	Optimized	200.25	-19.16208	1183.8578	2453.5542	733.05958	-1.2193e-005

3/1/2013

45	Optimized	200.4	-19.078015	1169.0274	2443.3031	735.70341	4.8845e-005
46	Optimized	200.55	-18.99395	1163.445	2433.6648	733.36177	-1.2197e-005
47	Optimized	200.7	-18.909885	1158.1232	2423.9371	730.81803	-1.2155e-005
48	Optimized	200.85	-18.82582	1152.8896	2414.2115	728.22456	-1.2112e-005
49	Optimized	200.95	-18.769775	1149.2258	2407.6689	726.56252	4.8239e-005
50	Optimized	201.05	-18.71373	1145.3874	2401.2136	725.05158	4.8138e-005
51	Optimized	201.25	-18.601645	1138.292	2388.5639	721.84481	4.7926e-005
52	Optimized	201.41345	-18.510055	1132.552	2378.2001	719.17523	4.7748e-005
53	Optimized	201.46345	-18.45611	1129.2289	2171.3988	601.69707	-1.001e-005
54	Optimized	201.55	-18.34623	1122.1693	2159.9221	599.14688	3.9786e-005
55	Optimized	201.65	-18.21931	1113.9381	2146.5541	596.18116	3.9591e-005
56	Optimized	201.8	-18.028935	1101.5912	2126.595	591.78618	-9.8446e-006
57	Optimized	201.95	-17.83856	1089.2444	2106.5739	587.35546	3.9005e-005
58	Optimized	202.05	-17.71164	1081.0132	2093.2678	584.42548	3.8809e-005
59	Optimized	202.2	-17.521265	1068.6663	2073.2777	580.01263	3.8516e-005
60	Optimized	202.35	-17.33089	1056.3814	2053.2876	575.56405	-0.00011641
61	Optimized	202.5	-17.140515	1044.2821	2033.3284	571.02614	-0.0001155
62	Optimized	202.65	-16.95014	1032.1828	2013.3692	566.48823	-0.00011458
63	Optimized	202.85	-16.696305	1015.9471	1986.7566	560.49712	-0.00011337
64	Optimized	203.15	-16.31555	991.5629	1946.8383	551.5285	-0.00011155
65	Optimized	203.4	-15.98255	971.25323	1913.5425	544.03094	-0.00011004
66	Optimized	203.55	-15.80788	959.03018	1893.6142	539.58236	-0.00010913
67	Optimized	203.65	-15.68096	950.92273	1880.2462	536.54518	-0.00010853
68	Optimized	203.7564	-15.54592	942.26889	1866.1028	533.37575	-0.00010789
69	Optimized	203.9564	-15.283915	925.41968	1826.6468	520.32369	-0.00010524
70	Optimized	204.2	-14.96088	904.70031	1792.9636	512.83903	-0.00010373
71	Optimized	204.35	-14.761965	891.93573	1772.1909	508.21557	-0.0001028
72	Optimized	204.55	-14.496745	875.27809	1744.5955	501.90064	-0.00010152
73	Optimized	204.75	-14.231525	858.09829	1716.9191	495.84042	-0.00010029
74	Optimized	204.85	-	849.84966	1703.1312	492.64234	-9.9647e-

3/1/2013

			14.098915				005
75	Optimized	204.95	-13.966305	841.23978	1689.2832	489.61808	-3.4744e-005
76	Optimized	205.05	-13.833695	798.31078	1669.354	502.89704	-0.00010172
77	Optimized	205.15	-13.701085	710.16484	1641.5374	537.72823	3.2447e-005
78	Optimized	205.21385	-13.61639	689.27164	1629.9926	543.12552	-0.00010985
79	Optimized	205.26385	-13.550085	633.34866	1613.9918	566.17456	-0.00011452
80	Optimized	205.55	-13.170645	514.53397	1557.8474	602.35726	3.9999e-005
81	Optimized	205.95625	-12.6319	480.60464	1501.6896	589.5237	-9.8075e-006
82	Optimized	206.25625	-12.247195	456.59551	1480.8048	591.32748	-9.837e-006
83	Optimized	206.5	-11.94623	437.80828	1446.5956	582.42363	3.8676e-005
84	Optimized	206.9	-11.452315	406.67637	1384.2583	564.40722	-0.00011415
85	Optimized	207.4	-10.83492	367.84014	1306.3132	541.82766	-0.00010959
86	Optimized	207.9	-10.21752	329.3186	1228.4939	519.13909	-0.00010499
87	Optimized	208.45	-9.53838	286.63177	1142.7258	494.26612	-9.9971e-005
88	Optimized	208.77775	-9.1336755	261.06141	1091.6311	479.52965	-3.4027e-005
89	Optimized	209.02775	-8.852639	243.51521	1082.6458	484.4723	-9.7984e-005
90	Optimized	209.5	-8.345348	211.87381	1015.7837	464.13761	-9.3871e-005
91	Optimized	210.05	-7.7545385	173.75084	990.2844	0	281.77
92	Optimized	210.5262	-7.2429945	141.83431	928.23719	0	276.38
93	Optimized	211.0762	-6.6521845	104.96826	856.11177	0	270.16
94	Optimized	211.65	-6.035819	66.195663	780.48878	0	263.66
95	Optimized	212.26645	-5.3736345	24.562989	699.23633	0	256.69
96	Optimized	212.63755	-4.975	0.31200137	650.32308	0	252.49
97	Optimized	212.75915	-4.84435	-8.4645673	634.30372	0	251.11
98	Optimized	212.93805	-4.6622895	-19.825057	629.45974	0	249.19
99	Optimized	213.25	-4.3781605	-37.554136	591.56007	0	246.17
100	Optimized	213.5826	-4.075221	-56.456916	550.91708	0	242.95
101	Optimized	213.7326	-3.93859	-64.982025	513.86351	0	315

3/1/2013

102	Optimized	214.1016	-3.602474	-85.958203	467.8356	0	315
103	Optimized	214.5016	-3.238125	-108.69373	417.21206	0	315
104	Optimized	214.85	-2.9207635	-128.80836	371.17958	0	315
105	Optimized	215.65	-2.1920645	-174.5919	267.85588	0	305.76
106	Optimized	216.5	-1.417822	-222.90639	161.48423	0	282.53
107	Optimized	217.5331	0.4767851	-281.62502	32.186581	0	254.3

Slices of Slip Surface: 4075

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4075	160.1769	-10.155841	658.68884	781.12748	70.689977	1.9448e-006
2	4075	161.90615	-12.093065	779.57937	1042.508	151.80192	-8.0603e-007
3	4075	163.6354	-13.76257	883.75229	1258.7949	216.53096	-1.5364e-005
4	4075	165.42825	-15.26172	977.30013	1456.0731	276.41971	1.6677e-005
5	4075	167.28475	-16.61275	1061.5937	1633.3137	330.08273	-6.6751e-005
6	4075	169.1412	-17.78353	1134.6394	1784.4724	375.18127	-7.587e-005
7	4075	170.99765	-18.79515	1197.7995	1913.3723	413.1362	-2.9311e-005
8	4075	172.79445	-19.63945	1250.4794	2019.6801	444.09823	-3.1508e-005
9	4075	174.5315	-20.33587	1293.9069	2106.4605	469.12806	-9.4865e-005
10	4075	176.505	-20.988445	1334.6559	2111.6162	448.57828	-9.0714e-005
11	4075	178.715	-21.573045	1371.1121	2210.401	484.56368	-9.7986e-005
12	4075	180.925	-22.00163	1397.863	2291.5963	515.9715	3.1129e-005
13	4075	183.135	-22.28018	1415.2529	2353.1829	541.51414	3.2668e-005
14	4075	185.45735	-22.411405	1423.4481	2395.9145	561.45375	-0.00011354
15	4075	187.11735	-22.42908	1424.5503	2415.9542	572.38732	-0.00011574
16	4075	188.3897	-22.36567	1420.5559	2418.9566	576.42694	-0.00011656
17	4075	190.0597	-22.218665	1411.4137	2424.9638	585.1734	3.885e-005
18	4075	191	-22.10976	1404.6218	2428.4198	591.09006	3.9244e-005
19	4075	191.15475	-22.087655	1403.2447	2434.9652	595.66411	3.9549e-005
20	4075	191.86665	-21.96947	1395.8748	2486.0409	629.40767	-1.0468e-005
21	4075	192.9619	-21.77093	1383.4898	2561.5707	680.1653	-1.1312e-005
22	4075	193.92	-21.56198	1370.4481	2614.3515	718.16798	4.7681e-005
23	4075	195.22	-21.22759	1349.5869	2696.0209	777.364	5.1611e-005
24	4075	196.05	-20.99873	1335.0107	2751.4012	817.75341	-1.3601e-005

3/1/2013

25	4075	196.15	20.968405	1332.424	2747.8734	817.21011	-1.3591e-005
26	4075	196.25	-20.937745	1329.6358	2744.2252	816.71362	-1.3584e-005
27	4075	196.55	-20.8427	1323.0478	2733.1084	814.09886	-1.354e-005
28	4075	197.05	-20.679145	1312.5388	2713.963	809.11265	5.3721e-005
29	4075	198.1	-20.296985	1288.3843	2669.2981	797.27093	-1.326e-005
30	4075	198.95	-19.97857	1268.4803	2632.1036	787.28828	5.2267e-005
31	4075	199.1	-19.917475	1264.6776	2623.8971	784.74576	-1.3052e-005
32	4075	199.25	-19.85582	1260.8488	2615.0836	781.86782	-1.3004e-005
33	4075	199.45	-19.771735	1255.2963	2603.176	778.19873	-1.2943e-005
34	4075	199.8	-19.621275	1245.5856	2581.9343	771.54127	-1.2832e-005
35	4075	200.05	-19.5119	1232.2028	2566.9978	770.64426	5.1164e-005
36	4075	200.15	-19.467185	1219.7503	2560.1893	773.90284	-1.2871e-005
37	4075	200.25	-19.42208	1200.1188	2552.9054	781.03173	5.1855e-005
38	4075	200.4	-19.353545	1186.2353	2542.7507	783.18455	5.1997e-005
39	4075	200.55	-19.284425	1181.6193	2533.0001	780.22005	5.18e-005
40	4075	200.7	-19.214115	1177.113	2522.9214	777.00283	-1.2923e-005
41	4075	200.85	-19.143205	1172.6719	2512.791	773.71811	-1.2868e-005
42	4075	200.95	-19.095335	1169.5764	2505.9777	771.57162	5.1227e-005
43	4075	201.05	-19.04706	1166.1986	2499.2284	769.62511	-1.28e-005
44	4075	201.25	-18.948885	1159.9472	2485.6225	765.37899	-1.273e-005
45	4075	201.45	-18.849895	1153.7454	2471.9029	761.03857	-1.2658e-005
46	4075	201.55	-18.79958	1150.4912	2465.0323	758.95065	5.0388e-005
47	4075	201.65	-18.74885	1146.958	2458.0472	756.9577	-1.2589e-005
48	4075	201.8	-18.67181	1141.7271	2447.3898	753.82468	-1.2538e-005
49	4075	201.95	-18.59414	1136.3858	2436.7714	750.77799	4.9843e-005
50	4075	202.05	-18.541725	1132.8118	2429.5145	748.65166	4.9705e-005
51	4075	202.2	-18.462145	1127.3847	2418.6676	745.52253	4.9496e-005
52	4075	202.35	-18.381925	1122.0249	2407.684	742.27562	4.9283e-005
53	4075	202.5	-18.300405	1116.6824	2396.5965	738.95876	-1.2291e-005

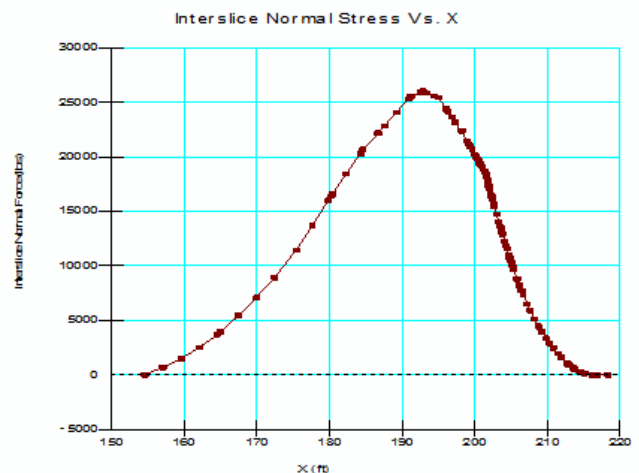
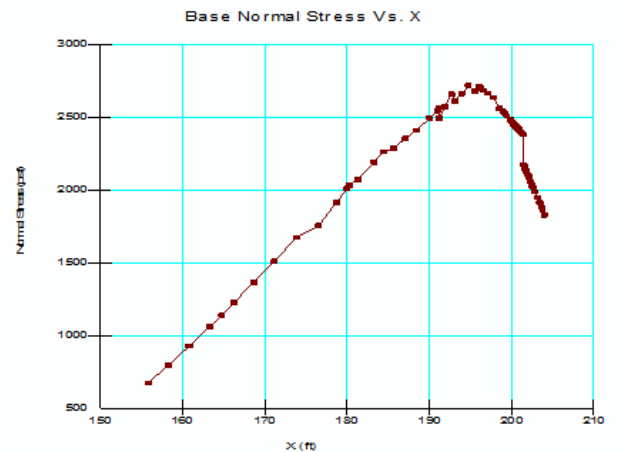
3/1/2013

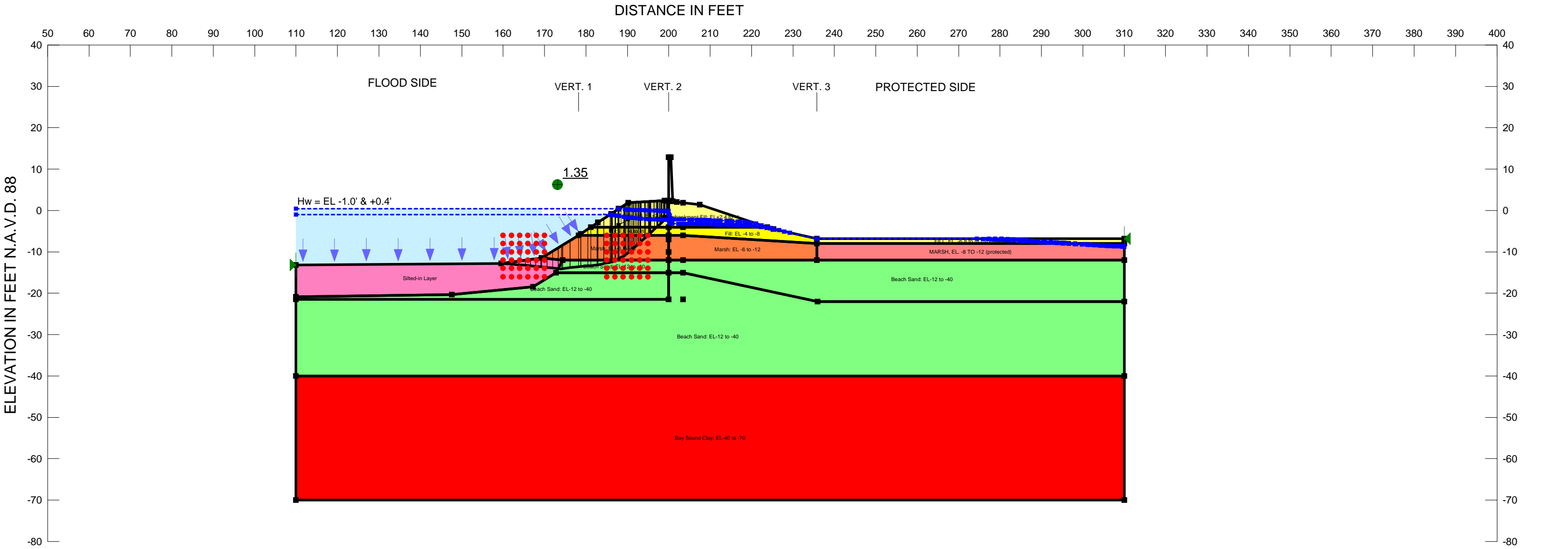
54	4075	202.65	-18.21823	1111.3183	2385.4607	735.62645	4.8839e-005
55	4075	202.85	-18.10646	1103.9482	2370.2835	731.11907	4.854e-005
56	4075	203.15	-17.93612	1092.7041	2347.2357	724.30417	4.8089e-005
57	4075	203.4	-17.79135	1083.1306	2327.7364	718.5735	4.7707e-005
58	4075	203.55	-17.70312	1077.3213	2315.8451	715.06204	-1.1893e-005
59	4075	203.65	-17.643605	1073.4061	2307.8574	712.7108	4.7319e-005
60	4075	203.9	-17.491885	1063.3299	2287.6377	706.85446	4.6926e-005
61	4075	204.2	-17.307685	1051.1364	2262.9449	699.63798	4.645e-005
62	4075	204.35	-17.213785	1044.952	2250.4316	695.98397	4.6209e-005
63	4075	204.55	-17.086145	1036.8616	2233.4822	690.86922	4.5869e-005
64	4075	204.75	-16.95752	1028.2378	2216.4069	685.98975	4.5546e-005
65	4075	204.85	-16.892205	1024.1177	2207.7991	683.39875	-1.1366e-005
66	4075	204.95	-16.82639	1019.7381	2199.0867	680.89723	4.5207e-005
67	4075	205.05	-16.76007	980.97238	2187.4394	696.55405	-1.1585e-005
68	4075	205.15	-16.693235	896.85279	2171.8785	736.13644	-1.2243e-005
69	4075	205.21385	-16.65034	878.60633	2164.8296	742.60133	4.9304e-005
70	4075	205.26385	-16.616535	824.7025	2155.9322	768.5858	-1.2783e-005
71	4075	205.55	-16.419115	717.23472	2121.3753	810.68094	5.3826e-005
72	4075	206.1	-16.02965	692.61158	2069.5366	794.96803	5.2782e-005
73	4075	206.5	-15.73874	674.46929	2028.1011	781.51972	5.1887e-005
74	4075	206.9	-15.434115	655.14514	1976.185	762.70274	5.0636e-005
75	4075	207.4	-15.044395	630.50869	1910.3481	738.91563	4.9059e-005
76	4075	207.9	-14.63614	605.03343	1842.6333	714.52862	4.744e-005
77	4075	208.45	-14.17097	575.69457	1766.4593	687.48835	4.5647e-005
78	4075	208.95	-13.729375	547.82575	1695.4601	662.58698	-1.102e-005
79	4075	209.5	-13.22175	516.16104	1615.0055	634.41813	4.212e-005
80	4075	210.05	-12.69308	482.85691	1532.386	605.94591	4.0232e-005
81	4075	210.85	-11.867135	431.00368	1406.437	563.1667	3.3975e-005
82	4075	211.65	-11.004885	376.89411	1277.2677	519.83095	-0.00010512
83	4075	212.45	-10.052847	317.17096	1138.8332	474.38692	-9.5935e-005
84	4075	213.25	-	254.86875	995.63172	427.6797	-3.0344e-005

3/1/2013

			9.0544505				
85	4075	213.65	-8.519957	221.20869	919.56805	403.19797	-8.1541e-005
86	4075	213.9115	-8.157173	198.25572	868.58495	387.01476	-7.8265e-005
87	4075	214.3115	-7.574909	161.92153	826.0363	0	277.52
88	4075	214.6489	-7.074909	130.6615	762.70902	0	272.33
89	4075	214.8989	-6.6826085	105.8697	713.02389	0	268.26
90	4075	215.503	-5.6776085	42.906667	587.22047	0	257.87
91	4075	215.9088	-4.985	-0.31200073	501.27891	0	250.71
92	4075	216.0558	-4.7143635	-17.200452	468.24004	0	247.92
93	4075	216.3171	-4.2243635	-47.775511	408.74516	0	242.87
94	4075	216.5695	-3.7300235	-78.623243	312.92339	0	315
95	4075	216.7524	-3.362156	-101.57892	265.36936	0	315
96	4075	217.52	-1.5321325	-215.77021	40.001279	0	285.96

3/1/2013





Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf Piezometric Line: 1
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 ° Piezometric Line: 2
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° Piezometric Line: 2
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf Piezometric Line: 1
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf Piezometric Line: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
PROTECTED SIDE STABILITY ANALYSIS
CASE: BLOCK IN front DD (Piezo: EL-1.0, EL+0.4 Sand)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

BLOCK IN front DD (Piezo: EL-1.0, EL+0.4 Sand)

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File Information

Created By: Johnson, Jehu
Revision Number: 160
Last Edited By: Johnson, Jehu B MVN
Date: 2/11/2013
Time: 8:46:40 AM
File Name: Reach 35B_Q-Case_FS EL -1.0.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water EL -1 Based on SeepW\
Last Solved Date: 2/11/2013
Last Solved Time: 8:54:14 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

BLOCK IN front DD (Piezo: EL-1.0, EL+0.4 Sand)

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Block
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 1

3/1/2013

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
 FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 4000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Fill: EL+2.4 to -4

Model: Undrained (Phi=0)
Unit Weight: 110 pcf
Cohesion: 450 psf
Pore Water Pressure
 Piezometric Line: 1

Fill: EL -4 to -8

Model: Spatial Mohr-Coulomb
Weight Fn: Fill -4 to -8
Cohesion Fn: Fill -4 to -8
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Marsh: EL -6 to -12

Model: Spatial Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion Fn: Marsh
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 20 °
Phi-B: 0 °

3/1/2013

BLOCK IN front DD (Piezo: EL-1.0, EL+0.4 Sand)

Page 3 of 18

BLOCK IN front DD (Piezo: EL-1.0, EL+0.4 Sand)

Page 4 of 18

Pore Water Pressure
 Piezometric Line: 2

Beach Sand: EL-12 to -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

Bay Sound Clay: EL-40 to -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay
Cohesion Spatial Fn: Bay Sound Clay
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

FILL, EL. -6.8 to -8 (protected)

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 600 psf
Pore Water Pressure
 Piezometric Line: 1

MARSH, EL. -8 TO -12 (protected)

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 150 psf
Pore Water Pressure
 Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (110, -13.2) ft
Right Coordinate: (310, -6.8) ft

Slip Surface Block

Left Grid
 Upper Left: (160, -6) ft
 Lower Left: (160, -16) ft
 Lower Right: (170, -16) ft
 X Increments: 5
 Y Increments: 5
 Starting Angle: 135 °
 Ending Angle: 145 °
 Angle Increments: 2

3/1/2013

Right Grid
 Upper Left: (185, -6) ft
 Lower Left: (185, -16) ft
 Lower Right: (195, -16) ft
 X Increments: 5
 Y Increments: 5
 Starting Angle: 45 °
 Ending Angle: 55 °
 Angle Increments: 2

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
110	-1
185.8	-1
186.1	-1.04
186.3	-1.06
187	-1.17
187.7	-1.27
187.9	-1.3
188	-1.33
189.1	-1.53
189.3	-1.57
189.7	-1.62
190.1	-1.67
190.7	-1.75
191	-1.78
191.4	-1.81
192.2	-1.89
193.3	-1.99
193.3	-2
194.4	-2.06
195.3	-2.11
195.5	-2.12
195.7	-2.13
196.6	-2.16
197.4	-2.19
197.8	-2.2
198.7	-2.22
199.4	-2.23
199.7	-2.24

3/1/2013

	200	-2.24
	200.1	-2.49
	200.2	-2.71
	200.2	-2.79
	200.2	-2.97
	200.3	-3.16
	200.8	-3.17
	200.9	-3.17
	202.3	-3.19
	203.2	-3.19
	203.6	-3.2
	204.4	-3.21
	205.1	-3.23
	205.8	-3.24
	206.6	-3.25
	207.4	-3.27
	208	-3.28
	208.6	-3.3
	209.3	-3.31
	209.8	-3.33
	210.8	-3.36
	211.3	-3.37
	212	-3.39
	212.3	-3.4
	212.9	-3.42
	213.8	-3.45
	214.7	-3.49
	215.2	-3.5
	215.8	-3.53
	216.6	-3.57
	217.6	-3.61
	218.1	-3.64
	218.8	-3.68
	219.5	-3.72
	220.5	-3.78
	220.9	-3.81
	222.3	-3.99
	222.4	-4
	222.4	-3.99
	223.7	-4.15
	223.8	-4.16
	224.5	-4.32
	224.6	-4.33
	225.3	-4.5

	226.6	-4.79
	227.9	-5.08
	229.2	-5.36
	235.8	-6.8
	274.4	-6.8
	275.9	-6.88
	277	-6.94
	277.8	-6.98
	278.8	-7.04
	279.6	-7.08
	280.3	-7.12
	281.2	-7.17
	281.8	-7.2
	282.2	-7.23
	283.3	-7.29
	284.7	-7.37
	284.8	-7.37
	285.3	-7.4
	286.3	-7.45
	287.4	-7.52
	287.7	-7.54
	288.1	-7.56
	289.2	-7.62
	290	-7.67
	290.7	-7.71
	291.6	-7.76
	292.2	-7.79
	292.6	-7.82
	293.7	-7.87
	295	-7.95
	295.2	-7.96
	295.9	-8
	296.7	-8.04
	298	-8.12
	298.2	-8.13
	298.4	-8.14
	299.8	-8.22
	300.9	-8.28
	301.3	-8.3
	301.8	-8.33
	302.8	-8.39
	303.6	-8.44
	304.2	-8.47
	304.8	-8.51

3/1/2013

3/1/2013

	305.7	-8.56
	306.2	-8.59
	306.8	-8.62
	307.1	-8.64
	307.6	-8.66
	308.6	-8.72
	309.5	-8.77
	310	-8.8

Piezometric Line 2

Coordinates		
X (ft)	Y (ft)	
110	0.4	
187.9	0.4	
189.4	0.24	
189.7	0.21	
190.4	0.16	
190.7	0.14	
191.5	0.12	
191.8	0.11	
192.6	0.08	
193	0.07	
193.2	0.07	
194.2	0.04	
194.4	0.03	
195.2	0.01	
195.3	0.01	
195.5	0	
196.6	-0.02	
197.3	-0.04	
197.8	-0.06	
198.3	-0.07	
198.8	-0.08	
199.5	-0.09	
199.7	-0.09	
199.7	-0.1	
200	-0.1	
200.1	-0.9	
200.1	-1.06	
200.2	-1.21	
200.3	-1.93	
200.3	-2.04	
200.3	-2.12	

	200.8	-2.13
	201	-2.13
	201.2	-2.14
	201.5	-2.14
	202.5	-2.16
	202.7	-2.16
	203.4	-2.18
	203.7	-2.18
	205	-2.21
	205.6	-2.23
	206.8	-2.26
	207.7	-2.28
	208.1	-2.29
	208.8	-2.31
	209.3	-2.33
	209.9	-2.35
	210.9	-2.39
	211.6	-2.41
	212.5	-2.44
	213.9	-2.51
	214	-2.51
	214	-2.52
	214.8	-2.55
	215.4	-2.58
	216.6	-2.67
	216.8	-2.68
	217.2	-2.7
	218.3	-2.78
	219.1	-2.87
	219.7	-2.94
	221.1	-3.1
	222.4	-3.55
	223.8	-4
	224.6	-4.25
	225.3	-4.5
	226.6	-4.79
	227.9	-5.08
	229.2	-5.36
	235.8	-6.8
	277.4	-6.8
	278.8	-6.81
	280.3	-6.82
	280.4	-6.82
	281.8	-6.92

3/1/2013

3/1/2013

	282.8	-6.99
	283.3	-7.02
	283.9	-7.07
	284.8	-7.12
	285.4	-7.16
	286.3	-7.21
	287.5	-7.3
	287.7	-7.31
	287.9	-7.33
	289.1	-7.4
	289.2	-7.41
	290.5	-7.5
	290.7	-7.51
	291	-7.53
	292.2	-7.61
	293	-7.66
	293.7	-7.71
	294.6	-7.77
	295.2	-7.81
	295.6	-7.83
	296.6	-7.91
	298.1	-8
	298.1	-8.01
	299.7	-8.11
	301	-8.19
	301.2	-8.21
	301.6	-8.23
	302.7	-8.3
	303.7	-8.36
	304.2	-8.4
	304.9	-8.43
	305.7	-8.48
	306.3	-8.51
	306.9	-8.54
	307.1	-8.56
	307.5	-8.57
	308.6	-8.59
	309.6	-8.6
	310	-8.62

Tension Crack Line

X (ft)	Y (ft)
186.1	-4.8

3/1/2013

	187.9	-3.6
	190.2	-2.1
	199	-1.6
	200	-1.6

Cohesion Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
Data Point: (110, 600)
Data Point: (178.1, 600)
Data Point: (178.3, 450)
Data Point: (200, 450)
Data Point: (235.7, 450)
Data Point: (235.9, 600)
Data Point: (310, 600)

Marsh

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 150
Data Points: X (ft), Cohesion (psf)
Data Point: (178.2, 150)
Data Point: (200, 275)
Data Point: (235.8, 150)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (0, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10

3/1/2013

Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (110, 96)
Data Point: (178.1, 96)
Data Point: (178.3, 88)
Data Point: (200, 88)
Data Point: (235.7, 88)
Data Point: (235.9, 96)
Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)
Data Point: (235.8, 107)
Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)

3/1/2013

Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1
Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	446.445
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	158.45
Region 8	Fill: EL -4 to -8	32,33,37,35,31	40.6
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	87.02
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40
Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-13.2
Point 17	159.5	-12.8

3/1/2013

Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-11.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6
Point 31	200	-6
Point 32	178.2	-6
Point 33	178.8	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.2	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	187.9	0.4
Point 50	182.9	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.35	(177.42, 1.178)	20.93962	(199.745, 2.4)	(159.203, -12.8024)
2	1390	1.46	(177.42, 1.178)	20.607	(199.4, 2.4)	(160.161, -12.7123)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength
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3/1/2013

							(psf)
1	Optimized	159.3517	-12.81206	824.44211	826.89811	0.89391081	0
2	Optimized	160.19865	-12.867225	827.84862	838.20387	3.7690025	0
3	Optimized	161.59595	-12.958235	833.56186	851.7014	6.6022527	0
4	Optimized	163.05615	-13.064385	840.20414	867.3645	9.8855631	0
5	Optimized	164.5793	-13.18568	847.73051	884.11885	13.244272	0
6	Optimized	165.974	-13.306255	855.2539	901.01211	16.654625	0
7	Optimized	167.24025	-13.42611	862.72302	916.73658	19.659326	0
8	Optimized	168.5065	-13.545965	870.19215	932.46104	22.664026	0
9	Optimized	169.2198	-13.614735	874.49898	942.23052	24.652262	0
10	Optimized	169.9665	-13.697075	879.6858	880.13321	0.16284451	0
11	Optimized	171.29945	-13.84407	888.85774	914.21106	9.2278555	0
12	Optimized	172.6324	-13.991065	898.02967	948.28891	18.292867	0
13	Optimized	173.68835	-14.107505	905.26588	1003.4701	56.693685	3.9363e-006
14	Optimized	174.2389	-14.12326	906.2577	1023.9424	67.939803	2.3021e-008
15	Optimized	175.30225	-13.94383	895.04248	1026.7934	76.060266	2.5221e-006
16	Optimized	177.20225	-13.6935	879.43107	1030.6908	87.322817	2.9586e-008
17	Optimized	178.5	-13.56592	871.46562	1035.0935	94.46298	3.2004e-008
18	Optimized	179.6123	-13.456575	864.67725	1039.328	100.82651	3.4173e-008
19	Optimized	180.8123	-13.343915	857.61916	1046.1309	108.82853	3.6875e-008
20	Optimized	181.9645	-13.24642	851.55107	1062.6956	121.89452	4.1302e-008
21	Optimized	182.8145	-13.164025	846.40048	1062.153	124.55473	4.2204e-008
22	Optimized	183.6238	-12.996415	835.93761	1065.1812	132.34319	4.389e-006
23	Optimized	185.0738	-12.69611	817.21787	1070.7233	146.34962	4.8527e-006
24	Optimized	185.95	-12.514645	805.86513	1080.014	158.26716	5.2477e-006
25	Optimized	186.2	-12.46287	802.66622	1090.7526	166.31334	-5.4024e-006

3/1/2013

26	Optimized	186.3468	-12.43247	800.74955	1097.1738	171.12684	-5.5579e-006
27	Optimized	186.6968	-12.265485	790.33147	1057.8006	154.41091	-5.0161e-006
28	Optimized	187.1043	-12.054095	777.15333	1058.9188	162.66424	5.3946e-006
29	Optimized	187.4543	-11.87253	663.79594	1052.374	0	203.06
30	Optimized	187.8	-11.693185	649.46391	1061.0766	0	205.05
31	Optimized	187.95	-11.615375	642.74396	1064.76	0	205.91
32	Optimized	188.55	-11.304125	616.14801	1078.9228	0	209.35
33	Optimized	189.2	-10.966935	587.63768	1094.2755	0	213.07
34	Optimized	189.3244	-10.902395	582.15738	1097.235	0	213.79
35	Optimized	189.3744	-10.868125	579.62601	1035.4965	0	214.07
36	Optimized	189.55	-10.71987	568.99899	1034.4672	0	215.08
37	Optimized	189.9	-10.42435	547.83436	1032.4424	0	217.09
38	Optimized	190.15	-10.21326	532.68286	1030.9523	0	218.52
39	Optimized	190.3	-10.086605	523.53701	1023.7318	0	219.38
40	Optimized	190.55	-9.8755185	508.28132	1006.3751	0	220.81
41	Optimized	190.85	-9.622214	490.30033	985.5416	0	222.53
42	Optimized	191.2	-9.3266905	469.97617	961.21245	0	224.54
43	Optimized	191.45	-9.1156025	455.55819	943.8489	0	225.97
44	Optimized	191.65	-8.946732	443.76878	929.96863	0	227.12
45	Optimized	192	-8.6512085	423.13901	905.64585	0	229.13
46	Optimized	192.35785	-8.349074	402.14691	880.78259	0	231.18
47	Optimized	192.55785	-8.178391	390.364	858.31124	0	232.33
48	Optimized	192.8	-7.963504	375.58189	840.58536	0	233.72
49	Optimized	193.1	-7.6973025	357.27122	818.632	0	235.44
50	Optimized	193.25	-7.564202	348.11201	807.59892	0	236.3
51	Optimized	193.75	-7.1205325	317.99327	771.02274	0	239.16
52	Optimized	194.3	-6.632496	285.66289	730.74378	0	242.32
53	Optimized	194.7064	-6.271881	261.75755	701.00245	0	244.65
54	Optimized	195.1064	-5.9169455	238.22595	547.20727	0	450

3/1/2013

55	Optimized	195.25	-5.789524	229.77338	537.21747	0	450
56	Optimized	195.332	-5.7167535	224.95627	531.49919	0	450
57	Optimized	195.432	-5.623967	218.8623	503.89004	0	450
58	Optimized	195.6	-5.4648895	208.41048	491.35571	0	450
59	Optimized	196.15	-4.944069	174.66069	450.29847	0	450
60	Optimized	196.8735	-4.2589715	130.3353	396.29344	0	450
61	Optimized	197.2235	-3.92754	108.83588	368.62999	0	450
62	Optimized	197.35	-3.807733	101.06665	356.63406	0	450
63	Optimized	197.6	-3.5709965	85.861981	332.93755	0	450
64	Optimized	197.95035	-3.2392335	64.639576	299.71475	0	450
65	Optimized	198.20035	-3.0061715	49.748179	288.67006	0	450
66	Optimized	198.5	-2.7334695	32.317809	261.40465	0	450
67	Optimized	198.75	-2.5059525	17.798742	238.65521	0	450
68	Optimized	198.9	-2.3694425	9.1467575	225.00617	0	450
69	Optimized	199.0293	-2.2517795	1.6894504	213.06871	0	450
70	Optimized	199.2293	-2.069766	-9.8464576	193.65169	0	450
71	Optimized	199.45	-1.8689055	-22.636338	172.23349	0	450
72	Optimized	199.6	-1.732395	-31.466547	157.67109	0	450
73	Optimized	199.72275	-1.620694	-38.644202	-222.01349	0	450

Slices of Slip Surface: **1390**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1390	161.0805	-13.35616	858.39376	937.81445	28.906766	0
2	1390	162.60835	-14	898.5203	949.80796	18.667181	0
3	1390	163.825	-14	898.5203	954.24631	20.28261	0
4	1390	165.04165	-14	898.5203	958.68467	21.898039	0
5	1390	166.25835	-14	898.5203	963.12302	23.513468	0
6	1390	167.475	-14	898.5203	967.56138	25.128897	0
7	1390	168.69165	-14	898.5203	971.99973	26.744326	0
8	1390	169.9722	-14	898.58707	912.94245	5.2249298	0

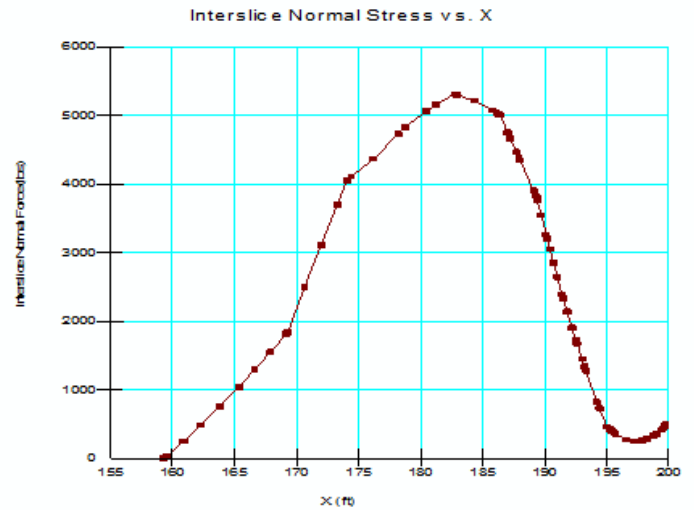
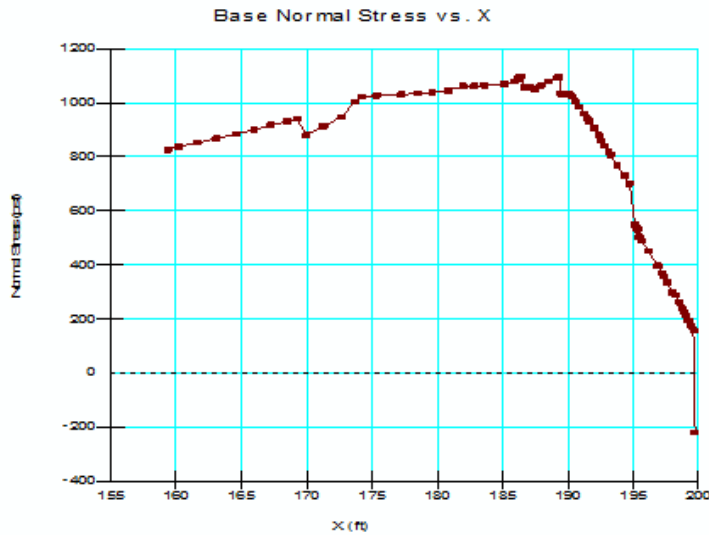
3/1/2013

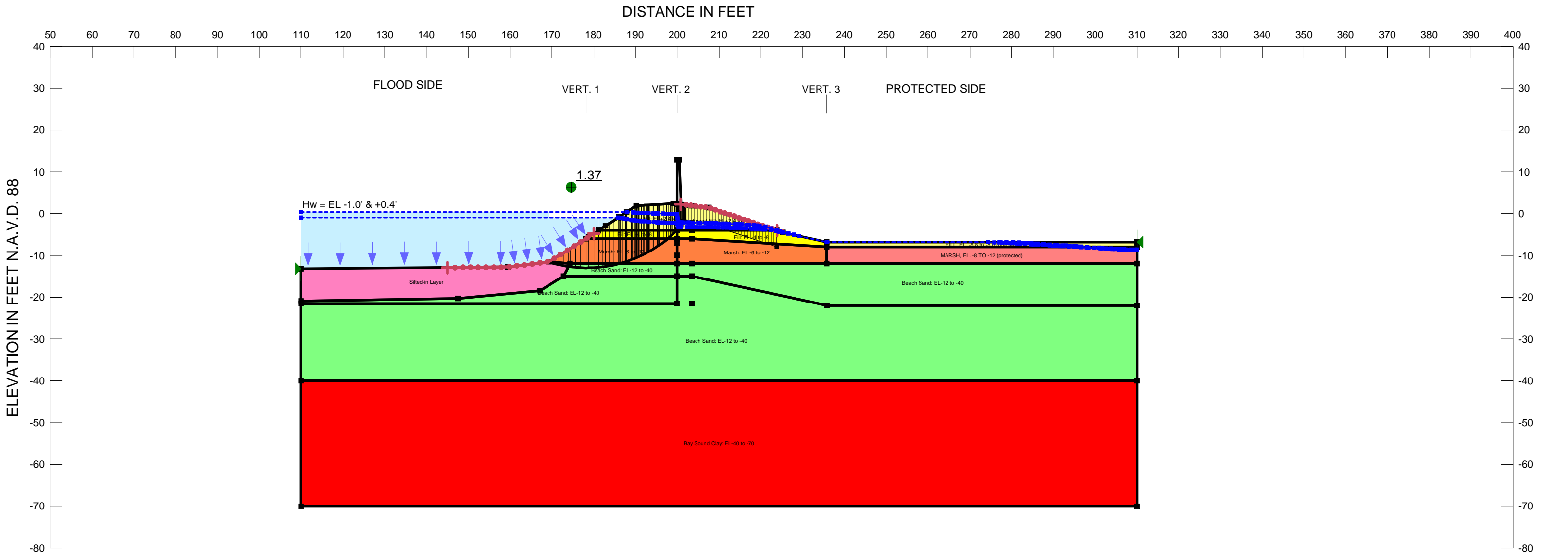
9	1390	171.31665	-14	898.58707	932.43006	12.31784	0
10	1390	172.6611	-14	898.58707	951.84329	19.383677	0
11	1390	173.86665	-14	898.55597	1002.6559	60.097299	2.0363e-008
12	1390	175.03335	-14	898.57871	1052.526	88.874366	3.0123e-008
13	1390	176.3	-14	898.57871	1071.2366	99.67602	3.3791e-008
14	1390	177.56665	-14	898.57871	1090.026	110.52325	3.7459e-008
15	1390	178.5	-14	898.56667	1105.0333	119.19398	4.0395e-008
16	1390	179.4	-14	898.58333	1119.25	127.39169	4.3186e-008
17	1390	180.6	-14	898.58333	1138.3333	138.40857	4.5904e-006
18	1390	182.05	-14	898.58824	1173.1176	158.48685	-5.149e-006
19	1390	183.6238	-14	898.57898	1220.625	185.91839	6.1668e-006
20	1390	185.0738	-14	898.59341	1264.6819	211.34426	-6.8673e-006
21	1390	185.95	-14	898.56667	1298.0667	230.63284	-7.4928e-006
22	1390	186.2	-14	898.55	1316.65	241.37069	-7.8412e-006
23	1390	186.65	-14	898.55714	1350.4	260.85057	-8.4742e-006
24	1390	187.35	-13.65	876.72149	1172.181	170.56988	5.6558e-006
25	1390	187.8	-13.2	848.63424	1149.4728	173.67524	5.7598e-006
26	1390	187.95	-13.05	838.98194	1141.765	174.79777	5.7981e-006
27	1390	188.5	-12.5	800.9396	1112.5615	179.90046	-5.8433e-006
28	1390	189.05	-11.95	650.77845	1068.1552	0	212.21
29	1390	189.2	-11.8	639.61347	1065.3271	0	213.07
30	1390	189.35	-11.65	628.60359	1062.4983	0	213.93
31	1390	189.55	-11.45	614.57003	1058.7038	0	215.08
32	1390	189.9	-11.1	589.99225	1052.1042	0	217.09
33	1390	190.15	-10.85	572.4169	1047.3662	0	218.52
34	1390	190.3	-10.7	561.79636	1038.351	0	219.38
35	1390	190.55	-10.45	544.11863	1018.1158	0	220.81
36	1390	190.85	-10.15	523.23541	993.86208	0	222.53
37	1390	191.2	-9.8	499.51793	965.53667	0	224.54
38	1390	191.45	-9.55	482.66387	945.33076	0	225.97

3/1/2013

39	1390	191.65	-9.35	468.92961	929.13824	0	227.12
40	1390	192	-9	444.91161	900.8364	0	229.13
41	1390	192.4	-8.6	417.56425	868.48626	0	231.42
42	1390	192.8	-8.2	390.34064	836.13613	0	233.72
43	1390	193.1	-7.9	369.92293	811.86469	0	235.44
44	1390	193.25	-7.75	359.70511	799.73752	0	236.3
45	1390	193.75	-7.25	326.07056	759.29138	0	239.16
46	1390	194.3	-6.7	289.8749	714.81428	0	242.32
47	1390	194.7	-6.3	263.53871	682.45235	0	244.61
48	1390	195.1	-5.9	237.18837	625.62785	0	450
49	1390	195.25	-5.75	227.30648	514.01697	0	450
50	1390	195.4	-5.6	217.46363	502.39939	0	450
51	1390	195.6	-5.4	204.36094	486.94911	0	450
52	1390	196.15	-4.85	168.79427	444.38526	0	450
53	1390	196.8	-4.2	126.82845	394.0883	0	450
54	1390	197.15	-3.85	104.16861	363.90069	0	450
55	1390	197.35	-3.65	91.223818	344.25483	0	450
56	1390	197.6	-3.4	75.191971	319.70067	0	450
57	1390	198.05	-2.95	46.452672	275.51708	0	450
58	1390	198.5	-2.5	17.750149	231.32999	0	450
59	1390	198.73945	-	2.2605635	2.4959747	207.82905	0
60	1390	198.78945	-	2.2105635	0.66855771	202.91689	0
61	1390	198.9	-2.1	-7.6664521	192.06082	0	450
62	1390	199.2	-1.8	-26.654391	94.526039	0	450

3/1/2013





- Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf Piezometric Line: 1
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 ° Piezometric Line: 2
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° Piezometric Line: 2
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf Piezometric Line: 1
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf Piezometric Line: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
PROTECTED SIDE STABILITY ANALYSIS
CASE: E/E Through DD (Piezo: EL-1.0, EL+0.4 Sand)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

E/E Through DD (Piezo: EL-1.0, EL+0.4 Sand)

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: Johnson, Jehu
Revision Number: 147
Last Edited By: Johnson, Jehu B MVN
Date: 1/22/2013
Time: 10:14:00 AM
File Name: Reach 35B_Q-Case_FS EL -1.0.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water EL -1 Based on SeepW\
Last Solved Date: 1/22/2013
Last Solved Time: 10:23:58 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

E/E Through DD (Piezo: EL-1.0, EL+0.4 Sand)

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: [Piezometric Line](#)
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: No
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: [Tension Crack Line](#)
 Percentage Wet: 1

3/1/2013

E/E Through DD (Piezo: EL-1.0, EL+0.4 Sand)

Page 3 of 19

Piezometric Line: 2

Beach Sand: EL-12 to -40

Model: [Shear/Normal Fn.](#)
Unit Weight: 122 pcf
Strength Function: [Sand](#)
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 2

Bay Sound Clay: EL-40 to -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay](#)
Cohesion Spatial Fn: [Bay Sound Clay](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. -6.8 to -8 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: 96 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -8 TO -12 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: 96 pcf
Cohesion: 150 psf
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: (145, -12.91717) ft
Left-Zone Right Coordinate: (180, -4.8) ft
Left-Zone Increment: 20
Right Projection: [Range](#)
Right-Zone Left Coordinate: (200.9, 2.2) ft
Right-Zone Right Coordinate: (223.9, -4.03333) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (110, -13.2) ft
Right Coordinate: (310, -6.8) ft

3/1/2013

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Fill: EL+2.4 to -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: 110 pcf
Cohesion: 450 psf
Pore Water Pressure
Piezometric Line: 1

Fill: EL -4 to -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill -4 to -8](#)
Cohesion Fn: [Fill -4 to -8](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh: EL -6 to -12

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 88 pcf
Cohesion Fn: [Marsh](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 20 °
Phi-B: 0 °
Pore Water Pressure

3/1/2013

E/E Through DD (Piezo: EL-1.0, EL+0.4 Sand)

Page 4 of 19

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
110	-1
185.8	-1
186.1	-1.04
186.3	-1.06
187	-1.17
187.7	-1.27
187.9	-1.3
188	-1.33
189.1	-1.53
189.3	-1.57
189.7	-1.62
190.1	-1.67
190.7	-1.75
191	-1.78
191.4	-1.81
192.2	-1.89
193.3	-1.99
193.3	-2
194.4	-2.06
195.3	-2.11
195.5	-2.12
195.7	-2.13
196.6	-2.16
197.4	-2.19
197.8	-2.2
198.7	-2.22
199.4	-2.23
199.7	-2.24
200	-2.24
200.1	-2.49
200.2	-2.71
200.2	-2.79
200.2	-2.97
200.3	-3.16
200.8	-3.17
200.9	-3.17

3/1/2013

	202.3	-3.19
	203.2	-3.19
	203.6	-3.2
	204.4	-3.21
	205.1	-3.23
	205.8	-3.24
	206.6	-3.25
	207.4	-3.27
	208	-3.28
	208.6	-3.3
	209.3	-3.31
	209.8	-3.33
	210.8	-3.36
	211.3	-3.37
	212	-3.39
	212.3	-3.4
	212.9	-3.42
	213.8	-3.45
	214.7	-3.49
	215.2	-3.5
	215.8	-3.53
	216.6	-3.57
	217.6	-3.61
	218.1	-3.64
	218.8	-3.68
	219.5	-3.72
	220.5	-3.78
	220.9	-3.81
	222.3	-3.99
	222.4	-4
	222.4	-3.99
	223.7	-4.15
	223.8	-4.16
	224.5	-4.32
	224.6	-4.33
	225.3	-4.5
	226.6	-4.79
	227.9	-5.08
	229.2	-5.36
	235.8	-6.8
	274.4	-6.8
	275.9	-6.88
	277	-6.94
	277.8	-6.98

3/1/2013

	278.8	-7.04
	279.6	-7.08
	280.3	-7.12
	281.2	-7.17
	281.8	-7.2
	282.2	-7.23
	283.3	-7.29
	284.7	-7.37
	284.8	-7.37
	285.3	-7.4
	286.3	-7.45
	287.4	-7.52
	287.7	-7.54
	288.1	-7.56
	289.2	-7.62
	290	-7.67
	290.7	-7.71
	291.6	-7.76
	292.2	-7.79
	292.6	-7.82
	293.7	-7.87
	295	-7.95
	295.2	-7.96
	295.9	-8
	296.7	-8.04
	298	-8.12
	298.2	-8.13
	298.4	-8.14
	299.8	-8.22
	300.9	-8.28
	301.3	-8.3
	301.8	-8.33
	302.8	-8.39
	303.6	-8.44
	304.2	-8.47
	304.8	-8.51
	305.7	-8.56
	306.2	-8.59
	306.8	-8.62
	307.1	-8.64
	307.6	-8.66
	308.6	-8.72
	309.5	-8.77
	310	-8.8

3/1/2013

Piezometric Line 2

Coordinates

X (ft)	Y (ft)
110	0.4
187.9	0.4
189.4	0.24
189.7	0.21
190.4	0.16
190.7	0.14
191.5	0.12
191.8	0.11
192.6	0.08
193	0.07
193.2	0.07
194.2	0.04
194.4	0.03
195.2	0.01
195.3	0.01
195.5	0
196.6	-0.02
197.3	-0.04
197.8	-0.06
198.3	-0.07
198.8	-0.08
199.5	-0.09
199.7	-0.09
199.7	-0.1
200	-0.1
200.1	-0.9
200.1	-1.06
200.2	-1.21
200.3	-1.93
200.3	-2.04
200.3	-2.12
200.8	-2.13
201	-2.13
201.2	-2.14
201.5	-2.14
202.5	-2.16
202.7	-2.16
203.4	-2.18
203.7	-2.18

3/1/2013

	205	-2.21
	205.6	-2.23
	206.8	-2.26
	207.7	-2.28
	208.1	-2.29
	208.8	-2.31
	209.3	-2.33
	209.9	-2.35
	210.9	-2.39
	211.6	-2.41
	212.5	-2.44
	213.9	-2.51
	214	-2.51
	214	-2.52
	214.8	-2.55
	215.4	-2.58
	216.6	-2.67
	216.8	-2.68
	217.2	-2.7
	218.3	-2.78
	219.1	-2.87
	219.7	-2.94
	221.1	-3.1
	222.4	-3.55
	223.8	-4
	224.6	-4.25
	225.3	-4.5
	226.6	-4.79
	227.9	-5.08
	229.2	-5.36
	235.8	-6.8
	277.4	-6.8
	278.8	-6.81
	280.3	-6.82
	280.4	-6.82
	281.8	-6.92
	282.8	-6.99
	283.3	-7.02
	283.9	-7.07
	284.8	-7.12
	285.4	-7.16
	286.3	-7.21
	287.5	-7.3
	287.7	-7.31

3/1/2013

	287.9	-7.33
	289.1	-7.4
	289.2	-7.41
	290.5	-7.5
	290.7	-7.51
	291	-7.53
	292.2	-7.61
	293	-7.66
	293.7	-7.71
	294.6	-7.77
	295.2	-7.81
	295.6	-7.83
	296.6	-7.91
	298.1	-8
	298.1	-8.01
	299.7	-8.11
	301	-8.19
	301.2	-8.21
	301.6	-8.23
	302.7	-8.3
	303.7	-8.36
	304.2	-8.4
	304.9	-8.43
	305.7	-8.48
	306.3	-8.51
	306.9	-8.54
	307.1	-8.56
	307.5	-8.57
	308.6	-8.59
	309.6	-8.6
	310	-8.62

Tension Crack Line

X (ft)	Y (ft)
201	-1.8
201.9	-1.9
203.5	-2.1
207.5	-2.6
223.8	-8

Cohesion Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (110, 96)
Data Point: (178.1, 96)
Data Point: (178.3, 88)
Data Point: (200, 88)
Data Point: (235.7, 88)
Data Point: (235.9, 96)
Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)
Data Point: (235.8, 107)
Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)
Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

--	--	--	--	--

Fill -4 to -8

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
Data Point: (110, 600)
Data Point: (178.1, 600)
Data Point: (178.3, 450)
Data Point: (200, 450)
Data Point: (235.7, 450)
Data Point: (235.9, 600)
Data Point: (310, 600)

Marsh

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 150
Data Points: X (ft), Cohesion (psf)
Data Point: (178.2, 150)
Data Point: (200, 275)
Data Point: (235.8, 150)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (0, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1
Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	446.445
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	158.45
Region 8	Fill: EL -4 to -8	32,33,37,35,31	40.6
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	87.02
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40
Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-13.2
Point 17	159.5	-12.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-11.5
Point 24	200	-10

Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6
Point 31	200	-6
Point 32	178.2	-6
Point 33	178.8	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.2	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	187.9	0.4
Point 50	182.9	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.37	(178.263, 17.65)	30.63572	(201.854, 2.09567)	(168.974, -11.5432)
2	5807	1.37	(178.263, 17.65)	30.636	(201.854, 2.09567)	(168.974, -11.5432)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	169.13715	-11.594015	748.43323	760.2452	4.2992046	0
2	Optimized	169.8914	-11.812865	762.08151	703.11954	-21.460404	0
3	Optimized	171.0742	-12.123685	781.47562	751.05915	-11.07069	0
			-				

3/1/2013

4	Optimized	172.257	-12.384725	797.76721	793.62197	-1.5087424	0
5	Optimized	173.4398	-12.59728	811.03353	831.04637	7.2840784	0
6	Optimized	174.2156	-12.71616	818.45596	867.07152	28.065943	-2.3575e-007
7	Optimized	175.03335	-12.80789	824.16957	902.28433	45.095941	3.1315e-006
8	Optimized	176.3	-12.91571	830.86736	933.28795	59.12779	2.0032e-008
9	Optimized	177.56665	-12.97078	834.33702	956.91061	70.762189	2.3977e-008
10	Optimized	178.5	-12.982855	835.09161	971.08753	78.510952	2.6032e-006
11	Optimized	179.4	-12.95824	833.59149	980.32358	84.708982	2.8705e-008
12	Optimized	180.6	-12.89003	829.29999	987.94442	91.586021	3.1021e-008
13	Optimized	181.625	-12.79718	823.50036	995.45515	99.270146	3.3632e-008
14	Optimized	182.475	-12.69125	816.89519	1004.566	108.34304	3.6706e-008
15	Optimized	183.38255	-12.55045	808.11296	1010.7899	117.00617	3.8794e-006
16	Optimized	184.34765	-12.370845	796.90034	1013.5952	125.09873	4.2382e-008
17	Optimized	185.3151	-12.158315	783.64373	1012.2278	131.96244	-4.285e-006
18	Optimized	185.88485	-12.021795	775.09735	1013.2596	137.49194	-4.4645e-006
19	Optimized	186.03485	-11.982915	683.37991	1009.3571	0	194.92
20	Optimized	186.2	-11.939005	679.47873	1016.3205	0	195.87
21	Optimized	186.65	-11.812545	667.52293	1034.7753	0	198.45
22	Optimized	187.35	-11.60419	647.97345	1062.2612	0	202.47
23	Optimized	187.8	-11.462715	635.09079	1079.1222	0	205.05
24	Optimized	187.95	-11.413295	630.12945	1084.4476	0	205.91
25	Optimized	188.55	-11.20052	609.68425	1103.5815	0	209.35
26	Optimized	189.2	-10.96619	587.54928	1123.7697	0	213.07
27	Optimized	189.35	-10.90856	582.33602	1128.0733	0	213.93
28	Optimized	189.55	-10.8297	575.85779	1133.6493	0	215.08
29	Optimized	189.9	-10.68812	564.29835	1142.958	0	217.09
30	Optimized	190.15	-10.58494	555.87609	1149.3924	0	218.52
31	Optimized	190.3	-10.52116	550.6412	1146.5714	0	219.38
			-				

3/1/2013

32	Optimized	190.55	10.412755	541.80897	1136.2599	0	220.81
33	Optimized	190.85	-10.27948	531.30419	1123.6006	0	222.53
34	Optimized	191.2	-10.118705	519.39882	1108.2548	0	224.54
35	Optimized	191.45	-10.001685	510.85212	1097.0364	0	225.97
36	Optimized	191.65	-9.9049645	503.5523	1087.8169	0	227.12
37	Optimized	192	-9.7317535	490.57573	1071.2043	0	229.13
38	Optimized	192.4	-9.5273825	475.44801	1051.5436	0	231.42
39	Optimized	192.8	-9.3155295	459.94682	1031.1338	0	233.72
40	Optimized	193.1	-9.152354	448.0772	1015.3588	0	235.44
41	Optimized	193.25	-9.0689515	442.01439	1007.266	0	236.3
42	Optimized	193.75	-8.777196	421.36595	979.04913	0	239.16
43	Optimized	194.3	-8.452047	399.2042	947.29308	0	242.32
44	Optimized	194.8	-8.1340635	377.63055	916.25651	0	245.18
45	Optimized	195.25	-7.844204	357.99139	887.78004	0	247.76
46	Optimized	195.4	-7.7434035	351.21086	877.89246	0	248.62
47	Optimized	195.6	-7.607277	342.09364	864.48869	0	249.77
48	Optimized	196.15	-7.2149235	316.3599	825.77926	0	252.92
49	Optimized	196.95	-6.621746	277.58899	766.86464	0	257.51
50	Optimized	197.35	-6.3124545	257.35651	735.96358	0	259.81
51	Optimized	197.56795	-6.136314	245.98478	718.3301	0	261.05
52	Optimized	197.76795	-5.9735455	235.51998	594.81671	0	450
53	Optimized	198.05	-5.735563	220.27212	569.17754	0	450
54	Optimized	198.5	-5.3480485	195.47342	527.24335	0	450
55	Optimized	198.75	-5.1270895	181.35424	503.24463	0	450
56	Optimized	198.9	-4.9909695	172.72968	488.44552	0	450
57	Optimized	199.2	-4.7125735	155.09127	456.90442	0	450
58	Optimized	199.45	-4.477451	140.13946	429.66374	0	450
59	Optimized	199.6	-4.3325145	130.78042	412.88882	0	450
60	Optimized	199.8189	-4.117726	117.17091	387.9598	0	450

3/1/2013

61	Optimized	199.9689	-3.9687595	107.87407	369.97511	0	450
62	Optimized	200.05	-3.8869395	94.970747	337.27305	0	450
63	Optimized	200.15	-3.785307	73.965387	323.27583	0	450
64	Optimized	200.25	-3.682721	38.545904	309.13879	0	450
65	Optimized	200.4	-3.5266545	22.754342	287.62464	0	450
66	Optimized	200.6187	-3.2954345	8.0533743	255.69651	0	450
67	Optimized	200.7687	-3.1348535	2.1540714	233.48327	0	450
68	Optimized	200.85	-3.0463925	7.7131156	221.23272	0	450
69	Optimized	200.95	-2.9367255	14.600586	206.04251	0	450
70	Optimized	201.1	-2.769789	25.151609	181.5907	0	450
71	Optimized	201.35	-2.4859725	43.084154	138.9017	0	450
72	Optimized	201.57295	-2.228455	59.354479	100.1087	0	450
73	Optimized	201.74975	-2.0188835	72.587165	8.1398252	0	450

Slices of Slip Surface: **5807**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	5807	169.13715	-11.594015	748.43323	760.2452	4.2992046	0
2	5807	169.8914	-11.812865	762.08151	703.11954	-21.460404	0
3	5807	171.0742	-12.123685	781.47562	751.05915	-11.07069	0
4	5807	172.257	-12.384725	797.76721	793.62197	-1.5087424	0
5	5807	173.4398	-12.59728	811.03353	831.04637	7.2840784	0
6	5807	174.2156	-12.71616	818.45596	867.07152	28.065943	-2.3575e-007
7	5807	175.03335	-12.80789	824.16957	902.28433	45.095941	3.1315e-006
8	5807	176.3	-12.91571	830.86736	933.28795	59.12779	2.0032e-008
9	5807	177.56665	-12.97078	834.33702	956.91061	70.762189	2.3977e-008
10	5807	178.5	-12.982855	835.09161	971.08753	78.510952	2.6032e-006
11	5807	179.4	-12.95824	833.59149	980.32358	84.708982	2.8705e-008
12	5807	180.6	-12.89003	829.29999	987.94442	91.586021	3.1021e-008

3/1/2013

13	5807	181.625	-12.79718	823.50036	995.45515	99.270146	3.3632e-008
14	5807	182.475	-12.69125	816.89519	1004.566	108.34304	3.6706e-008
15	5807	183.38255	-12.55045	808.11296	1010.7899	117.00617	3.8794e-006
16	5807	184.34765	-12.370845	796.90034	1013.5952	125.09873	4.2382e-008
17	5807	185.3151	-12.158315	783.64373	1012.2278	131.96244	-4.285e-006
18	5807	185.88485	-12.021795	775.09735	1013.2596	137.49194	-4.4645e-006
19	5807	186.03485	-11.982915	683.37991	1009.3571	0	194.92
20	5807	186.2	-11.939005	679.47873	1016.3205	0	195.87
21	5807	186.65	-11.812545	667.52293	1034.7753	0	198.45
22	5807	187.35	-11.60419	647.97345	1062.2612	0	202.47
23	5807	187.8	-11.462715	635.09079	1079.1222	0	205.05
24	5807	187.95	-11.413295	630.12945	1084.4476	0	205.91
25	5807	188.55	-11.20052	609.68425	1103.5815	0	209.35
26	5807	189.2	-10.96619	587.54928	1123.7697	0	213.07
27	5807	189.35	-10.90856	582.33602	1128.0733	0	213.93
28	5807	189.55	-10.8297	575.85779	1133.6493	0	215.08
29	5807	189.9	-10.68812	564.29835	1142.958	0	217.09
30	5807	190.15	-10.58494	555.87609	1149.3924	0	218.52
31	5807	190.3	-10.52116	550.6412	1146.5714	0	219.38
32	5807	190.55	-10.412755	541.80897	1136.2599	0	220.81
33	5807	190.85	-10.27948	531.30419	1123.6006	0	222.53
34	5807	191.2	-10.118705	519.39882	1108.2548	0	224.54
35	5807	191.45	-10.001685	510.85212	1097.0364	0	225.97
36	5807	191.65	-9.9049645	503.5523	1087.8169	0	227.12
37	5807	192	-9.7317535	490.57573	1071.2043	0	229.13
38	5807	192.4	-9.5273825	475.44801	1051.5436	0	231.42
39	5807	192.8	-9.3155295	459.94682	1031.1338	0	233.72
40	5807	193.1	-9.152354	448.0772	1015.3588	0	235.44
41	5807	193.25	-9.0689515	442.01439	1007.266	0	236.3
42	5807	193.75	-8.777196	421.36595	979.04913	0	239.16

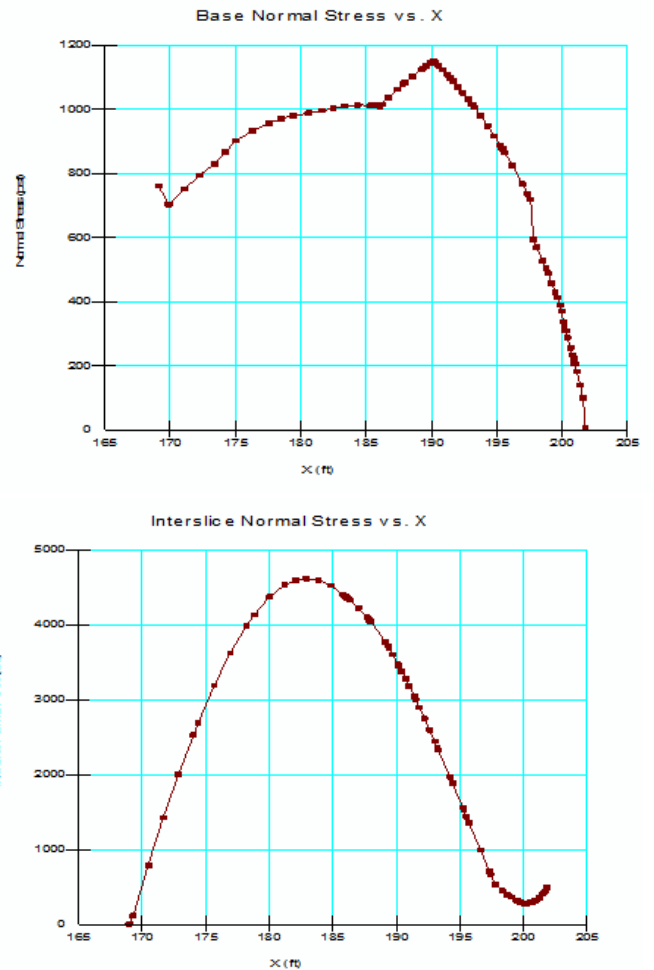
3/1/2013

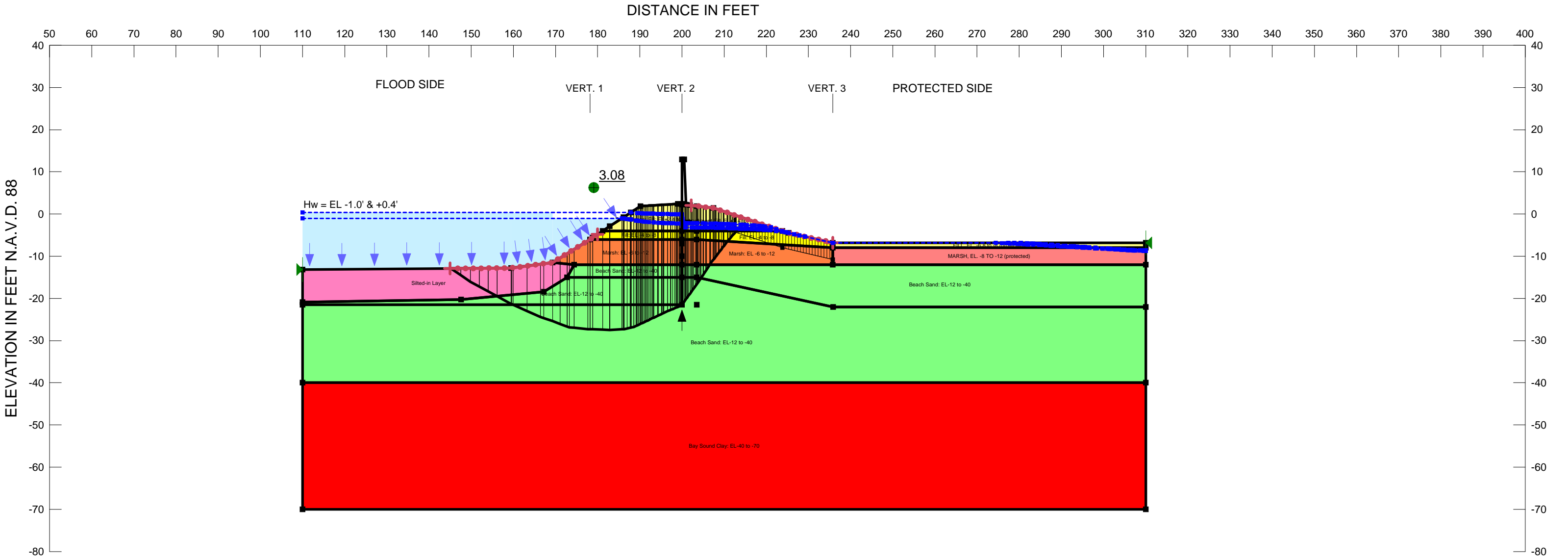
43	5807	194.3	-8.452047	399.2042	947.29308	0	242.32
44	5807	194.8	-8.1340635	377.63055	916.25651	0	245.18
45	5807	195.25	-7.844204	357.99139	887.78004	0	247.76
46	5807	195.4	-7.7434035	351.21086	877.89246	0	248.62
47	5807	195.6	-7.607277	342.09364	864.48869	0	249.77
48	5807	196.15	-7.2149235	316.3599	825.77926	0	252.92
49	5807	196.95	-6.621746	277.58899	766.86464	0	257.51
50	5807	197.35	-6.3124545	257.35651	735.96358	0	259.81
51	5807	197.56795	-6.136314	245.98478	718.3301	0	261.05
52	5807	197.76795	-5.9735455	235.51998	594.81671	0	450
53	5807	198.05	-5.735563	220.27212	569.17754	0	450
54	5807	198.5	-5.3480485	195.47342	527.24335	0	450
55	5807	198.75	-5.1270895	181.35424	503.24463	0	450
56	5807	198.9	-4.9909695	172.72968	488.44552	0	450
57	5807	199.2	-4.7125735	155.09127	456.90442	0	450
58	5807	199.45	-4.477451	140.13946	429.66374	0	450
59	5807	199.6	-4.3325145	130.78042	412.88882	0	450
60	5807	199.8189	-4.117726	117.17091	387.9598	0	450
61	5807	199.9689	-3.9687595	107.87407	369.97511	0	450
62	5807	200.05	-3.8869395	94.970747	337.27305	0	450
63	5807	200.15	-3.785307	73.965387	323.27583	0	450
64	5807	200.25	-3.682721	38.545904	309.13879	0	450
65	5807	200.4	-3.5266545	22.754342	287.62464	0	450
66	5807	200.6187	-3.2954345	8.0533743	255.69651	0	450
67	5807	200.7687	-3.1348535	2.1540714	233.48327	0	450
68	5807	200.85	-3.0463925	7.7131156	221.23272	0	450
69	5807	200.95	-2.9367255	14.600586	206.04251	0	450
70	5807	201.1	-2.769789	25.151609	181.5907	0	450

3/1/2013

71	5807	201.35	2.4859725	43.084154	138.9017	0	450
72	5807	201.57295	-2.228455	59.354479	100.1087	0	450
73	5807	201.74975	2.0188835	72.587165	8.1398252	0	450

3/1/2013





- Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf Piezometric Line: 1
- Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
- Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
- Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 ° Piezometric Line: 2
- Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° Piezometric Line: 2
- Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 ° Piezometric Line: 1
- Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf Piezometric Line: 1
- Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf Piezometric Line: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
PROTECTED SIDE STABILITY ANALYSIS
CASE: E/E Around DD (Piezo: EL-1.0, EL+0.4 Sand)
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

E/E Around DD (Piezo: EL-1.0, EL+0.4 Sand)

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: Johnson, Jehu
Revision Number: 147
Last Edited By: Johnson, Jehu 8 MVN
Date: 1/22/2013
Time: 10:14:00 AM
File Name: Reach 35B_Q-Case_FS EL -1.0.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/22/2013
Last Solved Time: 10:19:24 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

E/E Around DD (Piezo: EL-1.0, EL+0.4 Sand)

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: [Piezometric Line](#)
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: No
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: [Tension Crack Line](#)
 Percentage Wet: 1
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
 FOS Calculation Option: [Constant](#)

Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Fill: EL+2.4 to -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: 110 pcf
Cohesion: 450 psf
Pore Water Pressure
 Piezometric Line: 1

Fill: EL -4 to -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: Fill -4 to -8
Cohesion Fn: Fill -4 to -8
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Marsh: EL -6 to -12

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 88 pcf
Cohesion Fn: Marsh
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 20 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

Beach Sand: EL-12 to -40

3/1/2013

3/1/2013

E/E Around DD (Piezo: EL-1.0, EL+0.4 Sand)

Page 3 of 22

E/E Around DD (Piezo: EL-1.0, EL+0.4 Sand)

Page 4 of 22

Model: [Shear/Normal Fn.](#)
Unit Weight: 122 pcf
Strength Function: [Sand](#)
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 2

Bay Sound Clay: EL-40 to -70
Model: [Spatial Mohr-Coulomb](#)
Weight Fn: Clay
Cohesion Spatial Fn: Bay Sound Clay
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

FILL, EL. -6.8 to -8 (protected)
Model: [Undrained \(Phi=0\)](#)
Unit Weight: 96 pcf
Cohesion: 600 psf
Pore Water Pressure
 Piezometric Line: 1

MARSH, EL. -8 TO -12 (protected)
Model: [Undrained \(Phi=0\)](#)
Unit Weight: 96 pcf
Cohesion: 150 psf
Pore Water Pressure
 Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: (145, -12.91717) ft
Left-Zone Right Coordinate: (180, -4.8) ft
Left-Zone Increment: 20
Right Projection: [Range](#)
Right-Zone Left Coordinate: (202.2, 2.0525) ft
Right-Zone Right Coordinate: (235.8, -6.8) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (110, -13.2) ft
Right Coordinate: (310, -6.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
110	-1
185.8	-1
186.1	-1.04
186.3	-1.06
187	-1.17
187.7	-1.27
187.9	-1.3
188	-1.33
189.1	-1.53
189.3	-1.57
189.7	-1.62
190.1	-1.67
190.7	-1.75
191	-1.78
191.4	-1.81
192.2	-1.89
193.3	-1.99
193.3	-2
194.4	-2.06
195.3	-2.11
195.5	-2.12
195.7	-2.13
196.6	-2.16
197.4	-2.19
197.8	-2.2
198.7	-2.22
199.4	-2.23
199.7	-2.24
200	-2.24
200.1	-2.49
200.2	-2.71
200.2	-2.79
200.2	-2.97
200.3	-3.16
200.8	-3.17
200.9	-3.17
202.3	-3.19
203.2	-3.19
203.6	-3.2

3/1/2013

3/1/2013

	204.4	-3.21
	205.1	-3.23
	205.8	-3.24
	206.6	-3.25
	207.4	-3.27
	208	-3.28
	208.6	-3.3
	209.3	-3.31
	209.8	-3.33
	210.8	-3.36
	211.3	-3.37
	212	-3.39
	212.3	-3.4
	212.9	-3.42
	213.8	-3.45
	214.7	-3.49
	215.2	-3.5
	215.8	-3.53
	216.6	-3.57
	217.6	-3.61
	218.1	-3.64
	218.8	-3.68
	219.5	-3.72
	220.5	-3.78
	220.9	-3.81
	222.3	-3.99
	222.4	-3.99
	222.4	-4
	223.7	-4.15
	223.8	-4.16
	224.5	-4.32
	224.6	-4.33
	225.3	-4.5
	226.6	-4.79
	227.9	-5.08
	229.2	-5.36
	235.8	-6.8
	274.4	-6.8
	275.9	-6.88
	277	-6.94
	277.8	-6.98
	278.8	-7.04
	279.6	-7.08
	280.3	-7.12

	281.2	-7.17
	281.8	-7.2
	282.2	-7.23
	283.3	-7.29
	284.7	-7.37
	284.8	-7.37
	285.3	-7.4
	286.3	-7.45
	287.4	-7.52
	287.7	-7.54
	288.1	-7.56
	289.2	-7.62
	290	-7.67
	290.7	-7.71
	291.6	-7.76
	292.2	-7.79
	292.6	-7.82
	293.7	-7.87
	295	-7.95
	295.2	-7.96
	295.9	-8
	296.7	-8.04
	298	-8.12
	298.2	-8.13
	298.4	-8.14
	299.8	-8.22
	300.9	-8.28
	301.3	-8.3
	301.8	-8.33
	302.8	-8.39
	303.6	-8.44
	304.2	-8.47
	304.8	-8.51
	305.7	-8.56
	306.2	-8.59
	306.8	-8.62
	307.1	-8.64
	307.6	-8.66
	308.6	-8.72
	309.5	-8.77
	310	-8.8

Piezometric Line 2

3/1/2013

3/1/2013

Coordinates

X (ft)	Y (ft)
110	0.4
187.9	0.4
189.4	0.24
189.7	0.21
190.4	0.16
190.7	0.14
191.5	0.12
191.8	0.11
192.6	0.08
193	0.07
193.2	0.07
194.2	0.04
194.4	0.03
195.2	0.01
195.3	0.01
195.5	0
196.6	-0.02
197.3	-0.04
197.8	-0.06
198.3	-0.07
198.8	-0.08
199.5	-0.09
199.7	-0.09
199.7	-0.1
200	-0.1
200.1	-0.9
200.1	-1.06
200.2	-1.21
200.3	-1.93
200.3	-2.04
200.3	-2.12
200.8	-2.13
201	-2.13
201.2	-2.14
201.5	-2.14
202.5	-2.16
202.7	-2.16
203.4	-2.18
203.7	-2.18
205	-2.21

	205.6	-2.23
	206.8	-2.26
	207.7	-2.28
	208.1	-2.29
	208.8	-2.31
	209.3	-2.33
	209.9	-2.35
	210.9	-2.39
	211.6	-2.41
	212.5	-2.44
	213.9	-2.51
	214	-2.51
	214	-2.52
	214.8	-2.55
	215.4	-2.58
	216.6	-2.67
	216.8	-2.68
	217.2	-2.7
	218.3	-2.78
	219.1	-2.87
	219.7	-2.94
	221.1	-3.1
	222.4	-3.55
	223.8	-4
	224.6	-4.25
	225.3	-4.5
	226.6	-4.79
	227.9	-5.08
	229.2	-5.36
	235.8	-6.8
	277.4	-6.8
	278.8	-6.81
	280.3	-6.82
	280.4	-6.82
	281.8	-6.92
	282.8	-6.99
	283.3	-7.02
	283.9	-7.07
	284.8	-7.12
	285.4	-7.16
	286.3	-7.21
	287.5	-7.3
	287.7	-7.31
	287.9	-7.33

3/1/2013

3/1/2013

	289.1	-7.4
	289.2	-7.41
	290.5	-7.5
	290.7	-7.51
	291	-7.53
	292.2	-7.61
	293	-7.66
	293.7	-7.71
	294.6	-7.77
	295.2	-7.81
	295.6	-7.83
	296.6	-7.91
	298.1	-8
	298.1	-8.01
	299.7	-8.11
	301	-8.19
	301.2	-8.21
	301.6	-8.23
	302.7	-8.3
	303.7	-8.36
	304.2	-8.4
	304.9	-8.43
	305.7	-8.48
	306.3	-8.51
	306.9	-8.54
	307.1	-8.56
	307.5	-8.57
	308.6	-8.59
	309.6	-8.6
	310	-8.62

Reinforcements

Reinforcement 1

Type: Fabric
Outside Point: (200, -21.5) ft
Inside Point: (200, 2.2) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 23.7 ft
Reinforcement Direction: 270 °
Applied Load Option: Variable
F of S Dependent: Yes
Bond Skin Friction: 1000000 psf
Bond Safety Factor: 1

Bond Resistance: 1000000 lbs/ft
Fabric Capacity: 100000 lbs
Fabric Safety Factor: 1
Fabric Load: 100000 lbs
Load Distribution: Conc. in 1 slice
Load Orientation: 0
Applied Load: 100000 lbs
Fabric Load Used: 0 lbs
Resisting Force Used: 0 lbs/ft
Available Bond Length: 0 ft
Required Bond Length: 0 ft
Governing Component: Bond

Tension Crack Line

X (ft)	Y (ft)
201	-1.8
201.9	-1.9
203.5	-2.1
207.5	-2.6
223.8	-8
235.8	-10.8

Cohesion Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
Data Point: (110, 600)
Data Point: (178.1, 600)
Data Point: (178.3, 450)
Data Point: (200, 450)
Data Point: (235.7, 450)
Data Point: (235.9, 600)
Data Point: (310, 600)

Marsh

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 150
Data Points: X (ft), Cohesion (psf)

3/1/2013

3/1/2013

Data Point: (178.2, 150)
Data Point: (200, 275)
Data Point: (235.8, 150)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (0, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (110, 96)
Data Point: (178.1, 96)
Data Point: (178.3, 88)
Data Point: (200, 88)
Data Point: (235.7, 88)
Data Point: (235.9, 96)
Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)

Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)
Data Point: (235.8, 107)
Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)
Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1
Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	446.445
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	158.45
Region 8	Fill: EL -4 to -8	32,33,37,35,31	40.6
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	87.02
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)

3/1/2013

3/1/2013

Point 1	110	-70
Point 2	310	-70
Point 3	110	-40
Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-13.2
Point 17	159.5	-12.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-11.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6
Point 31	200	-6
Point 32	178.2	-6
Point 33	178.8	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.2	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2

3/1/2013

	200	2.4
Point 46	199	2.4
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	187.9	0.4
Point 50	182.9	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.08	(177.661, 8.473)	32.49493	(212.672, -0.313336)	(145.15, -12.916)
2	605	3.35	(177.661, 8.473)	37.499	(212.887, -0.384573)	(146.851, -12.9022)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	146.32445	-13.70248	879.9816	935.38287	20.164413	0
2	Optimized	148.67295	-15.27552	978.15435	1086.5512	39.453233	0
3	Optimized	150.89665	-16.63033	1062.6879	1206.3906	52.303513	0
4	Optimized	152.99555	-17.766905	1133.6176	1314.3981	65.798734	0
5	Optimized	155.09445	-18.90348	1204.5472	1422.3637	79.278707	0
6	Optimized	157.82195	-20.38046	1296.7015	1614.7851	183.63083	6.0892e-006
7	Optimized	159.54955	-21.31598	1355.0977	1751.4217	228.79928	-7.4329e-006
8	Optimized	159.771	-21.421405	1361.6491	1752.3356	225.54476	-7.3258e-006
9	Optimized	161.5867	-22.251575	1413.4706	1875.0284	266.45903	-8.6551e-006
10	Optimized	164.8504	-23.688055	1503.0968	2080.3755	333.26518	-5.4576e-005
11	Optimized	166.83515	-24.505215	1554.1311	2187.1477	365.44284	-5.9855e-005
12	Optimized	168.25	-25.01811	1586.0921	2282.8642	402.24912	-6.5873e-005
13	Optimized	170.175	-25.71595	1629.6514	2351.5115	416.73253	-0.00012295
14	Optimized	171.925	-26.35035	1669.2444	2499.0317	479.03927	-7.845e-005
15	Optimized	173.02415	-26.748805	1694.0832	2601.6682	523.9522	-8.5807e-005
16	Optimized	173.82415	-26.89034	1702.9464	2604.1608	520.27445	-8.5204e-005
17	Optimized	176.0405	-27.12235	1717.4012	2702.3848	568.63473	-9.3122e-005
			-				-1.3895e-

3/1/2013

18	Optimized	177.9405	27.304435	1728.754	2733.1379	579.83456	005
19	Optimized	178.5	-27.32676	1730.1231	2745.3152	586.07417	-1.4045e-005
20	Optimized	180	-27.38661	1733.8701	2776.7485	602.05757	-1.4429e-005
21	Optimized	182.04565	-27.468235	1738.9624	2831.4338	630.68777	-1.5115e-005
22	Optimized	182.89565	-27.501745	1741.078	2829.4676	628.33142	-1.5059e-005
23	Optimized	184.35	-27.42346	1736.1758	2863.509	650.81367	-1.5597e-005
24	Optimized	185.95	-27.337335	1730.7944	2907.3578	679.23443	-1.6279e-005
25	Optimized	186.14685	-27.326735	1730.1884	2920.2521	687.02822	4.0581e-005
26	Optimized	186.24685	-27.311665	1729.198	2863.5548	654.86841	-1.5695e-005
27	Optimized	186.65	-27.216475	1723.3212	2880.4977	668.0423	3.946e-005
28	Optimized	187.35	-27.051185	1712.8937	2909.9728	691.07824	4.0815e-005
29	Optimized	187.8	-26.944925	1706.3244	2928.8536	705.77068	4.1687e-005
30	Optimized	187.95	-26.909505	1703.7453	2935.0823	710.85544	4.1985e-005
31	Optimized	188.30885	-26.82477	1696.1381	2949.5313	723.5886	-1.7343e-005
32	Optimized	188.85885	-26.63905	1680.8585	2886.0704	695.7733	-1.6676e-005
33	Optimized	189.2	-26.47949	1668.6195	2889.7616	704.9699	-1.6896e-005
34	Optimized	189.35	-26.409335	1663.2759	2891.3934	708.99683	-1.6993e-005
35	Optimized	189.55	-26.3158	1656.1495	2893.5363	714.34799	-1.7121e-005
36	Optimized	189.9	-26.15211	1644.0943	2897.2799	723.46876	-1.734e-005
37	Optimized	190.15	-26.035185	1635.7388	2900.0893	729.91428	-1.7495e-005
38	Optimized	190.3	-25.96503	1630.6654	2895.7853	730.35844	-1.7505e-005
39	Optimized	190.55	-25.848105	1622.2717	2883.6326	728.18837	-1.7452e-005
40	Optimized	190.85	-25.707795	1612.67	2869.079	725.32965	4.2842e-005
41	Optimized	191.2	-25.5441	1601.9055	2852.2152	721.80844	-1.7299e-005
42	Optimized	191.45	-	1594.252	2840.0331	719.19408	-1.7238e-

3/1/2013

			25.427175				005
43	Optimized	191.65	-25.333635	1588.0013	2830.3701	717.22414	-1.719e-005
44	Optimized	192	-25.16994	1576.9953	2813.4912	713.83367	-1.7107e-005
45	Optimized	192.4	-24.98286	1564.3817	2794.0159	709.87243	-1.7014e-005
46	Optimized	192.8	-24.79578	1551.9266	2774.7672	705.95041	-1.6918e-005
47	Optimized	193.1	-24.65547	1542.891	2760.1834	702.74742	-1.6843e-005
48	Optimized	193.25	-24.585315	1538.3626	2752.8928	701.15279	-1.6805e-005
49	Optimized	193.75	-24.351465	1522.8925	2728.7464	696.14394	-1.6684e-005
50	Optimized	194.3	-24.09423	1505.6616	2702.0747	690.69375	-1.6554e-005
51	Optimized	194.8	-23.86038	1490.0814	2677.8439	685.69971	4.0501e-005
52	Optimized	195.25	-23.649915	1476.4042	2656.1506	681.07204	-1.6323e-005
53	Optimized	195.4	-23.57976	1471.6932	2648.8576	679.58136	-1.6288e-005
54	Optimized	195.6	-23.48622	1465.443	2639.1652	677.59421	4.0023e-005
55	Optimized	195.71055	-23.43452	1462.0758	2633.8067	676.44461	-1.6213e-005
56	Optimized	196.16055	-23.236885	1449.2041	2622.4884	677.3414	4.0008e-005
57	Optimized	196.95	-22.890705	1426.4523	2586.9249	669.94513	-1.6055e-005
58	Optimized	197.35	-22.715305	1414.8472	2568.7779	666.16849	-1.5967e-005
59	Optimized	197.6	-22.605675	1407.3379	2557.4224	663.94808	3.9219e-005
60	Optimized	198.05	-22.408345	1394.2233	2537.1827	659.83472	-1.5814e-005
61	Optimized	198.5	-22.21102	1381.3515	2516.8974	655.55488	-1.5711e-005
62	Optimized	198.75	-22.101395	1374.1849	2505.5865	653.16234	-1.5654e-005
63	Optimized	198.9	-22.035615	1369.927	2498.8106	651.7087	-1.562e-005
64	Optimized	199.2	-21.90406	1361.4554	2484.1569	648.13979	-1.5534e-005
65	Optimized	199.45	-21.794435	1354.4033	2471.4265	644.86167	-1.5456e-005
66	Optimized	199.6	-21.72866	1350.2369	2463.8263	642.87932	-1.5408e-005

3/1/2013

67	Optimized	199.8309	-21.6274	1343.2978	2452.0449	640.08384	-1.5341e-005
68	Optimized	199.9809	-21.5435	1338.0701	2212.733	504.94613	-8.2705e-005
69	Optimized	200.05	-21.447595	1307.1009	2181.1706	504.60368	-8.2647e-005
70	Optimized	200.15	-21.308765	1258.824	2159.0778	519.71986	-8.512e-005
71	Optimized	200.25	-21.169935	1223.0546	2139.3228	528.96502	-8.664e-005
72	Optimized	200.4	-20.96169	1175.5963	2110.9183	539.9649	-8.8439e-005
73	Optimized	200.65	-20.614615	1153.6202	2074.4669	531.60821	-8.7074e-005
74	Optimized	200.85	-20.336955	1136.086	2045.399	524.94979	-8.5976e-005
75	Optimized	200.95	-20.198125	1127.4359	2030.8458	521.5419	-8.542e-005
76	Optimized	201.1	-19.98988	1114.1396	2007.9645	516.00845	-8.4514e-005
77	Optimized	201.35	-19.642805	1092.1733	1969.0681	506.23462	-8.2906e-005
78	Optimized	201.7	-19.156895	1061.6105	1914.4204	492.33029	-8.0641e-005
79	Optimized	202.1	-18.60157	1026.4549	1852.0285	476.60677	-7.8065e-005
80	Optimized	202.4	-18.18508	1000.0809	1805.213	464.80575	-7.6129e-005
81	Optimized	202.6	-17.90742	982.63462	1774.0317	456.87651	-7.4829e-005
82	Optimized	202.95	-17.421515	951.87408	1719.384	443.08634	-0.00013075
83	Optimized	203.3	-16.93561	920.91494	1664.7072	429.39407	-7.0328e-005
84	Optimized	203.45	-16.727365	907.73495	1641.2989	423.48919	-6.936e-005
85	Optimized	203.55	-16.588535	899.08484	1625.6936	419.47395	-6.8706e-005
86	Optimized	203.65	-16.4497	890.43474	1610.1468	415.49246	-6.8053e-005
87	Optimized	203.87595	-16.136045	870.61187	1574.9286	406.60466	-6.6598e-005
88	Optimized	204.22595	-15.626305	838.29685	1497.907	380.79538	-6.237e-005
89	Optimized	204.44775	-15.28794	816.86461	1460.634	371.65049	-6.0871e-005
90	Optimized	204.74775	-14.83037	787.87433	1410.1286	359.22974	-5.8843e-005

3/1/2013

91	Optimized	205.05	-14.369395	758.62375	1359.3928	346.82621	-5.6803e-005
92	Optimized	205.35	-13.91182	729.4654	1308.8948	334.50674	-5.479e-005
93	Optimized	205.7	-13.377985	695.48735	1250.035	320.1424	-5.2437e-005
94	Optimized	206.2	-12.615365	647.11394	1165.9538	299.52817	-4.9062e-005
95	Optimized	206.7	-11.85275	536.64571	1098.8695	0	251.61
96	Optimized	206.8051	-11.69248	526.48933	1084.5058	0	251.24
97	Optimized	207.1051	-11.29655	501.31948	1074.0436	0	250.19
98	Optimized	207.45	-10.84256	472.47372	1032.4246	0	248.99
99	Optimized	207.6	-10.64513	460.0114	1012.1582	0	248.46
100	Optimized	207.85	-10.31608	439.20083	976.56648	0	247.59
101	Optimized	208.05	-10.052838	422.52217	948.09323	0	246.89
102	Optimized	208.35	-9.6579725	397.2529	905.40703	0	245.84
103	Optimized	208.7	-9.1972975	367.90628	855.59459	0	244.62
104	Optimized	209.05	-8.736623	338.85008	805.78225	0	243.4
105	Optimized	209.55	-8.0785165	296.92637	734.61478	0	241.66
106	Optimized	209.85	-7.6836525	271.57257	691.89269	0	240.61
107	Optimized	210.35	-7.025546	229.57555	620.75604	0	238.86
108	Optimized	210.84865	-6.36919	187.71523	466.88912	0	450
109	Optimized	210.89865	-6.303637	183.56039	490.50964	0	450
110	Optimized	211.1	-6.07764	169.20581	464.59674	0	450
111	Optimized	211.45	-5.684758	144.17389	419.57499	0	450
112	Optimized	211.8	-5.291876	119.03441	374.53103	0	450
113	Optimized	212.15	-4.898994	93.848392	329.4871	0	450
114	Optimized	212.4	-4.618364	75.817518	297.32999	0	450
115	Optimized	212.58585	-4.409724	62.410478	147.9097	0	450

Slices of Slip Surface: 605

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	605	147.8755	-14.24598	913.90463	1012.0966	35.73897	0
2	605	149.9255	-16.71822	1068.1623	1243.8606	63.948984	0
3	605	151.97545	-18.811595	1198.802	1435.5362	86.164196	0
4	605	154.06355	-20.638245	1312.7902	1655.8577	198.05412	-6.4331e-006
5	605	156.22005	-22.262675	1414.1651	1866.9995	261.42299	-8.4918e-006

3/1/2013

6	605	158.4067	-23.68005	1502.6033	2046.8001	314.16688	-5.1449e-005
7	605	160.78335	-24.98216	1583.8457	2217.1822	365.62754	-5.9878e-005
8	605	163.35	-26.159855	1657.343	2369.3664	411.05375	-6.7319e-005
9	605	165.91665	-27.113655	1716.8359	2491.212	447.05021	-7.3214e-005
10	605	168.25	-27.809515	1760.2763	2597.5241	483.3463	-7.916e-005
11	605	170.175	-28.260175	1788.3859	2616.6762	478.17509	-7.8312e-005
12	605	171.925	-28.57396	1808.0018	2706.1581	518.50895	-8.492e-005
13	605	173.6	-28.796595	1821.8431	2814.4065	573.01054	-9.3842e-005
14	605	175.35	-28.942435	1830.9852	2894.958	614.23549	3.6281e-005
15	605	177.25	-29.011152	1835.2583	2917.5618	624.81784	-1.4975e-005
16	605	178.5	-29.015215	1835.5402	2927.9332	630.64256	-1.5116e-005
17	605	180	-28.93346	1830.4246	2930.4425	635.04447	-1.5221e-005
18	605	182.05	-28.758215	1819.4596	2937.2487	645.30379	-1.5466e-005
19	605	184.35	-28.394935	1796.8036	2942.7841	661.57884	3.9077e-005
20	605	185.95	-28.09786	1778.2611	2947.1457	674.80142	3.9858e-005
21	605	186.2	-28.040475	1774.6668	2955.6034	681.75908	-1.634e-005
22	605	186.65	-27.930665	1767.9004	2970.3555	694.18185	-1.6638e-005
23	605	187.35	-27.750625	1756.5357	2991.8241	713.13661	4.2118e-005
24	605	187.8	-27.628925	1748.9844	3004.6544	724.90298	-1.7374e-005
25	605	187.95	-27.58657	1746.0148	3008.6229	728.90833	-1.747e-005
26	605	188.55	-27.40538	1730.7717	3022.2392	745.569	-1.787e-005
27	605	189.2	-27.206115	1713.9916	3036.3074	763.37787	-1.8297e-005
28	605	189.35	-27.15737	1709.9345	3039.2289	767.40665	-1.8392e-005
29	605	189.55	-27.090825	1704.5102	3042.8402	772.62288	4.5636e-005
30	605	189.9	-26.97162	1695.2325	3048.8569	781.4524	-1.8728e-005
31	605	190.15	-26.8849	1688.7496	3052.8557	787.50354	-1.8875e-005
32	605	190.3	-26.83144	1684.6953	3048.9559	787.59269	-1.8876e-005
33	605	190.55	-26.740735	1677.9966	3037.1469	784.64254	-1.8806e-005
34	605	190.85	-26.62947	1670.1672	3022.714	780.8303	4.612e-005
35	605	191.2	-	1661.2801	3005.3554	775.93968	-1.8598e-005

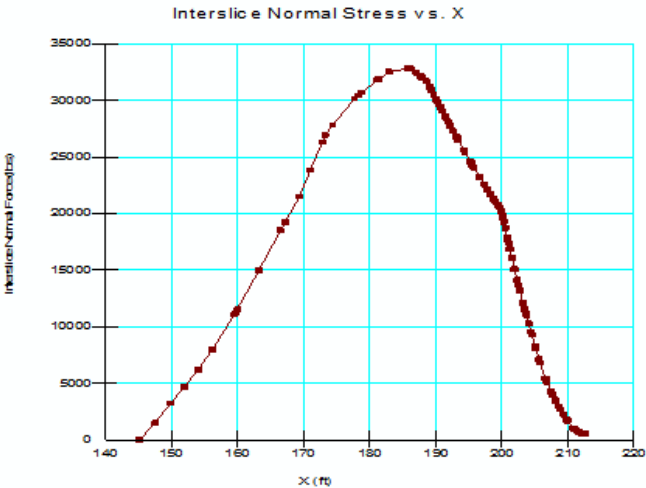
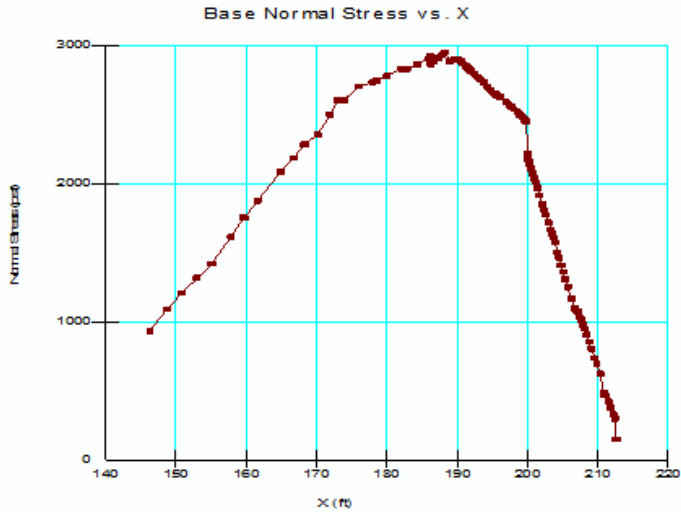
3/1/2013

			26.495675				
36	605	191.45	-26.39847	1654.8239	2992.9111	772.48271	4.5628e-005
37	605	191.65	-26.318385	1649.4285	2982.6286	769.66141	4.546e-005
38	605	192	-26.175305	1639.7313	2964.1936	764.61703	-1.8327e-005
39	605	192.4	-26.007045	1628.2973	2942.6727	758.79383	4.482e-005
40	605	192.8	-25.833295	1616.6845	2920.5257	752.71242	4.4461e-005
41	605	193.1	-25.69986	1608.052	2903.5702	747.9075	-1.7925e-005
42	605	193.25	-25.631825	1603.7085	2894.9154	745.41852	4.403e-005
43	605	193.75	-25.3952	1588.0341	2864.9447	737.16529	4.3543e-005
44	605	194.3	-25.131915	1570.3939	2831.6559	728.13125	-1.7451e-005
45	605	194.8	-24.876835	1553.5987	2799.5683	719.30293	-1.724e-005
46	605	195.25	-24.644715	1538.4819	2770.4156	711.19989	-1.7046e-005
47	605	195.4	-24.564465	1533.1286	2760.3627	708.48683	-1.698e-005
48	605	195.6	-24.456295	1525.9574	2746.8462	704.82369	-1.6892e-005
49	605	196.15	-24.14676	1506.0183	2708.223	694.03726	-1.6634e-005
50	605	196.95	-23.68174	1475.8255	2650.4097	678.09181	-1.6251e-005
51	605	197.35	-23.440935	1460.0926	2620.6091	669.97054	3.9571e-005
52	605	197.6	-23.28452	1449.7028	2601.2923	664.81693	-1.5932e-005
53	605	198.05	-22.99698	1430.9626	2565.769	655.12799	-1.5701e-005
54	605	198.5	-22.70132	1411.9415	2529.4151	645.12165	3.8101e-005
55	605	198.75	-22.53362	1401.1358	2508.7318	639.41929	-1.5325e-005
56	605	198.9	-22.430885	1394.6035	2496.1441	635.92349	-1.5241e-005
57	605	199.2	-22.22182	1381.3029	2469.4334	628.18182	3.7105e-005
58	605	199.45	-22.04578	1370.057	2446.5536	621.46551	-1.4894e-005
59	605	199.6	-21.93794	1363.3162	2432.5671	617.28254	-1.4795e-005
60	605	199.85	-21.755695	1351.3263	2408.9503	610.57026	3.6064e-005
61	605	200.05	-21.608375	1317.13	2368.1707	606.76971	3.5837e-005
62	605	200.15	-21.53369	1272.8899	2354.2902	624.29642	-1.4962e-005
63	605	200.25	-21.458485	1241.0442	2341.6048	635.35777	-1.5228e-005
64	605	200.4	-21.34449	1199.4668	2323.1543	648.709	-1.5547e-005
65	605	200.65	-21.15183	1187.1565	2298.2591	641.44369	3.7887e-005

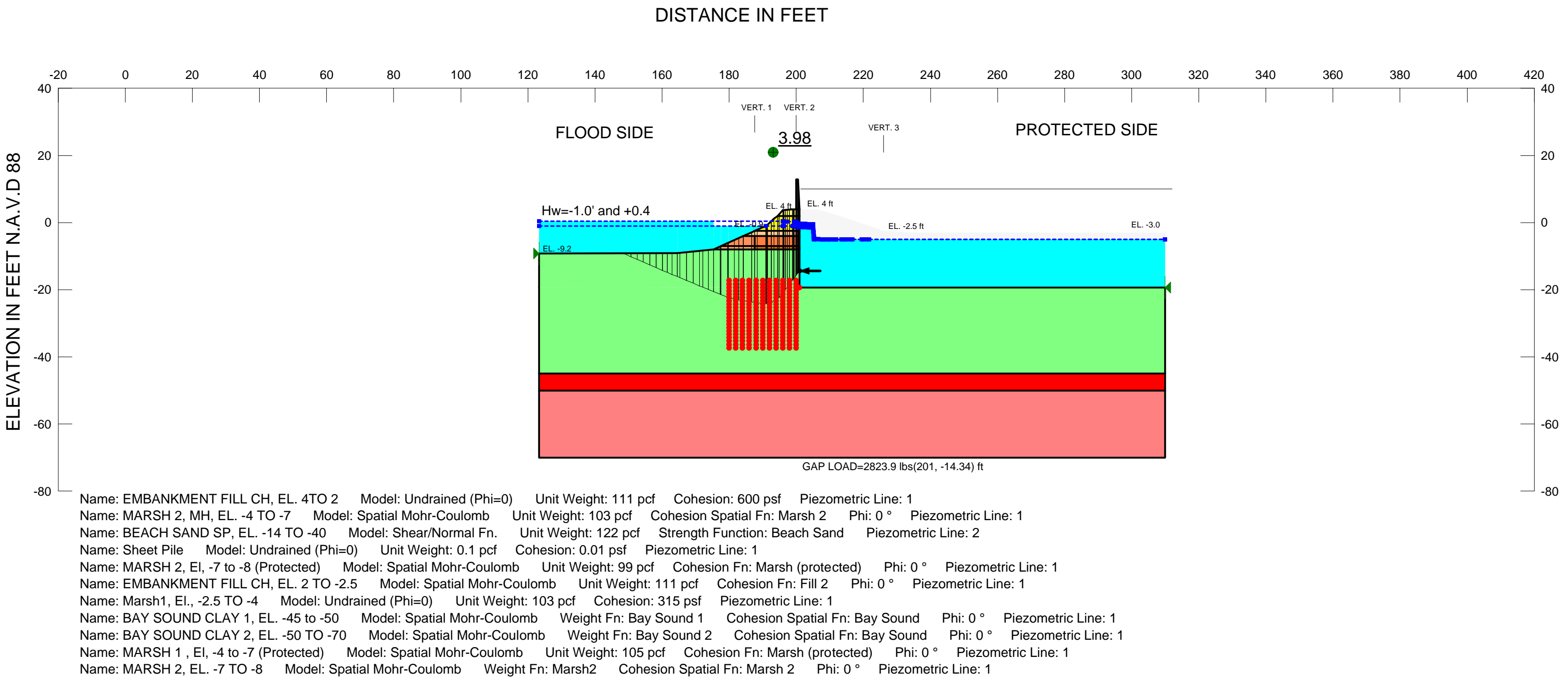
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66	605	200.85	-	20.996085	1177.2343	2278.1605	635.56882	-1.5233e-005
67	605	200.95	-	20.91712	1172.2779	2267.9819	632.55402	3.7362e-005
68	605	201.1	-	20.797425	1164.542	2251.4557	627.47932	-1.5039e-005
69	605	201.35	-	20.595105	1151.5922	2222.5909	618.2915	3.6519e-005
70	605	201.7	-	20.305805	1133.3	2181.5632	605.16625	3.5745e-005
71	605	202.1	-	19.966885	1111.6494	2133.8784	590.13662	3.4853e-005
72	605	202.4	-	19.707235	1095.0548	2097.3364	578.62089	3.4175e-005
73	605	202.6	-	19.53039	1083.9263	2072.6371	570.78643	-9.3478e-005
74	605	202.95	-	19.21298	1063.6663	2028.5413	557.02599	-9.1226e-005
75	605	203.3	-	18.890935	1042.9388	1984.0429	543.3029	-8.8975e-005
76	605	203.45	-	18.74987	1033.9275	1964.6946	537.3353	-8.7991e-005
77	605	203.55	-	18.654785	1028.0013	1951.6832	533.24503	-8.7322e-005
78	605	203.65	-	18.559	1022.0647	1938.5925	529.1149	-8.6651e-005
79	605	204.05	-	18.164195	996.91184	1884.9276	512.65479	-8.3959e-005
80	605	204.7	-	17.505215	954.85038	1796.1469	485.6836	-7.9539e-005
81	605	205.05	-	17.1395	931.5122	1747.3196	470.96867	-7.7126e-005
82	605	205.35	-	16.81227	910.45625	1703.9024	458.05941	-7.5012e-005
83	605	205.7	-	16.4259	885.67793	1652.8648	442.89987	-7.2533e-005
84	605	206.0959	-	15.969035	856.54353	1593.098	425.21567	-0.00012546
85	605	206.4959	-	15.49959	826.62116	1532.0868	407.26797	-6.6694e-005
86	605	206.7	-	15.252	810.86416	1500.124	397.91228	-6.5162e-005
87	605	207.1	-	14.749295	778.91958	1435.6233	379.11751	-6.2089e-005
88	605	207.45	-	14.303595	750.62653	1378.8617	362.68251	-5.9393e-005
89	605	207.6	-	14.105605	738.05593	1351.9836	354.42272	-5.804e-005
90	605	207.85	-	13.76942	716.7057	1305.1091	339.68745	-5.5627e-005
91	605	208.05	-	13.49667	699.36871	1267.3238	327.88261	-5.3693e-005
92	605	208.35	-	13.071405	672.31547	1209.0302	309.8474	-5.074e-005
93	605	208.7	-	12.567785	640.26256	1140.5545	288.82039	-9.3811e-006
94	605	208.93895	-	12.210135	617.43072	1092.5164	274.26871	-8.9083e-006

95	605	209.18895	-	11.827545	531.58931	1054.0129	0	242.92
96	605	209.55	-	11.250905	494.88367	987.48435	0	241.66
97	605	209.85	-	10.763055	463.72859	931.3764	0	240.61
98	605	210.35	-	9.877803	407.55541	831.10192	0	238.86
99	605	210.85	-	8.981143	350.69664	729.66573	0	237.12
100	605	211.1	-	8.491864	319.85862	675.04217	0	236.24
101	605	211.45	-	7.785938	275.28496	596.51819	0	235.02
102	605	211.8	-	7.033922	227.73365	513.52253	0	233.8
103	605	212.01435	-	6.560859	197.83104	461.4054	0	233.05
104	605	212.16435	-	6.2093	175.57785	283.91773	0	450
105	605	212.4	-	5.6444435	139.84492	215.52398	0	450
106	605	212.6934	-	4.891476	92.251603	82.904792	0	450



APPENDIX J.4 FLOODSIDE STABILITY ANALYSES MODIFIED ETL REACH 27 RESULTS



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOOD SIDE STABILITY ANALYSIS,
CASE: FS GAP +0.4 & -1 Block Thru
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS GAP +0.4 & -1 Block Thru

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File Information

Created By: Lijegren, James
Revision Number: 411
Last Edited By: Johnson, Jehu B MVN
Date: 1/30/2013
Time: 1:36:04 PM
File Name: Reach 27 etl -1.0.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water El -1 Based on SeepW\
Last Solved Date: 1/30/2013
Last Solved Time: 1:37:36 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS GAP +0.4 & -1 Block Thru

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
Apply Phreatic Correction: [Yes](#)
PWP Conditions Source: [Piezometric Line](#)
Use Staged Rapid Drawdown: [No](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [Yes](#)
Slip Surface Option: [Block](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [\(none\)](#)
FOS Distribution

MARSH 2, El, -7 to -8 (Protected)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 99 pcf
Cohesion Fn: [Marsh \(protected\)](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL CH, EL. 2 TO -2.5

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 111 pcf
Cohesion Fn: [Fill 2](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh1, El., -2.5 TO -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: 103 pcf
Cohesion: 315 psf
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, EL. -45 to -50

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 1](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -50 TO -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 2](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 , El, -4 to -7 (Protected)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 105 pcf
Cohesion Fn: [Marsh \(protected\)](#)

FOS Calculation Option: [Constant](#)
Restrict Block Crossing: [No](#)
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 6000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: [Undrained \(Phi=0\)](#)
Unit Weight: 111 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -4 TO -7

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 103 pcf
Cohesion Spatial Fn: [Marsh 2](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -14 TO -40

Model: [Shear/Normal Fn.](#)
Unit Weight: 122 pcf
Strength Function: [Beach Sand](#)
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 2

Sheet Pile

Model: [Undrained \(Phi=0\)](#)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf
Pore Water Pressure
Piezometric Line: 1

Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -7 TO -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh2](#)
Cohesion Spatial Fn: [Marsh 2](#)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Limits

Left Coordinate: [\(123.3, -9.2\) ft](#)
Right Coordinate: [\(310, -19.3\) ft](#)

Slip Surface Block

Left Grid
Upper Left: [\(180, -17.3\) ft](#)
Lower Left: [\(180, -37.3\) ft](#)
Lower Right: [\(200, -37.3\) ft](#)
X Increments: 10
Y Increments: 20
Starting Angle: 135 °
Ending Angle: 155 °
Angle Increments: 2
Right Grid
Upper Left: [\(201, -19.3\) ft](#)
Lower Left: [\(201, -19.3\) ft](#)
Lower Right: [\(201, -19.3\) ft](#)
X Increments: 0
Y Increments: 0
Starting Angle: 45 °
Ending Angle: 65 °
Angle Increments: 4

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
123.3	-1
190.9	-1
196	-1
196.2	-1.01
196.3	-1.02
198.9	-1.02
199.2	-1.03
200	-1.03
200.1	-1.15
200.1	-1.19
200.2	-1.21
200.2	-1.23
200.3	-1.36
200.5	-1.36
200.8	-1.37
201.4	-1.37
201.6	-1.38
201.9	-1.38
202.4	-1.39
202.6	-1.39
203	-1.4
203.5	-1.41
203.7	-1.41
204.1	-1.42
204.3	-1.43
204.7	-1.43
204.8	-1.44
205	-1.44
205	-1.59
205.1	-2.15

205.1	-2.79
205.2	-3.02
205.2	-3.08
205.2	-3.1
205.2	-3.11
205.2	-3.39
205.2	-3.6
205.2	-3.7
205.2	-3.82
205.2	-4
205.3	-4.26
205.3	-4.75
205.3	-4.94
205.8	-4.95
207.6	-4.95
208.2	-4.96
209.2	-4.96
209.8	-4.97
211.4	-4.97
211.9	-4.98
214.6	-4.98
215.1	-4.99
219.5	-4.99
220	-5
310	-5

Piezometric Line 2

Coordinates	
X (ft)	Y (ft)
123.3	0.4
196	0.4
196.1	0.39
196.2	0.38
196.3	0.36
196.8	0.36

197.3	0.35
199.3	0.35
199.6	0.34
200	0.34
200	0.27
200.1	0.2
200.2	-0.04
200.2	-0.13
200.3	-0.25
200.3	-0.34
200.6	-0.35
200.9	-0.35
201.1	-0.36
201.5	-0.36
201.7	-0.37
202.1	-0.39
202.3	-0.4
202.7	-0.41
203.3	-0.43
203.6	-0.44
204.4	-0.47
204.7	-0.47
204.7	-0.48
204.9	-0.48
205	-0.49
205.1	-1.59
205.1	-1.84
205.2	-3.2
205.2	-3.39
205.2	-3.55
205.2	-3.7
205.2	-3.88
205.2	-2.34
205.2	-2.8
205.2	-3.02
205.2	-3.1

205.3	-4
205.3	-4.2
205.3	-4.75
205.3	-4.92
205.8	-4.93
206.6	-4.93
207.2	-4.94
208.2	-4.94
208.7	-4.95
209.8	-4.95
210.3	-4.96
211.4	-4.96
211.9	-4.97
213.5	-4.97
213.8	-4.98
216.2	-4.98
216.8	-4.99
221.1	-4.99
221.7	-5
310	-5

Point Loads

	Coordinate (ft)	Magnitude (lbs)	Direction (°)
Point Load 1	(201, -14.34)	2823.9	0

Cohesion Functions

Fill 2
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function

Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft ²)
Region 1	Marsh1, El., -2.5 TO -4	5,26,16,59,19,20,27,50,4,56	22.621262
Region 2		59,21,19	18.103752
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,14,60,18,23,1,24,2,25,51	820.8
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,60,61,13,12	4802.025
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,19,34,42,41,52	40.32
Region 6	Sheet Pile	15,30,31,32	6.675
Region 7		19,21,33,34	75.3
Region 8	EMBANKMENT FILL CH, EL. 4 TO 2	6,53,15,32,38,39,37	10.876
Region 9		32,7,36,38	17.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,57,58,46,5,26,16,59,38,39	42.739737
Region 11		38,59,21,8,36	103.02125
Region 12		21,8,43,9,10	86.025
Region 13		35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3734
Region 16		33,21,10,35	251.7
Region 17	MARSH 1 , El, -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, El, -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42,34,14	13.44
Region 20		34,33,22,14	25.1

Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	123.3	-45
Point 13	310	-45
Point 14	201	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	201	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	123.3	-19.2
Point 24	123.3	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8
Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7

Point 34	201	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	201	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3
Point 44	123.3	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	123.3	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4
Point 54	205	3
Point 55	205	-49
Point 56	186.67467	-2.9
Point 57	192.52381	0.4
Point 58	191.20952	-0.8
Point 59	201	-2.55747
Point 60	201	-19.3
Point 61	310	-19.3

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.98	(175.162, -6.605)	25.34801	(201, 4)	(148.538, -9.13874)
2	1109	7.24	(175.162, -	28.649	(201, 4)	(146.486, -

			6.605)			9.14372)
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Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	149.6342	-9.6533365	627.34226	665.78468	22.19474	-8.3009e-007
2	Optimized	151.6542	-10.563665	684.15738	781.01293	55.919579	3.7136e-006
3	Optimized	153.50205	-11.35514	733.50545	881.84817	85.645704	2.3555e-006
4	Optimized	155.37325	-12.16281	783.92705	985.00349	116.09154	-6.164e-007
5	Optimized	157.26775	-12.98667	835.33369	1090.0434	147.05673	-7.8067e-007
6	Optimized	159.16225	-13.81053	886.74033	1195.035	177.99398	-9.4495e-007
7	Optimized	160.84125	-14.529445	931.58388	1285.5038	204.33578	-1.0847e-006
8	Optimized	162.30475	-15.143415	969.89318	1363.6346	227.32674	-1.6126e-005
9	Optimized	163.76825	-15.757385	1008.2025	1441.7655	250.3177	-1.3289e-006
10	Optimized	164.9244	-16.242405	1038.4893	1507.1323	270.57114	-1.9197e-005
11	Optimized	166.32145	-16.829435	1075.1165	1590.7819	297.71958	-2.1121e-005

12	Optimized	168.26675	-17.64742	1126.1523	1707.1644	335.4475	-6.7831e-005
13	Optimized	170.21205	-18.465405	1177.1881	1823.5469	373.17543	-7.5458e-005
14	Optimized	171.66	-19.069035	1214.8394	1907.9763	400.18282	-8.0917e-005
15	Optimized	172.95145	-19.5979	1247.8911	1983.3486	424.6166	-3.0124e-005
16	Optimized	174.5838	-20.266355	1289.5593	2078.5902	455.5472	-9.2116e-005
17	Optimized	176.343	-20.986735	1334.5116	2100.4193	442.19702	-8.9418e-005
18	Optimized	177.448	-21.433125	1362.3967	2170.2947	466.4401	-9.4324e-005
19	Optimized	178.57835	-21.85337	1388.5978	2245.9267	494.97904	0.00010009
20	Optimized	179.68335	-22.25214	1413.5028	2303.2292	513.6838	0.00010388
21	Optimized	180.67095	-22.53223	1430.986	2358.1253	535.28408	0.00010824
22	Optimized	182.1922	-22.90265	1454.1148	2418.0069	556.50338	0.00011254
23	Optimized	183.53285	-23.16083	1470.2285	2476.5289	580.98784	-9.6634e-006
24	Optimized	184.2216	-23.29251	1478.4113	2496.4621	587.77195	-9.7758e-006
25	Optimiz	185.45735	-	1489.2422	2540.9648	607.21235	4.0313e-

	ed		23.46631				005
26	Optimized	187.11735	-23.69978	1503.8416	2600.768	633.31073	4.2045e-005
27	Optimized	187.97965	-23.82106	1511.4504	2627.2807	644.22493	4.2774e-005
28	Optimized	189.64965	-23.962815	1520.231	2666.7486	661.94222	-1.101e-005
29	Optimized	191	-24.052165	1525.8138	2711.4215	684.51091	-1.1385e-005
30	Optimized	191.15475	-24.062405	1526.4282	2723.5	691.12971	-1.1494e-005
31	Optimized	191.32045	-24.07337	1527.125	2741.8641	701.32995	4.6563e-005
32	Optimized	191.9776	-23.96459	1520.3205	2734.3204	700.9032	-1.1658e-005
33	Optimized	192.5322	-23.84669	1513.0188	2774.8416	728.51375	4.837e-005
34	Optimized	192.9703	-23.561805	1495.2405	2690.6361	690.162	4.5823e-005
35	Optimized	193.92	-22.93612	1456.147	2698.1476	717.0694	-1.1926e-005
36	Optimized	194.6508	-22.454655	1426.1217	2705.9156	738.88935	4.9058e-005
37	Optimized	195.4308	-21.608095	1373.3028	2579.4574	696.37365	4.6238e-005
38	Optimiz	196.05	-	1311.8295	2550.017	714.8679	-1.1891e-

	ed		20.838255				005
39	Optimized	196.15	20.713925	1303.5565	2537.1061	712.19022	-1.1846e-005
40	Optimized	196.25	20.589595	1257.5538	2518.5546	728.03918	-1.2109e-005
41	Optimized	196.55	-20.2166	1283.9395	2487.2803	694.74912	4.613e-005
42	Optimized	197.05	19.594945	1244.3797	2422.8514	680.39097	4.5177e-005
43	Optimized	197.6329	18.87025	1199.3309	2347.9208	663.13871	-1.103e-005
44	Optimized	198.4329	17.822845	1133.9982	2220.9899	627.57497	4.1669e-005
45	Optimized	198.95	17.121495	1090.2263	2148.4657	610.97478	4.0567e-005
46	Optimized	199.1	16.918055	1077.5265	2126.508	605.62978	4.0212e-005
47	Optimized	199.25	16.71462	1064.8267	2104.0756	600.01068	3.984e-005
48	Optimized	199.45	16.44337	1046.4297	2073.9086	593.21522	3.9391e-005
49	Optimized	199.8	15.968675	1017.6622	2021.8829	579.78704	-9.6434e-006
50	Optimized	200.05	15.62961	664.4262	1932.0939	731.88831	-1.2174e-005
51	Optimized	200.15	15.4939	143.75724	1835.243	976.57974	6.4841e-005

			85				
52	Optimized	200.25	15.35836	387.91428	1860.7019	850.31435	5.6458e-005
53	Optimized	200.4	15.154925	923.22958	1925.9517	578.92191	-9.6296e-006
54	Optimized	200.55	14.951485	910.23303	1903.4303	573.42272	0.00011597
55	Optimized	200.7	14.748045	898.42338	1880.9386	567.25541	0.00011472
56	Optimized	200.85	14.544605	885.72356	1858.3281	561.53352	0.00011356
57	Optimized	200.95	14.40898	874.92278	727.86596	0	0

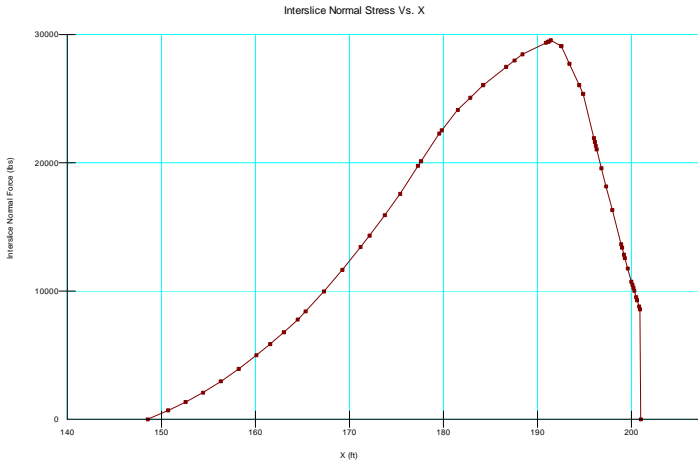
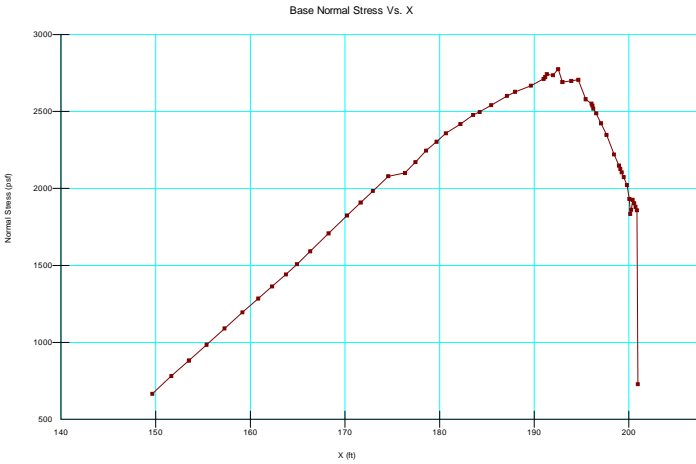
Slices of Slip Surface: 1109

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1109	147.3864	-9.563734	621.73705	647.04323	14.610528	-3.5682e-007
2	1109	149.18785	10.403752	674.16058	751.58843	44.702988	6.484e-007
3	1109	150.9893	11.24377	726.58411	856.13363	74.795447	2.0579e-006
4	1109	152.7907	12.08379	779.00765	960.67883	104.88791	-5.5693e-007
5	1109	154.59215	12.92381	831.38087	1065.224	135.00941	-9.5776e-006
6	1109	156.3936	13.76383	883.8044	1169.7692	165.10187	-8.7649e-007
7	1109	158.195	14.60385	936.22793	1274.3144	195.19433	-1.3848e-005

8	1109	159.9964	15.44387	988.65146	1378.8596	225.28679	-1.1961e-006
9	1109	161.79785	16.28389	1041.075	1483.4048	255.37925	-1.3558e-006
10	1109	163.5993	17.12391	1093.4985	1587.95	285.47171	1.7222e-005
11	1109	165.41925	17.97257	1146.4471	1699.0152	319.02538	-6.4513e-005
12	1109	167.2577	18.829865	1199.9341	1816.884	356.19615	-7.2032e-005
13	1109	169.0798	19.67953	1252.9857	1933.7586	393.04446	-7.9483e-005
14	1109	170.8856	20.52157	1305.4841	2049.5463	429.5845	-8.6868e-005
15	1109	172.69135	21.363615	1358.0327	2165.3339	466.09556	-9.4252e-005
16	1109	174.4971	22.20566	1410.5813	2281.1215	502.60662	-3.5658e-005
17	1109	176.505	23.14195	1468.9979	2331.0156	497.68615	-3.5308e-005
18	1109	178.715	24.17249	1533.3417	2500.0974	558.15668	0.00011287
19	1109	180.925	25.20303	1597.6444	2672.2549	620.42664	-1.0319e-005
20	1109	183.135	26.23357	1661.9472	2844.4534	682.72028	4.5328e-005
21	1109	185.45735	27.31649	1729.5144	3024.2026	747.4886	-1.2432e-005
22	1109	187.11735	28.09056	1777.8508	3151.9564	793.34024	-1.3195e-005
23	1109	188.3897	28.68387	1814.8273	3247.0051	826.8682	-1.3753e-005
24	1109	190.0597	29.462605	1863.4411	3382.3438	876.93888	-1.4585e-005
25	1109	191	-	1890.7845	3462.0502	907.17067	6.023e-005

			29.90108				
26	1109	191.15475	29.973245	1895.2863	3482.0704	916.1302	-1.5237e-005
27	1109	191.86665	30.30521	1915.9968	3598.2951	971.27537	6.4486e-005
28	1109	192.9619	30.81593	1947.8289	3777.222	1056.2006	7.0121e-005
29	1109	193.7	31.16011	1969.4067	3892.7427	1110.4386	7.3728e-005
30	1109	194.22	30.922855	1954.5616	3628.7877	966.61487	6.4176e-005
31	1109	195.22	29.20857	1847.5596	3531.2965	972.10596	-1.6169e-005
32	1109	196.05	27.785715	1741.0758	3449.1985	986.18507	6.5476e-005
33	1109	196.15	27.614285	1729.8395	3430.4041	981.82142	6.5185e-005
34	1109	196.25	27.442855	1668.7703	3405.5632	1002.7379	6.6574e-005
35	1109	196.55	26.92857	1702.7818	3357.2927	955.23234	6.3419e-005
36	1109	197.05	26.07143	1648.3637	3263.3712	932.42499	6.1908e-005
37	1109	198.1	24.27143	1536.3656	3066.5588	883.45746	5.8655e-005
38	1109	198.95	22.814285	1445.4547	2907.1844	843.93006	5.603e-005
39	1109	199.1	22.55714	1429.4064	2878.1111	836.41003	-1.3911e-005
40	1109	199.25	-22.3	1413.3581	2848.4331	828.54092	5.501e-005
41	1109	199.45	21.957145	1390.1129	2808.7448	819.04755	5.438e-005

42	1109	199.8	- 21.35714 5	1353.9015	2739.7988	800.1482	-1.3309e- 005
43	1109	200.05	- 20.92857 5	886.30907	2637.9662	1011.3197	6.7145e- 005
44	1109	200.15	- 20.75714 5	192.34267	2535.63	1352.8976	8.9822e- 005
45	1109	200.25	- 20.58571 5	521.60725	2556.9941	1175.1312	7.8021e- 005
46	1109	200.4	- 20.32857	1245.6951	2616.854	791.63898	5.2561e- 005
47	1109	200.55	- 20.07142 5	1229.3444	2587.176	783.94441	5.2049e- 005
48	1109	200.7	- 19.81428 5	1214.581	2557.3972	775.27529	5.1478e- 005
49	1109	200.85	- 19.55714 5	1198.5075	2527.6688	767.39162	-1.2763e- 005
50	1109	200.95	- 19.38571 5	1184.7015	2818.1001	943.04311	-1.5685e- 005

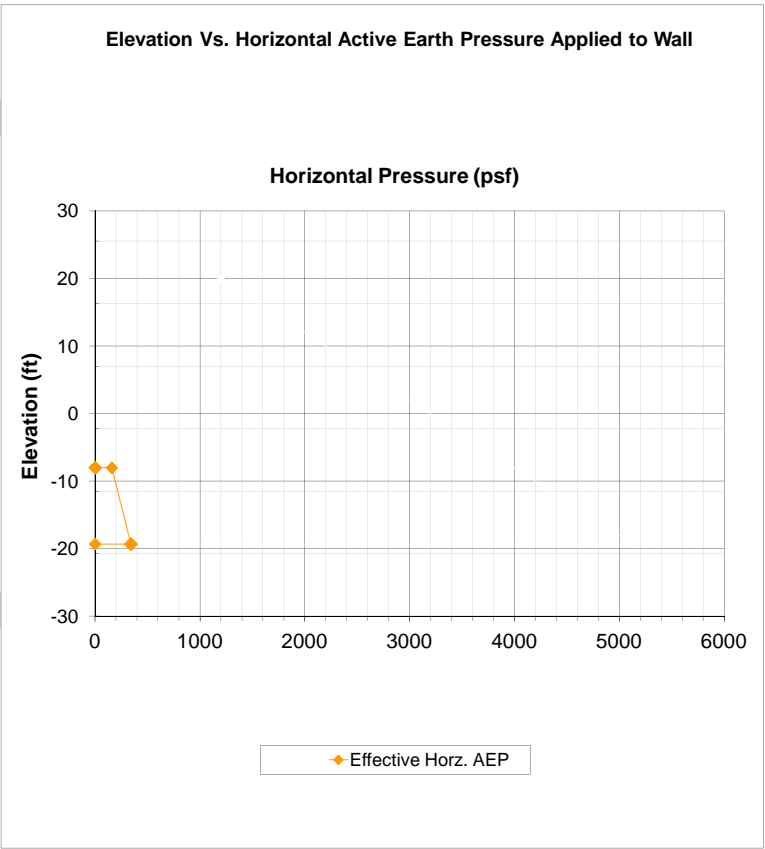


TOTAL STRESS

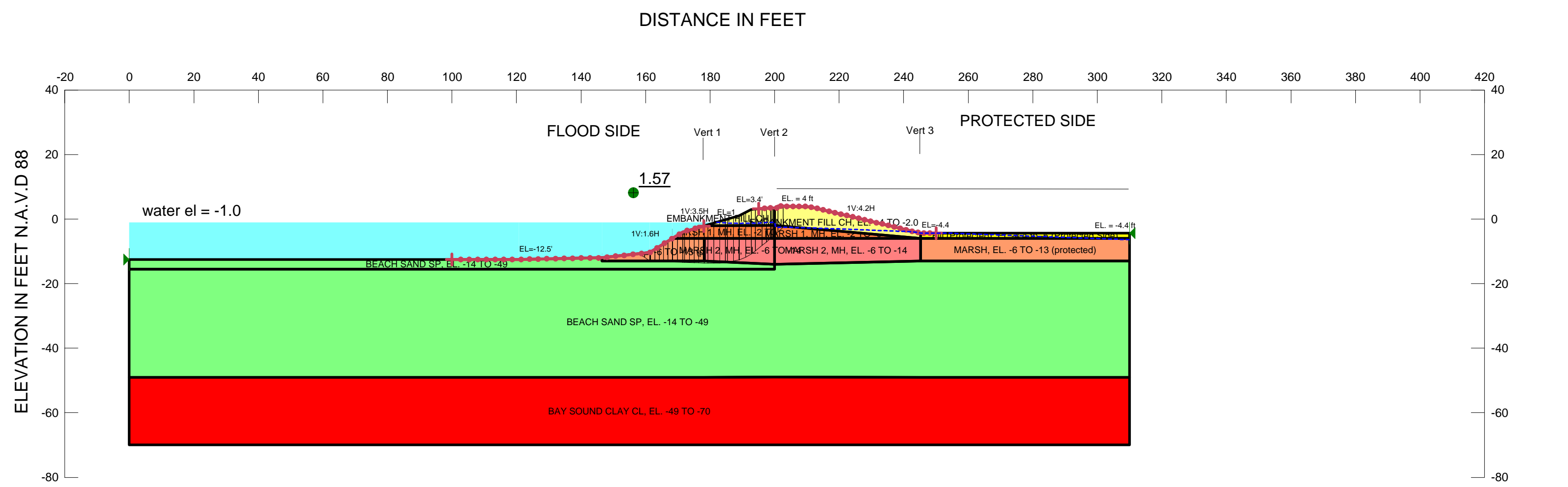
Storm Event		
1 Water	EL.	γ_w
Normal	0.03	62.4

137.28

Effective Active Earth Force



APPENDIX J.5 FLOODSIDE STABILITY ANALYSES WITH TENSION CRACK SEARCH RESULTS



Name: EMBANKMENT FILL CH, EL. +4 TO -2.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 700 psf Phi: 0 °

Name: MARSH 1, MH, EL. -2 TO -6 Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 250 psf Phi: 0 °

Name: BEACH SAND SP, EL. -14 TO -49 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY CL, EL. -49 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Bay Sound Phi: 0 °

Name: MARSH 2, MH, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Spatial Fn: Marsh 2 Phi: 0 °

Name: Fill (Protected) ,EL -4.4 to -6 (Protected Side) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 600 psf Phi: 0 °

Name: MARSH, EL. -6 TO -13 (protected) Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 220 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVELS



**US Army Corps
of Engineers®**
New Orleans District
LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 13, STA. 93+00 TO 96+00
FLOOD SIDE STABILITY ANALYSIS,
CASE: FS Slope Stability through(Entry/Exit)
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability through(Entry/Exit)

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File Information

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Revision Number: 312
Last Edited By: Schroeder, Danielle MVN
Date: 6/25/2013
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Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0441021\
Last Solved Date: 6/25/2013
Last Solved Time: 8:53:27 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability through(Entry/Exit)

Kind: SLOPE/W
Parent: Gap Stability (Seepage)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of Movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 1
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Phi: 0 °
Phi-B: 0 °
Fill (Protected) ,EL -4.4 to -6 (Protected Side)
Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 600 psf
Phi: 0 °
Phi-B: 0 °

MARSH, EL. -6 TO -13 (protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 75 pcf
Cohesion: 220 psf
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (100, -12.5) ft
Left-Zone Right Coordinate: (178, -2.15672) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (195, 3.14603) ft
Right-Zone Right Coordinate: (250, -4.4) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (0, -12.5) ft
Right Coordinate: (310, -4.4) ft

Shear/Normal Strength Functions

Sand
Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
 Data Point: (-100000, 0)
 Data Point: (0, 0)

FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +4 TO -2.0

Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 700 psf
Phi: 0 °
Phi-B: 0 °

MARSH 1, MH, EL. -2 TO -6

Model: Spatial Mohr-Coulomb
Unit Weight: 75 pcf
Cohesion: 250 psf
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -49

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -49 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 2, MH, EL. -6 TO -14

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion Spatial Fn: Marsh 2

Data Point: (100000, 57735)
Estimation Properties
 Intact Rock Param.: 10
 Geological Strength: 100
 Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 75
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (178.2, 75)
 Data Point: (200, 105)
 Data Point: (245.2, 75)

Spatial Functions

Bay Sound
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
 Data Point: (0, -49, 700)
 Data Point: (0, -70, 900)
 Data Point: (200, -49, 720)
 Data Point: (200, -70, 930)
 Data Point: (310, -49, 700)
 Data Point: (310, -70, 900)
 Data Point: (245.2, -49, 700)
 Data Point: (245.5, -70, 900)
 Data Point: (178.2, -49, 700)
 Data Point: (178.2, -70, 900)

Marsh 2
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
 Data Point: (200, -6, 250)
 Data Point: (200, -14, 310)

Data Point: (245.2, -6, 220)
Data Point: (245.2, -13, 220)
Data Point: (178.2, -6, 220)
Data Point: (178.2, -13, 220)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1, MH, EL. -2 TO -6	23,2,11,12,42,39	109.0625
Region 2	MARSH 1, MH, EL. -2 TO -6	11,15,12	90.4
Region 3	BEACH SAND SP, EL. -14 TO -49	7,1,34,35,31,40,30,14,41,32,33	568.775
Region 4	BAY SOUND CLAY CL, EL. -49 TO -70	9,38,37,36,10,17,18	6513.35
Region 5	Fill (Protected) ,EL -4.4 to -6 (Protected Side)	24,19,6,15	103.68
Region 6	BEACH SAND SP, EL. -14 TO -49	14,16,8,10,36,37,38,9,7,33,32,41	10634.05
Region 7	EMBANKMENT FILL CH, EL. +4 TO -2.0	2,22,3,27,4,11	69.71
Region 8	EMBANKMENT FILL CH, EL. +4 TO -2.0	4,20,25,5,24,15,11	212.94
Region 9	MARSH 2, MH, EL. -6 TO -14	12,15,16,14,21,13	339
Region 10	MARSH, EL. -6 TO -13 (protected)	30,40,31,35,26,39,42	129.5125
Region 11	MARSH 2, MH, EL. -6 TO -14	30,42,12,13,21,14	163.5
Region 12	MARSH, EL. -6 TO -13 (protected)	16,15,6,8	453.6

Points

	X (ft)	Y (ft)
Point 1	0	-12.5
Point 2	178.2	-2.1
Point 3	192.7	3
Point 4	200	3.4
Point 5	211	3.8
Point 6	310	-6
Point 7	0	-15.5
Point 8	310	-13

Point 9	0	-49
Point 10	310	-49
Point 11	200	-2
Point 12	200	-6
Point 13	200	-7.9
Point 14	200	-14
Point 15	245.2	-6
Point 16	245.2	-13
Point 17	310	-70
Point 18	0	-70
Point 19	310	-4.4
Point 20	201	3.4
Point 21	200	-10.7
Point 22	189	1
Point 23	171.5	-4
Point 24	245.2	-4.4
Point 25	201	4
Point 26	161.3	-10.4
Point 27	199	3.4
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	178.2	-13
Point 31	146.5	-13
Point 32	151.7	-15.5
Point 33	138.6	-15.5
Point 34	120.8	-12.5
Point 35	146.5	-12
Point 36	245.2	-49
Point 37	199.9	-48.9
Point 38	178.2	-49
Point 39	168.3125	-6
Point 40	154.61111	-13
Point 41	200	-15.5
Point 42	178.2	-6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.57	(177.487, 15.595)	20.12891	(202.652, 3.96695)	(157.969, -10.7602)
2	15113	1.72	(177.487, 15.595)	30.545	(202.31, 3.9738)	(161.374, -10.3537)

Slides of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	158.80135	-11.3056	634.35002	828.35636	0	220
2	Optimized	160.4671	12.396475	685.07392	919.10694	0	220
3	Optimized	161.34435	12.970955	711.87217	1004.9161	0	220
4	Optimized	161.4433	13.03575	715.38197	975.63928	150.25963	-7.9741e-007
5	Optimized	162.17935	13.09378	718.00682	849.99817	76.20524	2.0966e-006
6	Optimized	163.54225	13.138335	718.99681	863.1247	83.212277	2.2884e-006
7	Optimized	164.9052	13.18289	720.01613	876.1779	90.160041	2.4799e-006
8	Optimized	166.26815	13.22745	721.07212	889.23111	97.086635	2.6707e-006
9	Optimized	167.63105	13.272005	722.17944	902.28431	103.98359	2.8606e-006
10	Optimized	168.34995	-	722.77096	909.19648	107.63282	-5.7137e-

	ed		13.295505				007
11	Optimized	169.16555	13.33188	724.053	920.60001	113.47647	3.1211e-006
12	Optimized	170.72185	13.40218	726.62057	938.05945	122.0743	-6.4808e-007
13	Optimized	171.8181	-13.4517	728.41342	941.74279	123.16577	-6.5384e-007
14	Optimized	172.85555	13.486085	729.39399	946.03054	125.07517	-6.6392e-007
15	Optimized	174.29425	13.52611	730.29723	955.68817	130.12952	-6.909e-007
16	Optimized	175.73295	13.566135	731.20046	965.3458	135.18387	-7.1775e-007
17	Optimized	177.32615	13.61618	732.65352	978.20567	141.7696	-1.0058e-005
18	Optimized	178.74495	13.664935	734.27397	998.86936	152.76422	-8.1111e-007
19	Optimized	180.21015	13.67181	733.26441	1020.279	165.70795	-8.797e-007
20	Optimized	182.05065	13.64811	730.05906	1056.8417	188.66805	-1.0016e-006
21	Optimized	183.81545	13.55301	722.523	1093.5945	214.23823	-1.1373e-006
22	Optimized	185.0504	13.400955	712.05527	1102.7675	225.5778	-1.1976e-006
23	Optimized	186.3306	13.1753	697.83478	1131.3114	0	252.97

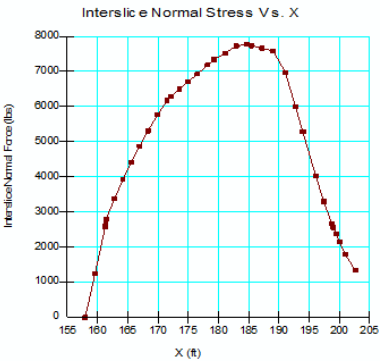
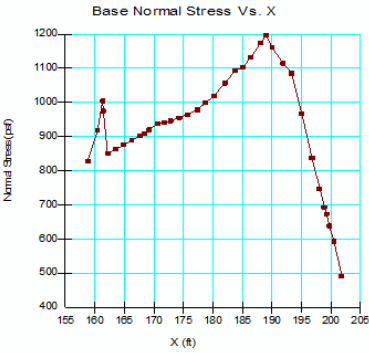
			3				
24	Optimized	188.1102	12.861695	679.01925	1175.3618	0	258.74
25	Optimized	189.0161	12.70204	669.69143	1197.6504	0	261.5
26	Optimized	190.05055	12.28473	645.76363	1161.1922	0	263.48
27	Optimized	191.88445	11.314905	591.79094	1114.5109	0	265.08
28	Optimized	193.3282	10.33175	538.65996	1085.5958	0	264.26
29	Optimized	195.04315	-9.06247	471.46388	967.19215	0	261.44
30	Optimized	196.7806	7.6657425	397.23234	838.86596	0	256.42
31	Optimized	198.08195	6.5552475	336.40565	748.26305	0	251.2
32	Optimized	198.8663	5.8859105	299.24431	694.04538	0	250
33	Optimized	199.2224	5.5820505	282.12855	674.09158	0	250
34	Optimized	199.7224	5.148396	257.55968	639.07546	0	250
35	Optimized	200.5	4.4652635	120.29384	593.85128	0	250
36	Optimized	201.8262	3.3001875	46.7605	491.70132	0	250

Slices of Slip Surface: 15113

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	15113	162.04575	-10.74757	599.67056	799.9887	0	220
2	15113	163.38965	11.491175	632.01924	851.4006	0	220
3	15113	164.73355	12.149775	663.72522	896.42896	0	220
4	15113	166.07745	12.729325	692.41361	935.57282	0	220
5	15113	167.53095	13.269565	722.13913	962.00544	138.48688	7.3488e-007
6	15113	169.1094	13.766505	751.25682	1026.2732	158.78076	8.4274e-007
7	15113	170.70315	14.175465	774.86563	1076.8344	174.34176	9.2533e-007
8	15113	172.17	14.47552	791.89469	1102.3033	179.21449	1.2711e-005
9	15113	173.51	-14.682	803.2491	1122.1514	184.11834	1.3058e-005
10	15113	174.85	14.82809	810.83995	1134.031	186.59442	9.9005e-007
11	15113	176.19	14.914655	814.78604	1138.2251	186.73762	1.3241e-005
12	15113	177.53	-14.9422	815.14865	1135.0738	184.70886	9.8022e-007

							-007
13	15113	178.8337	14.913295	812.00196	1136.4559	187.32357	9.9394e-007
14	15113	180.10105	14.83089	805.56466	1142.2714	194.3977	1.0315e-006
15	15113	181.3684	14.695255	795.94841	1141.4072	199.45075	1.0584e-006
16	15113	182.63575	14.505675	782.95861	1144.6891	208.84518	1.1081e-006
17	15113	183.9031	14.261115	766.59485	1152.5961	222.85795	1.5803e-005
18	15113	185.1705	13.96021	746.77564	1153.1268	234.60698	1.2449e-006
19	15113	186.43785	13.601215	723.47417	1146.2187	244.07167	1.7309e-005
20	15113	188.03575	13.051895	690.00083	1137.5282	0	259.16
21	15113	189.61665	12.429945	654.04809	1143.7675	0	262.57
22	15113	190.85	11.862945	622.2241	1158.4045	0	264.34
23	15113	192.08335	11.227265	586.99483	1164.076	0	265.26
24	15113	193.33	10.50935	548.75947	1129.2581	0	265.23
25	15113	194.59	9.701068	506.62315	1053.4185	0	264.09
26	15113	195.85	-	459.74278	966.30764	0	261.71

			8.800933				
27	15113	197.11	7.7982915	406.97395	866.90985	0	257.92
28	15113	198.37	6.679208	345.60104	753.55965	0	252.51
29	15113	199.04445	6.0442865	309.95892	688.14068	0	249
30	15113	199.54445	5.5242315	280.10014	641.93031	0	250
31	15113	200.5	4.475166	120.91439	553.72428	0	250
32	15113	201.6549	3.0531385	31.348514	403.22156	0	250



Global Stability through(Block)

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File Information

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Last Solved Date: 6/24/2013
Last Solved Time: 9:53:43 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability through(Block)

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL., 0.5 TO -4 (Protected Side)

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: Spatial Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 500 psf
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -11 (protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion Fn: Bay Sound (Protected)
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (100, -8.4) ft
Right Coordinate: (310, 1.8) ft

Slip Surface Block

Left Grid
Upper Left: (125, -1) ft

FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: Undrained (Phi=0)
Unit Weight: 110 pcf
Cohesion: 600 psf
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -2.5 TO -11

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: MARSH
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -11 TO -42

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -44 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound
Cohesion Spatial Fn: Bay Sound
Phi: 0 °

Lower Left: (125, -46) ft
Lower Right: (175, -46) ft
X Increments: 10
Y Increments: 9
Starting Angle: 135 °
Ending Angle: 155 °
Angle Increments: 4

Right Grid
Upper Left: (185, -1) ft
Lower Left: (185, -46) ft
Lower Right: (215, -46) ft
X Increments: 6
Y Increments: 9
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	-1
310	-1

Tension Crack Line

X (ft)	Y (ft)
201	-3
206.3	-3
212.9	-3
221.3	-3

Cohesion Functions

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-11, 295)
Data Point: (-4, 235)

Bay Sound (Protected)
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: Y (ft), Cohesion (psf)
Data Point: (-70, 785)
Data Point: (-42, 500)

Shear/Normal Strength Functions

Beach Sand
Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Bay Sound
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109
Data Points: X (ft), Unit Weight (pcf)
Data Point: (184.4, 109)

Data Point: (200, 110)
Data Point: (229.1, 109)

Spatial Functions

Bay Sound
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -42, 500)
Data Point: (184.4, -70, 785)
Data Point: (200, -44, 640)
Data Point: (200, -70, 910)
Data Point: (229.1, -42, 500)
Data Point: (229.1, -70, 785)

MARSH
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (184.4, -4, 235)
Data Point: (184.4, -11, 295)
Data Point: (229.1, -4, 235)
Data Point: (229.1, -11, 295)
Data Point: (200, -2.5, 237)
Data Point: (200, -11, 313)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND SP, EL. -11 TO -42	20,24,14,17,1,2,41	1027.08
Region 2	BEACH SAND SP, EL. -11 TO -42	17,14,24,38,8,10,16,11,42,9	5729.7
Region 3	MARSH, EL. -4 TO -11 (protected)	15,7,8,38	566.3
Region 4	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	25,30,4,31,12,23,27	9.23
Region 5	Fill, EL., 0.5 TO -4 (Protected Side)	15,35,6,7	469.22
Region 6	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	25,27,23,13,40,39,29	52.06
Region 7	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	23,26,5,34,35,15,13	151.06
Region 8	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	23,12,32,22,33,26	17.1
Region 9		12,36,37,22,32	7.1
Region 10	MARSH, MH, EL. -2.5 TO -11	13,40,39,41,20,24,45	132.6
Region	MARSH, MH, EL. -2.5 TO -11	13,15,38,24,45	225.525

11			
Region 12	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	9,18,43,42	2363.2
Region 13	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	16,44,19,10	2265.2
Region 14	BAY SOUND CLAY CL, EL. -44 TO -70	42,43,44,16,11	1206.9
Region 15	MARSH, EL. -4 TO -11 (protected)	2,3,28,39,41	62.36

Point 25	192.3	2
Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	199	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	1.9
Point 35	229.1	1.8
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8

Points

	X (ft)	Y (ft)
Point 1	100	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	1.9
Point 6	310	1.8
Point 7	310	-4
Point 8	310	-11
Point 9	100	-42
Point 10	310	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42
Point 17	100	-19.2
Point 18	100	-70
Point 19	310	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.49	(183.506, -1.674)	17.20692	(203.038, 3.88676)	(163.44, -8.30643)
2	5572	1.63	(183.506, -1.674)	16.795	(203.856, 3.84131)	(164.221, -8.30528)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimiz	164.0859	-	461.22023	478.21058	9.8093794	-1.1236e-

	ed		8.39133 25				007
2	Optimiz ed	165.3767	8.56113 75	471.81231	500.86181	16.771733	-1.9202e- 007
3	Optimiz ed	166.91105	8.76914 45	484.79662	529.40642	25.755481	-2.9488e- 007
4	Optimiz ed	168.72145	9.01985 45	500.44154	593.06096	53.473845	3.5517e- 006
5	Optimiz ed	170.4072	9.26355 15	515.64322	643.11489	73.595804	2.0257e- 006
6	Optimiz ed	171.93575	9.49573 4	530.13158	688.19697	91.259096	-4.847e- 007
7	Optimiz ed	172.774	9.62306 25	538.07635	712.82905	100.89352	-5.3599e- 007
8	Optimiz ed	173.58855	9.74174 5	545.48625	734.6515	109.2146	-5.8017e- 007
9	Optimiz ed	175.06965	9.95663 5	558.8964	776.81294	125.81417	3.4627e- 006
10	Optimiz ed	176.42515	10.1582 45	571.4761	818.15106	142.41785	-1.0108e- 005
11	Optimiz ed	177.6551	10.3465 75	583.22597	854.55798	156.6536	-8.3216e- 007
12	Optimiz ed	178.88505	10.5349 1	594.97585	891.04526	170.93576	-1.2133e- 005
13	Optimiz ed	180.02215	10.7090 3	605.83917	944.55782	195.55931	-1.0387e- 006
14	Optimiz	181.18585	-	613.01659	951.66871	195.52089	-1.0384e-

	ed		10.8239 75				006
15	Optimiz ed	182.46895	10.8939 65	617.38233	985.75415	212.67957	-1.1293e- 006
16	Optimiz ed	183.75525	10.9641 35	621.76378	1019.8701	229.84678	-1.2205e- 006
17	Optimiz ed	184.78995	11.0205 8	625.28046	1030.8422	234.15117	-1.2434e- 006
18	Optimiz ed	186.1595	11.0286 65	625.81084	1042.3716	240.50147	-1.7066e- 005
19	Optimiz ed	187.71395	11.0077 4	624.48035	1100.2592	274.69103	1.6575e- 005
20	Optimiz ed	188.4444	10.9979 05	623.87907	1145.4386	0	299.65
21	Optimiz ed	188.66095	10.9949 9	623.68492	1158.4981	0	299.87
22	Optimiz ed	189.31825	-10.8196	612.74281	1080.0328	0	299.1
23	Optimiz ed	190.51095	10.4704 55	590.9603	1120.347	0	297.43
24	Optimiz ed	191.70365	10.1213 1	569.16974	1160.6611	0	295.73
25	Optimiz ed	192.3005	9.94658 95	558.26745	1180.9305	0	294.87
26	Optimiz ed	193.0005	9.54291 35	533.07609	1099.0174	0	292.11
27	Optimiz ed	194.22115	- 8.83872	489.13834	1093.7699	0	287.27

			75				
28	Optimiz ed	195.2635	8.23740 9	451.61012	1047.2335	0	283.1
29	Optimiz ed	195.89235	7.86457 15	428.36829	988.67278	0	280.49
30	Optimiz ed	196.75	7.28952 35	392.46608	942.3217	0	276.32
31	Optimiz ed	198.25	6.28378 5	329.70739	860.81402	0	268.98
32	Optimiz ed	199.1101	5.70709 8	293.72291	813.38013	0	264.74
33	Optimiz ed	199.6101	5.35388 8	271.68523	768.89921	0	262.11
34	Optimiz ed	200.25	4.89535 45	243.07654	727.81524	0	258.28
35	Optimiz ed	200.75	4.53707 2	220.70673	695.98379	0	254.8
36	Optimiz ed	201.5843	3.93924 55	183.40551	689.0975	0	249.01
37	Optimiz ed	202.60345	-3.26028	141.04364	407.41446	0	242.4

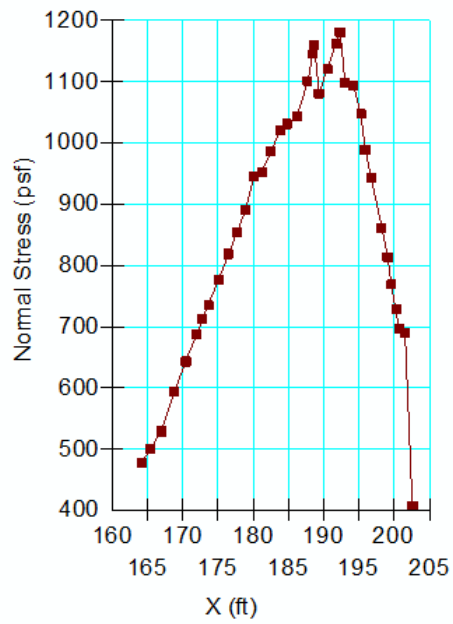
			9.139701				007
3	5572	167.20355	9.695982 5	542.63018	709.97376	96.615859	2.662e-006
4	5572	168.35	10.23059 1	575.99142	821.37831	141.67419	-7.5335e- 007
5	5572	169.45	- 10.74353	607.99231	911.25107	175.08652	-9.3089e- 007
6	5572	170.675	-11	624	836	122.39826	-6.4983e- 007
7	5572	172.025	-11	624	847.18519	128.85603	-6.843e-007
8	5572	173.38	-11	624	858.45588	135.36317	-7.1875e- 007
9	5572	174.74	-11	624	869.77941	141.90081	-7.5338e- 007
10	5572	176.1	-11	624	881.02941	148.396	-7.8801e- 007
11	5572	177.46	-11	624	892.35294	154.93364	-8.2263e- 007
12	5572	178.82	-11	624	903.67647	161.47129	-8.5726e- 007
13	5572	180.1125	-11	624	932.32653	178.01241	-9.4518e- 007
14	5572	181.3375	-11	624	955.5102	191.39751	-1.3581e- 005
15	5572	182.5625	-11	624	978.69388	204.78261	-1.0875e- 006
16	5572	183.7875	-11	624	1001.9592	218.21484	-1.5483e- 005
17	5572	185.0848	-11	624.00105	1018.7906	0	295.79
18	5572	186.45435	-11	624.00105	1050.9176	0	297.37
19	5572	187.86955	-11	623.99803	1111.0503	0	299
20	5572	189.3	-11	624	1201	0	300.65
21	5572	190.575	- 10.66802 5	603.28818	1055.9482	0	299.23
22	5572	191.725	-	561.85453	1063.4036	0	294.72

Slices of Slip Surface: 5572

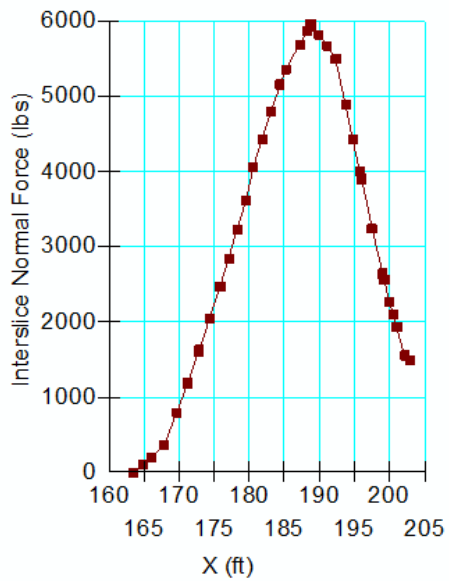
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	5572	164.81765	8.583419 5	473.20695	541.10314	39.199888	2.6082e- 006
2	5572	166.0106	-	507.91856	625.53845	67.907874	-3.6115e-

			10.00407 2				
23	5572	193	- 9.267949	515.92218	1085.1915	0	289.69
24	5572	194.275	- 8.531827 5	469.98809	1077.3353	0	284.62
25	5572	195.425	- 7.867874 5	428.55443	1025.5244	0	280.01
26	5572	196.75	- 7.102885 5	380.8202	964.23258	0	274.66
27	5572	198.25	- 6.236860 5	326.78022	893.56491	0	268.56
28	5572	199.5	- 5.515172 5	281.74393	831.28879	0	263.44
29	5572	200.25	- 5.082159 5	254.7327	791.0622	0	259.95
30	5572	200.75	- 4.793484 5	236.71937	764.47522	0	257.09
31	5572	201.7141	- 4.236860 5	201.97714	759.96864	0	251.59
32	5572	203.1423	- 3.412287	150.5263	539.69113	0	243.47

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



Thru Sheetpile (Entry/Exit)

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File Information

Created By: Liljegren, James
Revision Number: 271
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 10:09:16 AM
File Name: Reach 29 - filled.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0441021\
Last Solved Date: 6/24/2013
Last Solved Time: 10:19:30 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Thru Sheetpile (Entry/Exit)

Kind: SLOPE/W
Method: Spencer
Settings
PWP Conditions Source: Other GeoStudio Analysis
PWP Other Analysis: Steady-State Seepage [(last)]
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

MARSH 2, MH, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Unit Weight: 97 pcf
Cohesion Spatial Fn: Marsh 2/3 Cohesion
Phi: 0 °
Phi-B: 0 °

Marsh 3, EL. -12 to -16

Model: Spatial Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion Spatial Fn: Marsh 2/3 Cohesion
Phi: 0 °
Phi-B: 0 °

Fill -2.6 to -7

Model: Undrained (Phi=0)
Unit Weight: 100 pcf
Cohesion: 400 psf

Marsh -7 to -16

Model: Spatial Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 220 psf
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -11.41152) ft
Left-Zone Right Coordinate: (181.2, 0.24173) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (200, 4.6) ft
Right-Zone Right Coordinate: (240.10888, -0.95746) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (127, -11.6) ft
Right Coordinate: (310, -2.6) ft

Tension Crack Line

	X (ft)	Y (ft)
--	--------	--------

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.6 TO 0

Model: Undrained (Phi=0)
Unit Weight: 114 pcf
Cohesion: 850 psf

MARSH 1, EL. -3 TO -8

Model: Spatial Mohr-Coulomb
Unit Weight: 93 pcf
Cohesion: 260 psf
Phi: 0 °
Phi-B: 0 °

BEACH SAND, EL. -16 TO -49

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

BAY SOUND CLAY, EL. -49 TO -70

Model: Spatial Mohr-Coulomb
Weight Spatial Fn: Clay Gamma
Cohesion Spatial Fn: Clay Cohesion
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL1, EL. 0 TO -3

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

	201.1	0.8
	209.5	0.6
	226.4	-5
	263.6	-7.6

Cohesion Functions

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 400
Data Points: X (ft), Cohesion (psf)
Data Point: (172.7, 400)
Data Point: (200, 850)
Data Point: (263.6, 400)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Spatial Functions

Marsh 2/3 Cohesion

Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (172.7, -7, 220)
Data Point: (172.7, -16, 220)
Data Point: (200, -8, 260)
Data Point: (200, -16, 260)
Data Point: (263.6, -7, 220)
Data Point: (263.6, -16, 220)

Clay Cohesion

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (172.7, -49, 544)
Data Point: (172.7, -70, 773)
Data Point: (200, -49, 900)
Data Point: (200, -70, 900)
Data Point: (263.6, -49, 544)
Data Point: (263.6, -70, 773)
Data Point: (310, -49, 544)
Data Point: (310, -70, 773)
Data Point: (127.5, -49, 544)
Data Point: (127.5, -70, 773)

Clay Gamma

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (127.5, -49, 112)
Data Point: (127.5, -70, 112)
Data Point: (172.7, -49, 112)
Data Point: (172.7, -70, 112)
Data Point: (200, -49, 106)
Data Point: (200, -70, 106)
Data Point: (231, -49, 112)
Data Point: (231, -70, 112)
Data Point: (310, -49, 112)
Data Point: (310, -70, 112)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -16 TO -49	25,10,14,1,13,27	571.48
Region 2	BEACH SAND, EL. -16 TO -49	8,14,10,25,28,26,9	5637.5
Region 3	BAY SOUND CLAY, EL. -49 TO -70	15,8,9,16	3843
Region 4		4,18,5,19,20	6.45

Region 5	Marsh -7 to -16	13,2,38,29,37,27	128.94137
Region 6	EMBANKMENT FILL, EL. 4.6 TO 0	4,18,5,17,33,21	99.833372
Region 7	EMBANKMENT FILL1, EL. 0 TO -3	21,33,6,30,22	269.66014
Region 8	MARSH 1, EL. -3 TO -8	23,22,30	159
Region 9	MARSH 2, MH, EL. -8 TO -12	23,30,34,24,39	286.2
Region 10	Marsh 3, EL. -12 to -16	25,28,34,24	254.4
Region 11	Fill -2.6 to -7	6,7,31,30	204.16
Region 12	Marsh -7 to -16	28,34,30,31,26	417.6
Region 13	EMBANKMENT FILL, EL. 4.6 TO 0	4,32,11,36,21	56.9916
Region 14	EMBANKMENT FILL1, EL. 0 TO -3	21,36,3,35,22	71.5206
Region 15	Marsh 3, EL. -12 to -16	25,24,37,27	109.2
Region 16	MARSH 2, MH, EL. -8 TO -12	24,39,23,29,37	122.85
Region 17	MARSH 1, EL. -3 TO -8	23,22,35,38,29	140.41862

Points

	X (ft)	Y (ft)
Point 1	127	-11.6
Point 2	161.5	-8.1
Point 3	177.3	-0.9
Point 4	200	4.6
Point 5	201	5.8
Point 6	263.6	-2.6
Point 7	310	-2.6
Point 8	127	-49
Point 9	310	-49
Point 10	200	-21.5
Point 11	196	4.9
Point 12	231	-1.5
Point 13	146.1	-10.4
Point 14	127	-21.5
Point 15	127	-70
Point 16	310	-70
Point 17	209.3	5.6
Point 18	201	4.6
Point 19	200.5	12.8

Point 20	200	12.8
Point 21	200	0
Point 22	200	-3
Point 23	200	-8
Point 24	200	-12
Point 25	200	-16
Point 26	310	-16
Point 27	172.7	-16
Point 28	263.6	-16
Point 29	172.7	-7
Point 30	263.6	-7
Point 31	310	-7
Point 32	199	4.6
Point 33	226.41549	0
Point 34	263.6	-12
Point 35	172.7	-3
Point 36	180.432	0
Point 37	172.7	-12
Point 38	163.91569	-7
Point 39	200	-8.3

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.57	(181.197, 23.634)	23.92492	(212.52, 4.54639)	(160.579, -8.23761)
2	10680	1.61	(181.197, 23.634)	39.611	(212.65, 4.50379)	(158.17, -8.59731)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimize d	161.0393	-8.546163	467.43417	622.96602	0	220

2	Optimize d	162.62365	9.6072615	520.85971	766.24202	0	220
3	Optimize d	163.8315	-10.40636	562.09675	846.18559	0	220
4	Optimize d	165.13185	-11.12534	599.85658	938.89501	0	220
5	Optimize d	167.61005	12.381885	666.5159	1082.9355	0	220
6	Optimize d	169.82905	13.302325	716.21409	1182.1722	0	220
7	Optimize d	171.743	13.974975	752.44378	1276.7145	0	220
8	Optimize d	173.60555	14.629555	787.81789	1330.8622	0	221.33
9	Optimize d	175.47975	-15.22057	819.22618	1402.3932	0	224.07
10	Optimize d	176.8742	15.563325	837.25396	1429.896	0	226.12
11	Optimize d	178.4023	-15.81453	849.91592	1499.9859	0	228.36
12	Optimize d	179.9683	15.995655	858.58934	1521.0757	0	230.65
13	Optimize d	181.3165	-15.99541	856.83113	1566.4006	0	232.62
14	Optimize d	183.08545	15.995095	854.56992	1629.7146	0	235.22
15	Optimize d	184.8544	-15.99478	852.36523	1692.9721	0	237.81
16	Optimize d	186.62335	-15.99446	850.27361	1756.2862	0	240.4
17	Optimize	188.20195	-	842.12717	1762.2106	0	242.71

	d		15.89155 5				
18	Optimize d	189.5902	- 15.68606 5	828.08934	1792.9228	0	244.75
19	Optimize d	191.05115	-15.34363	805.57737	1767.9763	0	246.89
20	Optimize d	192.5849	- 14.86424 5	774.77314	1779.0534	0	249.14
21	Optimize d	194.01385	-14.28487	738.0659	1722.3329	0	251.23
22	Optimize d	195.33795	- 13.60551 5	695.73327	1708.4908	0	253.17
23	Optimize d	196.39025	- 13.06561 5	662.10037	1679.6176	0	254.71
24	Optimize d	197.5636	- 12.43269 5	623.00038	1600.6438	0	256.43
25	Optimize d	198.67335	-11.81952	585.31315	1533.5564	0	258.06
26	Optimize d	199.5	- 11.36277 5	557.05374	1486.8362	0	259.27
27	Optimize d	200.25	- 10.94837 5	511.88051	1448.0436	0	259.84
28	Optimize d	200.75	-10.67211	490.5062	1422.6956	0	259.53
29	Optimize d	201.00745	- 10.52985 5	481.51479	1541.2647	0	259.37
30	Optimize d	201.7994	- 9.877973 5	440.41302	1409.4101	0	258.87
31	Optimize d	203.36835	- 8.582460	358.69013	1288.0643	0	257.88

			5				
32	Optimize d	204.8213	-7.382712	282.94444	1176.3831	0	260
33	Optimize d	206.24925	-6.153505	205.54283	1050.6123	0	260
34	Optimize d	207.7682	-4.799075	120.14158	929.09485	0	260
35	Optimize d	208.82195	- 3.847602 5	60.183479	835.25739	0	260
36	Optimize d	209.2081	-3.487686	37.508696	532.17146	0	784.85
37	Optimize d	210.10505	- 2.651712 5	-15.144679	426.26641	0	778.5
38	Optimize d	211.71515	- 1.151083 5	-109.68795	199.27114	0	767.11

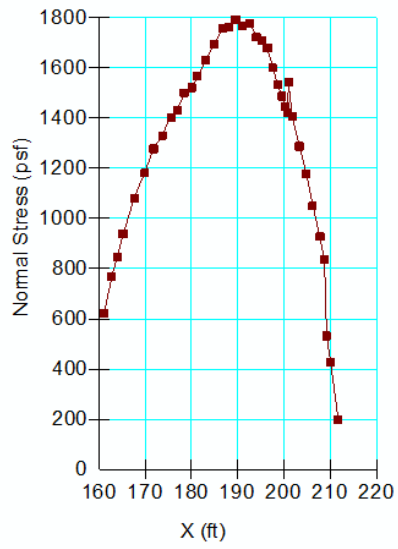
Slices of Slip Surface: 10680

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona l Strength (psf)	Cohesiv e Strength (psf)
1	10680	159.00265	-9.160685	502.84901	673.21778	0	220
2	10680	160.66755	- 10.22873 5	557.58263	780.74922	0	220
3	10680	162.70785	- 11.37136 5	616.26536	918.65121	0	220
4	10680	164.79415	-12.40908	671.42153	1042.7757	0	220
5	10680	166.551	- 13.15851 5	711.55162	1131.1846	0	220
6	10680	168.30785	- 13.81055 5	746.86671	1209.5613	0	220
7	10680	170.0647	-14.37023	777.30637	1278.5952	0	220

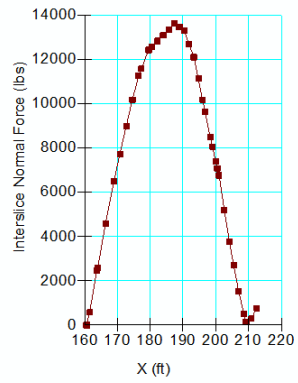
8	10680	171.82155	-14.84158	802.70314	1338.5759	0	220
9	10680	173.46665	-15.2082	821.86103	1343.0318	0	221.12
10	10680	175	- 15.48223 5	835.38653	1385.9983	0	223.37
11	10680	176.53335	- 15.69459 5	845.49002	1423.1822	0	225.62
12	10680	178.083	- 15.84725 5	852.27038	1470.8476	0	227.89
13	10680	179.649	-15.93963	855.66779	1515.8911	0	230.18
14	10680	181.2969	- 15.96806 5	855.19398	1562.2191	0	232.6
15	10680	183.0267	-15.92587	850.47184	1609.1225	0	235.13
16	10680	184.75645	- 15.80780 5	841.19834	1648.7142	0	237.67
17	10680	186.4862	- 15.61318 5	827.25217	1680.9737	0	240.2
18	10680	188.216	- 15.34085 5	808.65632	1705.7852	0	242.73
19	10680	189.9458	-14.98917	785.23773	1722.9899	0	245.27
20	10680	191.67555	- 14.55593 5	756.92154	1732.3284	0	247.8
21	10680	193.4053	- 14.03833 5	723.57006	1733.5544	0	250.34
22	10680	195.1351	-13.43282	685.32326	1726.322	0	252.87
23	10680	197.2485	- 12.55379 5	630.47114	1646.7224	0	255.97
24	10680	198.7485	- 11.87568 5	588.74573	1556.2064	0	258.17

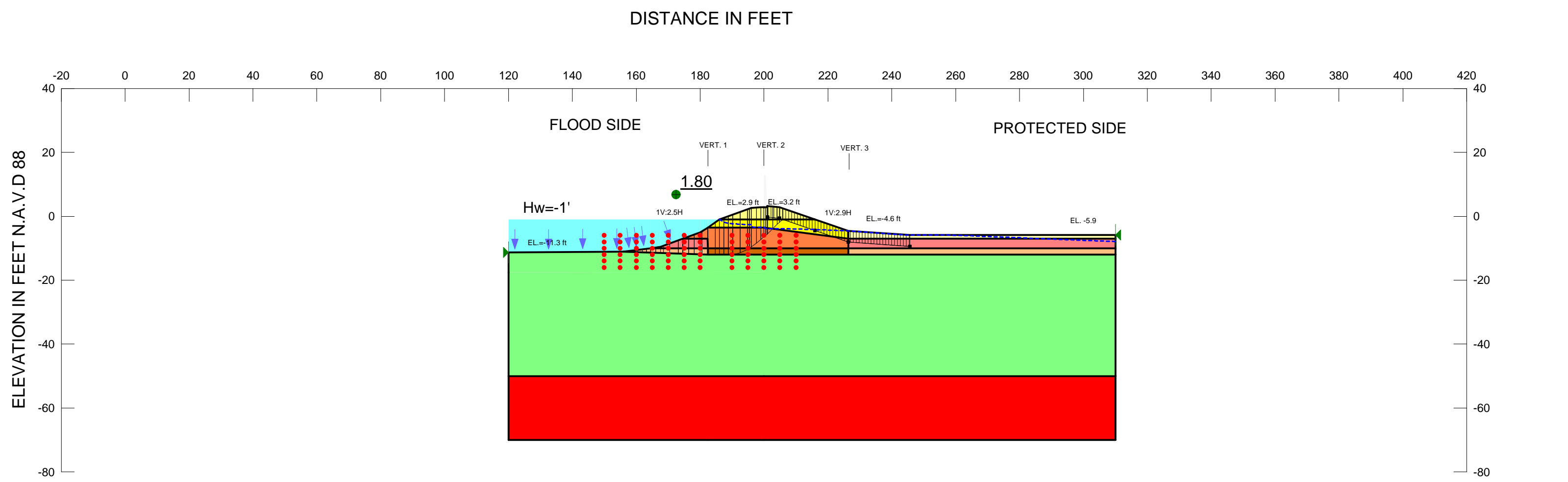
25	10680	199.5	-11.49082	564.91298	1510.0765	0	259.27
26	10680	200.25	- 11.09310 5	520.94219	1465.7746	0	259.84
27	10680	200.75	-10.81404	499.43228	1435.3504	0	259.53
28	10680	202.03605	- 10.03079 8	449.98484	1479.2544	0	258.72
29	10680	204.10815	- 8.654286 5	362.93865	1325.7057	0	257.42
30	10680	206.18315	-7.073732	263.13216	1153.6902	0	260
31	10680	208.26105	- 5.255010 5	148.39212	962.72953	0	260
32	10680	209.6187	- 3.953333 5	66.318032	816.82713	0	260
33	10680	211.2939	- 2.034452 1	-54.36687	208.40235	0	770.09

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL 1, EL. 2.5 TO -1 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 900 psf Phi: 0 °
Name: MARSH, EL. -3.5 TO -10 Model: Spatial Mohr-Coulomb Unit Weight: 92 pcf Cohesion Fn: Marsh Phi: 0 °
Name: BEACH SAND, EL. -12 TO -50 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Beach Sand
Name: BAY SOUND CLAY, EL. -50 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion Spatial Fn: Bay Sound Phi: 0 °
Name: EMBANKMENT FILL 2, -1 to -3.5 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion Fn: FILL Phi: 0 °
Name: FILL, EL -4 to -7 Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 550 psf
Name: MARSH 1,-7 to -10 Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 215 psf
Name: MARSH 2,-10 to -12 Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 200 psf
Name: MARSH, EL. -10 TO -12 Model: Spatial Mohr-Coulomb Unit Weight: 92 pcf Cohesion Fn: Marsh (2) Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 31, STA. 76+90 TO 83+73
FLOOD SIDE STABILITY ANALYSIS,
CASE: Thru Sheetpile BLOCK
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Thru Sheetpile BLOCK

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File Information

Created By: Lijegren, James
Revision Number: 293
Last Edited By: Johnson, Jehu B MVN
Date: 3/27/2013
Time: 2:58:18 PM
File Name: Reach 31.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water El -1 Based on SeepW\
Last Solved Date: 3/27/2013
Last Solved Time: 2:59:06 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Thru Sheetpile BLOCK

Kind: SLOPE/W
Method: Spencer
Settings
PWP Conditions Source: Other GeoStudio Analysis
PWP Other Analysis: Steady-State Seepage [(last)]
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

Weight Fn: Fill 2
Cohesion Fn: FILL
Phi: 0 °
Phi-B: 0 °

Fill, EL -4 to -7

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 550 psf

MARSH 1,-7 to -10

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 215 psf

MARSH 2,-10 to -12

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 200 psf

MARSH, EL. -10 TO -12

Model: Spatial Mohr-Coulomb
Unit Weight: 92 pcf
Cohesion Fn: Marsh (2)
Phi: 0 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (120, -11.3) ft
Right Coordinate: (310, -5.9) ft

Slip Surface Block

Left Grid
Upper Left: (150, -6) ft
Lower Left: (150, -16) ft
Lower Right: (180, -16) ft
X Increments: 6
Y Increments: 5
Starting Angle: 135 °
Ending Angle: 145 °
Angle Increments: 2
Right Grid
Upper Left: (190, -6) ft
Lower Left: (190, -16) ft
Lower Right: (210, -16) ft

FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 5000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, EL. 2.5 TO -1

Model: Spatial Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 900 psf
Phi: 0 °
Phi-B: 0 °

MARSH, EL. -3.5 TO -10

Model: Spatial Mohr-Coulomb
Unit Weight: 92 pcf
Cohesion Fn: Marsh
Phi: 0 °
Phi-B: 0 °

BEACH SAND, EL. -12 TO -50

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

BAY SOUND CLAY, EL. -50 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL 2, -1 to -3.5

Model: Spatial Mohr-Coulomb

X Increments: 4
Y Increments: 5
Starting Angle: 45 °
Ending Angle: 65 °
Angle Increments: 2

Tension Crack Line

	X (ft)	Y (ft)
	201.1	-0.3
	204.8	-0.6
	216	-4.5
	226.4	-8.1
	245.7	-9.4

Cohesion Functions

Marsh

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 6 %
Y-Intercept: 215
Data Points: X (ft), Cohesion (psf)
Data Point: (182.4, 215)
Data Point: (200, 225)
Data Point: (226.4, 215)

FILL

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 550
Data Points: X (ft), Cohesion (psf)
Data Point: (182.4, 550)
Data Point: (200, 600)
Data Point: (226.4, 550)

Marsh (2)

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 6 %

Y-Intercept: 200
Data Points: X (ft), Cohesion (psf)
Data Point: (182.4, 200)
Data Point: (200, 225)
Data Point: (226.4, 200)

Shear/Normal Strength Functions

Beach Sand
Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Fill 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (182.4, 96)
Data Point: (200, 103)
Data Point: (226.4, 96)

Spatial Functions

Bay Sound
Model: Linear Interpolation

Point 2	310	-12
Point 3	120	-50
Point 4	310	-50
Point 5	120	-70
Point 6	310	-70
Point 7	310	-7
Point 8	226.4	-7
Point 9	200	-50
Point 10	226.4	-12
Point 11	245.7	-5.9
Point 12	310	-5.9
Point 13	120	-17.5
Point 14	200	-17.4
Point 15	200	-12
Point 16	120	-11.3
Point 17	155.9	-11.1
Point 18	167.6	-9.6
Point 19	180	-5
Point 20	182.4	-3.5
Point 21	200	-3.5
Point 22	196	2.6
Point 23	200	2.8
Point 24	201	2.8
Point 25	201	3.2
Point 26	196	-3.5
Point 27	196	-12
Point 28	196	-17.2
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	204.8	2.9
Point 32	216	-1
Point 33	200	-1
Point 34	200	2.9
Point 35	186	-1
Point 36	196	-1
Point 37	200	-8.8

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (127.2, -50, 700)
Data Point: (127.2, -70, 900)
Data Point: (200, -50, 1050)
Data Point: (200, -70, 1050)
Data Point: (226.4, -50, 700)
Data Point: (226.4, -70, 900)
Data Point: (310, -50, 700)
Data Point: (310, -70, 900)
Data Point: (182.4, -50, 700)
Data Point: (182.4, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	BAY SOUND CLAY, EL. -50 TO -70	5,3,46,9,49,4,6,50,48,47	3800
Region 2	MARSH 1,-7 to -10	8,7,45,39	250.8
Region 3	Fill, EL -4 to -7	1,11,12,7,8	104.505
Region 4	BEACH SAND, EL. -12 TO -50	3,13,14,15,10,2,4,49,9,46	6784
Region 5	BEACH SAND, EL. -12 TO -50	13,16,17,44,27,15,14	476.645
Region 6	MARSH, EL. -3.5 TO -10	20,26,21,37,51,52,41,40	114.725
Region 7	MARSH, EL. -3.5 TO -10	51,37,21,8,39	125.4
Region 8		23,34,29,30,25,24	7.675
Region 9	EMBANKMENT FILL 1, EL. 2.5 TO -1	23,24,25,31,32,33	41.03
Region 10	EMBANKMENT FILL 1, EL. 2.5 TO -1	23,34,38,22,35,36,33	33.15
Region 11	EMBANKMENT FILL 2, -1 to -3.5	20,35,36,33,21,26	39.5
Region 12	EMBANKMENT FILL 2, -1 to -3.5	21,33,32,1,8	93.48
Region 13	MARSH, EL. -3.5 TO -10	20,19,42,40	11.8163
Region 14	MARSH 1,-7 to -10	40,42,18,43,41	35.76269
Region 15	MARSH 2,-10 to -12	41,43,17,44	36.356
Region 16	MARSH 2,-10 to -12	2,10,39,45	167.2
Region 17	MARSH, EL. -10 TO -12	15,51,39,10	52.8
Region 18	MARSH, EL. -10 TO -12	44,41,52,51,15,27	35.2

Points

	X (ft)	Y (ft)
Point 1	226.4	-4.6

Point 38	199	2.9
Point 39	226.4	-10
Point 40	182.3	-7
Point 41	182.4	-10
Point 42	174.6087	-7
Point 43	164.48	-10
Point 44	182.4	-12
Point 45	310	-10
Point 46	182.4	-50
Point 47	182.4	-70
Point 48	200	-70
Point 49	226.4	-50
Point 50	226.4	-70
Point 51	200	-10
Point 52	196	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.80	(178.396, 1.511)	22.38612	(205.833, 2.54012)	(155.892, -11.1001)
2	1024	1.93	(178.396, 1.511)	23.168	(205.987, 2.48676)	(153.732, -11.1121)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	155.89575	11.10019	630.25369	632.08672	1.0582984	1.9847e-009
2	Optimized	156.69085	11.12714	631.38586	643.87798	7.2123273	5.7862e-008
3	Optimized	158.27255	11.1807	633.64164	656.07312	12.950815	-3.1653e-007

			55				
4	Optimized	159.766	- 11.23148	635.45957	667.65571	18.588452	-6.9495e-007
5	Optimized	161.17125	- 11.279315	636.99577	678.53711	23.983908	-2.745e-007
6	Optimized	162.5254	- 11.32579	636.62148	689.18177	30.345698	-3.4728e-007
7	Optimized	163.82845	- 11.370905	634.78075	699.48981	37.359792	5.4186e-007
8	Optimized	165.26	- 11.420465	630.87829	710.85599	46.17515	3.0668e-006
9	Optimized	166.82	- 11.474475	623.12652	723.41257	57.900176	-3.0742e-007
10	Optimized	168.07655	- 11.51798	617.55135	746.82702	74.637339	2.0534e-006
11	Optimized	169.5474	- 11.56577	612.48985	769.5076	90.654239	2.4935e-006
12	Optimized	171.82645	- 11.64286	606.41606	805.85818	115.14796	3.168e-006
13	Optimized	173.8175	- 11.710655	602.44885	836.61463	135.19567	-9.5929e-006
14	Optimized	174.56625	- 11.734095	601.23105	848.56683	142.79938	-7.5818e-007
15	Optimized	175.50725	-11.7661	599.84239	862.00233	151.35811	-8.0356e-007
16	Optimized	177.30435	- 11.827225	597.67348	887.4731	167.31589	-8.8836e-007

17	Optimized	179.10145	- 11.88835	596.11632	912.9995	182.95259	-9.7128e-007
18	Optimized	180.2868	- 11.928665	595.34586	936.3276	196.8659	-1.3968e-005
19	Optimized	181.4368	- 11.95093	593.7064	954.47093	0	200
20	Optimized	182.35	- 11.964165	592.11783	965.08867	0	200
21	Optimized	183.60805	-11.9824	588.12234	980.70052	0	202.86
22	Optimized	185.40805	- 11.99929	581.92227	1019.8316	0	207.06
23	Optimized	186.70265	- 11.997935	577.90055	1062.4694	0	209.98
24	Optimized	188.10795	- 11.996465	573.65238	1120.5349	0	212.99
25	Optimized	189.51325	- 11.994995	569.92367	1178.5292	0	215.79
26	Optimized	191.37275	- 11.72617	550.31231	1183.3609	0	219.09
27	Optimized	193.67335	- 10.924875	500.31341	1156.6603	0	222.37
28	Optimized	195.0971	- 10.195835	457.17289	1102.664	0	223.85
29	Optimized	195.68855	- 9.7821975	432.70462	1089.3858	0	224.73
30	Optimized	196.79525	-	352.14428	1042.9649	0	225

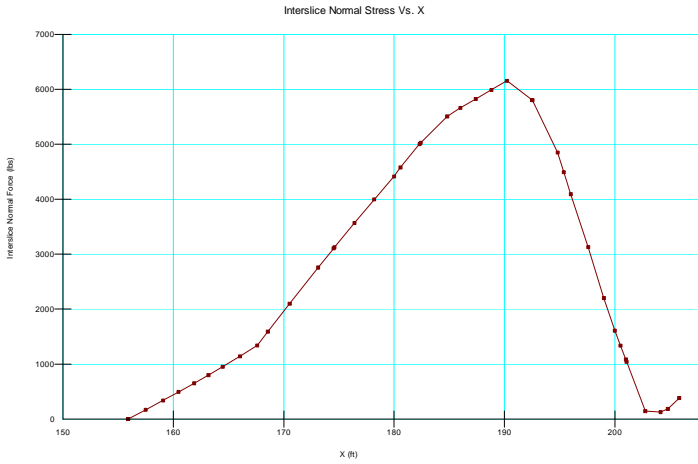
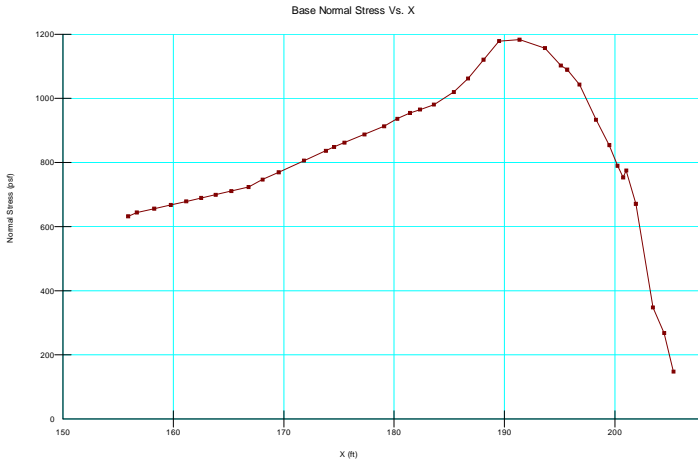
	ed		9.0082225				
31	Optimized	198.29525	-7.85887	280.27633	933.62116	0	225.15
32	Optimized	199.5	- 6.8448335	216.86375	854.18885	0	225.08
33	Optimized	200.25	- 6.213549	163.14122	789.54109	0	224.95
34	Optimized	200.75	- 5.792693	122.45078	753.39969	0	224.85
35	Optimized	201.0361	- 5.5518875	107.29696	774.69399	0	224.79
36	Optimized	201.9156	- 4.6936425	53.324601	670.74597	0	224.59
37	Optimized	203.44885	- 3.1886125	-41.326478	347.71571	0	593.47
38	Optimized	204.46935	- 2.2087515	-103.20791	267.82972	0	591.54
39	Optimized	205.31675	- 1.4329659	-152.34074	147.80892	0	589.93

4	1024	158.474	-12	681.35198	756.29371	43.267625	2.8723e-006
5	1024	160.19	-12	679.54545	762.17949	47.708781	6.9193e-007
6	1024	161.906	-12	677.331	768.12354	52.419098	7.603e-007
7	1024	163.622	-12	671.62005	774.12587	59.181767	6.5698e-007
8	1024	165.26	-12	664.42308	779.87179	66.654348	1.8337e-006
9	1024	166.82	-12	654.35897	785.44872	75.684699	-4.0179e-007
10	1024	168.4761	-12	644.62739	808.02431	94.337256	2.5944e-006
11	1024	170.2283	-12	635.43881	827.82827	111.07611	3.0553e-006
12	1024	171.98045	-12	627.79117	847.63223	126.92529	-6.7378e-007
13	1024	173.7326	-12	620.60011	867.37911	142.47792	-7.5628e-007
14	1024	175.50725	-12	614.32308	886.03862	156.87504	-8.3276e-007
15	1024	177.30435	-12	608.36904	903.56686	170.43254	-9.0467e-007
16	1024	179.10145	-12	603.0271	921.03945	183.60452	-9.7478e-007
17	1024	181.2	-12	597.33333	954.125	205.99376	-1.0935e-006
18	1024	183.3	-12	590.38889	972.94444	0	202.14
19	1024	185.1	-12	582.94444	1012.8889	0	206.35
20	1024	186.9	-12	577.38889	1070.7778	0	210.41
21	1024	188.7	-12	572.33333	1145.3333	0	214.2
22	1024	190.5	-12	567.66667	1219.7778	0	217.61
23	1024	192.3	-12	564.27778	1294.2778	0	220.53
24	1024	194.1	-12	561.72222	1368.7222	0	222.86
25	1024	195.5	-11.5	531.75121	1177.686	0	224.19
26	1024	196.5	-10.5	445.38521	1116.592	0	224.85
27	1024	198	-9	351.6124	1005.0109	0	225.14

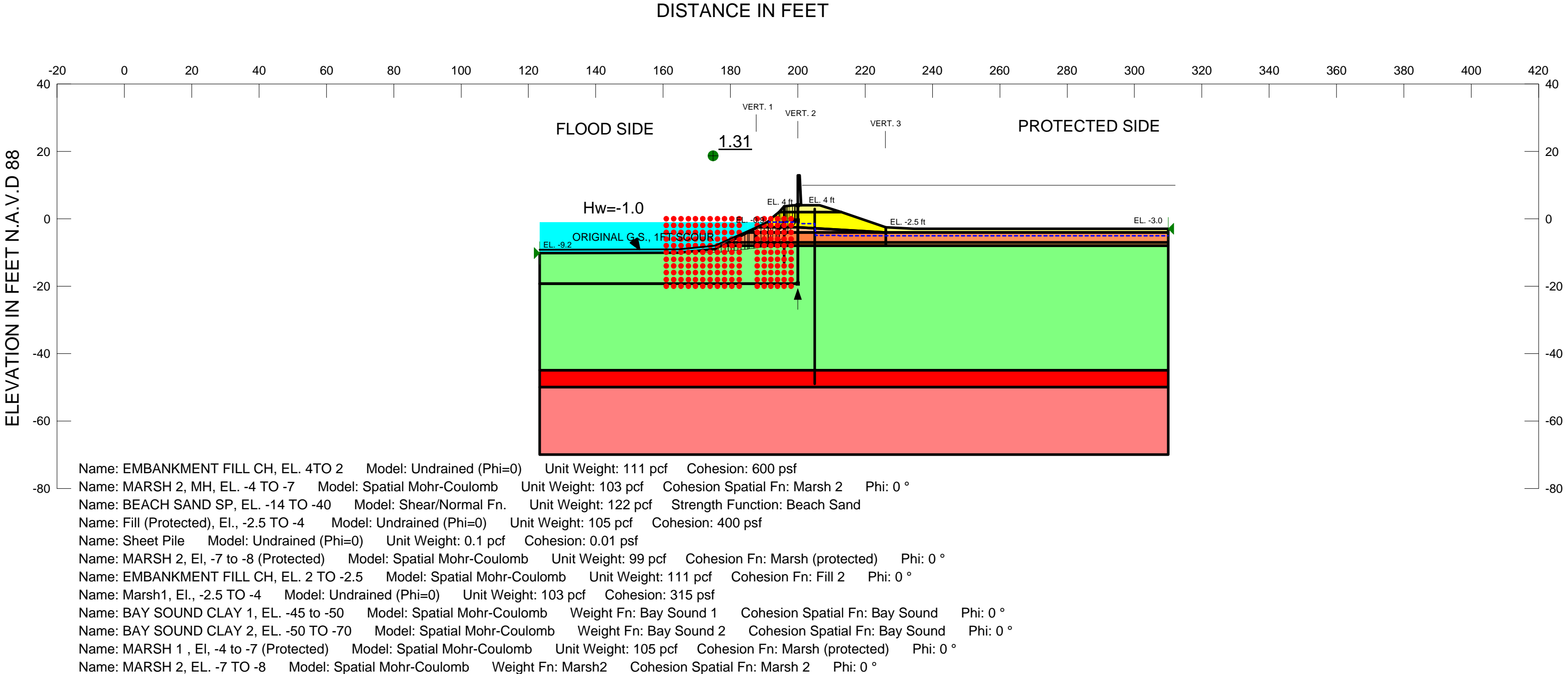
Slices of Slip Surface: 1024

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1024	154.36595	- 11.55604	657.21646	744.16489	50.199701	7.2858e-007
2	1024	155.45	-12	683.23333	741.43333	33.601786	4.8727e-007
3	1024	156.758	-12	682.51748	750.34965	39.16292	2.6009e-006

28	1024	199.5	-7.5	257.81812	888.33797	0	225.08
29	1024	200.25	-6.75	196.85852	814.36072	0	224.95
30	1024	200.75	-6.25	151.10872	771.92017	0	224.85
31	1024	202.04515	4.9548495	69.648446	695.02986	0	224.56
32	1024	203.94515	3.0548495	-50.047976	344.44637	0	592.53
33	1024	205.3934	1.6066225	-141.57568	157.22223	0	589.79



APPENDIX J.6 FLOODSIDE STABILITY ANALYSES WITH EROSION RESULTS



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN HE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL

OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
1 FT. EROSION CASE
CASE: FS Block In Front -1.0
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Block In Front -1.0

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: [Liljegren, James](#)
Revision Number: 442
Last Edited By: [Johnson, Jehu B MVN](#)
Date: 2/11/2013
Time: 10:07:22 AM
File Name: [Reach 27 erosion 1ft.gsz](#)
Directory: [G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet Pile\Water El -1 Based on SeepW\](#)
Last Solved Date: 2/11/2013
Last Solved Time: 10:09:36 AM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

FS Block In Front -1.0
Kind: [SLOPE/W](#)
Parent: [FS Analysis \(Seepage\) -1.0](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Parent Analysis](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Block](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Tension Crack Line](#)
Percentage Wet: [1](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Restrict Block Crossing: [Yes](#)

3/27/2013

EMBANKMENT FILL CH, EL. 2 TO -2.5

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [111 pcf](#)
Cohesion Fn: [Fill 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Marsh1, El., -2.5 TO -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [103 pcf](#)
Cohesion: [315 psf](#)

BAY SOUND CLAY 1, EL. -45 to -50

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 1](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

BAY SOUND CLAY 2, EL. -50 TO -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 2](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

MARSH 1, El, -4 to -7 (Protected)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [105 pcf](#)
Cohesion Fn: [Marsh \(protected\)](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

MARSH 2, EL. -7 TO -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh2](#)
Cohesion Spatial Fn: [Marsh 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Slip Surface Limits

Left Coordinate: [\(123.3, -10.2\) ft](#)
Right Coordinate: [\(310, -3\) ft](#)

Slip Surface Block

Left Grid

3/27/2013

Advanced
Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [111 pcf](#)
Cohesion: [600 psf](#)

MARSH 2, MH, EL. -4 TO -7

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [103 pcf](#)
Cohesion Spatial Fn: [Marsh 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

BEACH SAND SP, EL. -14 TO -40

Model: [Shear/Normal Fn.](#)
Unit Weight: [122 pcf](#)
Strength Function: [Beach Sand](#)
Phi-B: [0 °](#)

Fill (Protected), El., -2.5 TO -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [105 pcf](#)
Cohesion: [400 psf](#)

Sheet Pile

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [0.1 pcf](#)
Cohesion: [0.01 psf](#)

MARSH 2, El, -7 to -8 (Protected)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [99 pcf](#)
Cohesion Fn: [Marsh \(protected\)](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

3/27/2013

Upper Left: [\(161, 0\) ft](#)
Lower Left: [\(161, -20\) ft](#)
Lower Right: [\(182.592, -20\) ft](#)
X Increments: [10](#)
Y Increments: [10](#)
Starting Angle: [135 °](#)
Ending Angle: [155 °](#)
Angle Increments: [3](#)
Right Grid
Upper Left: [\(188, 0\) ft](#)
Lower Left: [\(188, -20\) ft](#)
Lower Right: [\(198, -20\) ft](#)
X Increments: [5](#)
Y Increments: [10](#)
Starting Angle: [45 °](#)
Ending Angle: [55 °](#)
Angle Increments: [2](#)

Reinforcements

Reinforcement 1

Type: [Fabric](#)
Outside Point: [\(200, -19.3\) ft](#)
Inside Point: [\(200, 4\) ft](#)
Slip Surface Intersection: [\(0, 0\) ft](#)
Total Length: [23.3 ft](#)
Reinforcement Direction: [270 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [Yes](#)
Bond Skin Friction: [100000 psf](#)
Bond Safety Factor: [1](#)
Bond Resistance: [100000 lbs/ft](#)
Fabric Capacity: [100000 lbs](#)
Fabric Safety Factor: [1](#)
Fabric Load: [100000 lbs](#)
Load Distribution: [Conc. in 1 slice](#)
Load Orientation: [0](#)
Applied Load: [100000 lbs](#)
Fabric Load Used: [0 lbs](#)
Resisting Force Used: [0 lbs/ft](#)
Available Bond Length: [0 ft](#)
Required Bond Length: [0 ft](#)
Governing Component: [Bond](#)

Tension Crack Line

X (ft)	Y (ft)
194.4	-2.5

3/27/2013

	196	-0.8
	199	-0.5
	200	-0.5

Cohesion Functions

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

3/27/2013

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

3/27/2013

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL, -2.5 TO -4	4,25,15,19,26,49,3	20.175
Region 2	Marsh1, EL, -2.5 TO -4	15,20,18,19	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	27,16,17,22,1,57,58,24,50	756.45
Region 4	BEACH SAND SP, EL. -14 TO -40	22,17,16,13,21,10,12,11	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	49,26,19,41,40,51	37.32
Region 6	Sheet Pile	14,29,30,31	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	19,18,20,32,33,41	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	5,52,14,37,38,36	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	14,31,6,35,37	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	36,46,55,56,45,4,25,15,37,38	37.859002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,15,20,7,35	107.55
Region 12	Fill (Protected), EL, -2.5 TO -4	20,7,42,8,9	86.025
Region 13	MARSH 2, EL, -7 to -8 (Protected)	34,32,21,10	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	11,12,48,47	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	47,48,44,43	3734
Region 16	MARSH 1, EL, -4 to -7 (Protected)	32,20,9,34	251.7
Region 17	MARSH 1, EL, -4 to -7 (Protected)	39,3,49,51	16.08
Region 18	MARSH 2, EL, -7 to -8 (Protected)	24,50,51,39	9.26
Region 19	MARSH 2, EL, -7 TO -8	16,27,50,51,40,41	12.44
Region 20	MARSH 2, EL. -7 TO -8	16,41,33,32,21,13	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-10.2
Point 2	164.5	-9.1
Point 3	185.1	-4

3/27/2013

Point 4	188	-2.5
Point 5	196	3.7
Point 6	206.4	4
Point 7	226.1	-2.5
Point 8	310	-3
Point 9	310	-4
Point 10	310	-8
Point 11	123.3	-45
Point 12	310	-45
Point 13	202	-8
Point 14	200	4
Point 15	200	-2.5
Point 16	200	-8
Point 17	200	-19.3
Point 18	202	-4
Point 19	200	-4
Point 20	226.1	-4
Point 21	226.1	-8
Point 22	123.3	-19.2
Point 23	123.3	-9.2
Point 24	177.3	-8
Point 25	196	-2.5
Point 26	196	-4
Point 27	196	-8
Point 28	196	-13
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	201	4
Point 32	226.1	-7
Point 33	202	-7
Point 34	310	-7
Point 35	213	2
Point 36	194.44	2
Point 37	200	2
Point 38	196	2
Point 39	179.3	-7
Point 40	196	-7
Point 41	200	-7
Point 42	234.6	-3
Point 43	123.3	-70
Point 44	310	-70
Point 45	191.1	-0.9
Point 46	193.4	1.2
Point 47	123.3	-50

3/27/2013

	310	-50
Point 49	187.56	-4
Point 50	187.56	-8
Point 51	187.56	-7
Point 52	199	4
Point 53	205	3
Point 54	205	-49
Point 55	192.52381	0.4
Point 56	191.20952	-0.8
Point 57	164.5	-10.1
Point 58	175.4	-9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.31	(180.768, 1.875)	16.07324	(200, 4)	(167.797, -9.76724)
2	4040	1.51	(180.768, 1.875)	17.271	(199.971, 4)	(165.491, -10)

Slices of Slip Surface: **Optimized**

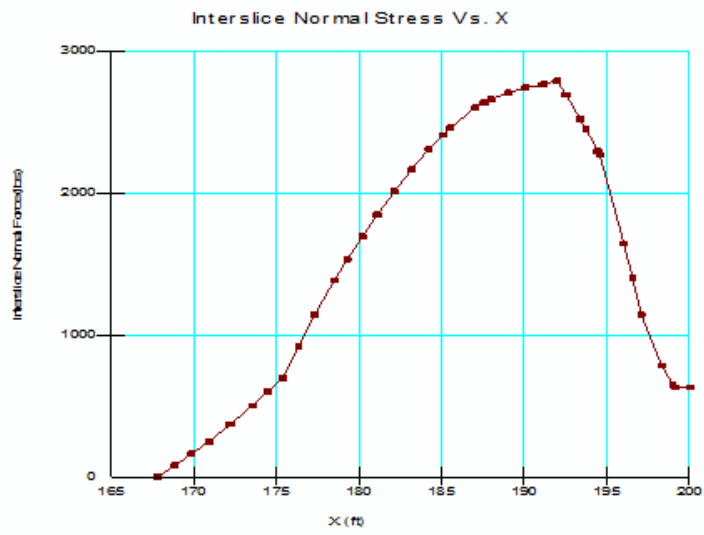
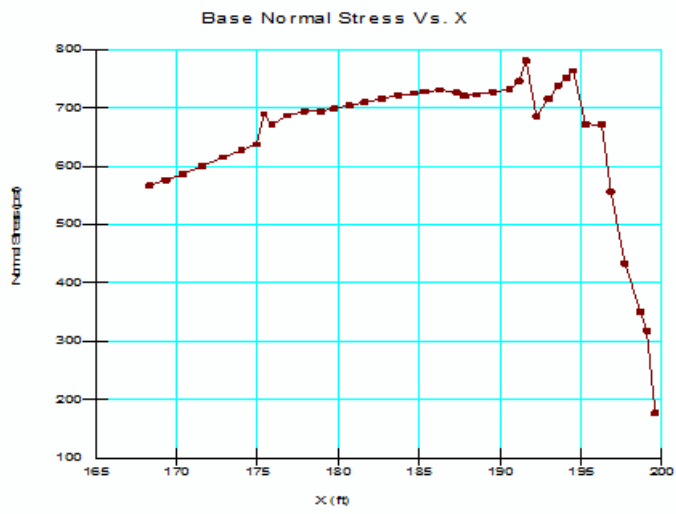
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	168.3155	-9.778799	547.79255	566.66432	10.895619	-2.6624e-007
2	Optimized	169.3517	-9.8019235	549.23977	576.42824	15.697267	-1.798e-007
3	Optimized	170.3879	-9.825048	550.687	586.19216	20.498915	-2.3482e-007
4	Optimized	171.56365	-9.8599825	552.85943	600.43994	27.470622	-3.1457e-007
5	Optimized	172.8789	-9.9067275	555.77717	615.18823	34.300989	-1.2836e-006
6	Optimized	174.0024	-9.946068	558.22933	627.49983	39.993346	2.6573e-006
7	Optimized	174.93415	-9.978004	560.22442	637.78636	44.780409	6.4998e-007
8	Optimized	175.40085	-9.994001	561.22347	689.71275	74.183318	-3.9413e-007
9	Optimized	175.8763	-9.9467835	558.27899	671.23269	65.213852	-3.4654e-007
10	Optimized	176.82545	-9.85229	552.37654	686.85373	77.640439	2.1377e-006
11	Optimized	177.8929	-9.7460165	545.75039	694.39153	85.818003	2.3629e-006
12	Optimized	178.8929	-9.641145	539.19801	694.43148	89.624085	2.4676e-006

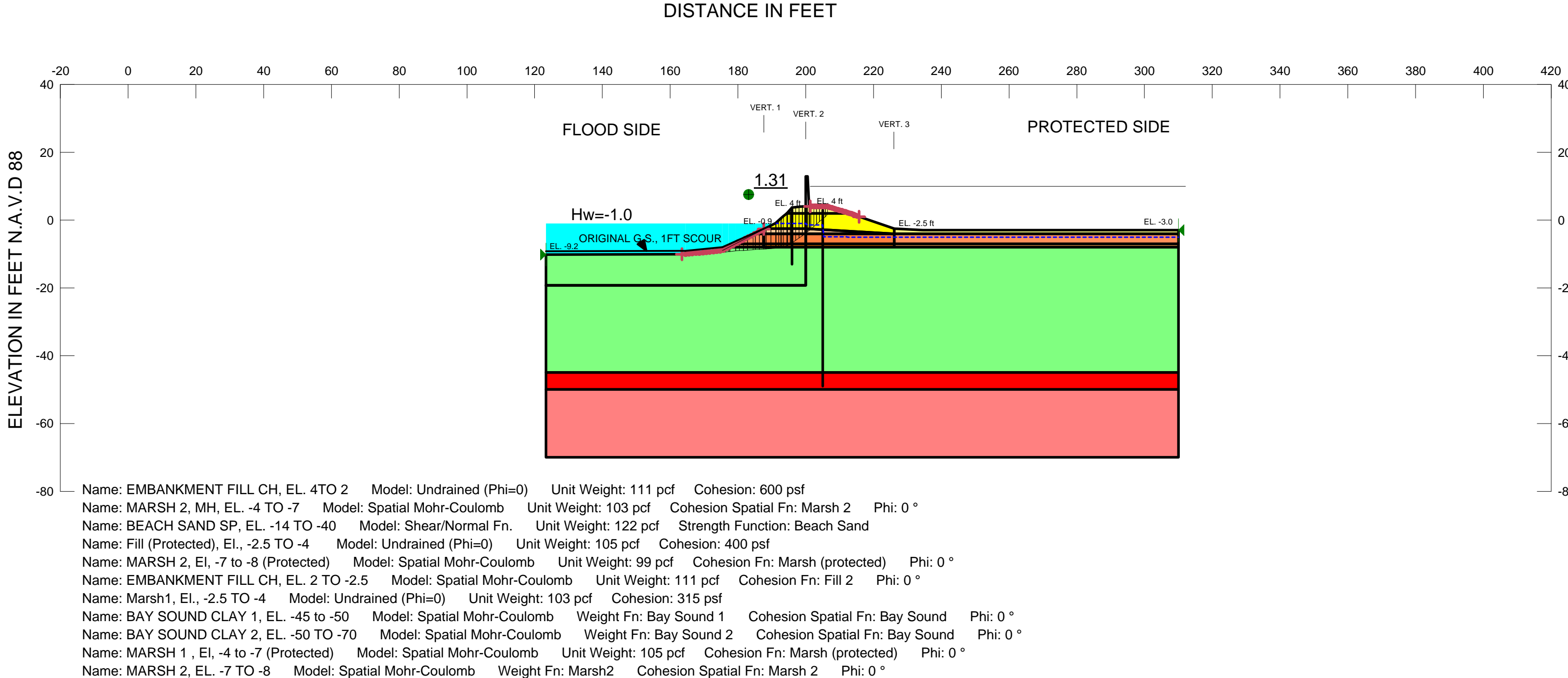
13	Optimized	179.7509	-9.5445225	533.17086	698.84667	95.652972	2.6337e-006
14	Optimized	180.6527	-9.4429675	526.83474	703.67314	102.0977	-5.4251e-007
15	Optimized	181.62355	-9.3352965	520.11468	709.78523	109.50634	-5.8189e-007
16	Optimized	182.6634	-9.22151	513.01195	715.76949	117.06212	3.2232e-006
17	Optimized	183.70325	-9.1077235	505.90922	721.75375	124.6179	-6.6218e-007
18	Optimized	184.6616	-8.9995335	499.16072	725.00362	130.39046	-6.9285e-007
19	Optimized	185.32115	-8.9223585	494.33285	727.92562	134.86484	-7.166e-007
20	Optimized	186.2894	-8.8075	487.17744	730.80936	140.66095	-9.9888e-006
21	Optimized	187.29825	-8.680061	479.2271	726.37257	142.68951	-7.5821e-007
22	Optimized	187.78	-8.6092745	474.81038	720.46787	141.83041	-7.5369e-007
23	Optimized	188.51665	-8.501027	468.05435	722.78659	147.06973	-7.8149e-007
24	Optimized	189.55	-8.3491865	458.57549	727.3058	155.15152	-8.2442e-007
25	Optimized	190.58335	-8.197346	449.09664	731.82501	163.23331	-8.6735e-007
26	Optimized	191.15475	-8.1133795	443.86388	745.46438	174.12913	-9.2527e-007
27	Optimized	191.5856	-8.0500715	439.90814	781.39829	197.15943	-1.0476e-006
28	Optimized	192.24275	-7.8359815	426.55567	685.76931	0	279.01
29	Optimized	192.9619	-7.429592	401.18958	715.52563	0	275.81
30	Optimized	193.56105	-7.0910155	380.04995	737.85689	0	273.15
31	Optimized	194.08105	-6.797171	361.72116	751.34818	0	270.83
32	Optimized	194.4957	-6.562881	347.10337	763.73843	0	268.99
33	Optimized	195.2757	-5.8512925	302.70549	672.30984	0	262.82
34	Optimized	196.27675	-4.9112925	243.8335	671.0887	0	254.62
35	Optimized	196.8199	-4.32571	207.2241	556.11491	0	249.42
36	Optimized	197.6997	-3.25	140.02398	433.13306	0	315
37	Optimized	198.65655	-2.0801	66.651243	349.78745	0	302.4
38	Optimized	199.06295	-1.583215	35.238083	317.81742	0	287.5
39	Optimized	199.5629	-1.003115	-1.4789354	176.25525	0	270.09

Slices of Slip Surface: **4040**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4040	166.0414	-10	561.60253	577.07923	8.9354761	-1.0219e-007
2	4040	167.1424	-10	561.60253	584.09097	12.983708	-3.1684e-007
3	4040	168.2434	-10	561.60253	591.10271	17.03194	-1.9481e-007
4	4040	169.3444	-10	561.60253	598.11446	21.080173	-2.4111e-007
5	4040	170.44545	-10	561.60253	605.13528	25.133649	-2.8742e-007
6	4040	171.5465	-10	561.60253	612.14703	29.181881	-3.3373e-007
7	4040	172.6475	-10	561.60253	619.15877	33.230113	4.8163e-007
8	4040	173.7485	-10	561.60253	626.17052	37.278345	5.4032e-007
9	4040	174.8495	-10	561.60253	633.18226	41.326577	5.9901e-007
10	4040	175.875	-10	561.6	695.92632	77.553335	2.1321e-006
11	4040	176.825	-10	561.6	724.68421	94.156713	2.5886e-006
12	4040	177.8	-10	561.6	744.88	105.81676	2.9092e-006
13	4040	178.8	-10	561.6	761.37	115.33726	-6.1198e-007
14	4040	179.88	-10	561.59483	782.75862	127.68898	3.5105e-006
15	4040	181.04	-10	561.59483	806.31034	141.28657	-7.4964e-007
16	4040	182.2	-10	561.59483	829.86207	154.88416	-8.2179e-007
17	4040	183.36	-10	561.58621	853.41379	168.48674	-8.9393e-007
18	4040	184.52	-10	561.58621	876.98276	182.09428	-9.6608e-007
19	4040	185.715	-10	561.58537	900.56911	195.71235	-1.0383e-006
20	4040	186.945	-10	561.58537	924.14634	209.32468	-1.1106e-006
21	4040	187.78	-10	561.59091	933.72727	214.85303	-1.14e-006
22	4040	188.51665	-10	561.5905	950.39063	224.47386	-1.191e-006
23	4040	189.55	-10	561.58083	975.19386	238.7996	-1.2669e-006
24	4040	190.58335	-10	561.58083	999.87129	253.04712	-1.3427e-006
25	4040	191.15475	-10	561.58692	1025.7487	267.98394	1.6157e-005
26	4040	191.60475	-10	561.58284	1075.2201	296.54862	-5.9931e-005

27	4040	192.2619	-9.687874	542.11314	788.28946	142.12997	-1.0083e-005
28	4040	192.9619	-8.8536465	490.04849	757.01888	154.13542	-8.1835e-007
29	4040	193.5391	-8.1657725	447.1337	729.91942	163.26641	-8.6673e-007
30	4040	194.0591	-7.5460605	408.45394	650.9376	0	278.3
31	4040	194.47865	-7.0460605	377.25447	642.51424	0	273.8
32	4040	195.25865	-6.116493	319.25201	645.90863	0	265.45
33	4040	196.5173	-4.616493	225.39247	605.18854	0	251.97
34	4040	197.6639	-3.25	140.02271	467.67012	0	315
35	4040	198.6466	-2.0788625	66.57408	382.67886	0	302.37
36	4040	199.4857	-1.0788625	3.3210437	208.80671	0	272.37





**US Army Corps
of Engineers®**
New Orleans District
LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
1 FT. EROSION CASE
CASE: FS Entry/Exit Thru -1.0
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

FS Entry/Exit Thru -1.0

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File Information

Created By: Lijegren, James
Revision Number: 439
Last Edited By: Johnson, Jehu B MVN
Date: 2/8/2013
Time: 10:29:15 AM
File Name: Reach 27 erosion 1ft.gsz
Directory: G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/8/2013
Last Solved Time: 11:11:30 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Entry/Exit Thru -1.0
Kind: SLOPE/W
Parent: FS Analysis (Seepage) -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

3/27/2013

Marsh1, El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf

BAY SOUND CLAY 1, EL. -45 to -50
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 1 , El, -4 to -7 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -7 TO -8
Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (163.50242, -10.10242) ft
Left-Zone Right Coordinate: (187.67418, -2.66853) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (201.3, 4) ft
Right-Zone Right Coordinate: (215.8, 1.03817) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (123.3, -10.2) ft
Right Coordinate: (310, -3) ft

3/27/2013

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4 TO 2
Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf

MARSH 2, MH, EL. -4 TO -7
Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -40
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

Fill (Protected), El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf

MARSH 2, El, -7 to -8 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL CH, EL. 2 TO -2.5
Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

3/27/2013

Cohesion Functions

Fill 2
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand
Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

3/27/2013

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL, -2.5 TO -4	4,25,15,19,26,49,3	20.175
Region 2	Marsh1, EL, -2.5 TO -4	15,20,18,19	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	27,16,17,22,1,57,58,24,50	756.45
Region 4	BEACH SAND SP, EL. -14 TO -40	22,17,16,13,21,10,12,11	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	49,26,19,41,40,51	37.32
Region 6		14,29,30,31	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	19,18,20,32,33,41	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	5,52,14,37,38,36	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	14,31,6,35,37	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	36,46,55,56,45,4,25,15,37,38	37.859002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,15,20,7,35	107.55
Region 12	Fill (Protected), EL, -2.5 TO -4	20,7,42,8,9	86.025
Region 13	MARSH 2, EL, -7 to -8 (Protected)	34,32,21,10	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	11,12,48,47	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	47,48,44,43	3734
Region 16	MARSH 1, EL, -4 to -7 (Protected)	32,20,9,34	251.7
Region 17	MARSH 1, EL, -4 to -7 (Protected)	39,3,49,51	16.08
Region 18	MARSH 2, EL, -7 to -8 (Protected)	24,50,51,39	9.26
Region 19	MARSH 2, EL. -7 TO -8	16,27,50,51,40,41	12.44
Region 20	MARSH 2, EL. -7 TO -8	16,41,33,32,21,13	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-10.2
Point 2	164.5	-9.1
Point 3	185.1	-4
Point 4	188	-2.5
Point 5	196	3.7
Point 6	206.4	4
Point 7	226.1	-2.5

Point 8	310	-3
Point 9	310	-4
Point 10	310	-8
Point 11	123.3	-45
Point 12	310	-45
Point 13	202	-8
Point 14	200	4
Point 15	200	-2.5
Point 16	200	-8
Point 17	200	-19.3
Point 18	202	-4
Point 19	200	-4
Point 20	226.1	-4
Point 21	226.1	-8
Point 22	123.3	-19.2
Point 23	123.3	-9.2
Point 24	177.3	-8
Point 25	196	-2.5
Point 26	196	-4
Point 27	196	-8
Point 28	196	-13
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	201	4
Point 32	226.1	-7
Point 33	202	-7
Point 34	310	-7
Point 35	213	2
Point 36	194.44	2
Point 37	200	2
Point 38	196	2
Point 39	179.3	-7
Point 40	196	-7
Point 41	200	-7
Point 42	234.6	-3
Point 43	123.3	-70
Point 44	310	-70
Point 45	191.1	-0.9
Point 46	193.4	1.2
Point 47	123.3	-50
Point 48	310	-50
Point 49	187.56	-4
Point 50	187.56	-8
Point 51	187.56	-7

	199	4
Point 53	205	3
Point 54	205	-49
Point 55	192.52381	0.4
Point 56	191.20952	-0.8
Point 57	164.5	-10.1
Point 58	175.4	-9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.31	(181.982, 21.624)	17.82384	(206.4, 4)	(172.585, -9.28412)
2	7734	1.35	(181.982, 21.624)	31.518	(206.646, 3.92555)	(174.786, -9.06192)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	173.28845	-9.3202795	519.18366	538.55142	11.181981	-2.7287e-007
2	Optimized	174.69615	-9.3925905	523.69571	557.03947	19.25103	-2.2021e-007
3	Optimized	175.406	-9.429053	525.97036	599.89462	42.680195	6.1874e-007
4	Optimized	175.884	-9.390691	523.57381	593.2647	40.236055	5.8306e-007
5	Optimized	176.828	-9.3133535	518.74897	611.51883	53.560705	7.7622e-007
6	Optimized	177.46025	-9.2615575	515.52836	619.98995	60.310927	6.6913e-007
7	Optimized	178.46025	-9.176217	510.1921	625.31218	66.464612	1.8273e-006
8	Optimized	179.88385	-9.053797	502.54734	636.6248	77.409663	-4.1066e-007
9	Optimized	181.05665	-8.9639375	496.94329	652.0533	89.552804	-4.7513e-007
10	Optimized	182.2345	-8.8846325	491.9963	666.03022	100.47853	2.7623e-006
11	Optimized	183.6338	-8.78219	485.59713	679.72895	112.08206	-5.9461e-007
12	Optimized	184.7721	-8.699914	480.46561	696.00158	124.43975	3.421e-006
13	Optimized	185.715	-8.6438815	476.96341	707.51601	133.10961	-9.4371e-006
14	Optimized	186.945	-8.570788	472.40235	722.0838	144.15366	-1.022e-005
15	Optimized	187.78	-	469.30846	725.87858	148.13082	-7.8588e-

			8.5211675				007
16	Optimized	188.16345	-8.498382	467.87683	731.22553	152.04444	-8.0659e-007
17	Optimized	189.02015	-8.447353	464.69839	745.19629	161.94554	-1.1482e-005
18	Optimized	190.4067	-8.3647185	459.54371	767.87398	178.01457	-9.4448e-007
19	Optimized	191.15475	-8.3201375	456.75906	791.45563	193.23716	-1.0252e-006
20	Optimized	191.6074	-8.293162	455.08378	835.49107	219.62825	-1.1652e-006
21	Optimized	192.26455	-8.189561	448.60884	819.82939	214.32428	-1.1368e-006
22	Optimized	192.70175	-8.054836	440.21081	844.3885	233.3521	-1.2377e-006
23	Optimized	193.13985	-7.919843	431.79021	867.18066	0	280.93
24	Optimized	193.92	-7.6794555	416.77808	912.0857	0	279.46
25	Optimized	194.5634	-7.4812025	404.4292	949.96718	0	278.26
26	Optimized	195.04925	-7.22159	388.20981	883.57895	0	276.25
27	Optimized	195.70585	-6.820182	363.16324	919.98937	0	273.02
28	Optimized	196.5111	-6.327897	332.30924	912.58802	0	269.07
29	Optimized	197.51665	-5.657817	290.44848	828.31936	0	263.58
30	Optimized	198.50555	-4.942591	245.75905	773.86283	0	257.62
31	Optimized	199.41065	-4.287964	204.86042	719.89716	0	252.17
32	Optimized	199.91065	-3.917638	181.716	630.98538	0	315
33	Optimized	200.25	-3.639189	159.28124	605.41405	0	315
34	Optimized	200.75	-3.228915	132.09582	567.7815	0	315
35	Optimized	201.1103	-2.933259	113.2452	540.68278	0	315
36	Optimized	201.3717	-2.715129	99.33589	513.9092	0	315
37	Optimized	201.9379	-2.236939	64.464148	471.2714	0	307.11
38	Optimized	202.7789	-1.527995	10.106445	411.98293	0	285.84
39	Optimized	203.6307	-0.811265	-45.696834	351.17	0	264.34
40	Optimized	204.50495	-0.0810025	-103.447	291.62064	0	242.43
41	Optimized	205.4017	0.6627925	-303.09663	228.24089	0	220.12
42	Optimized	206.12505	1.383486	-341.52811	66.272529	0	198.5

Slices of Slip Surface: 7734

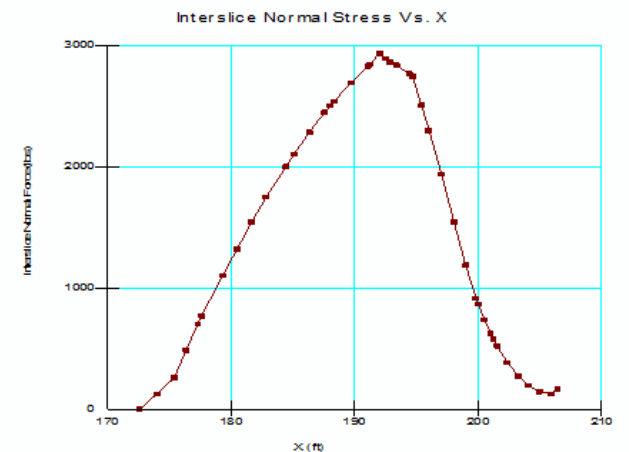
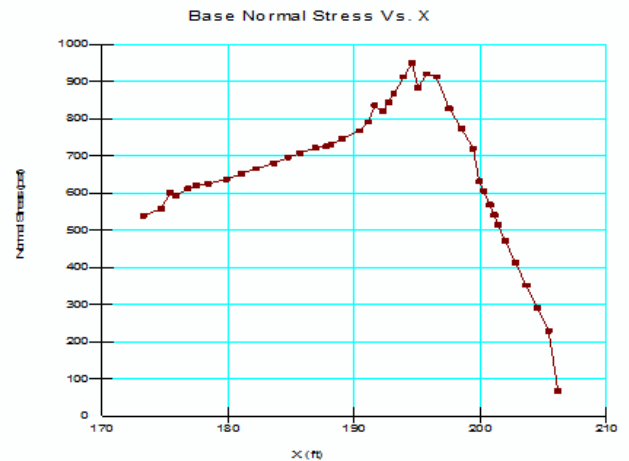
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)

3/27/2013

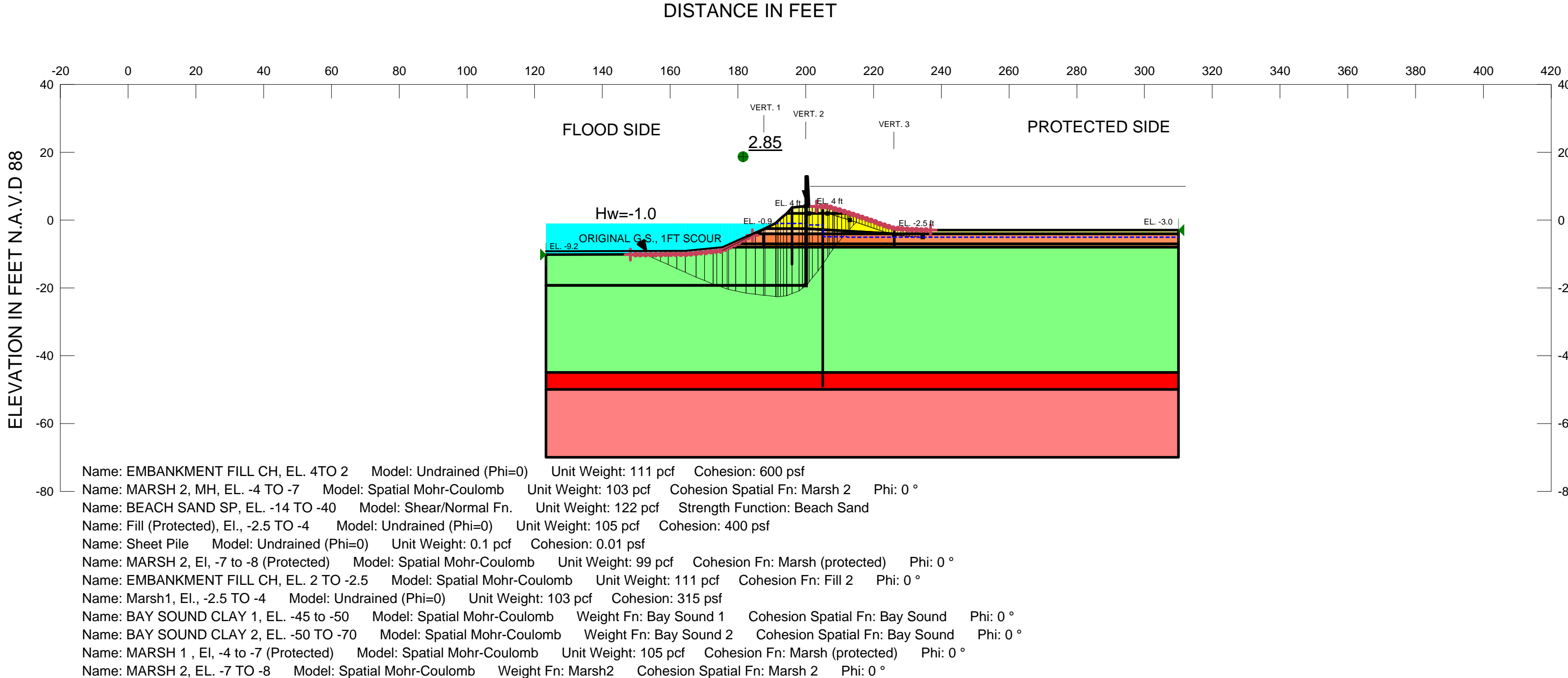
1	7734	175.0932	-9.130644	507.34926	539.69672	18.67581	-2.1371e-007
2	7734	175.875	-9.293194	517.4952	609.79589	53.289828	7.727e-007
3	7734	176.825	-9.465815	528.26565	661.03042	76.651773	-4.0682e-007
4	7734	177.8	-9.611553	537.35465	698.75432	93.184143	2.5622e-006
5	7734	178.8	-9.7292445	544.70187	726.73675	105.09789	2.8898e-006
6	7734	179.88	-9.818767	550.28858	754.41041	117.84979	3.2402e-006
7	7734	181.04	-9.8748905	553.78671	779.17725	130.12929	-9.2266e-006
8	7734	182.2	-9.8882275	554.61592	797.6704	140.32757	-7.4453e-007
9	7734	183.36	-9.8588315	552.78091	810.12926	148.58014	-7.8832e-007
10	7734	184.52	-9.786583	548.27373	816.75231	155.00618	-8.2243e-007
11	7734	185.715	-9.66635	540.76702	816.97104	159.46647	-8.4596e-007
12	7734	186.945	-9.494897	530.06558	810.48923	161.90267	-8.5896e-007
13	7734	187.78	-9.35564	521.37925	797.62827	159.49245	-8.462e-007
14	7734	188.51665	-9.204951	511.97017	790.2171	160.64594	-8.5232e-007
15	7734	189.55	-8.9676185	497.16107	777.88863	162.07813	-8.5994e-007
16	7734	190.58335	-8.6932165	480.04126	761.16546	162.30713	-8.612e-007
17	7734	191.15475	-8.5299745	469.85723	760.40924	167.75028	-8.901e-007
18	7734	191.86665	-8.2962165	455.2666	793.04645	195.01728	-1.0349e-006
19	7734	192.63395	-8.039558	439.26386	826.36967	223.49565	-1.186e-006
20	7734	193.07205	-7.8767205	429.09659	838.127	0	280.41
21	7734	193.92	-7.540587	408.11351	870.42027	0	278.07
22	7734	194.8078	-7.1638665	384.61113	908.39902	0	275.38
23	7734	195.5878	-6.802709	362.07167	953.2993	0	272.71
24	7734	196.5	-6.3458865	333.43747	949.86367	0	269.24
25	7734	197.5	-5.803461	299.54838	895.50316	0	265.02
26	7734	198.5	-5.212815	262.64603	836.65888	0	260.32
27	7734	199.5	-4.570679	222.51537	768.06831	0	255.1
28	7734	200.16725	-4.1181475	191.22639	717.04096	0	251.09
29	7734	200.41725	-3.94032	177.47837	670.91598	0	315

3/27/2013

30	7734	200.75	-3.695325	161.82836	642.12377	0	315
31	7734	201.56005	-3.065926	121.66781	568.76484	0	315
32	7734	202.65505	-2.1567575	57.746157	465.3492	0	304.7
33	7734	203.725	-1.1816	-17.729033	363.32681	0	275.45
34	7734	204.795	-0.1099647	-102.07463	256.39207	0	243.3
35	7734	205.865	1.0733508	325.12416	144.6405	0	207.8
36	7734	206.52285	1.847552	366.70065	20.305547	0	184.57



3/27/2013



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
1 FT. EROSION CASE
CASE: FS Entry/Exit Around -1.0
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

FS Entry/Exit Around -1.0

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File Information

Created By: Lijegren, James
Revision Number: 441
Last Edited By: Johnson, Jehu B MVN
Date: 2/11/2013
Time: 9:55:11 AM
File Name: Reach 27 erosion 1ft.gsz
Directory: G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/11/2013
Last Solved Time: 10:02:46 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Entry/Exit Around -1.0
Kind: SLOPE/W
Parent: FS Analysis (Seepage) -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4 TO 2

Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf

MARSH 2, MH, EL. -4 TO -7

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

Fill (Protected), EL., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

MARSH 2, El, -7 to -8 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL CH, EL. 2 TO -2.5

3/27/2013

3/27/2013

Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

Marsh1, EL., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf

BAY SOUND CLAY 1, EL. -45 to -50

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 1 , El, -4 to -7 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -7 TO -8

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (148.30242, -10.13931) ft
Left-Zone Right Coordinate: (184.23913, -4.44528) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (203.2, 4) ft
Right-Zone Right Coordinate: (236.9, -3) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (123.3, -10.2) ft
Right Coordinate: (310, -3) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 4) ft
Inside Point: (200, -19.3) ft
Slip Surface Intersection: (200, -19.301) ft
Total Length: 23.3 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs
Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
201	2
206.4	2
213	0
226.1	-4.5
234.6	-5

Cohesion Functions

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

3/27/2013

3/27/2013

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107

Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL., -2.5 TO -4	4,25,15,19,26,49,3	20.175

Region 2	Marsh1, EL., -2.5 TO -4	15,20,18,19	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	27,16,17,22,1,57,58,24,50	756.45
Region 4	BEACH SAND SP, EL. -14 TO -40	22,17,16,13,21,10,12,11	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	49,26,19,41,40,51	37.32
Region 6	Sheet Pile	14,29,30,31	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	19,18,20,32,33,41	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	5,52,14,37,38,36	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	14,31,6,35,37	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	36,46,55,56,45,4,25,15,37,38	37.859002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,15,20,7,35	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	20,7,42,8,9	86.025
Region 13	MARSH 2, EL. -7 to -8 (Protected)	34,32,21,10	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	11,12,48,47	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	47,48,44,43	3734
Region 16	MARSH 1, EL. -4 to -7 (Protected)	32,20,9,34	251.7
Region 17	MARSH 1, EL. -4 to -7 (Protected)	39,3,49,51	16.08
Region 18	MARSH 2, EL. -7 to -8 (Protected)	24,50,51,39	9.26
Region 19	MARSH 2, EL. -7 TO -8	16,27,50,51,40,41	12.44
Region 20	MARSH 2, EL. -7 TO -8	16,41,33,32,21,13	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-10.2
Point 2	164.5	-9.1
Point 3	185.1	-4
Point 4	188	-2.5
Point 5	196	3.7
Point 6	206.4	4
Point 7	226.1	-2.5
Point 8	310	-3
Point 9	310	-4
Point 10	310	-8
Point 11	123.3	-45
Point 12	310	-45
Point 13	202	-8
Point 14	200	4
Point 15	200	-2.5
Point 16	200	-8
Point 17	200	-19.3
Point 18	202	-4
Point 19	200	-4
Point 20	226.1	-4
Point 21	226.1	-8

Point 22	123.3	-19.2
Point 23	123.3	-9.2
Point 24	177.3	-8
Point 25	196	-2.5
Point 26	196	-4
Point 27	196	-8
Point 28	196	-13
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	201	4
Point 32	226.1	-7
Point 33	202	-7
Point 34	310	-7
Point 35	213	2
Point 36	194.44	2
Point 37	200	2
Point 38	196	2
Point 39	179.3	-7
Point 40	196	-7
Point 41	200	-7
Point 42	234.6	-3
Point 43	123.3	-70
Point 44	310	-70
Point 45	191.1	-0.9
Point 46	193.4	1.2
Point 47	123.3	-50
Point 48	310	-50
Point 49	187.56	-4
Point 50	187.56	-8
Point 51	187.56	-7
Point 52	199	4
Point 53	205	3
Point 54	205	-49
Point 55	192.52381	0.4
Point 56	191.20952	-0.8
Point 57	164.5	-10.1
Point 58	175.4	-9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.85	(185.283, 7.461)	30.41979	(214.953, 1.32895)	(152.688, -10.1287)
2	5664	3.24	(185.283, 7.461)	30.647	(214.842, 1.36719)	(160.173, -10.1105)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	153.80435	-10.635855	601.26458	662.66721	35.45082	-1.3251e-006
2	Optimized	156.03745	-11.650225	664.58349	799.74265	78.034176	-4.143e-007
3	Optimized	158.2705	-12.664595	727.86162	936.81809	120.64107	-6.4044e-007
4	Optimized	160.66525	-13.74595	795.3488	1082.124	165.56971	-8.7889e-007
5	Optimized	163.22175	-14.89429	866.99798	1237.126	213.6935	-1.5159e-005
6	Optimized	166.04435	-16.162175	946.12247	1424.0271	275.91839	-1.9574e-005
7	Optimized	168.86115	-17.36481	1021.1647	1591.5268	329.29876	-6.6585e-005
8	Optimized	171.40605	-18.382645	1084.6842	1744.5063	380.94851	-7.7031e-005
9	Optimized	173.22925	-19.078685	1128.1156	1829.7065	405.0637	-8.1904e-005
10	Optimized	174.59	-19.541015	1156.9228	1899.6235	428.79845	-8.67e-005
11	Optimized	176.1299	-20.064215	1189.6152	2017.7602	478.12974	-3.392e-005
12	Optimized	177.0799	-20.361745	1208.1733	2045.7875	483.5968	-9.7783e-005
13	Optimized	178.3	-20.63633	1225.3033	2105.7325	508.316	-3.6059e-005
14	Optimized	180.84675	-21.209485	1261.0639	2233.2188	561.27387	-0.00011349
15	Optimized	183.74675	-21.716645	1292.718	2317.5203	591.66988	-9.8398e-006
16	Optimized	186.33	-22.02027	1311.6619	2410.6012	634.47287	4.212e-005
17	Optimized	187.78	-22.1907	1322.2842	2455.8223	654.4485	4.3444e-005
18	Optimized	189.55	-22.39874	1335.2603	2525.775	687.34399	-1.1431e-005
19	Optimized	191.15475	-22.587355	1347.0096	2601.4315	724.24085	4.8079e-005
20	Optimized	191.4866	-22.62636	1349.4736	2641.8171	746.13489	4.9534e-005
21	Optimized	192.14375	-22.60596	1348.1404	2585.6514	714.47733	4.7428e-005
22	Optimized	192.9619	-22.49193	1341.0803	2653.223	757.56592	5.0293e-005
23	Optimized	193.89705	-22.36159	1332.9813	2722.753	802.38509	5.327e-005
24	Optimized	194.41705	-22.28354	1328.0738	2643.4532	759.43464	-1.263e-005
25	Optimized	195.22	-21.976855	1308.9305	2696.4878	801.10659	-1.3324e-005
26	Optimized	197.02395	-21.28785	1265.9365	2714.4741	836.31356	5.5522e-005
27	Optimized	198.52395	-20.50764	1217.2253	2460.7988	717.97752	-1.1942e-005
28	Optimized	199.5	-19.70981	1167.4902	2379.19	699.57522	-1.1637e-005

3/27/2013

29	Optimized	200.24275	-19.102655	1129.5856	2314.535	684.13088	4.5424e-005
30	Optimized	200.49275	-18.89496	1116.6226	2146.7319	594.73387	-9.8948e-006
31	Optimized	200.75	-18.565605	1096.0657	2112.951	587.09905	3.8989e-005
32	Optimized	201.5	-17.60529	1036.1635	2014.8992	565.07331	3.41e-005
33	Optimized	202.79385	-15.948635	932.77398	1846.3575	527.45768	-0.0001067
34	Optimized	204.99385	-12.91227	743.28334	1505.5007	440.06641	-3.1233e-005
35	Optimized	206.6698	-10.50481	343.57428	1209.1332	499.73071	-0.0001011
36	Optimized	207.44665	-9.376265	273.15196	1073.1288	461.86684	-3.278e-005
37	Optimized	208.20975	-8.31763	207.09541	986.7855	450.15428	-9.1056e-005
38	Optimized	208.86885	-7.5	156.43405	948.27392	0	279.9
39	Optimized	209.9553	-6.15216	73.214059	795.13424	0	265.8
40	Optimized	211.23345	-4.65216	19.792008	640.18971	0	250.07
41	Optimized	212.1836	-3.6103155	84.621423	491.35754	0	315
42	Optimized	212.7695	-2.96787	-123.9106	410.74545	0	315
43	Optimized	213.56805	-2.0922095	176.64904	298.41257	0	302.77
44	Optimized	214.5448	-1.07018	239.44627	170.7117	0	272.11

Slices of Slip Surface: **5664**

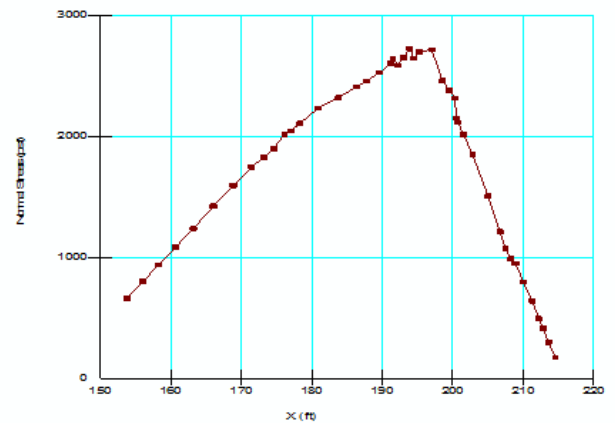
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	5664	161.25505	-11.482465	654.09421	843.98329	109.63251	3.0149e-006
2	5664	163.41835	-13.958555	808.61871	1181.0808	215.04111	-1.5255e-005
3	5664	165.4629	-15.880305	928.51452	1435.9953	292.99418	-2.0785e-005
4	5664	167.3887	-17.39124	1022.8218	1631.576	351.46443	-7.1075e-005
5	5664	169.31445	-18.6729	1102.7872	1792.6496	398.29222	-8.0543e-005
6	5664	171.1311	-19.705995	1167.223	1919.2464	434.18092	-3.0804e-005
7	5664	172.83865	-20.53031	1218.6586	2017.9869	461.49241	-9.3325e-005
8	5664	174.5462	-21.229385	1262.2847	2099.877	483.58415	-9.7792e-005
9	5664	176.35	-21.83853	1300.328	2208.1763	524.14648	-0.000106
10	5664	178.3	-22.362315	1332.9977	2301.4549	559.13897	-0.00011307
11	5664	180.26665	-22.756935	1357.6448	2369.1302	583.98137	3.8774e-005

3/27/2013

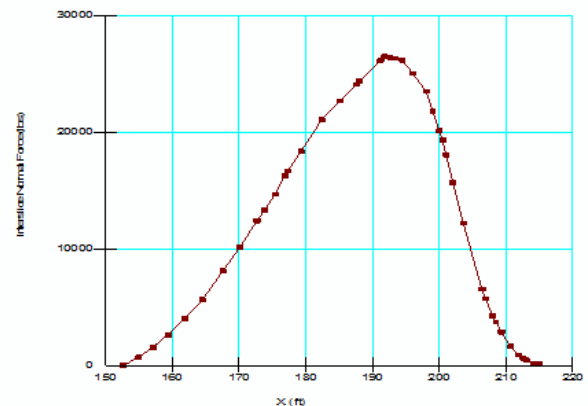
12	5664	182.2	-23.015195	1373.7128	2421.9316	605.18946	-1.0066e-005
13	5664	184.13335	-23.14929	1382.0776	2458.6292	621.54733	-1.0338e-005
14	5664	186.33	-23.14352	1381.7527	2478.7939	633.37703	4.2055e-005
15	5664	187.78	-23.083455	1377.994	2478.3234	635.27548	4.2181e-005
16	5664	188.775	-22.97656	1371.3276	2477.363	638.56986	4.24e-005
17	5664	190.325	-22.758345	1357.684	2470.6859	642.5919	-1.0688e-005
18	5664	191.15475	-22.61835	1348.9898	2474.4774	649.80052	-1.0808e-005
19	5664	191.86665	-22.46308	1339.2801	2517.2342	680.09215	-1.1312e-005
20	5664	192.9619	-22.2051	1323.218	2579.4795	725.30295	-1.2064e-005
21	5664	193.92	-21.93894	1306.6113	2619.865	758.20736	-1.2612e-005
22	5664	195.22	-21.518725	1280.348	2682.94	809.78686	-1.3469e-005
23	5664	196.75	-20.948545	1244.7615	2689.0186	833.84224	-1.387e-005
24	5664	198.25	-20.295445	1204.0261	2605.5018	809.14238	-1.3459e-005
25	5664	199.5	-19.683195	1165.7799	2522.9923	783.58691	5.2024e-005
26	5664	200.25	-19.2814	1140.7355	2465.875	765.06963	-1.2725e-005
27	5664	200.75	-18.995325	1122.8878	2424.6503	751.57294	-1.2501e-005
28	5664	201.5	-18.537285	1094.269	2359.9286	730.72887	-1.2154e-005
29	5664	203.1	-17.43829	1025.7225	2208.9187	683.11862	-1.1362e-005
30	5664	205.3	-15.700525	667.76947	1946.5289	738.29211	4.9017e-005
31	5664	207.29075	-13.829105	551.00698	1674.3696	648.57373	4.306e-005
32	5664	209.07225	-11.808685	424.93458	1368.4328	544.72895	3.2861e-005
33	5664	210.85375	-9.354515	271.79096	1020.4151	432.21834	-8.7396e-005
34	5664	212.02425	-7.5	156.30918	817.60584	0	278.09
35	5664	212.652	-6.3082575	82.455828	672.43147	0	265.81
36	5664	213.3533	-4.8082575	10.677421	491.51735	0	250.41
37	5664	213.84215	-3.651657	82.599534	302.52653	0	315
38	5664	214.40995	-1.9680623	184.99426	83.439261	0	299.04

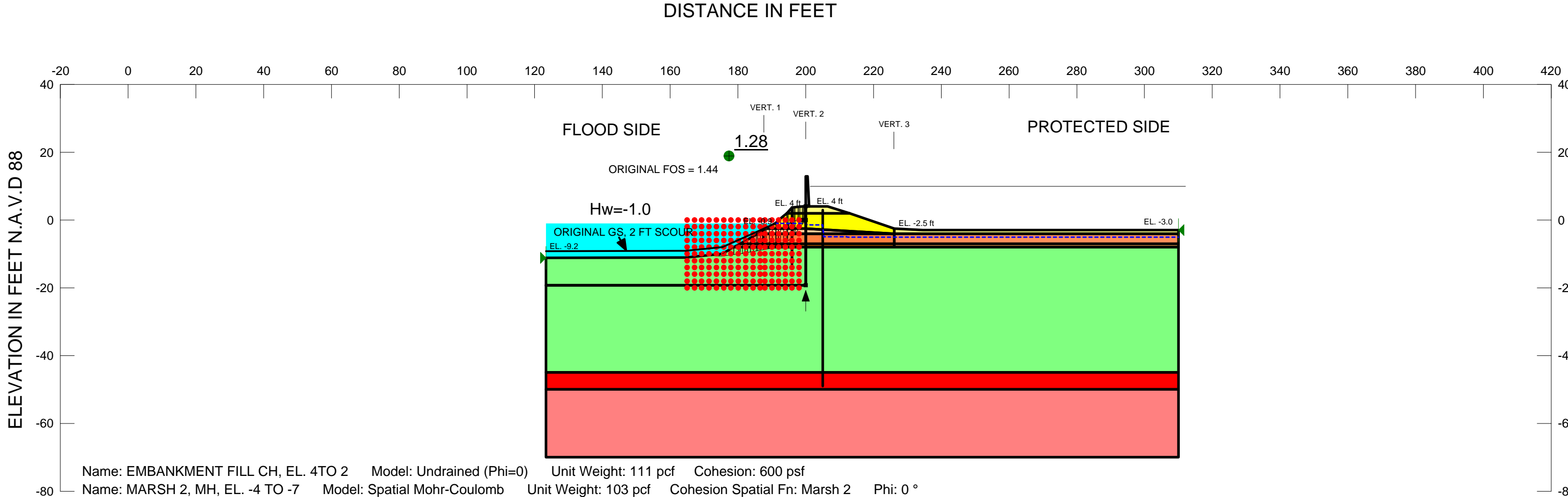
3/27/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X





**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
CASE: FS Block In Front -1.0
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Block In Front -1.0

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File Information

Created By: Lijegren, James
Revision Number: 438
Last Edited By: Johnson, Jehu B MVN
Date: 2/11/2013
Time: 11:03:25 AM
File Name: Reach 27 erosion 2ft.gsz
Directory: G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/11/2013
Last Solved Time: 11:04:22 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Block In Front -1.0
Kind: SLOPE/W
Parent: FS Analysis (Seepage) -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes

3/27/2013

EMBANKMENT FILL CH, EL. 2 TO -2.5

Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

Marsh1, El., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf

BAY SOUND CLAY 1, EL. -45 to -50

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 1, El, -4 to -7 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -7 TO -8

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (123.3, -11.2) ft
Right Coordinate: (310, -3) ft

Slip Surface Block

Left Grid

3/27/2013

Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf

MARSH 2, MH, EL. -4 TO -7

Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

Fill (Protected), El., -2.5 TO -4

Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

MARSH 2, El, -7 to -8 (Protected)

Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

3/27/2013

Upper Left: (165, 0) ft
Lower Left: (165, -20) ft
Lower Right: (186.592, -20) ft
X Increments: 10
Y Increments: 10
Starting Angle: 135 °
Ending Angle: 155 °
Angle Increments: 3
Right Grid
Upper Left: (188, 0) ft
Lower Left: (188, -20) ft
Lower Right: (198, -20) ft
X Increments: 5
Y Increments: 10
Starting Angle: 45 °
Ending Angle: 55 °
Angle Increments: 2

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, -19.3) ft
Inside Point: (200, 4) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 23.3 ft
Reinforcement Direction: 270 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 1000000 lbs
Shear Safety Factor: 1
Shear Load Used: 1000000 lbs
Shear Option: Perp. to Reinf.
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
194.4	-2
196	-0.3
199	0
200	0

Cohesion Functions

3/27/2013

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)

3/27/2013

3/27/2013

Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL., -2.5 TO -4	4,25,15,19,26,49,3	19.425
Region 2	Marsh1, EL., -2.5 TO -4	15,20,18,19	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	27,16,17,22,1,57,58,24,50	701.9
Region 4	BEACH SAND SP, EL. -14 TO -40	22,17,16,13,21,10,12,11	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	49,26,19,41,40,51	37.32
Region 6	Sheet Pile	14,29,30,31	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	19,18,20,32,33,41	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	5,52,14,37,38,36	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	14,31,6,35,37	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	36,46,55,56,45,4,25,15,37,38	37.619002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,15,20,7,35	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	20,7,42,8,9	86.025
Region 13	MARSH 2, EL, -7 to -8 (Protected)	34,32,21,10	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	11,12,48,47	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	47,48,44,43	3734
Region 16	MARSH 1, EL. -4 to -7 (Protected)	32,20,9,34	251.7
Region 17	MARSH 1, EL, -4 to -7 (Protected)	39,3,49,51	13.08
Region 18	MARSH 2, EL, -7 to -8 (Protected)	24,50,51,39	7.86
Region 19	MARSH 2, EL. -7 TO -8	16,27,50,51,40,41	12.44
Region 20	MARSH 2, EL. -7 TO -8	16,41,33,32,21,13	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	185.8	-4
Point 4	188.3	-2.5
Point 5	196	3.7
Point 6	206.4	4
Point 7	226.1	-2.5
Point 8	310	-3
Point 9	310	-4
Point 10	310	-8

3/27/2013

Point 11	123.3	-45
Point 12	310	-45
Point 13	202	-8
Point 14	200	4
Point 15	200	-2.5
Point 16	200	-8
Point 17	200	-19.3
Point 18	202	-4
Point 19	200	-4
Point 20	226.1	-4
Point 21	226.1	-8
Point 22	123.3	-19.2
Point 23	123.3	-9.2
Point 24	178.8	-8
Point 25	196	-2.5
Point 26	196	-4
Point 27	196	-8
Point 28	196	-13
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	201	4
Point 32	226.1	-7
Point 33	202	-7
Point 34	310	-7
Point 35	213	2
Point 36	194.44	2
Point 37	200	2
Point 38	196	2
Point 39	180.6	-7
Point 40	196	-7
Point 41	200	-7
Point 42	234.6	-3
Point 43	123.3	-70
Point 44	310	-70
Point 45	191.1	-0.9
Point 46	193.4	1.2
Point 47	123.3	-50
Point 48	310	-50
Point 49	187.56	-4
Point 50	187.56	-8
Point 51	187.56	-7
Point 52	199	4
Point 53	205	3
Point 54	205	-49

3/27/2013

	192.52381	0.4
Point 56	191.20952	-0.8
Point 57	164.5	-11.1
Point 58	175.4	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.28	(183.641, 2.417)	15.88342	(199.994, 4)	(170.954, -10.4487)
2	4145	1.68	(183.641, 2.417)	14.356	(198.335, 3.93352)	(175.4, -10)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	171.3988	-10.46732	590.75641	613.31963	13.026883	-1.4893e-007
2	Optimized	172.28795	-10.504645	593.09363	624.09559	17.898989	-2.047e-007
3	Optimized	173.1771	-10.54197	595.41962	634.87155	22.77582	-2.6048e-007
4	Optimized	174.06625	-10.579295	597.74561	645.65875	27.662663	-1.0333e-006
5	Optimized	174.9554	-10.616625	600.0716	656.43471	32.541257	-1.2156e-006
6	Optimized	175.4054	-10.635515	601.25245	721.59889	69.482047	1.9099e-006
7	Optimized	175.9102	-10.58738	598.25278	704.16036	61.145772	-3.2435e-007
8	Optimized	176.90895	-10.49066	592.21345	723.97257	76.071164	-4.0352e-007
9	Optimized	178.10415	-10.327895	582.05954	727.61874	84.038643	2.3104e-006
10	Optimized	179.50535	-10.097525	567.67969	730.12971	93.790558	-4.9759e-007
11	Optimized	180.40535	-9.9486175	558.39295	726.09571	96.823233	-5.1364e-007
12	Optimized	180.97385	-9.8524115	552.38237	726.88762	100.75065	-5.3442e-007
13	Optimized	181.72155	-9.725884	544.48328	726.91399	105.32642	-5.5869e-007
14	Optimized	182.48905	-9.59546	536.34481	726.58196	109.83347	-5.826e-007
15	Optimized	183.2764	-9.46114	527.96912	726.4818	114.61135	3.1502e-006
16	Optimized	184.1106	-9.318435	519.05888	726.12756	119.55116	-6.3414e-007

3/27/2013

17	Optimized	184.99165	-9.167345	509.62836	725.91501	124.87316	-6.6237e-007
18	Optimized	185.6161	-9.0621725	503.07004	728.46109	130.12958	-6.9025e-007
19	Optimized	186.24	-8.9616595	496.79889	729.6937	134.46188	-7.1325e-007
20	Optimized	187.12	-8.819889	487.94711	730.14246	139.83155	-7.4172e-007
21	Optimized	187.93	-8.689396	479.79998	724.77641	141.43721	-7.5022e-007
22	Optimized	188.78725	-8.551294	471.1838	726.80053	147.58039	-1.0461e-005
23	Optimized	189.73085	-8.3893195	461.07706	724.38802	152.02265	-1.0776e-005
24	Optimized	190.6436	-8.222359	450.66662	726.06921	159.00376	-8.4346e-007
25	Optimized	191.15475	-8.1288625	444.82926	737.85827	169.18038	-8.9741e-007
26	Optimized	191.53435	-8.059423	440.49529	767.10827	188.5701	-1.0002e-006
27	Optimized	191.8784	-7.996495	436.55759	794.26376	0	280.17
28	Optimized	192.2107	-7.7974005	424.14774	659.94939	0	278.58
29	Optimized	192.9619	-7.3281565	394.86739	687.03228	0	274.8
30	Optimized	193.44365	-7.027251	376.0831	703.67101	0	272.37
31	Optimized	193.96365	-6.702435	355.8206	714.28508	0	269.75
32	Optimized	194.5397	-6.34258	333.36338	729.14602	0	266.84
33	Optimized	195.3197	-5.5991855	286.9751	636.83946	0	260.35
34	Optimized	196.17355	-4.7443005	233.47625	637.64727	0	252.83
35	Optimized	196.57325	-4.28526	204.70035	538.44584	0	248.72
36	Optimized	197.35155	-3.3035	143.36698	419.23238	0	315
37	Optimized	197.94475	-2.5539	96.513159	351.75365	0	315
38	Optimized	198.4929	-1.839162	51.457325	307.4318	0	295.17
39	Optimized	199.21895	-0.893002	8.3616829	247.81278	0	266.79
40	Optimized	199.716	-0.30384	45.661474	106.20517	0	249.12

Slices of Slip Surface: **4145**

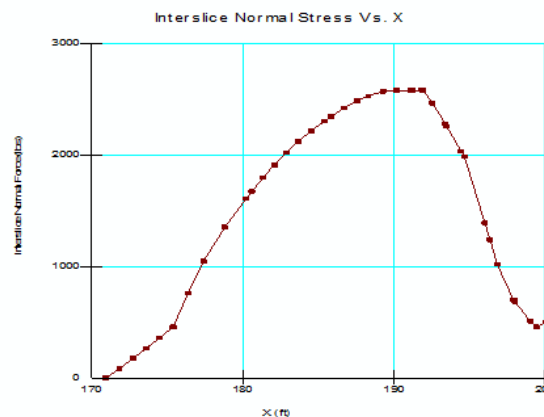
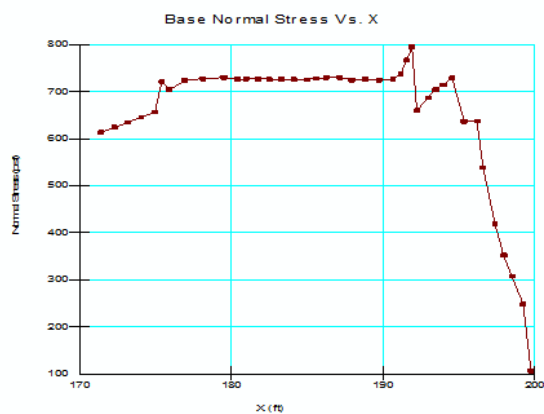
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4145	175.825	-10	561.6	656.49412	54.787144	7.9416e-007

3/27/2013

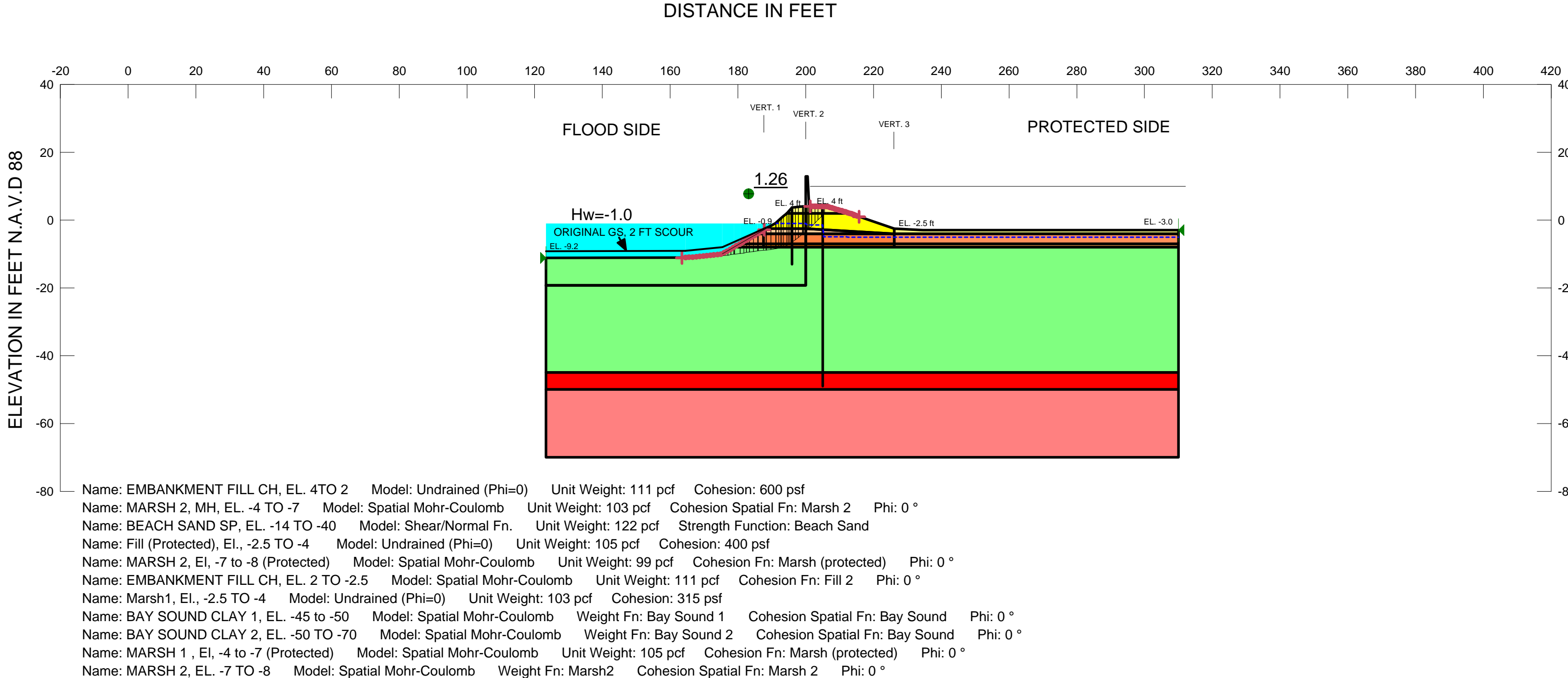
2	4145	176.675	-10	561.6	684.30588	70.844274	-3.7593e-007
3	4145	177.525	-10	561.6	712.11765	86.901404	-4.6113e-007
4	4145	178.375	-10	561.6	739.92941	102.95853	-5.4633e-007
5	4145	179.25	-10	561.6	758.13333	113.46857	3.1198e-006
6	4145	180.15	-10	561.6	773.72222	122.46882	-6.4986e-007
7	4145	180.97145	-10	561.58849	791.48466	132.73061	-7.0429e-007
8	4145	181.7143	-10	561.58849	807.49043	141.97155	-7.5334e-007
9	4145	182.45715	-10	561.58849	823.50966	151.22026	-8.024e-007
10	4145	183.2	-10	561.58849	839.51543	160.46119	-8.5146e-007
11	4145	183.94285	-10	561.58849	855.53466	169.7099	-1.2034e-005
12	4145	184.6857	-10	561.58849	871.54043	178.95084	-9.4957e-007
13	4145	185.42855	-10	561.58849	887.55967	188.19954	-9.9863e-007
14	4145	186.24	-10	561.59091	905.81818	198.73971	-1.0546e-006
15	4145	187.12	-10	561.59091	924.21591	209.36164	-1.1109e-006
16	4145	187.93	-10	561.59459	934.77027	215.45308	-1.1433e-006
17	4145	188.725	-10	561.58824	952.8	225.86622	-1.1985e-006
18	4145	189.575	-10	561.58824	974.43529	238.35736	-1.2648e-006
19	4145	190.55	-9.3445355	520.68725	660.84418	80.919643	-4.2953e-007
20	4145	191.15475	-8.6238105	475.71088	612.56147	79.010724	-4.1937e-007
21	4145	191.44385	-8.279275	454.20913	600.19023	84.282226	2.3184e-006
22	4145	192.101	-7.49612	405.34778	499.58306	0	275.44
23	4145	192.9619	-6.470139	341.32242	490.24657	0	266.21
24	4145	193.92	-5.328326	270.06965	472.19542	0	255.95
25	4145	194.7373	-4.354307	209.29053	460.42836	0	247.2
26	4145	195.5173	-3.424739	151.28181	428.66398	0	315
27	4145	196.1466	-2.674739	104.29149	415.09238	0	315
28	4145	196.63355	-2.094413	67.621294	375.20587	0	302.83
29	4145	197.31425	-1.2832392	16.482956	321.23538	0	278.5

3/27/2013

30	4145	197.9949	-0.47206549	34.692212	136.63081	0	254.16
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3/27/2013



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27, STA. 48+50 TO 58+50
FLOODSIDE SIDE STABILITY ANALYSIS,
CASE: FS Entry/Exit Thru -1.0
JANUARY 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Entry/Exit Thru -1.0

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File Information

Created By: Lijegren, James
Revision Number: 432
Last Edited By: Johnson, Jehu B MVN
Date: 2/7/2013
Time: 1:26:37 PM
File Name: Reach 27 erosion 2ft.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/7/2013
Last Solved Time: 2:26:32 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Entry/Exit Thru -1.0
Kind: SLOPE/W
Parent: FS Analysis (Seepage) -1.0
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

3/27/2013

Marsh1, El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 103 pcf
Cohesion: 315 psf

BAY SOUND CLAY 1, EL. -45 to -50
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion Spatial Fn: Bay Sound
Phi: 0 °
Phi-B: 0 °

MARSH 1 , El, -4 to -7 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

MARSH 2, EL. -7 TO -8
Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (163.50485, -11.10242) ft
Left-Zone Right Coordinate: (187.75588, -2.82647) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (201.3, 4) ft
Right-Zone Right Coordinate: (215.8, 1.03817) ft
Right-Zone Increment: 25
Radius Increments: 25

Slip Surface Limits

Left Coordinate: (123.3, -11.2) ft
Right Coordinate: (310, -3) ft

3/27/2013

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4 TO 2
Model: Undrained (Phi=0)
Unit Weight: 111 pcf
Cohesion: 600 psf

MARSH 2, MH, EL. -4 TO -7
Model: Spatial Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion Spatial Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -40
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Beach Sand
Phi-B: 0 °

Fill (Protected), El., -2.5 TO -4
Model: Undrained (Phi=0)
Unit Weight: 105 pcf
Cohesion: 400 psf

MARSH 2, El, -7 to -8 (Protected)
Model: Spatial Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion Fn: Marsh (protected)
Phi: 0 °
Phi-B: 0 °

EMBANKMENT FILL CH, EL. 2 TO -2.5
Model: Spatial Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion Fn: Fill 2
Phi: 0 °
Phi-B: 0 °

3/27/2013

Cohesion Functions

Fill 2
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)
Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand
Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

3/27/2013

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)
Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL, -2.5 TO -4	4,25,15,19,26,49,3	19.425
Region 2	Marsh1, EL, -2.5 TO -4	15,20,18,19	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	27,16,17,22,1,57,58,24,50	701.9
Region 4	BEACH SAND SP, EL. -14 TO -40	22,17,16,13,21,10,12,11	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	49,26,19,41,40,51	37.32
Region 6		14,29,30,31	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	19,18,20,32,33,41	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	5,52,14,37,38,36	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	14,31,6,35,37	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	36,46,55,56,45,4,25,15,37,38	37.619002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,15,20,7,35	107.55
Region 12	Fill (Protected), EL, -2.5 TO -4	20,7,42,8,9	86.025
Region 13	MARSH 2, EL, -7 to -8 (Protected)	34,32,21,10	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	11,12,48,47	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	47,48,44,43	3734
Region 16	MARSH 1, EL, -4 to -7 (Protected)	32,20,9,34	251.7
Region 17	MARSH 1, EL, -4 to -7 (Protected)	39,3,49,51	13.08
Region 18	MARSH 2, EL, -7 to -8 (Protected)	24,50,51,39	7.86
Region 19	MARSH 2, EL. -7 TO -8	16,27,50,51,40,41	12.44
Region 20	MARSH 2, EL. -7 TO -8	16,41,33,32,21,13	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	185.8	-4
Point 4	188.3	-2.5
Point 5	196	3.7
Point 6	206.4	4
Point 7	226.1	-2.5

Point 8	310	-3
Point 9	310	-4
Point 10	310	-8
Point 11	123.3	-45
Point 12	310	-45
Point 13	202	-8
Point 14	200	4
Point 15	200	-2.5
Point 16	200	-8
Point 17	200	-19.3
Point 18	202	-4
Point 19	200	-4
Point 20	226.1	-4
Point 21	226.1	-8
Point 22	123.3	-19.2
Point 23	123.3	-9.2
Point 24	178.8	-8
Point 25	196	-2.5
Point 26	196	-4
Point 27	196	-8
Point 28	196	-13
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	201	4
Point 32	226.1	-7
Point 33	202	-7
Point 34	310	-7
Point 35	213	2
Point 36	194.44	2
Point 37	200	2
Point 38	196	2
Point 39	180.6	-7
Point 40	196	-7
Point 41	200	-7
Point 42	234.6	-3
Point 43	123.3	-70
Point 44	310	-70
Point 45	191.1	-0.9
Point 46	193.4	1.2
Point 47	123.3	-50
Point 48	310	-50
Point 49	187.56	-4
Point 50	187.56	-8
Point 51	187.56	-7

	199	4
Point 53	205	3
Point 54	205	-49
Point 55	192.52381	0.4
Point 56	191.20952	-0.8
Point 57	164.5	-11.1
Point 58	175.4	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.26	(178.924, 25.55)	18.36054	(205.585, 4)	(172.395, -10.3032)
2	6381	1.29	(178.924, 25.55)	36.303	(206.4, 4)	(172.908, -10.2515)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	172.89615	-10.33201	582.31416	601.8818	11.297381	-1.292e-007
2	Optimized	173.8977	-10.38959	585.9127	615.89714	17.311524	-1.9806e-007
3	Optimized	174.89925	-10.447165	589.50126	629.92244	23.337178	-2.6692e-007
4	Optimized	175.4098	-10.476515	591.31169	680.03139	51.222342	3.3995e-006
5	Optimized	176.24145	-10.406865	586.98833	678.80736	53.011743	3.5172e-006
6	Optimized	177.49745	-10.27307	578.63416	693.96676	66.587303	-3.5319e-007
7	Optimized	178.3658	-10.14591	570.70377	705.9649	78.093052	-4.1424e-007
8	Optimized	178.90835	-10.066465	565.74458	709.97726	83.272776	-4.4171e-007
9	Optimized	179.80835	-9.9412965	557.93307	711.93949	88.915648	2.4438e-006
10	Optimized	181.15265	-9.7556865	546.34946	716.27147	98.104519	-5.204e-007
11	Optimized	182.1237	-9.6227425	538.04684	721.50096	105.91729	-5.6184e-007
12	Optimized	182.96055	-9.5094675	530.97724	725.76403	112.4602	3.0909e-006
13	Optimized	183.98425	-9.369797	522.26627	730.47548	120.20964	3.3041e-006
14	Optimized	185.19475	-9.203731	511.90492	736.35182	129.58448	-6.8738e-007

15	Optimized	185.87685	-9.110154	506.06536	740.20461	135.18036	-7.1712e-007
16	Optimized	186.75685	-9.0053955	499.52575	750.3274	144.8004	-7.6807e-007
17	Optimized	187.93	-8.867777	490.93097	752.59618	151.07248	-8.0137e-007
18	Optimized	188.34355	-8.8192615	487.91084	755.38257	154.42488	-8.1917e-007
19	Optimized	189.06535	-8.7250325	482.03145	758.87098	159.83337	-8.478e-007
20	Optimized	190.4218	-8.5467975	470.90641	771.22401	173.38845	-9.197e-007
21	Optimized	191.15475	-8.4504845	464.89543	788.66464	186.92824	-9.9155e-007
22	Optimized	191.6308	-8.3879345	460.99397	828.89244	212.40628	-1.1267e-006
23	Optimized	192.28795	-8.2428795	451.93375	809.26058	206.30274	-1.0942e-006
24	Optimized	192.7252	-8.0765895	441.56252	829.08126	223.73405	-1.1866e-006
25	Optimized	193.1633	-7.9099905	431.17006	843.58243	0	280.86
26	Optimized	193.92	-7.622235	413.2166	881.45446	0	278.89
27	Optimized	194.6643	-7.3391995	395.54148	922.63144	0	276.96
28	Optimized	195.06615	-7.126955	382.3014	841.60821	0	275.32
29	Optimized	195.62185	-6.729668	357.51769	867.05864	0	272.02
30	Optimized	196.4647	-6.127132	319.77312	858.98979	0	267.01
31	Optimized	197.39405	-5.462724	278.25653	808.46613	0	261.49
32	Optimized	198.42935	-4.6691715	228.67854	721.51518	0	254.8
33	Optimized	199.12855	-4.1039115	193.3593	677.22344	0	249.99
34	Optimized	199.3017	-3.963935	184.61184	633.3546	0	315
35	Optimized	199.67315	-3.6300395	163.74819	571.94275	0	315
36	Optimized	200.25	-3.1044155	125.29582	524.04443	0	315
37	Optimized	200.67955	-2.712999	99.218384	488.47683	0	315
38	Optimized	200.92955	-2.485206	83.923937	467.54324	0	314.56
39	Optimized	201.3847	-2.070503	52.466793	433.48775	0	302.12
40	Optimized	202.24005	-1.2755525	8.2694612	360.21513	0	278.27
41	Optimized	203.18135	-0.3867175	-77.06835	288.14121	0	251.6
42	Optimized	204.1353	0.5124925	-148.38479	215.80365	0	224.63

3/27/2013

43	Optimized	205.10185	1.4220775	-262.30669	123.89007	0	197.34
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Slices of Slip Surface: 6381

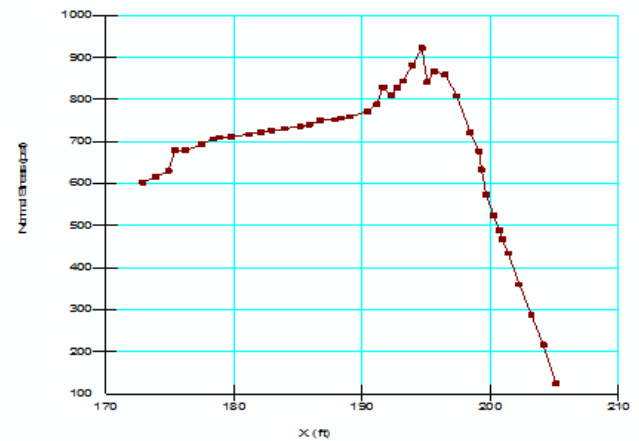
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	6381	173.531	-10.34509	583.13624	615.94628	18.942888	-2.1677e-007
2	6381	174.777	-10.510335	593.44224	642.33365	28.22747	-3.2293e-007
3	6381	175.96665	-10.6283	600.80221	717.72111	67.503158	1.8564e-006
4	6381	177.1	-10.70313	605.47231	762.39439	90.599006	2.4913e-006
5	6381	178.23335	-10.742425	607.92791	800.99582	111.46781	3.0652e-006
6	6381	179.25	-10.749165	608.34213	822.08906	123.40685	3.3932e-006
7	6381	180.15	-10.729915	607.14228	831.21436	129.36808	-6.8647e-007
8	6381	181.12	-10.68319	604.22801	840.70762	136.53157	-7.2451e-007
9	6381	182.16	-10.60513	599.35374	847.90808	143.50291	-7.6149e-007
10	6381	183.2	-10.496905	592.595	851.0616	149.22576	-7.9184e-007
11	6381	184.24	-10.358235	583.94327	850.24279	153.7481	-8.1584e-007
12	6381	185.28	-10.18877	573.36792	845.51083	157.12178	-8.3375e-007
13	6381	186.24	-10.005751	561.9432	838.18992	159.49112	-8.4631e-007
14	6381	187.12	-9.8132345	549.93417	827.80718	160.43006	-8.513e-007
15	6381	187.93	-9.6164995	537.66179	810.54436	157.54882	-8.3603e-007
16	6381	188.76665	-9.3902815	523.54461	797.17674	157.98159	-8.3834e-007
17	6381	189.7	-9.1137445	506.28518	781.1795	158.71031	-1.1255e-005
18	6381	190.63335	-8.809633	487.31141	762.01545	158.60045	-1.1247e-005
19	6381	191.15475	-8.6310025	476.15895	759.79794	163.75904	-8.6901e-007
20	6381	191.86665	-8.3605925	459.28747	787.40885	189.44097	-1.0054e-006
21	6381	192.6581	-8.0548885	440.22515	816.38434	217.17561	-1.5402e-005

3/27/2013

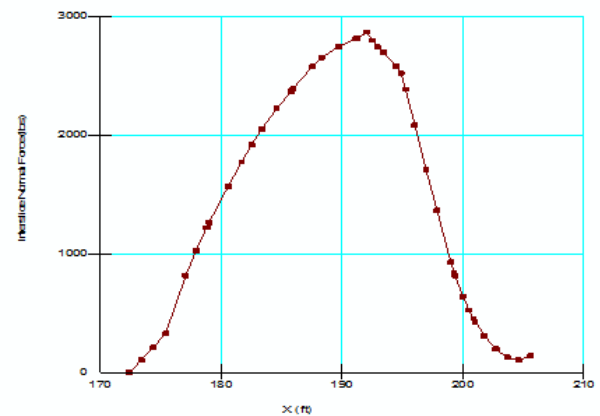
22	6381	193.0962	-7.8711755	428.75404	822.2786	0	280.39
23	6381	193.92	-7.5064515	405.98487	850.30556	0	277.73
24	6381	194.7199	-7.135276	382.82331	880.35047	0	274.99
25	6381	195.4999	-6.7433065	358.36686	922.84648	0	272.01
26	6381	196.5	-6.2099095	324.94048	922.1142	0	267.88
27	6381	197.5	-5.635371	289.04575	866.17502	0	263.34
28	6381	198.5	-5.017322	250.43432	806.35151	0	258.36
29	6381	199.5	-4.3530595	208.92699	737.43542	0	252.93
30	6381	200.25	-3.827527	171.25355	651.70546	0	315
31	6381	200.75	-3.4579375	146.69807	609.2749	0	315
32	6381	201.42045	-2.9378145	113.51864	549.99095	0	315
33	6381	202.4108	-2.1220965	55.375955	459.84531	0	303.66
34	6381	203.55055	-1.1120071	22.708275	356.57547	0	273.36
35	6381	204.6903	-0.0111471	109.64017	249.05075	0	240.33
36	6381	205.8301	1.19286	-330.60479	122.82567	0	204.21

3/27/2013

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X



FS Block Around -1.0

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File Information

Created By: [Liljegren, James](#)
Revision Number: 432
Last Edited By: [Johnson, Jehu B MVN](#)
Date: [2/7/2013](#)
Time: 1:26:37 PM
File Name: [Reach 27 erosion 2ft.gsz](#)
Directory: [G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet](#)
[Pile\Water El -1 Based on SeepW\](#)
Last Solved Date: [2/7/2013](#)
Last Solved Time: 1:30:44 PM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

FS Block Around -1.0

Kind: [SLOPE/W](#)
Parent: [FS Analysis \(Seepage\) -1.0](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Parent Analysis](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Block](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Tension Crack Line](#)
Percentage Wet: [1](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Restrict Block Crossing: [Yes](#)

3/27/2013

EMBANKMENT FILL CH, EL. 2 TO -2.5

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [111 pcf](#)
Cohesion Fn: [Fill 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Marsh1, El., -2.5 TO -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [103 pcf](#)
Cohesion: [315 psf](#)

BAY SOUND CLAY 1, EL. -45 to -50

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 1](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

BAY SOUND CLAY 2, EL. -50 TO -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Bay Sound 2](#)
Cohesion Spatial Fn: [Bay Sound](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

MARSH 1, El, -4 to -7 (Protected)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [105 pcf](#)
Cohesion Fn: [Marsh \(protected\)](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

MARSH 2, EL. -7 TO -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh2](#)
Cohesion Spatial Fn: [Marsh 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Slip Surface Limits

Left Coordinate: [\(123.3, -11.2\) ft](#)
Right Coordinate: [\(310, -3\) ft](#)

Slip Surface Block

Left Grid

3/27/2013

Advanced

Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [111 pcf](#)
Cohesion: [600 psf](#)

MARSH 2, MH, EL. -4 TO -7

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [103 pcf](#)
Cohesion Spatial Fn: [Marsh 2](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

BEACH SAND SP, EL. -14 TO -40

Model: [Shear/Normal Fn.](#)
Unit Weight: [122 pcf](#)
Strength Function: [Beach Sand](#)
Phi-B: [0 °](#)

Fill (Protected), El., -2.5 TO -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [105 pcf](#)
Cohesion: [400 psf](#)

Sheet Pile

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [0.1 pcf](#)
Cohesion: [0.01 psf](#)

MARSH 2, El, -7 to -8 (Protected)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [99 pcf](#)
Cohesion Fn: [Marsh \(protected\)](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

3/27/2013

Upper Left: [\(150, -19.3\) ft](#)
Lower Left: [\(150, -40\) ft](#)
Lower Right: [\(185, -40\) ft](#)
X Increments: [15](#)
Y Increments: [10](#)
Starting Angle: [135 °](#)
Ending Angle: [155 °](#)
Angle Increments: [2](#)

Right Grid

Upper Left: [\(190, -19.3\) ft](#)
Lower Left: [\(190, -40\) ft](#)
Lower Right: [\(206, -40\) ft](#)
X Increments: [8](#)
Y Increments: [10](#)
Starting Angle: [45 °](#)
Ending Angle: [55 °](#)
Angle Increments: [2](#)

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: [\(200, 4\) ft](#)
Inside Point: [\(200, -19.3\) ft](#)
Slip Surface Intersection: [\(200, -19.311\) ft](#)
Total Length: [23.3 ft](#)
Reinforcement Direction: [90 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: [1 ft](#)
Shear Capacity: [200000 lbs](#)
Shear Safety Factor: [1](#)
Shear Load Used: [200000 lbs](#)
Shear Option: [Parallel to Slip](#)
Resisting Force Used: [0 lbs/ft](#)

Tension Crack Line

X (ft)	Y (ft)
201	2
206.4	2
213	0
226.1	-4.5
234.6	-5

Cohesion Functions

3/27/2013

Fill 2

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 240
Data Points: Y (ft), Cohesion (psf)
Data Point: (-2.5, 315)
Data Point: (2, 180)

Marsh (protected)

Model: Spline Data Point Function
Function: Cohesion vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 235
Data Points: Y (ft), Cohesion (psf)
Data Point: (-8, 275)
Data Point: (-4, 235)

Shear/Normal Strength Functions

Beach Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-100000, 0)
Data Point: (0, 0)
Data Point: (100000, 57735)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Spatial Functions

Marsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -4, 235)
Data Point: (187.56, -8, 275)
Data Point: (200, -4, 250)
Data Point: (200, -8, 290)
Data Point: (226.1, -4, 235)
Data Point: (226.1, -8, 275)

Bay Sound

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (187.56, -45, 620)
Data Point: (187.56, -70, 900)
Data Point: (200, -45, 693)
Data Point: (200, -70, 955)

3/27/2013

3/27/2013

Data Point: (226.1, -45, 620)
Data Point: (226.1, -70, 900)
Data Point: (123.3, -45, 620)
Data Point: (123.3, -70, 900)
Data Point: (310, -45, 620)
Data Point: (310, -70, 900)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, EL., -2.5 TO -4	4,25,15,19,26,49,3	19.425
Region 2	Marsh1, EL., -2.5 TO -4	15,20,18,19	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	27,16,17,22,1,57,58,24,50	701.9
Region 4	BEACH SAND SP, EL. -14 TO -40	22,17,16,13,21,10,12,11	6045.025
Region 5	MARSH 2, MH, EL. -4 TO -7	49,26,19,41,40,51	37.32
Region 6	Sheet Pile	14,29,30,31	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	19,18,20,32,33,41	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	5,52,14,37,38,36	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	14,31,6,35,37	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	36,46,55,56,45,4,25,15,37,38	37.619002
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,15,20,7,35	107.55
Region 12	Fill (Protected), EL., -2.5 TO -4	20,7,42,8,9	86.025
Region 13	MARSH 2, EL, -7 to -8 (Protected)	34,32,21,10	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	11,12,48,47	933.5
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	47,48,44,43	3734
Region 16	MARSH 1, EL. -4 to -7 (Protected)	32,20,9,34	251.7
Region 17	MARSH 1, EL, -4 to -7 (Protected)	39,3,49,51	13.08
Region 18	MARSH 2, EL, -7 to -8 (Protected)	24,50,51,39	7.86
Region 19	MARSH 2, EL. -7 TO -8	16,27,50,51,40,41	12.44
Region 20	MARSH 2, EL. -7 TO -8	16,41,33,32,21,13	26.1

Points

	X (ft)	Y (ft)
Point 1	123.3	-11.2
Point 2	164.5	-9.1
Point 3	185.8	-4
Point 4	188.3	-2.5
Point 5	196	3.7
Point 6	206.4	4
Point 7	226.1	-2.5
Point 8	310	-3
Point 9	310	-4
Point 10	310	-8

Point 11	123.3	-45
Point 12	310	-45
Point 13	202	-8
Point 14	200	4
Point 15	200	-2.5
Point 16	200	-8
Point 17	200	-19.3
Point 18	202	-4
Point 19	200	-4
Point 20	226.1	-4
Point 21	226.1	-8
Point 22	123.3	-19.2
Point 23	123.3	-9.2
Point 24	178.8	-8
Point 25	196	-2.5
Point 26	196	-4
Point 27	196	-8
Point 28	196	-13
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	201	4
Point 32	226.1	-7
Point 33	202	-7
Point 34	310	-7
Point 35	213	2
Point 36	194.44	2
Point 37	200	2
Point 38	196	2
Point 39	180.6	-7
Point 40	196	-7
Point 41	200	-7
Point 42	234.6	-3
Point 43	123.3	-70
Point 44	310	-70
Point 45	191.1	-0.9
Point 46	193.4	1.2
Point 47	123.3	-50
Point 48	310	-50
Point 49	187.56	-4
Point 50	187.56	-8
Point 51	187.56	-7
Point 52	199	4
Point 53	205	3
Point 54	205	-49

3/27/2013

3/27/2013

	192.52381	0.4
Point 56	191.20952	-0.8
Point 57	164.5	-11.1
Point 58	175.4	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.67	(185.786, 0.744)	29.76942	(215.071, 1.28859)	(154.806, -11.1235)
2	2335	2.93	(185.786, 0.744)	29.068	(217.741, 0.371307)	(156.02, -11.1206)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	156.0483	-11.707765	668.15688	741.58712	42.394967	6.1466e-007
2	Optimized	158.5327	-12.876235	741.07719	901.23232	92.465611	2.5436e-006
3	Optimized	160.9336	-13.996355	810.98833	1053.0002	139.72559	-7.4174e-007
4	Optimized	163.25095	-15.068125	877.84611	1199.1708	185.51688	-1.316e-005
5	Optimized	164.4548	-15.6235	912.50128	1268.1106	205.31112	-1.0897e-006
6	Optimized	165.68585	-16.15422	945.62474	1354.1836	235.88155	-1.2521e-006
7	Optimized	168.0576	-17.17668	1009.433	1508.8257	288.32451	-2.0453e-005
8	Optimized	170.27465	-18.08225	1065.9112	1631.7251	326.67278	-6.605e-005
9	Optimized	172.33695	-18.870935	1115.142	1751.2013	367.22905	-7.425e-005
10	Optimized	174.38405	-19.65381	1163.9923	1869.7792	407.48629	-8.2391e-005
11	Optimized	175.4277	-20.052935	1188.8968	1957.7506	443.89793	-8.9759e-005
12	Optimized	176.962	-20.506525	1217.1984	2041.4317	475.87131	-9.6217e-005
13	Optimized	178.6343	-20.980285	1246.7571	2120.9645	504.72385	-0.00010205
14	Optimized	179.7	-21.178125	1259.0987	2169.1063	525.39312	-0.00010623
15	Optimized	182.07575	-21.61916	1286.6236	2280.7646	573.96759	-0.00011605
16	Optimized	184.67575	-21.989665	1309.7219	2346.7143	598.70784	3.9743e-005
17	Optimized	186.68	-22.161775	1320.4814	2416.1651	632.59326	-1.052e-005
18	Optimized	187.93	-22.269115	1327.1832	2452.8647	649.91252	-1.0807e-005
19	Optimized	189.7	-22.42111	1336.6521	2519.0504	682.65801	4.5317e-005

3/27/2013

20	Optimized	191.15475	-22.546035	1344.4854	2585.9897	716.78283	4.7583e-005
21	Optimized	191.4959	-22.57533	1346.2868	2625.9125	738.79222	4.9044e-005
22	Optimized	192.15305	-22.537335	1343.9452	2563.1629	703.91567	-1.1707e-005
23	Optimized	192.9619	-22.408005	1335.3829	2626.5381	745.44881	-1.2397e-005
24	Optimized	193.92	-22.239085	1325.292	2693.6289	790.00969	-1.3138e-005
25	Optimized	194.60275	-22.12384	1318.0982	2742.1628	822.1841	5.458e-005
26	Optimized	195.38275	-21.860225	1301.6755	2693.0043	803.28407	-1.336e-005
27	Optimized	197.24365	-21.148295	1257.2471	2692.4059	828.5893	5.501e-005
28	Optimized	198.74365	-20.44182	1213.1428	2408.9164	690.38024	4.5844e-005
29	Optimized	199.5	-19.761165	1170.6561	2339.1565	674.63404	4.4796e-005
30	Optimized	200.25	-19.086215	1128.5542	2268.3177	658.04275	4.3697e-005
31	Optimized	200.75	-18.63625	1100.4715	2220.2992	646.53278	-1.0755e-005
32	Optimized	201.11935	-18.30385	1079.719	2184.7519	637.99106	4.2364e-005
33	Optimized	201.61935	-17.67452	1040.4548	1978.7373	541.71765	-0.0001096
34	Optimized	202.9842	-15.803115	923.68576	1791.9612	501.29903	-0.00010142
35	Optimized	204.9526	-13.104125	755.26937	1522.5728	443.00282	-8.9626e-005
36	Optimized	206.1684	-11.433515	401.51894	1302.7833	520.34525	-0.00010527
37	Optimized	206.9997	-10.28093	329.6006	1173.5184	487.23617	-9.857e-005
38	Optimized	208.14155	-8.72473	232.49442	999.89283	443.05768	-3.1446e-005
39	Optimized	208.92985	-7.671	166.97095	934.70147	0	281.58
40	Optimized	209.324	-7.171	136.14188	908.85797	0	276.35
41	Optimized	210.7703	-5.5	32.769821	714.97792	0	258.81
42	Optimized	212.40105	-3.6159065	84.354687	468.40858	0	315
43	Optimized	212.86675	-3.077888	117.44346	402.67804	0	315
44	Optimized	213.2783	-2.6024415	145.89714	340.84995	0	315
45	Optimized	214.3138	-1.4961626	213.37411	211.14119	0	284.88

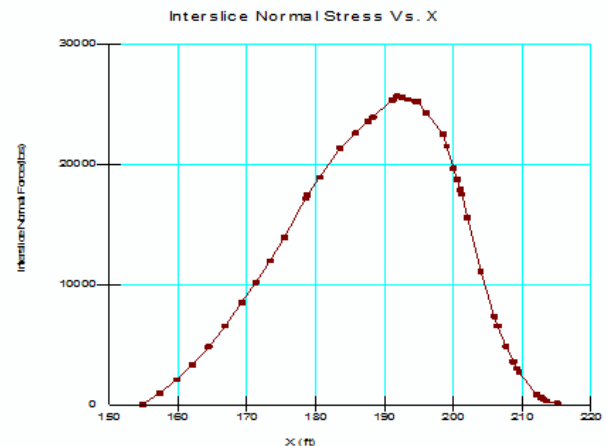
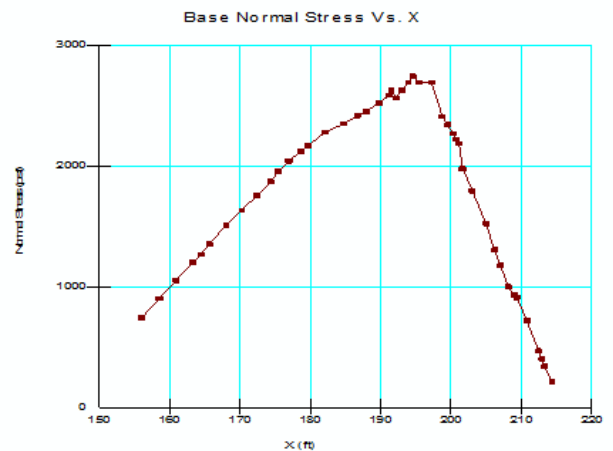
Slices of Slip Surface: 2335

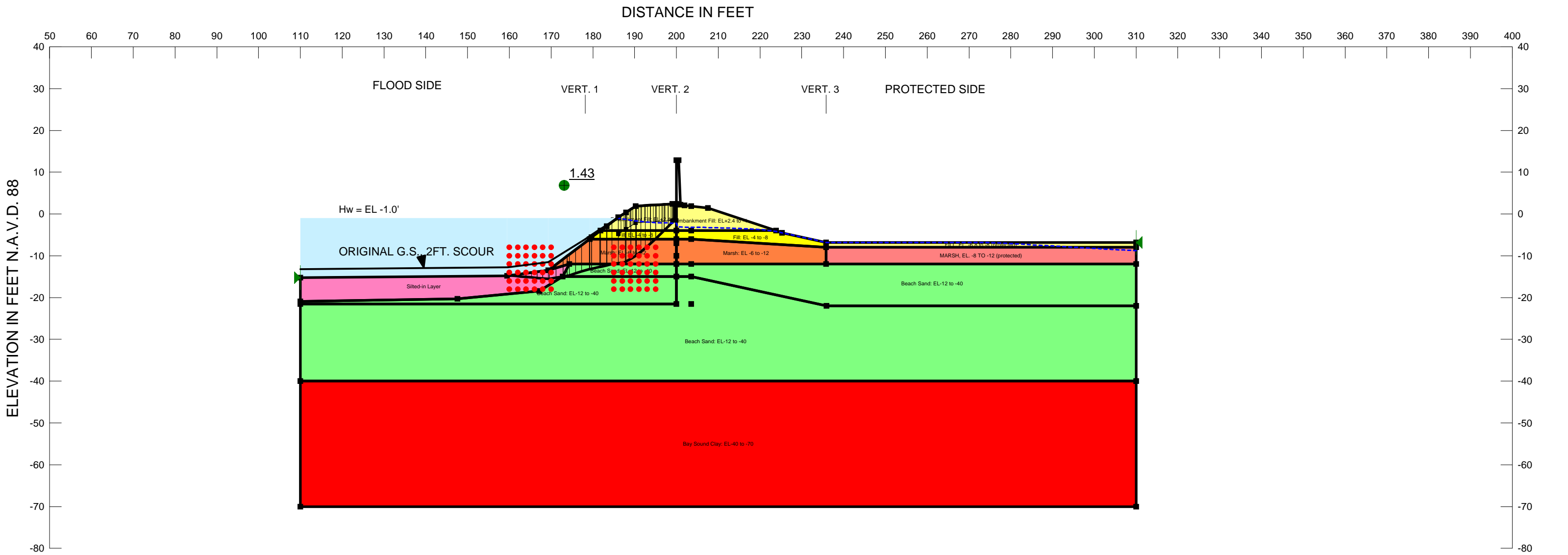
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
			-				

3/27/2013

1	2335	157.08005	11.614865	662.37821	723.89636	35.517521	5.1508e-007
2	2335	159.2	-12.60343	724.06736	857.06456	76.785969	-4.0769e-007
3	2335	161.32	-13.591995	785.75652	990.27551	118.0791	3.248e-006
4	2335	163.44	-14.580565	847.44567	1123.4437	159.34755	-8.4595e-007
5	2335	165.62335	-15.59867	910.95277	1273.6073	209.37871	-1.1115e-006
6	2335	167.87005	-16.646315	976.34355	1430.0046	261.92136	-1.8581e-005
7	2335	170.11675	-17.693965	1041.694	1586.3616	314.464	-6.3587e-005
8	2335	172.3634	-18.74161	1107.0848	1742.7589	367.00665	-7.4212e-005
9	2335	174.44335	-19.711515	1167.5717	1887.5459	415.67727	-8.4048e-005
10	2335	176.7	-20.7638	1233.2407	2110.0585	506.23099	-3.5911e-005
11	2335	178.4	-21.37	1271.125	2085.75	470.32396	-9.5114e-005
12	2335	179.7	-21.37	1271.0556	2115.5556	487.5723	-9.8587e-005
13	2335	181.46665	-21.37	1271.0772	2153.6543	509.55612	-3.6149e-005
14	2335	183.2	-21.37	1271.0772	2194.212	532.97212	3.215e-005
15	2335	184.93335	-21.37	1271.0772	2234.712	556.35481	-0.0001125
16	2335	186.68	-21.37	1271.0795	2275.5114	579.90898	-9.6447e-006
17	2335	187.93	-21.37	1271.0676	2298.3784	593.11817	-9.8637e-006
18	2335	189.7	-21.37	1271.0714	2344.5357	619.76489	4.1145e-005
19	2335	191.15475	-21.37	1271.092	2394.5398	648.62287	4.3061e-005
20	2335	191.86665	-21.37	1271.1046	2468.0246	691.04209	-1.1493e-005
21	2335	192.9619	-21.37	1271.0713	2581.0612	756.32299	5.0209e-005
22	2335	193.92	-21.37	1271.0577	2671.4423	808.51243	5.3676e-005
23	2335	195.22	-21.37	1271.0897	2812.6923	890.04466	-1.4803e-005
24	2335	197	-21.37	1271.05	2920.35	952.2238	6.3215e-005
25	2335	198.5	-20.87	1239.8406	2448.5686	697.85941	-1.1609e-005
26	2335	199.5	-19.87	1177.4738	2347.1695	675.32411	4.4846e-005
27	2335	200.25	-19.12	1130.6637	2268.5399	656.95313	-1.0928e-005
28	2335	200.75	-18.62	1099.4662	2215.2241	644.18313	-1.0716e-005
29	2335	201.5	-17.87	1052.6695	2135.4618	625.15041	-1.04e-005
30	2335	203.1	-16.27	952.82634	1966.1103	585.01977	-9.7321e-006
31	2335	205.3	-14.07	566.03895	1697.024	652.97455	-1.0863e-005
32	2335	207.6425	-11.7275	419.85351	1415.8069	575.01397	-0.0001163
33	2335	210.1275	-9.2425	264.80222	1086.2696	474.2744	-9.5927e-005
34	2335	211.87	-7.5	156.32005	901.773	0	278.18
35	2335	212.685	-6.685	105.80002	801.87035	0	269.56
36	2335	214.185	-5.185	12.539659	611.51313	0	253.7
37	2335	215.6616	-3.708424	79.531787	400.24169	0	315
38	2335	216.84725	-2.5227705	152.86498	233.17079	0	315

3/27/2013





Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 °
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 °
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 °
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
FLOOD SIDE STABILITY ANALYSIS - 2 FT EROSION
CASE: BLOCK IN front (Piezo: EL-1.0)
MARCH 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

BLOCK IN front (Piezo: EL-1.0)

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File Information

Created By: [Johnson, Jehu](#)
Revision Number: 172
Last Edited By: [Johnson, Jehu 8 MVN](#)
Date: [2/11/2013](#)
Time: 8:19:37 AM
File Name: [Reach 35B erosion 2 ft.gsz](#)
Directory: [G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet](#)
[Pile\Water EL -1 Based on SeepW\](#)
Last Solved Date: [2/11/2013](#)
Last Solved Time: [8:20:20 AM](#)

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

BLOCK IN front (Piezo: EL-1.0)

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Other GeoStudio Analysis](#)
PWP Other Analysis: [Steady-State Seepage \(EL -1.0\) \(Open Connection\) \[\(last\)\]](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Block](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Tension Crack Line](#)
Percentage Wet: [1](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Restrict Block Crossing: [Yes](#)

3/27/2013

BLOCK IN front (Piezo: EL-1.0)

Page 3 of 10

Cohesion Spatial Fn: [Bay Sound Clay](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

FILL, EL. -6.8 to -8 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [600 psf](#)

MARSH, EL. -8 TO -12 (protected)

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [96 pcf](#)
Cohesion: [150 psf](#)

Slip Surface Limits

Left Coordinate: [\(110, -15.2\) ft](#)
Right Coordinate: [\(310, -6.8\) ft](#)

Slip Surface Block

Left Grid
Upper Left: [\(160, -8\) ft](#)
Lower Left: [\(160, -18\) ft](#)
Lower Right: [\(170, -18\) ft](#)
X Increments: [5](#)
Y Increments: [5](#)
Starting Angle: [135 °](#)
Ending Angle: [145 °](#)
Angle Increments: [2](#)
Right Grid
Upper Left: [\(185, -8\) ft](#)
Lower Left: [\(185, -18\) ft](#)
Lower Right: [\(195, -18\) ft](#)
X Increments: [5](#)
Y Increments: [5](#)
Starting Angle: [45 °](#)
Ending Angle: [55 °](#)
Angle Increments: [2](#)

Tension Crack Line

X (ft)	Y (ft)
186.1	-4.8
187.9	-3.6
190.2	-2.1
199	-1.6
200	-1.6

3/27/2013

Advanced
Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

Embankment Fill: EL+2.4 to -4

Model: [Undrained \(Phi=0\)](#)
Unit Weight: [110 pcf](#)
Cohesion: [450 psf](#)

Fill: EL -4 to -8

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill -4 to -8](#)
Cohesion Fn: [Fill -4 to -8](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Marsh: EL -6 to -12

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: [88 pcf](#)
Cohesion Fn: [Marsh](#)
Phi: [0 °](#)
Phi-B: [0 °](#)

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: [90 pcf](#)
Cohesion: [0 psf](#)
Phi: [20 °](#)
Phi-B: [0 °](#)

Beach Sand: EL-12 to -40

Model: [Shear/Normal Fn.](#)
Unit Weight: [122 pcf](#)
Strength Function: [Sand](#)
Phi-B: [0 °](#)

Bay Sound Clay: EL-40 to -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay](#)

3/27/2013

BLOCK IN front (Piezo: EL-1.0)

Page 4 of 10

Cohesion Functions

Fill -4 to -8

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [600](#)
Data Points: [X \(ft\), Cohesion \(psf\)](#)
Data Point: [\(110, 600\)](#)
Data Point: [\(178.1, 600\)](#)
Data Point: [\(178.3, 450\)](#)
Data Point: [\(200, 450\)](#)
Data Point: [\(235.7, 450\)](#)
Data Point: [\(235.9, 600\)](#)
Data Point: [\(310, 600\)](#)

Marsh

Model: [Spline Data Point Function](#)
Function: [Cohesion vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [150](#)
Data Points: [X \(ft\), Cohesion \(psf\)](#)
Data Point: [\(178.2, 150\)](#)
Data Point: [\(200, 275\)](#)
Data Point: [\(235.8, 150\)](#)

Shear/Normal Strength Functions

Sand

Model: [Spline Data Point Function](#)
Function: [Shear Stress vs. Normal Stress](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [0](#)
Data Points: [Normal Stress \(psf\), Shear Stress \(psf\)](#)
Data Point: [\(-10000, 0\)](#)
Data Point: [\(0, 0\)](#)
Data Point: [\(10000, 5773\)](#)
Estimation Properties
Intact Rock Param.: [10](#)
Geological Strength: [100](#)
Disturbance Factor: [0](#)
SigmaC: [600000 psf](#)
Sigma3: [300000 psf](#)
Num. Points: [20](#)

3/27/2013

Unit Weight Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (110, 96)
Data Point: (178.1, 96)
Data Point: (178.3, 88)
Data Point: (200, 88)
Data Point: (235.7, 88)
Data Point: (235.9, 96)
Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)
Data Point: (235.8, 107)
Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)
Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1
Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	322.745
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	150.9
Region 8	Fill: EL -4 to -8	32,33,37,35,31	39.02
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	86.05
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40
Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-15.2
Point 17	159.5	-14.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12

Point 22	203.5	-12
Point 23	169.3	-13.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6
Point 31	200	-6
Point 32	179.2	-6
Point 33	179.7	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.8	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	187.9	0.4
Point 50	183.3	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.43	(179.061, 1.5)	20.66964	(199.467, 2.4)	(160.06, -14.7257)
2	1066	1.64	(179.061, 1.5)	19.073	(199.4, 2.4)	(165.531, -14)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	160.72025	-14.78194	859.71133	874.73306	5.4674649	0
2	Optimized	162.0402	-14.894465	866.05216	889.98126	8.7094792	0

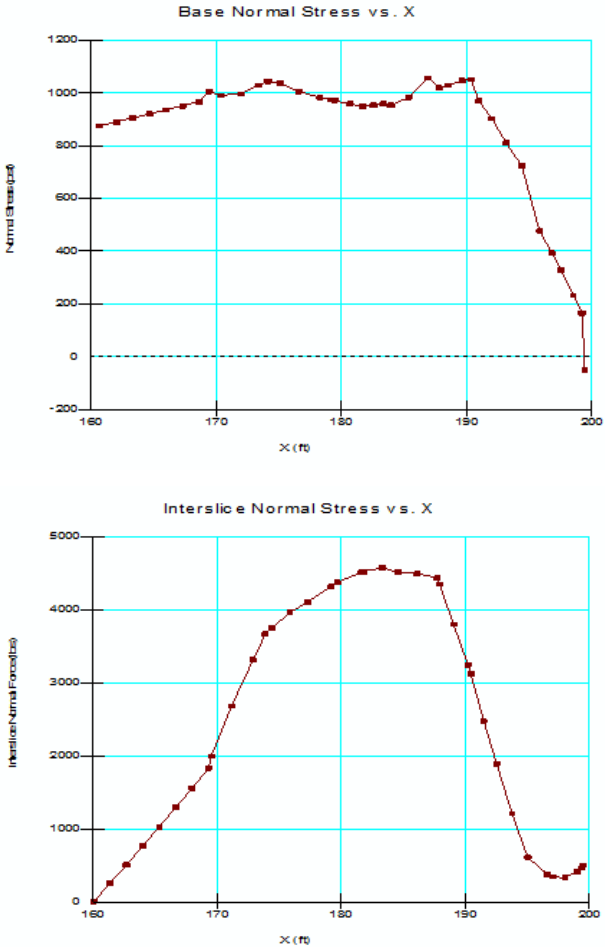
3	Optimized	163.3602	-15.006995	872.31751	905.22945	11.978968	0
4	Optimized	164.68015	-15.11952	878.3564	920.55313	15.358356	0
5	Optimized	166.0001	-15.232045	884.24431	935.80133	18.765219	0
6	Optimized	167.32005	-15.344575	889.67931	951.12501	22.364404	0
7	Optimized	168.64	-15.4571	894.28397	966.44869	26.265811	0
8	Optimized	169.41665	-15.523305	896.57217	1004.9279	39.438262	0
9	Optimized	170.3431	-15.404115	885.7646	990.94419	38.282241	0
10	Optimized	172.0151	-15.13749	863.35846	996.27535	48.377791	0
11	Optimized	173.3748	-14.92067	845.37769	1028.7576	105.86589	3.5861e-008
12	Optimized	174.13615	-14.75659	831.62487	1043.712	122.43871	4.1476e-008
13	Optimized	175.1252	-14.43893	807.28751	1036.5157	132.33428	4.3856e-006
14	Optimized	176.5756	-13.97311	771.77421	1005.0723	134.68385	-4.3735e-006
15	Optimized	178.2464	-13.489865	735.81242	982.80412	142.58923	4.7268e-006
16	Optimized	179.196	-13.23861	716.7307	973.45424	148.20746	4.9129e-006
17	Optimized	179.45	-13.18014	712.15529	971.53191	149.73909	-4.8622e-006
18	Optimized	180.6725	-12.89873	690.73466	957.83943	154.20058	5.1114e-006
19	Optimized	181.7225	-12.65856	672.53647	949.59322	159.94589	-5.1937e-006
20	Optimized	182.55	-12.48442	659.09777	953.12466	169.74282	-5.5115e-006
21	Optimized	183.30935	-12.32462	646.93031	957.73256	179.4273	-5.8261e-006
22	Optimized	183.9522	-12.16426	635.13455	952.38022	183.14711	-5.9473e-006
23	Optimized	185.34285	-11.87977	613.84418	982.91414	0	190.96
24	Optimized	186.9087	-11.61898	594.00403	1056.4937	0	199.94
25	Optimized	187.8087	-11.429135	580.15021	1018.5088	0	205.1
26	Optimized	188.475	-11.02664	554.04668	1029.2267	0	208.92
27	Optimized	189.625	-10.331961	509.17246	1047.4622	0	215.51
28	Optimized	190.32425	-9.9095655	481.81334	1050.6341	0	219.52

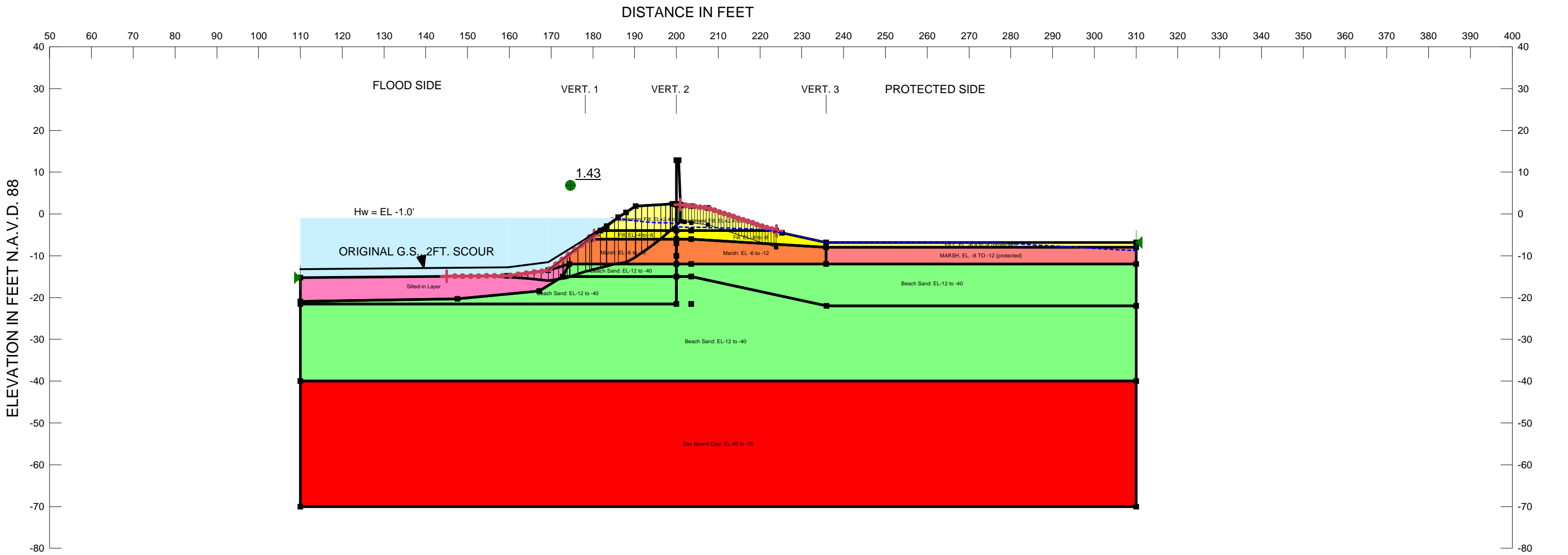
29	Optimized	190.9635	9.4173375	450.26804	969.47266	0	223.19
30	Optimized	191.99355	-8.5829925	397.03794	902.33153	0	229.09
31	Optimized	193.12445	-7.624365	335.7058	811.1254	0	235.58
32	Optimized	194.3805	-6.52007	265.32664	721.88508	0	242.78
33	Optimized	195.7953	-5.20656	184.6328	476.33417	0	450
34	Optimized	196.79975	-4.227945	125.52673	393.33572	0	450
35	Optimized	197.5222	-3.511585	81.636831	327.6213	0	450
36	Optimized	198.5074	-2.534755	21.781594	231.5254	0	450
37	Optimized	199.1799	-1.867945	19.113021	164.8563	0	450
38	Optimized	199.41355	-1.644775	33.009054	-51.577406	0	450

Slices of Slip Surface: 1066

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1066	166.159	-14	810.96139	823.77568	4.6640195	0
2	1066	167.4154	-14	810.24506	828.39201	6.6049469	0
3	1066	168.6718	-14	809.36955	833.00833	8.6038124	0
4	1066	169.80415	-14	805.88456	890.60856	30.837012	0
5	1066	170.8125	-14	799.58704	907.86476	39.409868	0
6	1066	171.82085	-14	794.43993	925.09121	47.553178	0
7	1066	172.82915	-14	791.68291	942.25816	54.804911	0
8	1066	173.86665	-14	788.12788	995.24969	119.57219	4.0502e-008
9	1066	175	-14	781.73333	1047.6667	153.5243	-4.9852e-006
10	1066	176.2	-14	774.975	1067.75	169.0201	5.6039e-006
11	1066	177.4	-14	770.35	1087.8333	183.28431	-5.9521e-006
12	1066	178.6	-14	765.90833	1107.8333	197.39458	6.545e-006
13	1066	179.45	-14	762.88	1123.54	208.21036	-6.7617e-006
14	1066	180.225	-14	760.45714	1135.619	216.58237	-7.0338e-006
15	1066	181.275	-14	757.18095	1153.2381	228.64527	-7.4252e-006
16	1066	182.55	-14	753.26667	1186.2	249.93403	-8.1165e-006
17	1066	184	-14	749.21429	1234.6429	280.23972	-9.1013e-006
18	1066	185.4	-14	745.28571	1281.7143	309.68221	-5.0704e-005
19	1066	186.55	-14	742.25556	1353.2222	352.71333	-0.00010404
20	1066	187.45	-13.55	711.89165	1111.9649	230.96376	7.6597e-006
21	1066	188.45	-12.55	647.06695	1062.2672	239.69664	7.9494e-006
22	1066	189.6	-11.4	573.83492	1040.331	0	215.37
23	1066	190.8	-10.2	498.18627	983.11429	0	222.25
24	1066	192	-9	422.6319	889.95295	0	229.13
25	1066	193.2	-7.8	346.34096	796.79162	0	236.01
26	1066	194.4	-6.6	270.2209	703.63029	0	242.89

27	1066	195.5	-5.5	202.31733	516.66155	0	450
28	1066	196.5	-4.5	142.00821	441.92746	0	450
29	1066	197.5	-3.5	80.977844	357.13124	0	450
30	1066	198.5	-2.5	19.70211	262.28704	0	450
31	1066	199.2	-1.8	-23.28326	87.65296	0	450





Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 °
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 °
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 °
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
FLOOD SIDE STABILITY ANALYSIS - 2 FT EROSION
CASE: E/E Through (Piezo: EL-1.0)
MARCH 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

E/E Through (Piezo: EL-1.0)

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File Information

Created By: Johnson, Jehu
Revision Number: 162
Last Edited By: Johnson, Jehu 8 MVN
Date: 2/8/2013
Time: 11:30:48 AM
File Name: Reach 35B erosion 2 ft.gsz
Directory: G:\F&M\HOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/8/2013
Last Solved Time: 11:59:22 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

E/E Through (Piezo: EL-1.0)

Kind: SLOPE/W
Method: Spencer
Settings
PWP Conditions Source: Other GeoStudio Analysis
PWP Other Analysis: Steady-State Seepage (EL -1.0) (Open Connection) [(last)]
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Fill: EL+2.4 to -4

Model: Undrained (Phi=0)
Unit Weight: 110 pcf
Cohesion: 450 psf

Fill: EL -4 to -8

Model: Spatial Mohr-Coulomb
Weight Fn: Fill -4 to -8
Cohesion Fn: Fill -4 to -8
Phi: 0 °
Phi-B: 0 °

Marsh: EL -6 to -12

Model: Spatial Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion Fn: Marsh
Phi: 0 °
Phi-B: 0 °

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 20 °
Phi-B: 0 °

Beach Sand: EL-12 to -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °

Bay Sound Clay: EL-40 to -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay
Cohesion Spatial Fn: Bay Sound Clay

3/27/2013

3/27/2013

Phi: 0 °
Phi-B: 0 °

FILL, EL. -6.8 to -8 (protected)

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 600 psf

MARSH, EL. -8 TO -12 (protected)

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 150 psf

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (145.01616, -14.91704) ft
Left-Zone Right Coordinate: (180.27547, -5.16155) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (200.9, 2.2) ft
Right-Zone Right Coordinate: (223.9, -4.03333) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (110, -15.2) ft
Right Coordinate: (310, -6.8) ft

Tension Crack Line

X (ft)	Y (ft)
201	-1.8
201.9	-1.9
203.5	-2.1
207.5	-2.6
223.8	-8

Cohesion Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600

Data Points: X (ft), Cohesion (psf)
Data Point: (110, 600)
Data Point: (178.1, 600)
Data Point: (178.3, 450)
Data Point: (200, 450)
Data Point: (235.7, 450)
Data Point: (235.9, 600)
Data Point: (310, 600)

Marsh

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 150
Data Points: X (ft), Cohesion (psf)
Data Point: (178.2, 150)
Data Point: (200, 275)
Data Point: (235.8, 150)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (0, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96

3/27/2013

3/27/2013

Data Points: X (ft), Unit Weight (pcf)

- Data Point: (110, 96)
- Data Point: (178.1, 96)
- Data Point: (178.3, 88)
- Data Point: (200, 88)
- Data Point: (235.7, 88)
- Data Point: (235.9, 96)
- Data Point: (310, 96)

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 107

Data Points: X (ft), Unit Weight (pcf)

- Data Point: (111.2, 107)
- Data Point: (178.2, 107)
- Data Point: (200, 108)
- Data Point: (235.8, 107)
- Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (110, -40, 400)
Data Point: (110, -70, 700)
Data Point: (178.2, -40, 400)
Data Point: (178.2, -70, 700)
Data Point: (200, -40, 600)
Data Point: (200, -70, 900)
Data Point: (235.8, -40, 400)
Data Point: (235.8, -70, 700)
Data Point: (310, -40, 400)
Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1

3/27/2013

Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	322.745
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	150.9
Region 8	Fill: EL -4 to -8	32,33,37,35,31	39.02
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	86.05
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40
Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-15.2
Point 17	159.5	-14.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-13.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6

3/27/2013

Point 31	200	-6
Point 32	179.2	-6
Point 33	179.7	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.8	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	187.9	0.4
Point 50	183.3	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.43	(168.229, 30.139)	22.1971	(201, 2.19996)	(156.08, -14.8276)
2	3159	1.46	(168.229, 30.139)	46.017	(201.322, 2.16062)	(158.37, -14.8091)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	156.93465	-14.887095	866.49704	872.27174	2.1018199	0
2	Optimized	158.6449	-15.006005	873.67167	883.5295	3.5879551	0
3	Optimized	160.5563	-15.1389	881.30295	905.85835	8.9374367	0
4	Optimized	162.32675	-15.272895	888.76177	925.66561	13.431901	0
5	Optimized	163.75505	-15.394	895.38911	942.12933	17.012048	0
6	Optimized	165.1834	-15.515105	901.73741	958.59305	20.69376	0
7	Optimized	166.7482	-15.660525	909.12228	978.96028	25.418953	0
8	Optimized	168.4494	-	916.49212	1001.0698	30.783757	0

3/27/2013

			15.830255				
9	Optimized	169.30145	-15.915265	919.61811	1039.973	43.805588	0
10	Optimized	169.93535	-15.833395	912.94987	1024.2852	40.522753	0
11	Optimized	171.2002	-15.66936	897.97448	1031.8121	48.712916	0
12	Optimized	172.3163	-15.524615	885.90095	1043.9852	91.262599	3.0917e-008
13	Optimized	172.9362	-15.444225	879.20105	1062.0312	105.54852	3.5758e-008
14	Optimized	173.451	-15.335435	870.08587	1072.6578	116.94551	3.9613e-008
15	Optimized	174.1148	-15.14943	855.40688	1085.5226	132.84664	4.4027e-006
16	Optimized	174.482	-15.027275	846.01184	1092.3674	142.222	-4.6164e-006
17	Optimized	175.48615	-14.693235	820.66611	1069.2686	143.51916	-4.6595e-006
18	Optimized	177.33045	-14.079705	775.49372	1027.0288	145.21216	-4.7142e-006
19	Optimized	178.7263	-13.654775	744.16324	1011.6036	154.39433	-5.0134e-006
20	Optimized	179.45	-13.474255	730.30393	1002.8532	157.3437	5.2158e-006
21	Optimized	180.75	-13.14999	706.08032	985.37986	161.24066	-5.2357e-006
22	Optimized	182.51575	-12.70955	673.17586	972.10831	172.57482	5.7199e-006
23	Optimized	183.26575	-12.521865	659.32476	969.9146	179.30467	5.9436e-006
24	Optimized	184.25835	-12.256645	639.99202	969.53977	190.24915	-6.1772e-006
25	Optimized	185.65835	-11.92008	615.32752	993.8484	0	192.77
26	Optimized	187	-11.675535	597.16111	1064.8444	0	200.46
27	Optimized	187.9549	-11.501485	584.11701	1118.417	0	205.93
28	Optimized	189.0804	-10.91642	545.87547	1074.0186	0	212.39
29	Optimized	190.1755	-10.32413	507.30932	1063.4944	0	218.67
30	Optimized	190.9166	-9.8027655	473.7866	1023.438	0	222.92
31	Optimized	192.3498	-8.7944955	409.27817	943.03068	0	231.13
32	Optimized	193.8464	-7.71777	339.88201	850.71266	0	239.72
33	Optimized	195.4345	-6.55195	265.79609	757.42235	0	248.82
34	Optimized	196.811	-5.46904	198.57884	539.69377	0	450
35	Optimized	197.94775	-4.48968	139.36374	464.15704	0	450

3/27/2013

36	Optimized	198.58435	-3.941215	106.20279	420.61966	0	450
37	Optimized	198.8263	-3.7283585	93.173687	391.52028	0	450
38	Optimized	199.5	-3.130788	56.549006	329.84988	0	450
39	Optimized	200.25	-2.4655395	31.655584	239.06646	0	450
40	Optimized	200.75	-2.0220405	69.272119	192.51898	0	450
41	Optimized	201.00015	-1.8001615	83.278103	-88713.964	0	450

Slices of Slip Surface: 3159

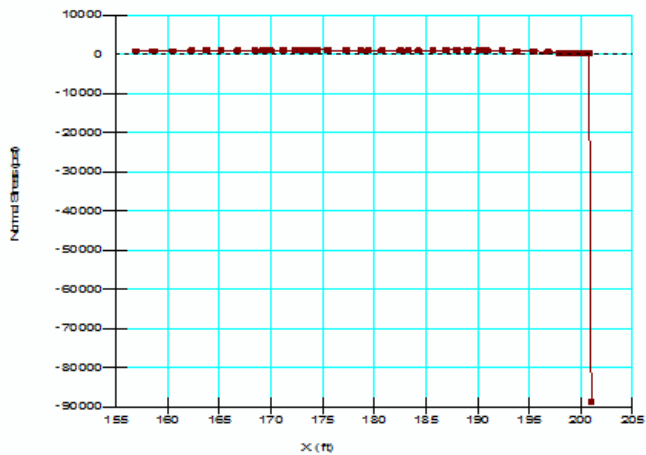
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	3159	158.93485	-14.925695	868.78918	882.65238	5.0457908	0
2	3159	160.2	-15.16631	883.09723	912.07429	10.54679	0
3	3159	161.6	-15.392275	896.26509	936.48393	14.638459	0
4	3159	163	-15.57426	906.5884	956.69027	18.23559	0
5	3159	164.4	-15.712785	914.10398	972.68579	21.322034	0
6	3159	165.8	-15.808245	918.78841	984.55371	23.936614	0
7	3159	167.2	-15.860905	920.41275	992.46617	26.225298	0
8	3159	168.6	-15.870915	918.61267	996.46726	28.336751	0
9	3159	169.86305	-15.845265	913.98966	1029.4475	42.023226	0
10	3159	170.98915	-15.79142	906.00538	1043.0452	49.878427	0
11	3159	172.1761	-15.703865	897.07546	1063.6353	96.155597	3.2601e-008
12	3159	173.6	-15.55612	882.73542	1125.5637	140.18567	-4.5534e-006
13	3159	175.09345	-15.357455	863.22872	1168.2248	176.07537	5.8386e-006
14	3159	176.4804	-15.12641	842.95705	1158.3921	182.10182	6.0391e-006
15	3159	178.18695	-14.775395	815.20273	1138.0939	186.4063	6.1821e-006
16	3159	179.45	-14.48793	793.13264	1120.5416	189.0144	6.2687e-006
17	3159	180.75	-14.12808	766.77474	1093.8935	188.84686	-6.135e-006
18	3159	182.55	-13.585445	727.5061	1062.4009	193.33603	6.4113e-006
19	3159	184	-13.08439	692.21891	1041.6834	201.74718	6.6904e-006
							-6.7645e-

3/27/2013

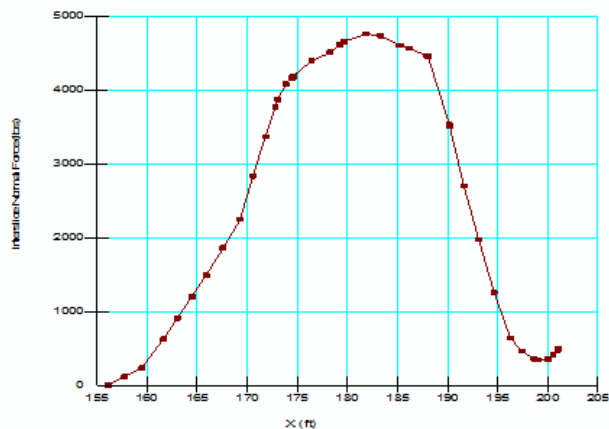
20	3159	185.4	-12.5474	654.86742	1015.5577	208.22787	006
21	3159	186.40905	-12.13291	626.39413	1014.8492	224.25653	7.4372e-006
22	3159	187.30905	-11.7307	599.62952	1041.2272	0	202.23
23	3159	188.475	-11.179655	563.27569	1068.1428	0	208.92
24	3159	189.625	-10.595895	525.14159	1089.6217	0	215.51
25	3159	190.8516	-9.925947	481.42924	1066.2643	0	222.54
26	3159	192.15485	-9.161317	432.1122	997.28787	0	230.02
27	3159	193.4581	-8.3373575	378.83061	922.61234	0	237.49
28	3159	194.7613	-7.450157	322.04678	841.72741	0	244.96
29	3159	196.0645	-6.4951095	261.40908	754.24089	0	252.43
30	3159	197.2871	-5.5349245	201.84463	570.26811	0	450
31	3159	198.42905	-4.573104	143.89392	478.1599	0	450
32	3159	199.04235	-4.0381795	111.56146	426.53272	0	450
33	3159	199.54235	-3.574938	83.229533	370.10205	0	450
34	3159	200.25	-2.907637	4.1484145	266.6407	0	450
35	3159	200.75	-2.4156585	44.628948	205.94602	0	450
36	3159	201.1611	-2.0008585	70.846064	79.142511	0	450

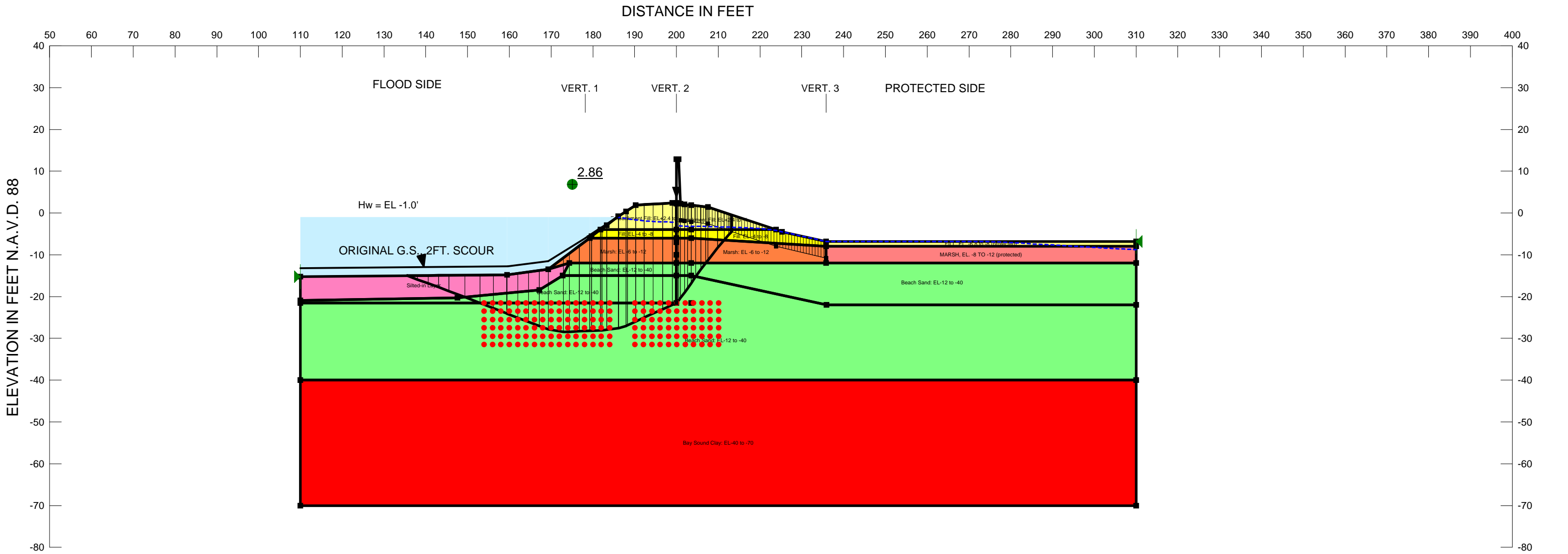
3/27/2013

Base Normal Stress vs. X



Interslice Normal Stress vs. X





Name: Embankment Fill: EL+2.4 to -4 Model: Undrained (Phi=0) Unit Weight: 110 pcf Cohesion: 450 psf
Name: Fill: EL -4 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Fill -4 to -8 Cohesion Fn: Fill -4 to -8 Phi: 0 ° Phi-B: 0 °
Name: Marsh: EL -6 to -12 Model: Spatial Mohr-Coulomb Unit Weight: 88 pcf Cohesion Fn: Marsh Phi: 0 ° Phi-B: 0 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 20 ° Phi-B: 0 °
Name: Beach Sand: EL-12 to -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °
Name: Bay Sound Clay: EL-40 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Phi-B: 0 °
Name: FILL, EL. -6.8 to -8 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 600 psf
Name: MARSH, EL. -8 TO -12 (protected) Model: Undrained (Phi=0) Unit Weight: 96 pcf Cohesion: 150 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO 114+66
FLOOD SIDE STABILITY ANALYSIS - 2 FT EROSION
CASE: BLOCK Around (Piezo: EL-1.0)
MARCH 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

BLOCK Around (Piezo: EL-1.0)

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File Information

Created By: Johnson, Jehu
Revision Number: 170
Last Edited By: Johnson, Jehu 8 MVN
Date: 2/11/2013
Time: 8:05:19 AM
File Name: Reach 35B erosion 2 ft.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\Flood Side Q-Case\Flood Side Strong Sheet
Pile\Water El -1 Based on SeepW\
Last Solved Date: 2/11/2013
Last Solved Time: 8:07:52 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

BLOCK Around (Piezo: EL-1.0)

Kind: SLOPE/W
Method: Spencer
Settings
PWP Conditions Source: Other GeoStudio Analysis
PWP Other Analysis: Steady-State Seepage (EL -1.0) (Open Connection) [(last)]
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes

3/27/2013

BLOCK Around (Piezo: EL-1.0)

Page 3 of 10

Cohesion Spatial Fn: Bay Sound Clay
Phi: 0 °
Phi-B: 0 °

FILL, EL. -6.8 to -8 (protected)

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 600 psf

MARSH, EL. -8 TO -12 (protected)

Model: Undrained (Phi=0)
Unit Weight: 96 pcf
Cohesion: 150 psf

Slip Surface Limits

Left Coordinate: (110, -15.2) ft
Right Coordinate: (310, -6.8) ft

Slip Surface Block

Left Grid
Upper Left: (154, -21.5) ft
Lower Left: (154, -31.5) ft
Lower Right: (184, -31.5) ft
X Increments: 15
Y Increments: 5
Starting Angle: 135 °
Ending Angle: 155 °
Angle Increments: 2
Right Grid
Upper Left: (190.1, -21.5) ft
Lower Left: (190.1, -31.5) ft
Lower Right: (210.1, -31.5) ft
X Increments: 10
Y Increments: 5
Starting Angle: 45 °
Ending Angle: 65 °
Angle Increments: 2

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 2.2) ft
Inside Point: (200, -21.5) ft
Slip Surface Intersection: (200, -21.527) ft
Total Length: 23.7 ft

3/27/2013

Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Embankment Fill: EL+2.4 to -4

Model: Undrained (Phi=0)
Unit Weight: 110 pcf
Cohesion: 450 psf

Fill: EL -4 to -8

Model: Spatial Mohr-Coulomb
Weight Fn: Fill -4 to -8
Cohesion Fn: Fill -4 to -8
Phi: 0 °
Phi-B: 0 °

Marsh: EL -6 to -12

Model: Spatial Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion Fn: Marsh
Phi: 0 °
Phi-B: 0 °

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 20 °
Phi-B: 0 °

Beach Sand: EL-12 to -40

Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °

Bay Sound Clay: EL-40 to -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay

3/27/2013

BLOCK Around (Piezo: EL-1.0)

Page 4 of 10

Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 1000000 lbs
Shear Safety Factor: 1
Shear Load Used: 1000000 lbs
Shear Option: Perp. to Reinf.
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
201	-1.8
201.9	-1.9
203.5	-2.1
207.5	-2.6
223.8	-8
235.8	-10.8

Cohesion Functions

Fill -4 to -8

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 600
Data Points: X (ft), Cohesion (psf)
Data Point: (110, 600)
Data Point: (178.1, 600)
Data Point: (178.3, 450)
Data Point: (200, 450)
Data Point: (235.7, 450)
Data Point: (235.9, 600)
Data Point: (310, 600)

Marsh

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 150
Data Points: X (ft), Cohesion (psf)
Data Point: (178.2, 150)
Data Point: (200, 275)
Data Point: (235.8, 150)

3/27/2013

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function

Function: Shear Stress vs. Normal Stress

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 0

Data Points: Normal Stress (psf), Shear Stress (psf)

Data Point: (-10000, 0)

Data Point: (0, 0)

Data Point: (10000, 5773)

Estimation Properties

Intact Rock Param.: 10

Geological Strength: 100

Disturbance Factor: 0

SigmaC: 600000 psf

Sigma3: 300000 psf

Num. Points: 20

Unit Weight Functions

Fill -4 to -8

Model: Spline Data Point Function

Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 96

Data Points: X (ft), Unit Weight (pcf)

Data Point: (110, 96)

Data Point: (178.1, 96)

Data Point: (178.3, 88)

Data Point: (200, 88)

Data Point: (235.7, 88)

Data Point: (235.9, 96)

Data Point: (310, 96)

Clay

Model: Spline Data Point Function

Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 107

Data Points: X (ft), Unit Weight (pcf)

Data Point: (111.2, 107)

Data Point: (178.2, 107)

Data Point: (200, 108)

Data Point: (235.8, 107)

Data Point: (310, 107)

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation

Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (110, -40, 400)

Data Point: (110, -70, 700)

Data Point: (178.2, -40, 400)

Data Point: (178.2, -70, 700)

Data Point: (200, -40, 600)

Data Point: (200, -70, 900)

Data Point: (235.8, -40, 400)

Data Point: (235.8, -70, 700)

Data Point: (310, -40, 400)

Data Point: (310, -70, 700)

Regions

	Material	Points	Area (ft²)
Region 1	Bay Sound Clay: EL-40 to -70	1,3,4,2	6000
Region 2	Beach Sand: EL-12 to -40	3,9,7,14,15,5,6,4	3782.9
Region 3	Beach Sand: EL-12 to -40	9,10,11,12,13,14,7	279.66
Region 4	Beach Sand: EL-12 to -40	13,18,20,14	79.2
Region 5	Beach Sand: EL-12 to -40	14,20,22,19,21,6,5,15	962.1
Region 6	Silted-in Layer	10,16,17,23,18,13,12,11	322.745
Region 7	Marsh: EL -6 to -12	23,32,31,27,24,20,18	150.9
Region 8	Fill: EL -4 to -8	32,33,37,35,31	39.02
Region 9	Embankment Fill: EL+2.4 to -4	37,50,51,49,41,46,45,43,35	86.05
Region 10	Embankment Fill: EL+2.4 to -4	43,44,42,40,39,36,38,35	87.9045
Region 11		43,45,47,48,44	8.025
Region 12	Fill: EL -4 to -8	31,35,38,36,34,28,25,30	86.2
Region 13	FILL, EL. -6.8 to -8 (protected)	25,28,29,26	89.04
Region 14	Marsh: EL -6 to -12	20,24,27,31,30,25,19,22	182.5
Region 15	MARSH, EL. -8 TO -12 (protected)	19,25,26,21	296.8

Points

	X (ft)	Y (ft)
Point 1	110	-70
Point 2	310	-70
Point 3	110	-40

Point 4	310	-40
Point 5	235.9	-22
Point 6	310	-22
Point 7	200	-21.5
Point 8	203.5	-21.5
Point 9	110	-21.5
Point 10	110	-20.9
Point 11	147.6	-20.3
Point 12	167.2	-18.4
Point 13	172.8	-15
Point 14	200	-15
Point 15	203.5	-15
Point 16	110	-15.2
Point 17	159.5	-14.8
Point 18	174.4	-12
Point 19	235.8	-12
Point 20	200	-12
Point 21	310	-12
Point 22	203.5	-12
Point 23	169.3	-13.5
Point 24	200	-10
Point 25	235.8	-8
Point 26	310	-8
Point 27	200	-7
Point 28	235.8	-6.8
Point 29	310	-6.8
Point 30	203.5	-6
Point 31	200	-6
Point 32	179.2	-6
Point 33	179.7	-5.6
Point 34	225.3	-4.5
Point 35	200	-4
Point 36	223.8	-4
Point 37	181.8	-4
Point 38	203.5	-4
Point 39	207.5	1.4
Point 40	203.5	1.89
Point 41	190.2	1.9
Point 42	201.9	2.09
Point 43	200	2.2
Point 44	201	2.2
Point 45	200	2.4
Point 46	199	2.4
Point 47	200	12.9

	200.5	12.9
Point 49	187.9	0.4
Point 50	183.3	-2.9
Point 51	186.1	-0.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.86	(176.609, -3.085)	36.23761	(213.242, -0.50233)	(135.519, -14.9938)
2	7198	3.25	(176.609, -3.085)	35.483	(216.138, -1.46175)	(138.834, -14.967)

Slices of Slip Surface: Optimized

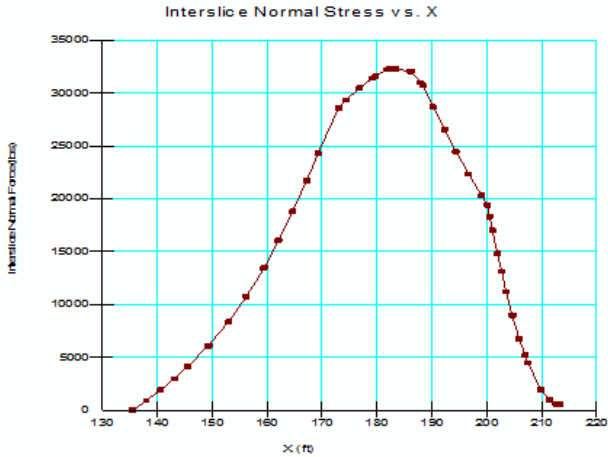
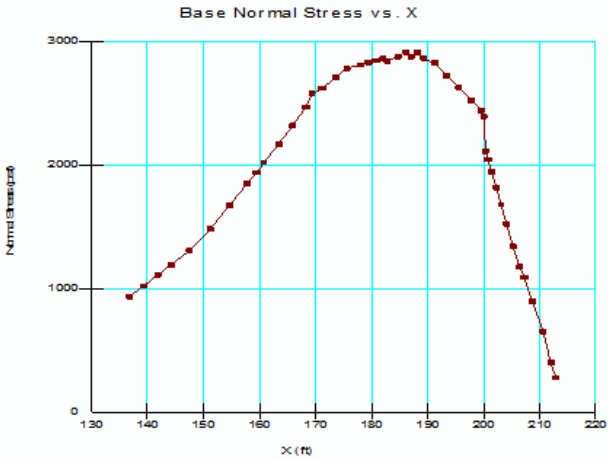
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	136.7749	-15.454265	901.77454	934.78453	12.014653	0
2	Optimized	139.2863	-16.375235	958.85976	1021.4404	22.777496	0
3	Optimized	141.7977	-17.296205	1015.7581	1108.1337	33.621979	0
4	Optimized	144.3091	-18.217175	1072.5442	1194.7896	44.493675	0
5	Optimized	147.46645	-19.40313	1145.3256	1307.831	59.147142	0
6	Optimized	151.19485	-20.8255	1232.0238	1480.7762	143.60569	4.7614e-006
7	Optimized	154.61195	-22.156315	1312.4213	1670.6146	206.78632	-6.7165e-006
8	Optimized	157.7927	-23.424145	1388.207	1848.8789	265.9476	-8.6378e-006
9	Optimized	159.44155	-24.080325	1426.9656	1937.1844	294.5512	-9.5666e-006
10	Optimized	160.78335	-24.59145	1456.9017	2020.1108	325.14272	-9.593e-005
11	Optimized	163.35	-25.56917	1513.6996	2167.4212	377.39592	-6.1799e-005
12	Optimized	165.91665	-26.54689	1570.0969	2314.768	429.90135	-7.0401e-005
13	Optimized	168.25	-27.435725	1620.4136	2468.0002	489.3149	-0.00014437
14	Optimized	169.309	-27.839135	1643.2697	2576.5723	538.79906	-8.8233e-005
15	Optimized	171.14185	-28.161885	1659.7703	2618.4373	553.44201	-9.0633e-005
16	Optimized	173.68285	-28.44945	1671.8036	2714.1559	601.75387	-1.4422e-005
17	Optimized	175.6	-28.36457	1662.2467	2780.8592	645.7792	-1.5477e-005
18	Optimized	178	-28.25831	1650.0503	2809.9974	669.64177	3.9551e-005
19	Optimized	179.45	-28.19411	1642.471	2828.4293	684.65811	4.0441e-005
20	Optimized	180.75	-28.136555	1635.6835	2844.0237	697.57931	-1.6719e-005

21	Optimized	181.9926	-28.08154	1629.144	2861.9783	711.71979	-1.7057e-005
22	Optimized	182.7426	-27.99879	1622.1638	2841.7877	704.09342	-1.6875e-005
23	Optimized	184.7	-27.738155	1600.8352	2874.9115	735.52902	-1.7628e-005
24	Optimized	186.1235	-27.548615	1585.3476	2912.7631	766.32192	-1.8366e-005
25	Optimized	187.0235	-27.28121	1566.4289	2877.0385	756.61982	4.4692e-005
26	Optimized	188.0972	-26.95748	1543.4883	2912.462	790.31361	-1.8942e-005
27	Optimized	189.2472	-26.452525	1509.0352	2864.7188	782.64118	-1.8758e-005
28	Optimized	191.24035	-25.520585	1445.877	2824.8826	796.10507	-1.9081e-005
29	Optimized	193.3211	-24.547715	1379.9199	2724.4884	776.22443	-1.8605e-005
30	Optimized	195.5211	-23.53998	1311.5303	2627.3079	759.6033	-1.8206e-005
31	Optimized	197.84035	-22.497375	1240.1139	2519.9866	738.87529	-1.7709e-005
32	Optimized	199.5	-21.7513	1187.6173	2440.2657	723.15862	-1.7333e-005
33	Optimized	200.0441	-21.506695	1170.1469	2391.9697	705.36282	-1.6906e-005
34	Optimized	200.2941	-21.20866	1148.6526	2109.6964	554.81416	-9.0882e-005
35	Optimized	200.75	-20.592635	1104.6942	2044.6372	542.63262	-8.8886e-005
36	Optimized	201.45	-19.64672	1041.9228	1941.0802	519.08693	-8.5035e-005
37	Optimized	202.2703	-18.53822	969.75324	1817.0223	489.1316	-8.0125e-005
38	Optimized	203.0703	-17.423075	898.24571	1678.0275	450.17094	-7.3742e-005
39	Optimized	204.0491	-16.0228	809.14591	1523.5524	412.42951	-6.756e-005
40	Optimized	205.2222	-14.3445	702.10374	1338.4269	367.35171	-6.0174e-005
41	Optimized	206.40465	-12.72587	598.68013	1176.5599	333.61213	-5.4645e-005
42	Optimized	207.23155	-11.651105	529.70288	1088.6646	0	249.75
43	Optimized	208.65445	-9.801695	410.35539	895.37126	0	244.78
44	Optimized	210.6053	-7.395224	255.58037	650.87872	0	237.97
45	Optimized	211.9511	-5.864254	157.04293	401.19039	0	450
46	Optimized	212.87135	-4.870785	92.810551	277.48766	0	450

Slices of Slip Surface: 7198

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	7198	140.206	-15.606835	911.17572	953.71267	15.482182	0
2	7198	142.95025	-16.886505	990.30501	1074.6193	30.687897	0
3	7198	145.69455	-	1069.2031	1195.559	45.989774	0

			18.166175				
4	7198	148.4388	-19.445845	1147.771	1316.4987	61.411854	0
5	7198	151.3274	-20.79284	1229.9739	1482.8295	145.97444	4.8403e-006
6	7198	153.95325	-22.017295	1304.1819	1653.6032	201.72219	6.6887e-006
7	7198	156.17195	-23.051885	1366.4765	1797.9631	249.09884	-8.0907e-006
8	7198	158.39065	-24.086475	1428.3217	1942.323	296.7349	-8.7551e-005
9	7198	160.78335	-25.2022	1494.384	2108.8608	354.73972	-0.00010466
10	7198	163.35	-26.399055	1564.6876	2285.838	416.32279	-0.00012283
11	7198	165.91665	-27.59591	1634.4969	2462.8505	478.21165	-7.8313e-005
12	7198	168.25	-28.68396	1697.169	2643.1815	546.13657	-8.9441e-005
13	7198	169.65	-29.33679	1735.0616	2797.9018	613.58158	3.6243e-005
14	7198	171.4	-29.5	1741.8571	2732.1786	571.71625	-9.3627e-005
15	7198	173.6	-29.5	1737	2848.5625	641.70918	-1.538e-005
16	7198	175.6	-29.5	1732.5833	2933.125	693.07718	-1.6611e-005
17	7198	178	-29.5	1727.0417	2975.9583	721.00425	-1.728e-005
18	7198	179.45	-29.5	1723.44	3002.6	738.46384	-1.7699e-005
19	7198	180.75	-29.5	1720.2381	3025.6667	753.62878	-1.8062e-005
20	7198	182.55	-29.5	1715.8	3069.4	781.43833	4.6156e-005
21	7198	184.7	-29.5	1710.2143	3142.75	827.00821	-1.9821e-005
22	7198	187	-29.5	1704.2222	3270.4444	904.18593	-2.167e-005
23	7198	189.05	-29.5	1698.7391	3420.2609	993.84092	-2.3819e-005
24	7198	191.15	-29.5	1693.0526	3509.5263	1048.657	-2.5133e-005
25	7198	193.25	-28.35	1615.7698	2990.2318	793.48201	-1.9018e-005
26	7198	195.55	-26.05	1466.4473	2750.7993	741.46116	-1.7771e-005
27	7198	197.85	-23.75	1317.217	2511.3667	689.38708	-1.6523e-005
28	7198	199.5	-22.1	1209.1522	2336.9165	651.06251	-1.5604e-005
29	7198	200.25	-21.35	1158.5237	2236.5787	622.36515	-1.4917e-005
30	7198	200.75	-20.85	1121.8956	2181.4244	611.66991	-1.466e-005
31	7198	201.45	-20.15	1074.4882	2099.7146	591.86704	-1.4186e-005
32	7198	202.7	-18.9	992.11488	1948.9628	552.39188	-9.047e-005
33	7198	204.7746	-16.82538	858.37886	1699.3383	485.48901	-7.9509e-005
34	7198	206.7746	-14.82538	729.79004	1458.8977	420.91658	-6.8934e-005
35	7198	208.55	-13.05	614.91363	1225.5173	352.50376	-5.7731e-005
36	7198	210.9236	-10.676385	460.68794	941.9702	0	236.86
37	7198	213.57085	-8.0291545	288.45417	630.30401	0	227.62
38	7198	215.51635	-6.083645	162.01985	318.83214	0	450



APPENDIX K S-CASE STABILITY ANALYSES

APPENDIX K.1 S-CASE STABILITY ANALYSES FOR FLOOD AND PROTECTED SIDE RESULTS

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 205
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 10:29:50 AM
File Name: Reach 1_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 10:30:30 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Porewater Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 0

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

SILT, EL. -21.5 TO -26.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

CLAY 2, -26.5 TO -41.5

Model: Spatial Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

CLAY3, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

SILT, EL. -41.5 TO -53.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

EMBANKMENT FILL, EL. 0.4 TO -1.5 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
 FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 2 ft
 Optimization Maximum Iterations: 6000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.5 TO -1.5

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

SILTY SAND, EL. -53.5 TO -58.5

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

CLAY3, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5 (protected side toe)

Model: Spatial Mohr-Coulomb
Weight Fn: clay1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

CLAY 2, -26.5 TO -41.5 (protected side toe)

Model: Spatial Mohr-Coulomb
Weight Fn: clay2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -5.9) ft
Left-Zone Right Coordinate: (152.6, -5.88978) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (203.6, 3.30645) ft
Right-Zone Right Coordinate: (230, 0.34634) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (20, -5.9) ft
Right Coordinate: (310, 0.1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
20	0.4
188	0.4
221.2	0.4
270.4	0.1
310	0.1

Unit Weight Functions

clay1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 111
Data Points: X (ft), Unit Weight (pcf)
Data Point: (188, 111)
Data Point: (200, 112)
Data Point: (221.6, 111)

clay2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (188, 101)
Data Point: (200, 102)
Data Point: (221.6, 101)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. 4.5 TO -1.5	27,43,14,4,44,3,46,47,28,21,13,25	121.83862

Region 2	EMBANKMENT FILL, EL. 4.5 TO -1.5	25,17,5,22,52,28,21,13	166.3
Region 3	CLAY 1, EL. -5.5 TO -21.5	47,28,35,45,34,18,57	140.50074
Region 4	CLAY 1, EL. -5.5 TO -21.5	28,52,53,48,57,18,34,45,35	389.6
Region 5	SILT, EL. -21.5 TO -26.5	7,48,53,8,31,54,49,30	1450
Region 6	CLAY 2, -26.5 TO -41.5	49,54,55,50	498
Region 7	SILTY SAND, EL. -53.5 TO -58.5	42,10,37,38,9,41,51,56	1450
Region 8	CLAY3, EL. -58.5 TO -70	38,37,40,39	381.8
Region 9	CLAY3, EL. -58.5 TO -70 (protected)	11,9,38,39	1932
Region 10	CLAY3, EL. -58.5 TO -70 (protected)	37,10,12,40	1021.2
Region 11	SILT, EL. -41.5 TO -53.5	41,32,50,55,33,42,56,51	3480
Region 12	EMBANKMENT FILL, EL. 0.4 TO -1.5 (protected side toe)	46,24,1,2,47	68.501441
Region 13	EMBANKMENT FILL, EL. 0.4 TO -1.5 (protected side toe)	22,36,6,29,52	504.66
Region 14	CLAY 1, EL. -5.5 TO -21.5 (protected side toe)	52,29,8,53	1420.8
Region 15	CLAY 1, EL. -5.5 TO -21.5 (protected side toe)	1,2,47,57,20,58	1916.7392
Region 16	CLAY 1, EL. -5.5 TO -21.5 (protected side toe)	20,57,48,7	705.6
Region 17	CLAY 2, -26.5 TO -41.5 (protected side toe)	54,31,33,55	1332
Region 18	CLAY 2, -26.5 TO -41.5 (protected side toe)	30,49,50,32	2520

Points

	X (ft)	Y (ft)
--	--------	--------

Point 1	152.5	-5.9
Point 2	173.8	-5.9
Point 3	189.5	1.5
Point 4	191.5	6
Point 5	213.4	2.2
Point 6	310	0.1
Point 7	20	-21.5
Point 8	310	-21.5
Point 9	20	-58.5
Point 10	310	-58.5
Point 11	20	-70
Point 12	310	-70
Point 13	200	1.5
Point 14	193.8	6
Point 15	193.8	1.5
Point 16	200.5	12.8
Point 17	201	3.6
Point 18	200	-17.3
Point 19	193.8	-16.5
Point 20	20	-17.3
Point 21	200	-4.9
Point 22	221.2	0.4
Point 23	201	6
Point 24	183.8	-2.7
Point 25	200	3.6
Point 26	200	12.8
Point 27	200	5.4
Point 28	200	-5.5
Point 29	310	-5.5
Point 30	20	-26.5
Point 31	310	-26.5
Point 32	20	-41.5
Point 33	310	-41.5
Point 34	200	-12.5
Point 35	200	-7.2
Point 36	270.4	0.1

Point 37	221.2	-58.5
Point 38	188	-58.5
Point 39	188	-70
Point 40	221.2	-70
Point 41	20	-53.5
Point 42	310	-53.5
Point 43	199	5.4
Point 44	191.5	3
Point 45	200	-10.9
Point 46	188.00714	0.4
Point 47	188	-5.68321
Point 48	188	-21.5
Point 49	188	-26.5
Point 50	188	-41.5
Point 51	188	-53.5
Point 52	221.2	-5.5
Point 53	221.2	-21.5
Point 54	221.2	-26.5
Point 55	221.2	-41.5
Point 56	221.2	-53.5
Point 57	188	-17.3
Point 58	20	-5.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.06	(166.582, 62.582)	22.39646	(203.6, 3.30645)	(153.061, -5.84268)
2	4623	1.44	(166.582, 62.582)	69.885	(203.6, 3.30645)	(152.6, -5.88978)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
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1	Optimiz ed	153.8867	-5.827765	388.61228	396.64331	3.4089699	0
2	Optimiz ed	155.5387 5	-5.797935	386.74826	402.68928	6.7665613	0
3	Optimiz ed	157.1908 5	-5.768105	384.89029	408.74129	10.124153	0
4	Optimiz ed	158.8429 5	-5.738275	383.02626	414.79331	13.484313	0
5	Optimiz ed	160.2167 5	-5.665975	378.51725	408.63885	12.785862	0
6	Optimiz ed	161.6630 5	-5.47947	366.87854	392.68876	10.955788	0
7	Optimiz ed	163.3495	-5.27896	354.3695	381.653	11.581159	0
8	Optimiz ed	165.2339 5	-5.16755	347.4138	382.378	14.841425	0
9	Optimiz ed	167.3666 5	-5.11355	344.04344	389.77983	19.413947	0
10	Optimiz ed	168.4439	-5.09559	342.92145	388.31737	19.269426	0
11	Optimiz ed	169.211	-5.0628175	340.88227	392.61847	21.960716	0
12	Optimiz ed	170.663	-5.0052325	337.29005	394.11867	24.122319	0
13	Optimiz ed	172.2755	-4.9709785	335.14924	401.89935	28.333737	0
14	Optimiz ed	174.0485	-4.9600555	334.4668	410.98548	32.480255	0
15	Optimiz ed	175.8215	-4.9491325	333.78435	420.07162	36.626772	0
16	Optimiz ed	177.5945	-4.93821	333.1019	429.15775	40.773289	0
17	Optimiz ed	179.3675	-4.9272875	332.4251	438.24953	44.919807	0
18	Optimiz ed	181.1405	-4.9163645	331.74265	447.33566	49.066324	0
19	Optimiz ed	182.9135	-4.9054415	331.0602	456.4218	53.212841	0

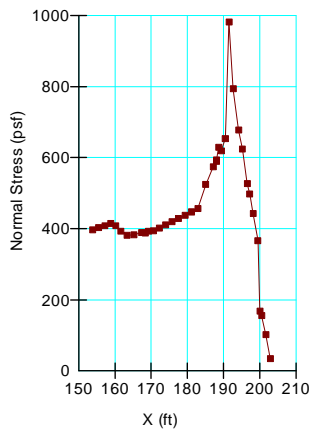
20	Optimiz ed	185.0628 5	-4.8922	330.23219	524.16363	82.319011	0
21	Optimiz ed	187.1628 5	-4.7906215	323.89258	574.43463	106.34879	0
22	Optimiz ed	188.0006	-4.696758	318.03849	594.10784	117.18449	0
23	Optimiz ed	188.0041 5	-4.696358	318.0146	589.1485	115.08951	0
24	Optimiz ed	188.6349	-4.6256865	313.60667	629.22384	133.97154	0
25	Optimiz ed	189.3813 5	-4.506242	306.1491	619.34462	132.94361	0
26	Optimiz ed	190.5	-4.043334	277.26444	653.69412	159.78492	0
27	Optimiz ed	191.5088 5	-3.625882	251.21679	982.49189	310.40786	0
28	Optimiz ed	192.6588 5	-2.7609285	197.24038	793.92751	253.27866	0
29	Optimiz ed	194.1815 5	-1.6116635	125.53131	677.35233	234.23413	0
30	Optimiz ed	195.2154	-0.909485	81.712996	624.03545	230.20222	0
31	Optimiz ed	196.52	-0.081055	30.017943	527.10318	211.00016	0
32	Optimiz ed	197.2366	0.36658	2.0854206	497.69812	210.37511	0
33	Optimiz ed	198.1504 5	0.8415915	-27.555217	442.29238	187.74198	0
34	Optimiz ed	199.5	1.5430765	-71.3278	366.346	155.50465	0
35	Optimiz ed	200.0419 5	1.82478	-88.906017	168.61978	71.574851	0
36	Optimiz ed	200.5419 5	2.0367665	-102.13703	155.36806	65.949829	0
37	Optimiz ed	201.65	2.49682	-130.83991	102.35167	43.445705	0
38	Optimiz ed	202.95	3.0365745	-164.5214	34.116985	14.481801	0

Slices of Slip Surface: 4623

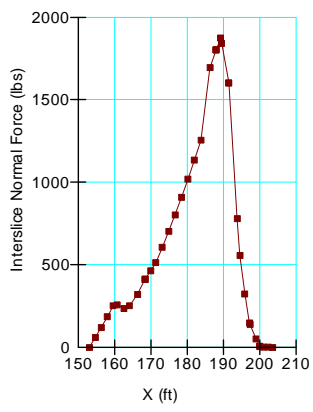
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4623	153.5063	-6.0624215	403.25378	434.17658	13.125953	0
2	4623	155.29385	-6.379321	423.03118	480.93333	24.578005	0
3	4623	157.05635	-6.6448395	439.59991	520.75353	34.447668	0
4	4623	158.81885	-6.8646195	453.31007	554.63708	43.010762	0
5	4623	160.58135	-7.039095	464.19999	582.75137	50.322075	0
6	4623	162.34385	-7.168606	472.27845	605.29931	56.464008	0
7	4623	164.10635	-7.253402	477.57023	622.36547	61.461929	0
8	4623	165.86885	-7.293647	480.08628	634.12761	65.386662	0
9	4623	167.6313	-7.289418	479.81914	640.72707	68.301365	0
10	4623	169.39375	-7.2407065	476.78034	642.15112	70.195732	0
11	4623	171.15625	-7.147419	470.95751	638.57589	71.149784	0
12	4623	172.91875	-7.0093765	462.34639	630.02288	71.174448	0
13	4623	174.706	-6.8230965	450.71943	616.27429	70.273867	0
14	4623	176.518	-6.586916	435.98251	597.1338	68.404663	0
15	4623	178.32995	-6.30227	418.22123	572.91548	65.663814	0
16	4623	180.1419	-5.9685545	397.3985	543.61243	62.064132	0
17	4623	181.73595	-5.6365155	376.67985	513.01133	57.869283	0
18	4623	183.112	-5.3161885	356.68692	482.07633	53.224649	0
19	4623	184.85	-4.8643045	328.49297	482.15188	65.224337	0
20	4623	186.95	-4.2599675	290.78115	482.79801	81.506323	0
21	4623	188.001	-3.9396895	270.7978	480.8685	89.169725	0
22	4623	188.00455	-3.93854	270.72608	476.90101	87.516066	0
23	4623	188.75355	-3.687996	255.0896	502.30213	104.9355	0
24	4623	190.5	-3.0739855	216.77444	567.61059	148.92111	0
25	4623	192.65	-2.247289	165.18957	857.85629	294.01958	0
26	4623	194.57955	-1.443991	115.06242	753.89981	271.17038	0
27	4623	196.1387	-0.7392253	71.084759	654.35639	247.58412	0
28	4623	197.69785	0.0123262	24.190742	551.06973	223.64686	0
29	4623	198.7387	0.53541755	-8.4500897	481.4667	204.37049	0
30	4623	199.5	0.93783155	-33.5608	436.5127	185.28865	0
31	4623	200.5	1.482388	-67.541161	205.63988	87.288952	0

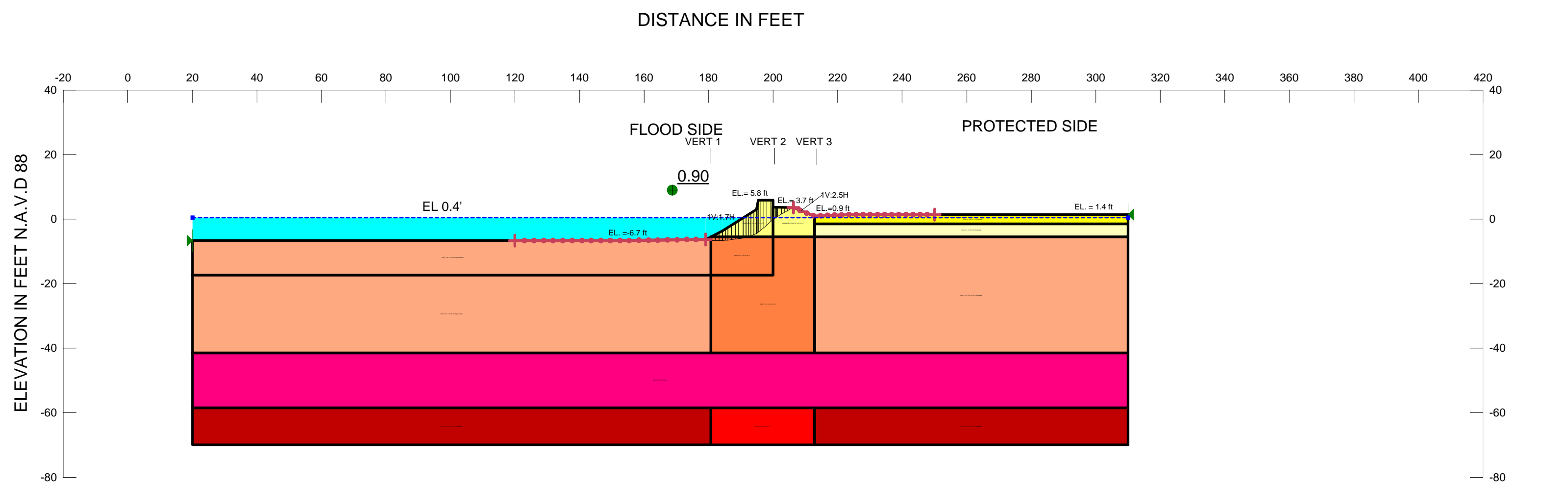
32	4623	201.65	2.13705	-108.39429	133.78454	56.788167	0
33	4623	202.95	2.910302	-156.6396	44.753982	18.996938	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. 5.8 TO -5.5 Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: CLAY 1, EL. -5.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: SILT, EL.-41.5 TO -58.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
Name: CLAY 2, EL. -58.5 TO -70 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: FILL, EL. 0.9 TO -1.5 (Protected) Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: FILL, EL. -1.5 TO -5.5 (Protected) Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: CLAY 1, EL. -5.5 TO -41.5 (protected) Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: CLAY 2, EL. -58.5 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.56.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



US Army Corps
of Engineers®
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 2 STA. 10+00 TO 12+21, 13+88 TO 21+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 214
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 10:38:38 AM
File Name: Reach 2_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 10:42:16 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 5.8 TO -5.5

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL.-41.5 TO -58.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70

Model: Mohr-Coulomb

Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. 0.9 TO -1.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. -1.5 TO -5.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -41.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -6.7) ft

Left-Zone Right Coordinate: (179.1, -6.3) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (206.3, 3.5) ft
Right-Zone Right Coordinate: (250, 1.4) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (20, -6.7) ft
Right Coordinate: (310, 1.4) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
20	0.4
310	0.4

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. 5.8 TO -5.5	3,4,14,21,15,41,23	115.235
Region 2	EMBANKMENT FILL, EL. 5.8 TO -5.5	15,21,19,5,24,31,32	107.48
Region 3	CLAY 1, EL. -5.5 TO -41.5	41,15,16,17,35	227.74
Region 4	CLAY 1, EL. -5.5 TO -41.5	35,17,16,15,32,34,28,36	927.86
Region 5	CLAY 2, EL. -58.5 TO -70	37,29,39,40,30,38	369.15
Region 6	SILT, EL.-41.5 TO -58.5	10,8,36,28,34,9,11,39,29,37	4930
Region 7	FILL, EL. 0.9 TO -1.5 (Protected)	26,6,31,24,25	279.18
Region 8	FILL, EL. -1.5 TO -5.5 (Protected)	32,31,6,33	388.8
Region 9	CLAY 1, EL. -5.5 TO -41.5 (protected)	20,7,1,2,41,35	1710.4
Region 10	CLAY 1, EL. -5.5 TO -41.5 (protected)	8,36,35,20	3888.94
Region 11	CLAY 1, EL. -5.5 TO -41.5 (protected)	32,33,9,34	3499.2
Region 12	CLAY 2, EL. -58.5 TO -70 (protected)	12,38,37,10	1848.05
Region 13	CLAY 2, EL. -58.5 TO -70 (protected)	40,13,11,39	1117.8

Points

	X (ft)	Y (ft)
Point 1	150.6	-6.7
Point 2	179.1	-6.3
Point 3	194.8	3
Point 4	195.4	5.8
Point 5	206.3	3.5
Point 6	310	-1.5
Point 7	20	-6.7
Point 8	20	-41.5
Point 9	310	-41.5
Point 10	20	-58.5
Point 11	310	-58.5
Point 12	20	-70
Point 13	310	-70
Point 14	200	5.8
Point 15	200	-5.5
Point 16	200	-9.5
Point 17	200	-17.3
Point 18	200.5	12.8
Point 19	201	3.7
Point 20	20	-17.3
Point 21	200	3.7
Point 22	201	6
Point 23	184.3	-3.7
Point 24	212.8	0.9
Point 25	223.6	1.4
Point 26	310	1.4
Point 27	200	12.8
Point 28	200	-41.5
Point 29	200	-58.5
Point 30	200	-70
Point 31	212.8	-1.5
Point 32	212.8	-5.5
Point 33	310	-5.5

Point 34	212.8	-41.5
Point 35	180.7	-17.3
Point 36	180.7	-41.5
Point 37	180.7	-58.5
Point 38	180.7	-70
Point 39	212.8	-58.5
Point 40	212.8	-70
Point 41	180.7	-5.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.90	(181.197, 29.299)	15.54632	(206.3, 3.5)	(176.825, -6.33193)
2	4393	1.02	(181.197, 29.299)	35.997	(206.3, 3.5)	(176.145, -6.34147)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	177.3939	-6.419375	425.52951	445.82013	8.6128575	0
2	Optimiz ed	178.5313	-6.594271	436.44387	469.66487	14.101479	0
3	Optimiz ed	179.1007	-6.6818295	441.90363	521.46852	33.773293	0
4	Optimiz ed	179.50105	-6.685353	442.13184	513.39338	30.24873	0
5	Optimiz ed	180.30035	-6.692179	442.5572	535.78772	39.574006	0
6	Optimiz ed	181.3937	-6.701516	443.13555	566.03896	52.169402	0
7	Optimiz ed	182.64055	-6.690642	442.45677	590.65611	62.90689	0
8	Optimiz ed	183.74685	-6.6570455	440.36067	615.10453	74.174368	0

	ed						
9	Optimiz ed	184.30275	-6.6401635	439.30653	633.47155	82.41816	0
10	Optimiz ed	184.736	-6.6067875	437.22753	633.56827	83.341699	0
11	Optimiz ed	185.59705	-6.5402025	433.07052	652.36168	93.083575	0
12	Optimiz ed	186.57615	-6.4378115	426.67619	659.76053	98.938432	0
13	Optimiz ed	187.67325	-6.299615	418.05784	676.68071	109.7789	0
14	Optimiz ed	188.77035	-6.1614185	409.43045	693.60994	120.62704	0
15	Optimiz ed	190.02215	-5.971243	397.56807	697.46079	127.29691	0
16	Optimiz ed	191.1392	-5.778918	385.56888	725.75921	144.40223	0
17	Optimiz ed	191.9	-5.603835	374.64605	725.57474	148.96039	0
18	Optimiz ed	192.67985	-5.37047	360.07604	752.16793	166.43314	0
19	Optimiz ed	193.5345	-5.054664	340.36833	735.87262	167.88161	0
20	Optimiz ed	194.37815	-4.6821125	317.12123	749.30692	183.45194	0
21	Optimiz ed	194.90665	-4.4487485	302.56316	799.14008	210.7844	0
22	Optimiz ed	195.20665	-4.237669	289.38115	789.47768	212.27838	0
23	Optimiz ed	195.79375	-3.739734	258.31881	814.70076	236.17013	0
24	Optimiz ed	196.6379	-3.00945	212.74645	738.59114	223.20783	0
25	Optimiz ed	197.53865	-2.21677	163.28313	665.20874	213.05478	0
26	Optimiz ed	198.6252	-1.277135	104.65469	583.83939	203.40184	0
27	Optimiz ed	199.6307	-0.4622895	53.807032	533.27079	203.52029	0

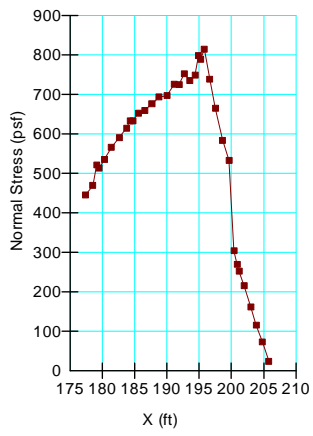
	ed						
28	Optimiz ed	200.4017	0.1046305	18.431144	303.74934	121.11039	0
29	Optimiz ed	200.9017	0.4723011	-4.5114636	269.46286	114.3802	0
30	Optimiz ed	201.1738	0.6723861	-16.996987	252.20213	107.05345	0
31	Optimiz ed	201.9712	1.19618	-49.681508	215.84088	91.619016	0
32	Optimiz ed	203.01975	1.8326675	-89.398607	162.05328	68.787536	0
33	Optimiz ed	203.86965	2.3136225	-119.40498	115.63678	49.084901	0
34	Optimiz ed	204.79595	2.7905755	-149.17632	72.701131	30.859799	0
35	Optimiz ed	205.79865	3.2635255	-178.6816	24.233732	10.286609	0

Slices of Slip Surface: 4393

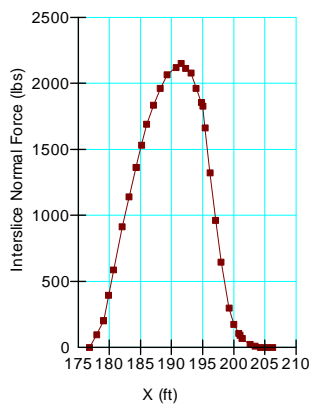
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4393	176.63765	-6.404358	424.59445	438.82481	6.0404293	0
2	4393	177.6226	-6.51639	431.58399	451.52656	8.4651207	0
3	4393	178.60755	-6.601055	436.86726	460.6139	10.07985	0
4	4393	179.5	-6.6554505	440.26005	508.24688	28.858701	0
5	4393	180.3	-6.6842955	442.06274	530.98513	37.745315	0
6	4393	181.15	-6.6948485	442.72183	551.85507	46.32431	0
7	4393	182.05	-6.6847625	442.08684	570.58405	54.54383	0
8	4393	182.95	-6.6521465	440.0548	586.09235	61.989264	0
9	4393	183.85	-6.596939	436.60893	598.4563	68.700132	0
10	4393	184.80875	-6.5123635	431.32741	616.24768	78.493994	0
11	4393	185.82625	-6.395066	424.00857	628.77126	86.916605	0
12	4393	186.84375	-6.248263	414.84915	637.30886	94.428542	0
13	4393	187.86125	-6.0715865	403.825	641.91679	101.06397	0
14	4393	188.87875	-5.864586	390.90997	642.64474	106.85507	0
15	4393	189.89625	-5.6267215	376.06906	639.52912	111.83216	0

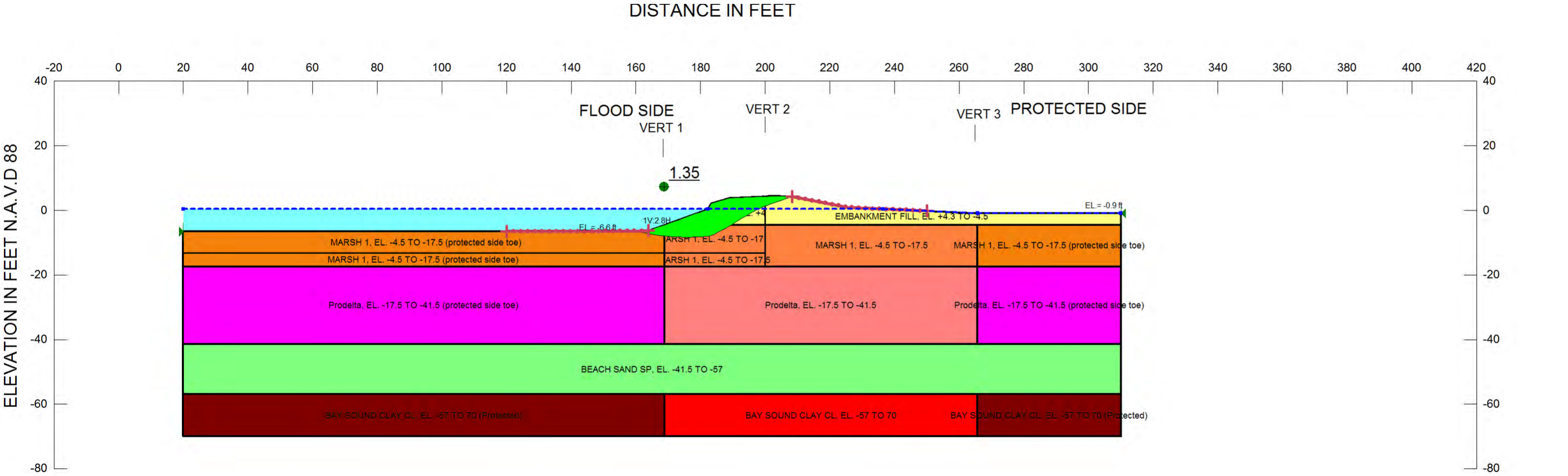
16	4393	190.5652	-5.4568175	365.47701	635.81789	114.7529	0
17	4393	191.2347	-5.2657205	353.54464	649.85581	125.77663	0
18	4393	192.25335	-4.953396	334.04863	677.2713	145.68938	0
19	4393	193.272	-4.607597	312.47717	699.57561	164.31354	0
20	4393	194.29065	-4.2272865	288.74598	716.73048	181.66864	0
21	4393	195.1	-3.9027395	268.49321	846.37238	245.29516	0
22	4393	195.86	-3.5719145	247.84938	940.17586	293.87515	0
23	4393	196.78	-3.1457765	221.25875	884.26096	281.42774	0
24	4393	197.7	-2.687504	192.66176	825.74568	268.72818	0
25	4393	198.62	-2.195692	161.97497	764.53519	255.77164	0
26	4393	199.54	-1.6687405	129.08638	700.5716	242.58108	0
27	4393	200.5	-1.0785444	92.258973	442.58312	148.70378	0
28	4393	201.41465	-0.4793027	54.868675	375.33533	136.03003	0
29	4393	202.24395	0.10110815	18.650504	310.19938	123.75515	0
30	4393	203.11375	0.7494335	-21.804858	243.2821	103.26712	0
31	4393	204.0241	1.4722685	-66.909614	175.35695	74.434608	0
32	4393	204.93445	2.2450545	-115.13415	105.97725	44.984673	0
33	4393	205.8448	3.0722195	-166.75005	35.237474	14.95742	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +4.3 TO -4.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -4.5 TO -17.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -41.5 TO -57 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -57 TO 70 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Prodelta, EL. -17.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -57 TO 70 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -4.5 TO -17.5 (protected side toe) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Prodelta, EL. -17.5 TO -41.5 (protected side toe) Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

LONDON AVE OUTFALL CANAL, REACH 3,
PROTECTED SIDE STABILITY ANALYSIS,
CASE: FS Slope Stability (Entry/Exit)_Global
STA. 21+00 TO 33+00
ORLEANS PARISH, LOUISIANA

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 178
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 10:46:58 AM
File Name: Reach 3_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 1
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf

Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -4.5 TO -17.5 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, EL. -17.5 TO -41.5 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -6.6) ft
Left-Zone Right Coordinate: (163.9, -6.22941) ft
Left-Zone Increment: 20

Right Projection: Range
Right-Zone Left Coordinate: (208.3, 4.3) ft
Right-Zone Right Coordinate: (250, -0.19876) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (20, -6.6) ft
Right Coordinate: (310, -0.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	20	0.4
	182.3	0.4
	236.5	0.4
	265.7	-0.9
	310	-0.9

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +4.3 TO -4.5	31,27,28,7,26,1,17	175.48
Region 2	EMBANKMENT FILL, EL. +4.3 TO -4.5	1,29,23,2,3,30,4,8,24,17	536.01
Region 3	MARSH 1, EL. -4.5 TO -17.5	31,17,18,36	273.76081
Region 4	MARSH 1, EL. -4.5 TO -17.5	18,17,24,25,19	854.1
Region 5	MARSH 1, EL. -4.5 TO -17.5	36,18,19,37	131.83919
Region 6	Prodelta, EL. -17.5 TO -41.5	37,19,25,39,38	2325.6
Region 7	BEACH SAND SP, EL. -41.5 TO -57	13,11,38,39,12,14,33,32	4495
Region 8	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	13,15,34,32	1934.4
Region 9	BAY SOUND CLAY CL, EL. -57 TO 70	32,34,35,33	1259.7
Region 10	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	33,35,16,14	575.9

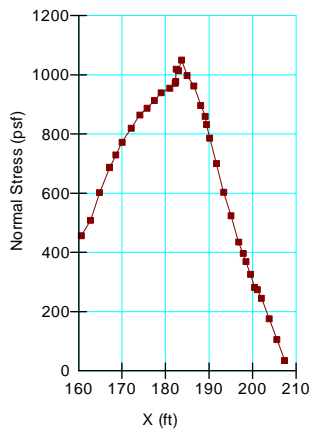
Region 11	MARSH 1, EL. -4.5 TO -17.5 (protected side toe)	25,24,8,10	575.9
Region 12	MARSH 1, EL. -4.5 TO -17.5 (protected side toe)	5,6,31,36,9,40	995.51849
Region 13	MARSH 1, EL. -4.5 TO -17.5 (protected side toe)	9,36,37,20	636.21151
Region 14	Prodelta, EL. -17.5 TO -41.5 (protected side toe)	20,37,38,11	3571.2
Region 15	Prodelta, EL. -17.5 TO -41.5 (protected side toe)	25,39,12,10	1063.2

Points

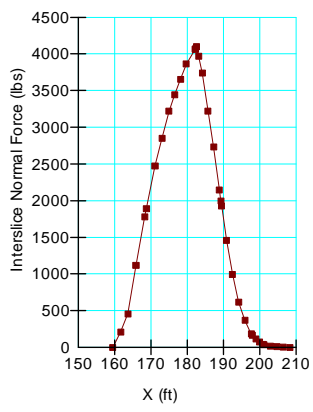
	X (ft)	Y (ft)
Point 1	200	4.3
Point 2	208.3	4.3
Point 3	225.4	0.9
Point 4	310	-0.9
Point 5	139.1	-6.6
Point 6	163.7	-6.3
Point 7	188.9	3.8
Point 8	310	-4.5
Point 9	20	-13.2
Point 10	310	-17.5
Point 11	20	-41.5
Point 12	310	-41.5
Point 13	20	-57
Point 14	310	-57
Point 15	20	-70
Point 16	310	-70
Point 17	200	-4.5
Point 18	200	-13.3
Point 19	200	-17.5
Point 20	20	-17.5
Point 21	200	12.8
Point 22	200.5	12.8
Point 23	201	4.5

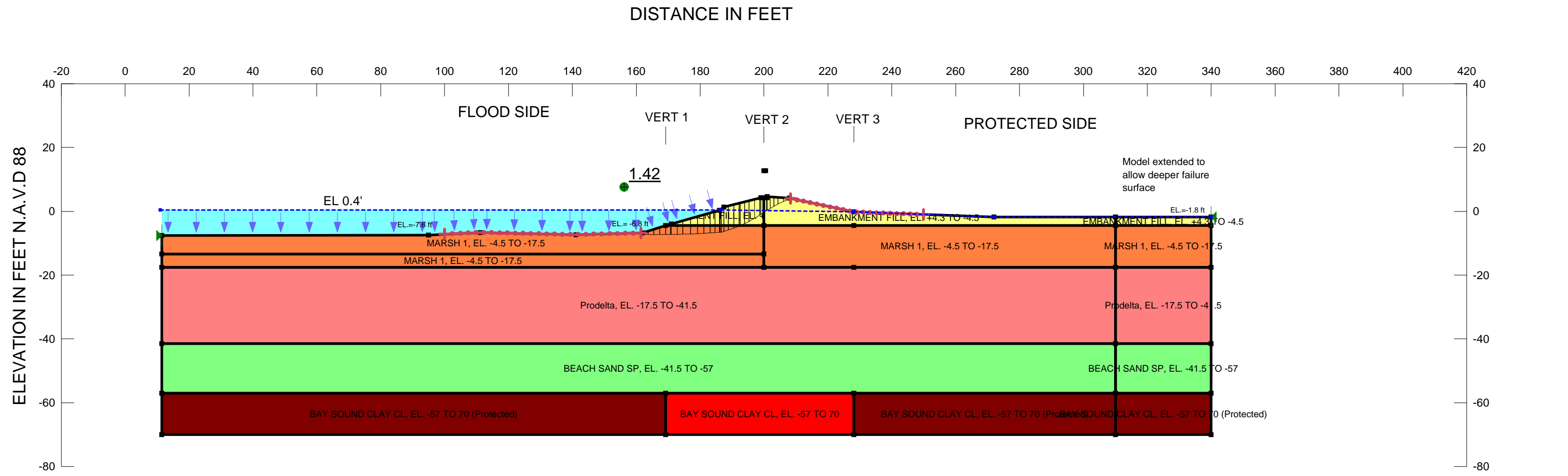
Point 24	265.7	-4.5
Point 25	265.7	-17.5
Point 26	199	4.3
Point 27	182.2	0.3
Point 28	183.2	2.1
Point 29	201	4.3
Point 30	265.7	-0.9
Point 31	168.8	-4.5
Point 32	168.8	-57
Point 33	265.7	-57
Point 34	168.8	-70
Point 35	265.7	-70
Point 36	168.8	-13.24877
Point 37	168.8	-17.5
Point 38	168.8	-41.5
Point 39	265.7	-41.5
Point 40	20	-6.6

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +4.3 TO -4.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -4.5 TO -17.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -41.5 TO -57 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO 70 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Prodelta, EL. -17.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO 70 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.07.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 4 STA.33+00 TO STA. 37+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 166
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
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File Name: Reach 4_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 10:57:56 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70

Model: Mohr-Coulomb

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (100, -7.16853) ft
Left-Zone Right Coordinate: (161.5, -6.80966) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (208.3, 4.03582) ft
Right-Zone Right Coordinate: (250, -0.99818) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (11.5, -7.6) ft
Right Coordinate: (340, -1.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
11	0.4
186.5	0.4
228.1	-0.2
272	-1.8
340	-1.8

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +4.3 TO -4.5	7,28,25,26,24,1,15	141.75
Region 2	EMBANKMENT FILL, EL. +4.3 TO -4.5	1,29,21,2,3,43,4,8,22,15	456.645
Region 3	MARSH 1, EL. -4.5 TO -17.5	5,44,27,30,6,7,15,16,9	1250.8564
Region 4	MARSH 1, EL. -4.5 TO -17.5	16,15,22,8,10,17	1430
Region 5	MARSH 1, EL. -4.5 TO -17.5	9,16,17,18	772.85
Region 6	Prodelta, EL. -17.5 TO -41.5	18,17,10,12,11	7164
Region 7	BEACH SAND SP, EL. -41.5 TO -57	36,11,12,38,40,39	4626.75
Region 8	BEACH SAND SP, EL. -41.5 TO -57	38,12,32,37	465
Region 9	Prodelta, EL. -17.5 TO -41.5	10,33,32,12	720
Region 10	MARSH 1, EL. -4.5 TO -17.5	8,34,33,10	390
Region 11	EMBANKMENT FILL, EL. +4.3 TO -4.5	4,35,34,8	81
Region 12	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	36,13,41,39	2050.1
Region 13	BAY SOUND CLAY CL, EL. -57 TO 70	39,41,42,40	765.7
Region 14	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	40,42,14,38	1064.7
Region 15	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	38,14,31,37	390

Points

	X (ft)	Y (ft)
Point 1	200	4.3
Point 2	208	4.1
Point 3	228.1	-0.2
Point 4	310	-1.8
Point 5	11.5	-7.6
Point 6	161.9	-6.8
Point 7	169.2	-4.5
Point 8	310	-4.5
Point 9	11.5	-13.4
Point 10	310	-17.5
Point 11	11.5	-41.5
Point 12	310	-41.5
Point 13	11.5	-70
Point 14	310	-70
Point 15	200	-4.5
Point 16	200	-13.4
Point 17	200	-17.5
Point 18	11.5	-17.5
Point 19	200	12.7
Point 20	200.5	12.7
Point 21	201	4.6
Point 22	228.1	-4.5
Point 23	228.1	-17.5
Point 24	199	4.3
Point 25	186	0.3
Point 26	187.4	1.4
Point 27	111.2	-6.6
Point 28	171	-4
Point 29	201	4.3
Point 30	141.2	-7.3
Point 31	340	-70
Point 32	340	-41.5
Point 33	340	-17.5

Point 34	340	-4.5
Point 35	340	-1.8
Point 36	11.5	-57
Point 37	340	-57
Point 38	310	-57
Point 39	169.2	-57
Point 40	228.1	-57
Point 41	169.2	-70
Point 42	228.1	-70
Point 43	272	-1.8
Point 44	95	-7.42234

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.42	(169.409, 63.003)	21.95459	(208.3, 4.03582)	(160.355, -6.83732)
2	5547	1.48	(169.409, 63.003)	70.637	(208.3, 4.03582)	(159.04, -6.86909)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	161.1274	-6.9579895	459.1379	477.94947	7.9850384	0
2	Optimized	161.93705	-7.0844375	467.03241	512.07716	19.120362	0
3	Optimized	162.8704	-7.1414625	470.58771	526.42043	23.699585	0
4	Optimized	164.663	-7.2439475	476.98132	568.0736	38.666375	0
5	Optimized	166.46945	-7.29113	479.9278	596.52446	49.492347	0
6	Optimized	168.2898	-7.28301	479.42241	624.81529	61.715616	0

7	Optimized	169.9835	-7.275455	478.94826	649.01251	72.187991	0
8	Optimized	170.8835	-7.2685705	478.5118	658.46312	76.384804	0
9	Optimized	171.8959	-7.2391185	476.67875	670.89608	82.440365	0
10	Optimized	173.68765	-7.186993	473.42636	692.4857	92.985173	0
11	Optimized	175.769	-7.11235	468.78951	714.05694	104.10985	0
12	Optimized	178.08245	-7.00832	462.26646	736.1464	116.25513	0
13	Optimized	180.20285	-6.898425	455.42189	754.96186	127.14717	0
14	Optimized	182.1878	-6.789535	448.62582	772.71916	137.56946	0
15	Optimized	183.8852	-6.6849205	442.09996	783.41007	144.87755	0
16	Optimized	185.29505	-6.584582	435.83862	793.31501	151.73973	0
17	Optimized	186.06365	-6.529884	432.42426	800.58247	156.27389	0
18	Optimized	186.31365	-6.5120915	431.3164	818.2621	164.24871	0
19	Optimized	186.5691	-6.493909	430.11885	839.81771	173.90684	0
20	Optimized	187.0191	-6.38555	422.95415	825.19513	170.74116	0
21	Optimized	188.1204	-6.086465	403.29732	844.76024	187.38989	0
22	Optimized	189.67735	-5.57694	370.10094	809.83713	186.65694	0
23	Optimized	191.3505	-4.94918	329.42442	786.89398	194.18431	0
24	Optimized	192.3316	-4.56765	304.73416	753.46945	190.47683	0
25	Optimized	193.18595	-4.16774	279.01241	732.50726	192.49714	0

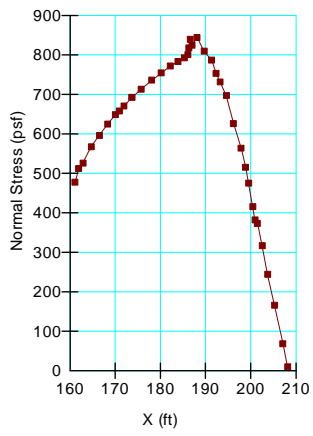
26	Optimized	194.6056	-3.50322	236.269	697.41938	195.74672	0
27	Optimized	196.1586	-2.67437	183.14751	626.68903	188.27221	0
28	Optimized	197.845	-1.68119	119.65596	563.99458	188.61055	0
29	Optimized	198.8441	-1.0832767	81.446679	516.27535	184.57382	0
30	Optimized	199.5	-0.65700105	54.257216	476.1226	179.07123	0
31	Optimized	200.4044	-0.0692132	16.764548	415.65132	169.31739	0
32	Optimized	200.9044	0.255739	-3.9621141	382.7365	162.46201	0
33	Optimized	201.46135	0.6176728	-27.047831	373.75134	158.64803	0
34	Optimized	202.5222	1.2485625	-67.369909	317.34965	134.70693	0
35	Optimized	203.72125	1.9107075	-109.76448	244.16847	103.64336	0
36	Optimized	205.2406	2.656477	-157.67187	166.45812	70.65728	0
37	Optimized	207.0802	3.4858715	-211.07821	68.96795	29.278913	0
38	Optimized	208.15	3.9681955	-242.14036	10.116886	4.2943632	0

Slices of Slip Surface: 5547

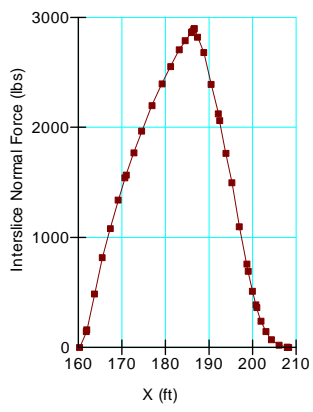
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	5547	159.7547	-6.967761	459.75061	474.72539	6.356416	0
2	5547	161.1849	-7.150264	471.13693	497.17154	11.051038	0
3	5547	162.8125	-7.319695	481.70989	546.53216	27.515421	0
4	5547	164.6375	-7.4670785	490.9033	591.95956	42.89584	0
5	5547	166.4625	-7.5669655	497.13948	631.01189	56.825465	0
6	5547	168.2875	-7.619558	500.41913	663.86154	69.377189	0

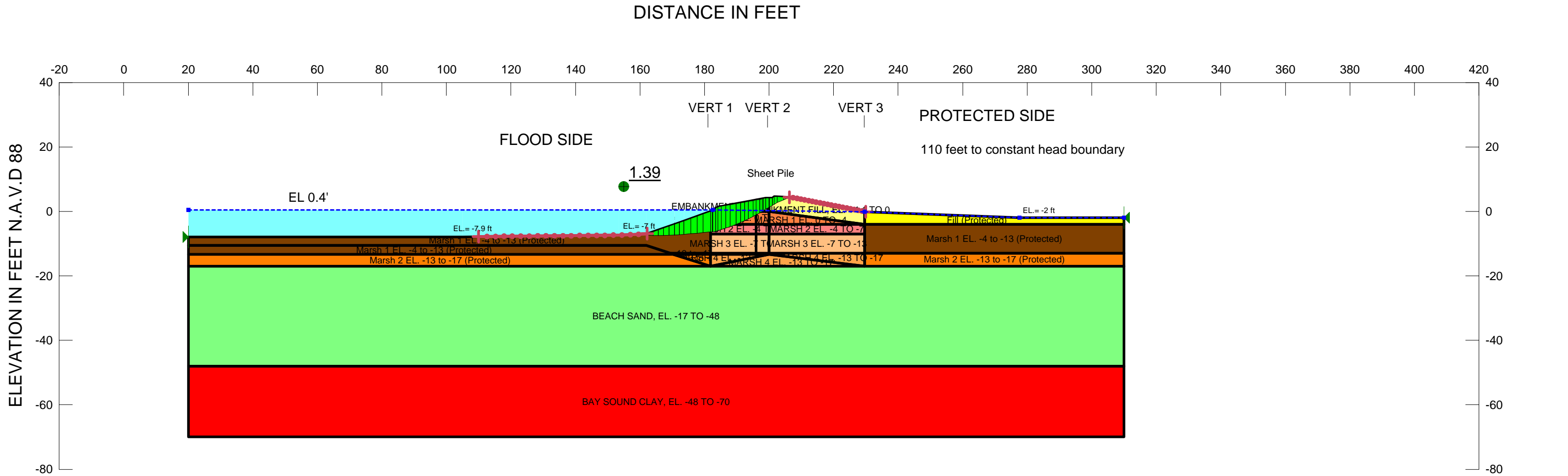
7	5547	170.1	-7.625246	500.77607	688.46711	79.670117	0
8	5547	171.83335	-7.5878235	498.43822	707.52299	88.751217	0
9	5547	173.5	-7.5108585	493.636	720.9478	96.488134	0
10	5547	175.16665	-7.394356	486.36792	729.56384	103.23054	0
11	5547	176.83335	-7.2381195	476.61895	733.43433	109.01166	0
12	5547	178.5	-7.041883	464.37528	732.57589	113.8444	0
13	5547	180.16665	-6.8053085	449.61277	727.01828	117.75165	0
14	5547	181.83335	-6.527984	432.30473	716.8065	120.76384	0
15	5547	183.5	-6.20942	412.42738	701.99905	122.91588	0
16	5547	185.16665	-5.8490435	389.93823	682.49425	124.18266	0
17	5547	186.06365	-5.6428855	377.07785	672.42393	125.36698	0
18	5547	186.31365	-5.5815115	373.2395	683.54302	131.71603	0
19	5547	186.95	-5.420215	362.77978	719.11249	151.25426	0
20	5547	188.1043	-5.1115405	342.47283	740.1099	168.78692	0
21	5547	189.51295	-4.709114	316.09987	730.49777	175.90147	0
22	5547	191.09555	-4.21665	283.94121	714.30932	182.68043	0
23	5547	192.8521	-3.624276	245.39956	690.45479	188.91473	0
24	5547	194.60865	-2.9798285	203.60157	660.69596	194.02505	0
25	5547	196.3652	-2.2817645	158.46204	624.9237	198.00123	0
26	5547	198.12175	-1.528343	109.86828	583.07218	200.86314	0
27	5547	199.5	-0.9021268	69.553086	533.75783	197.04322	0
28	5547	200.5	-0.4215893	38.667023	479.27247	187.02592	0
29	5547	201.35225	0.0021088	11.46141	459.14512	190.03046	0
30	5547	202.49145	0.5978803	-26.740258	387.20438	164.35851	0
31	5547	204.0653	1.458188	-81.83779	287.37344	121.98279	0
32	5547	205.63915	2.371555	-140.24834	184.43796	78.289271	0
33	5547	207.21305	3.3404205	-202.12212	78.396119	33.277178	0
34	5547	208.15	3.937436	-240.22113	12.449355	5.2844378	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +4.1 TO 0 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1 EL. 0 TO -4 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -17 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2 EL. -4 TO -7 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 3 EL. -7 TO -13 Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 1 EL. -4 to -13 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 2 EL. -13 to -17 (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 4 EL. -13 TO -17 Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.00.

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 5 STA.37+00 TO STA. 40+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 358
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 11:11:24 AM
File Name: Reach 5_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 11:14:58 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2 EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 3 EL. -7 TO -13

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1 EL. -4 to -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 EL. -13 to -17 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.1 TO 0

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 EL. 0 TO -4

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -17 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 4 EL. -13 TO -17

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (110, -7.83313) ft
Left-Zone Right Coordinate: (162.2, -6.93103) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (206.3, 4.4037) ft
Right-Zone Right Coordinate: (230, -0.11583) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (20, -7.9) ft
Right Coordinate: (310, -2) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
20	0.4
182.5	0.4
229.6	-0.1
277.6	-2
310	-2

Regions

	Material	Points	Area (ft²)
Region 1	Marsh 1 EL. -4 to -13 (Protected)	5,6,17,16,53	723.6
Region 2	Fill (Protected)	33,34,35,6,5	206.4
Region 3	Marsh 2 EL. -13 to -17 (Protected)	16,17,22,18	321.6
Region 4	BAY SOUND CLAY, EL. -48 TO -70	7,39,20,41,23,10,42,21,40,9	6380
Region 5	EMBANKMENT FILL, EL. +4.1 TO 0	29,30,3,13,31,4,8,14	46.405
Region 6	MARSH 1 EL. 0 TO -4	36,29,14,8,26,28	72.8
Region 7	MARSH 2 EL. -4 TO -7	37,36,28,26,27,56	54.6
Region 8	MARSH 4 EL. -13 TO -17	38,55,54,19,15,48	5.46
Region 9	EMBANKMENT FILL, EL. +4.1 TO 0	8,4,43,59,32,33,5	137.33001
Region 10	MARSH 2 EL. -4 TO -7	26,5,53,27	88.8
Region 11	MARSH 1 EL. 0 TO -4	8,5,26	59.2
Region 12	MARSH 1 EL. 0 TO -4	29,2,1,36	21.95
Region 13	Marsh 1 EL. -4 to -13 (Protected)	46,50,52,38,37,36,1,25,11,58,12	558.8919
Region 14	MARSH 4 EL. -13 TO -17	19,54,16,18	63.64
Region 15	Marsh 2 EL. -13 to -17 (Protected)	48,38,52,51	3.58125
Region 16	Marsh 2 EL. -13 to -17 (Protected)	47,51,48	21.275
Region 17	BEACH SAND, EL. -17 TO -48	47,57,7,39,20,41,23,22,18	8990
Region 18	Marsh 1 EL. -4 to -13 (Protected)	51,52,50,46,49	394.66875
Region 19	MARSH 3 EL. -7 TO -13	27,54,55,38,37,56	109.2
Region 20	MARSH 3 EL. -7 TO -13	54,27,53,16	177.6
Region 21	MARSH 4 EL. -13 TO -17	47,48,15,19	33.67
Region 22	Marsh 2 EL. -13 to -17 (Protected)	49,51,47,57	577.385
Region 23	MARSH 4 EL. -13 TO -17	19,18,47	88.43

Points

	X (ft)	Y (ft)
Point 1	170.7	-4
Point 2	173.6	-3
Point 3	193.6	3.1
Point 4	200	4.1
Point 5	229.6	-4
Point 6	310	-4
Point 7	20	-48

Point 8	200	0
Point 9	20	-70
Point 10	310	-70
Point 11	153.4	-7.4
Point 12	20	-7.9
Point 13	196	3.5
Point 14	196	0
Point 15	196	-13.3
Point 16	229.6	-13
Point 17	310	-13
Point 18	229.6	-13.7
Point 19	200	-13.3
Point 20	200.05	-48
Point 21	200	-70
Point 22	310	-17
Point 23	310	-48
Point 24	201	4.6
Point 25	162	-7
Point 26	200	-4
Point 27	200	-7
Point 28	196	-4
Point 29	181.8	0
Point 30	184.1	1.4
Point 31	199	4.1
Point 32	206.4	4.4
Point 33	229.6	-0.1
Point 34	277.6	-2
Point 35	310	-2
Point 36	181.8	-4
Point 37	181.8	-7
Point 38	181.8	-13
Point 39	181.8	-48
Point 40	181.8	-70
Point 41	229.6	-48
Point 42	229.6	-70
Point 43	201	4.1

Point 44	200	12.8
Point 45	200.5	12.8
Point 46	20	-10.6
Point 47	181.8	-17
Point 48	181.8	-13.3
Point 49	20	-13.3
Point 50	162	-10.6
Point 51	170.3	-13.3
Point 52	169.425	-13
Point 53	229.6	-7
Point 54	200	-13
Point 55	196	-13
Point 56	196	-7
Point 57	20	-17
Point 58	105	-7.88303
Point 59	201.6	4.57778

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.39	(167.492, 61.337)	21.52383	(206.3, 4.4037)	(160.001, -7.09299)
2	4392	1.43	(167.492, 61.337)	68.902	(206.3, 4.4037)	(159.603, -7.11149)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	160.9982	-7.2279735	475.98657	496.36371	8.6495832	0
2	Optimized	161.9978	-7.363071	484.40858	508.88498	10.389612	0
3	Optimized	163.00885	-7.414476	487.62403	548.33821	25.771639	0
4	Optimized	164.8265	-7.470855	491.14244	581.81061	38.486355	0

	ed						
5	Optimized	166.4441	-7.481025	491.77298	610.29625	50.310144	0
6	Optimized	168.1147	-7.4470245	489.65199	628.64174	58.997651	0
7	Optimized	169.83825	-7.368853	484.77749	648.29042	69.40712	0
8	Optimized	170.7174	-7.3289785	482.28173	658.32274	74.724978	0
9	Optimized	171.4511	-7.275136	478.93054	659.37875	76.595724	0
10	Optimized	172.8837	-7.169028	472.31044	668.44224	83.25301	0
11	Optimized	174.6882	-7.035377	463.95558	681.24717	92.234808	0
12	Optimized	176.7236	-6.86702	453.46028	691.08922	100.8675	0
13	Optimized	178.61795	-6.6915	442.51155	700.60299	109.55332	0
14	Optimized	180.68255	-6.483219	429.51374	706.6399	117.63308	0
15	Optimized	182.12855	-6.3272595	419.78716	696.20579	117.33275	0
16	Optimized	182.47855	-6.28951	417.41579	701.27617	120.49158	0
17	Optimized	182.96065	-6.2375145	413.87652	726.38825	132.65336	0
18	Optimized	183.76065	-6.0903395	404.1676	729.80999	138.227	0
19	Optimized	184.63715	-5.8385345	387.86509	734.14605	146.98755	0
20	Optimized	185.8512	-5.45341	363.03307	707.94456	146.40624	0
21	Optimized	187.205	-4.99179	333.3338	685.68408	149.56382	0
22	Optimized	188.831	-4.38049	294.10672	643.78018	148.42758	0
23	Optimized	190.4796	-3.719595	251.77851	606.37969	150.51927	0

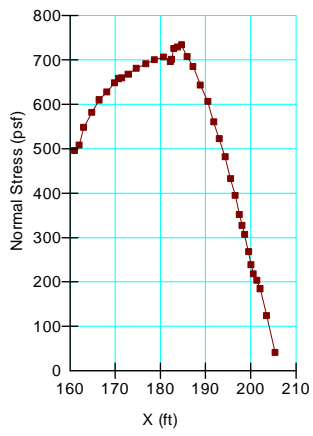
	ed						
24	Optimiz ed	191.7843	-3.1507095	215.41669	560.25791	146.37641	0
25	Optimiz ed	192.9947 5	-2.573749	178.60659	523.24645	146.29094	0
26	Optimiz ed	194.316	-1.9439945	138.43834	482.05364	145.85604	0
27	Optimiz ed	195.516	-1.340338	99.972755	432.53111	141.16264	0
28	Optimiz ed	196.5341	-0.788428	64.861537	395.62344	140.4001	0
29	Optimiz ed	197.4771	-0.24945	30.604371	352.24253	136.5273	0
30	Optimiz ed	198.0767	0.116309	7.3840224	327.78576	136.00247	0
31	Optimiz ed	198.6337	0.4560628	-14.185032	307.20447	130.40056	0
32	Optimiz ed	199.5	0.9845038	-47.734135	268.04671	113.77908	0
33	Optimiz ed	200.0655 5	1.329485	-69.637946	238.36703	101.1808	0
34	Optimiz ed	200.5655 5	1.6100585	-87.474661	218.41733	92.712656	0
35	Optimiz ed	201.3	2.01678	-113.33984	203.68657	86.459818	0
36	Optimiz ed	202.0808	2.4491715	-140.83713	185.15975	78.595649	0
37	Optimiz ed	203.4962	3.1374985	-184.72759	124.60957	52.893626	0
38	Optimiz ed	205.3654	3.9816355	-238.63877	41.536525	17.631209	0

Slices of Slip Surface: 4392

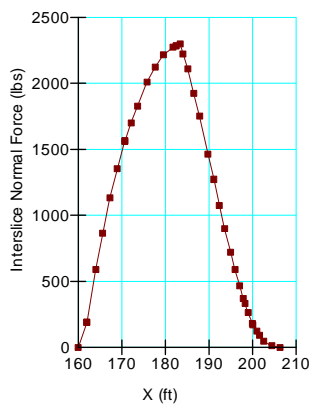
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4392	160.20225	-7.1752505	472.69234	485.56086	5.4623663	0
2	4392	161.40075	-7.292202	479.99023	501.06714	8.9466207	0

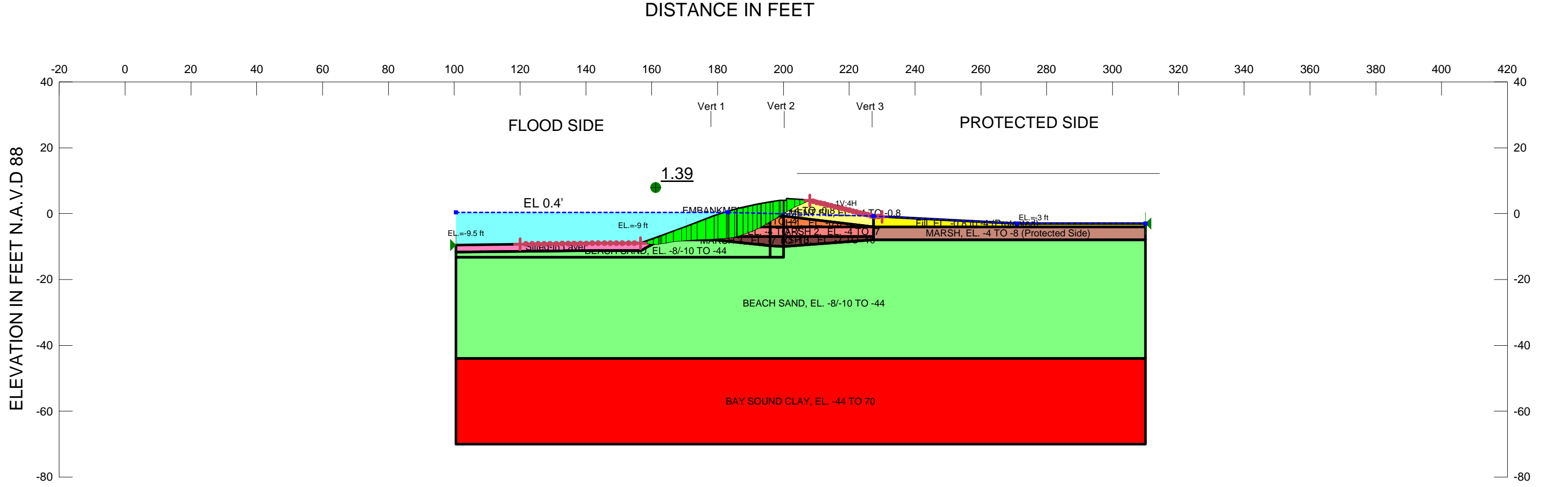
3	4392	162.725	-7.395676	486.45186	540.87283	23.100329	0
4	4392	164.175	-7.480908	491.7668	574.00922	34.909835	0
5	4392	165.625	-7.535511	495.1766	603.13002	45.823509	0
6	4392	167.075	-7.5595575	496.67351	628.32623	55.883265	0
7	4392	168.525	-7.553079	496.27525	649.65111	65.104191	0
8	4392	169.975	-7.5160675	493.96185	667.16657	73.521041	0
9	4392	171.425	-7.448474	489.74502	679.66934	80.618089	0
10	4392	172.875	-7.3502075	483.61369	687.22386	86.42739	0
11	4392	174.42	-7.210519	474.89799	692.32701	92.293145	0
12	4392	176.06	-7.024876	463.31444	693.47725	97.698317	0
13	4392	177.7	-6.799259	449.23663	690.04319	102.21632	0
14	4392	179.34	-6.5332695	432.63455	682.06391	105.87648	0
15	4392	180.98	-6.2264305	413.48753	669.53288	108.6848	0
16	4392	182.12855	-5.991307	398.81581	646.52176	105.14494	0
17	4392	182.47855	-5.915105	394.0711	646.7567	107.25867	0
18	4392	183.3	-5.7217465	381.4694	675.05995	124.62179	0
19	4392	184.97785	-5.3028205	354.21554	692.38846	143.54589	0
20	4392	186.7336	-4.8171465	322.74736	670.11615	147.4493	0
21	4392	188.48935	-4.2809075	288.12067	642.76953	150.53951	0
22	4392	190.07265	-3.7552755	254.27593	613.26475	152.38171	0
23	4392	191.4836	-3.2484945	221.71448	582.42655	153.11319	0
24	4392	192.89455	-2.7066225	186.96619	548.12408	153.30243	0
25	4392	194.2	-2.1744975	152.89787	512.7041	152.72869	0
26	4392	195.4	-1.656373	119.77234	476.62077	151.47317	0
27	4392	196.7201	-1.0532238	81.264517	435.95735	150.55817	0
28	4392	198.16025	-0.3579448	36.921985	390.04951	149.89374	0
29	4392	198.94015	0.030693075	12.154256	364.11465	149.39832	0
30	4392	199.1548	0.14147033	5.099747	354.01282	148.10481	0
31	4392	199.6548	0.40377045	-11.59891	328.90519	139.61197	0
32	4392	200.5	0.8588752	-40.557669	286.67307	121.6855	0
33	4392	201.3	1.3006995	-68.657622	267.16887	113.40646	0
34	4392	202.38335	1.9297	-108.6253	228.46207	96.976397	0
35	4392	203.95	2.878288	-168.8561	138.9866	58.996313	0
36	4392	205.51665	3.8852575	-232.72748	46.605111	19.782696	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FIL, EL. +4 TO -0.8 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -0.8 TO -4 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -8/-10 TO -44 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -44 TO 70 Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
Name: MARSH, EL. -4 TO -8 (Protected Side) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, EL. -4 TO -7 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 3, EL. -7 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 (protected) Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill, EL. -0.8 to -4 (Protected) Model: Undrained (Phi=0) Unit Weight: 109 pcf Cohesion: 500 psf Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.13.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



US Army Corps
of Engineers®
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 6A STA.40+00 TO STA. 47+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 270
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 11:31:03 AM
File Name: Reach 6A_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 11:34:30 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 9.807 pcf

FOS Distribution

FOS Calculation Option: Constant

Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FIL, EL. +4 TO -0.8

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -0.8 TO -4

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -8/-10 TO -44

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -44 TO 70

Model: Mohr-Coulomb

Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -8 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 3, EL. -7 TO -10

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3 (protected)
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. -0.8 to -4 (Protected)

Model: Undrained (Phi=0)
Unit Weight: 109 pcf
Cohesion: 500 psf
Pore Water Pressure

Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -9.27059) ft
Left-Zone Right Coordinate: (156.6, -9) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (208, 4) ft
Right-Zone Right Coordinate: (230, -0.93089) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (100.5, -9.5) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
100.5	0.4
183.1	0.4
227.4	-0.8
271	-3
310	-3

Unit Weight Functions

Marsh 3 (protected)

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (179, 101)

Data Point: (200, 103)
Data Point: (227.4, 101)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH, EL. -4 TO -8 (Protected Side)	29,35,28,40,41,42,55	53.85
Region 2	Fill, EL. -0.8 to -4 (Protected)	4,37,5,22,21	130.67
Region 3	MARSH 1, EL. -0.8 TO -4	9,21,25	43.84
Region 4	BAY SOUND CLAY, EL. -44 TO 70	13,7,8,14	5447
Region 5	MARSH, EL. -4 TO -8 (Protected Side)	39,21,22,6,23	330.4
Region 6	BEACH SAND, EL. -8/-10 TO -44	11,10,23,6,8,7,12,20	6997.2
Region 7	EMBANKMENT FIL, EL. +4 TO -0.8	2,24,38,3,4,21,9	130.1
Region 8	EMBANKMENT FIL, EL. +4 TO -0.8	49,56,36,1,17,33,2,9,18	58.44
Region 9	BEACH SAND, EL. -8/-10 TO -44	42,55,54,53,15,16,12,20,11,10,19	293.97
Region 10	Silted-in Layer	16,27,26,34,29,55,54,53,15	133.855
Region 11	MARSH 2, EL. -4 TO -7	32,25,21,39	82.2
Region 12	MARSH 3, EL. -7 TO -10	10,52,32,39,23	54.8
Region 13	MARSH 1, EL. -0.8 TO -4	18,9,25,30,40,28,49	80.8
Region 14	MARSH 2, EL. -4 TO -7	40,30,25,32,31,41	63
Region 15	MARSH 3, EL. -7 TO -10	41,31,32,52,10,19,42	43.9

Points

	X (ft)	Y (ft)
Point 1	192	2.7
Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	310	-3
Point 6	310	-8
Point 7	100.5	-44
Point 8	310	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2

Point 13	100.5	-70
Point 14	310	-70
Point 15	143.1	-11.2
Point 16	100.5	-11.7
Point 17	196	3.4
Point 18	196	-0.8
Point 19	196	-9.8
Point 20	196	-13.2
Point 21	227.4	-4
Point 22	310	-4
Point 23	227.4	-8
Point 24	201	3.9
Point 25	200	-4
Point 26	143	-9
Point 27	100.5	-9.5
Point 28	170.5	-4
Point 29	162.5	-7
Point 30	196	-4
Point 31	196	-7
Point 32	200	-7
Point 33	199	3.9
Point 34	156.8	-9
Point 35	164.3	-6.3
Point 36	186	1.4
Point 37	271.1	-3
Point 38	201	4.4
Point 39	227.4	-7
Point 40	179	-4
Point 41	179	-7
Point 42	179	-8
Point 43	179	-44
Point 44	200	-44
Point 45	227.4	-44
Point 46	227.4	-70
Point 47	200	-70
Point 48	179	-70

Point 49	179	-0.8
Point 50	200	12.9
Point 51	200.5	12.9
Point 52	200	-9
Point 53	156.8	-11.2
Point 54	159	-10
Point 55	163	-8
Point 56	180.1	-0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.39	(163.975, 68.787)	24.66407	(208, 4)	(154.884, -9)
2	4392	1.44	(163.975, 68.787)	78.329	(208, 4)	(154.77, -9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	155.8373	-9.120835	594.09382	605.3316	5.9752361	0
2	Optimized	156.79535	-9.2416885	601.64397	608.78831	3.7987131	0
3	Optimized	157.72185	-9.2453635	601.89339	637.09468	18.716862	0
4	Optimized	159.5655	-9.2526765	602.3273	654.99365	28.003195	0
5	Optimized	161.27735	-9.2594665	602.75254	684.14777	34.550226	0
6	Optimized	162.2837	-9.229198	600.86225	691.55585	38.49715	0
7	Optimized	162.75	-9.1571905	596.37133	702.35513	44.987452	0
8	Optimized	163.65	-9.0182105	587.69554	707.30853	50.772701	0
9	Optimized	165.4703	-8.737118	570.15051	697.37139	54.002058	0

10	Optimized	167.876	-8.418315	550.27842	695.31927	61.566191	0
11	Optimized	169.8057	-8.232969	538.69637	703.62395	70.007604	0
12	Optimized	171.2595	-8.134009	532.51978	711.57642	76.005034	0
13	Optimized	172.89545	-8.041155	526.73089	725.44458	84.348957	0
14	Optimized	175.09225	-7.938	520.27833	744.55711	95.200691	0
15	Optimized	177.7063	-7.7973335	511.52888	764.51579	107.38657	0
16	Optimized	179.55	-7.6852235	504.51348	764.67834	110.43343	0
17	Optimized	181.4111	-7.572056	497.47532	779.46301	119.69667	0
18	Optimized	182.9111	-7.4808465	491.76235	794.15973	128.36007	0
19	Optimized	183.31175	-7.4564855	489.89776	804.9785	133.74384	0
20	Optimized	184.34705	-7.301985	478.49716	804.32612	138.30619	0
21	Optimized	185.4552	-7.08018	462.7843	798.91807	142.68032	0
22	Optimized	185.8699	-6.9633445	454.78103	800.32435	146.67444	0
23	Optimized	186.8698	-6.6816195	435.5185	797.08301	153.47503	0
24	Optimized	188.47925	-6.1521775	399.76452	765.82201	155.38219	0
25	Optimized	189.9585	-5.5834325	361.77313	744.99963	162.67	0
26	Optimized	191.34905	-4.976754	321.56475	701.24161	161.16327	0
27	Optimized	192.5637	-4.375339	281.98459	669.77898	164.60895	0
28	Optimized	193.21285	-4.048115	260.46949	640.95014	161.50445	0

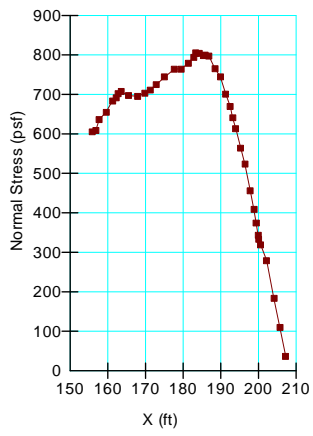
29	Optimized	193.9737	-3.6196395	232.44639	613.60892	161.7939	0
30	Optimized	195.32455	-2.8589185	182.69588	564.68404	162.14436	0
31	Optimized	196.45235	-2.223824	141.15558	523.49688	162.29425	0
32	Optimized	197.80905	-1.384545	86.494418	455.6744	156.7076	0
33	Optimized	198.8567	-0.7073862	42.468065	408.73791	155.47233	0
34	Optimized	199.43365	-0.33448264	18.223387	374.7032	151.3167	0
35	Optimized	199.93365	-0.011302775	-2.7884743	343.77513	145.92389	0
36	Optimized	200.11295	0.10459367	-10.323425	333.58924	141.60023	0
37	Optimized	200.61295	0.388511	-28.88485	319.09002	135.44568	0
38	Optimized	202.20345	1.255216	-85.655425	279.51927	118.64889	0
39	Optimized	204.17245	2.259175	-151.62911	183.59233	77.930321	0
40	Optimized	205.7035	2.955505	-197.67137	110.15302	46.757183	0
41	Optimized	207.2345	3.651835	-243.70769	36.717872	15.585812	0

Slices of Slip Surface: 4392

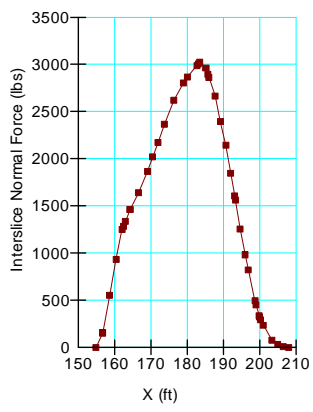
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4392	155.78495	-9.106728	593.20884	602.22283	4.7928244	0
2	4392	157.62645	-9.280664	604.04834	643.78756	21.129723	0
3	4392	159.2793	-9.397509	611.35392	668.84764	30.569954	0
4	4392	161.30285	-9.488017	617.02551	714.74279	41.478521	0
5	4392	162.75	-9.5327985	619.80414	764.50642	61.422477	0
6	4392	163.65	-9.5394075	620.21783	786.91642	70.759353	0

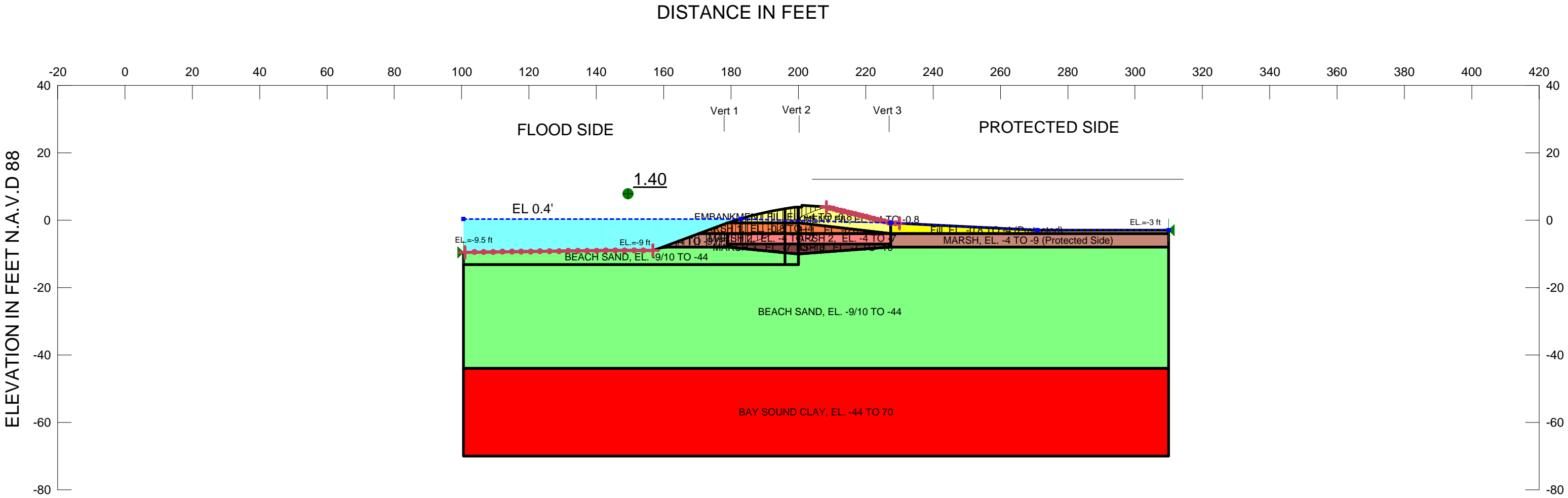
7	4392	165.33335	-9.5241845	619.26185	805.57258	79.084214	0
8	4392	167.4	-9.461035	615.33032	822.90582	88.110568	0
9	4392	169.46665	-9.343177	607.98401	833.10607	95.558644	0
10	4392	171.35	-9.190156	598.44716	836.91246	101.22251	0
11	4392	173.05	-9.010615	587.19494	835.21908	105.28	0
12	4392	174.75	-8.793411	573.66991	828.86738	108.3249	0
13	4392	176.45	-8.538226	557.74715	817.95328	110.45095	0
14	4392	178.15	-8.244683	539.42571	802.3525	111.6058	0
15	4392	179.1455	-8.0595435	527.88184	777.32791	105.88358	0
16	4392	179.6955	-7.9479515	520.91318	772.86248	106.94613	0
17	4392	181.4111	-7.565679	497.07647	754.87215	109.42777	0
18	4392	182.9111	-7.2192115	475.43753	740.69108	112.59345	0
19	4392	183.4356	-7.086076	466.5657	742.83367	117.2688	0
20	4392	184.8856	-6.691264	439.47434	747.37446	130.69585	0
21	4392	187	-6.0749625	397.44607	741.37618	145.98967	0
22	4392	189	-5.430211	353.83207	720.35227	155.5786	0
23	4392	191	-4.7253995	306.4715	693.4736	164.27264	0
24	4392	192.45825	-4.178887	269.90349	668.86872	169.35069	0
25	4392	193.6874	-3.68395	236.94555	640.16468	171.15637	0
26	4392	195.22915	-3.0324345	193.68337	600.27215	172.5867	0
27	4392	196.75	-2.351427	148.6185	556.73963	173.23714	0
28	4392	198.25	-1.6408835	101.74415	509.60794	173.12791	0
29	4392	199.4681	-1.037941	62.060619	461.76963	169.66641	0
30	4392	199.9681	-0.783494	45.338337	436.69399	166.12062	0
31	4392	200.5	-0.5034228	26.962354	407.65975	161.59646	0
32	4392	201.1369	-0.16607512	4.8354516	417.86146	175.31914	0
33	4392	202.1146	0.37644899	-30.670733	360.36864	152.96741	0
34	4392	203.79615	1.3416023	-93.738686	261.03446	110.80255	0
35	4392	205.4777	2.3633465	-160.33875	158.63914	67.338319	0
36	4392	207.15925	3.4443395	-230.63604	53.180194	22.573653	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FIL, EL. +4 TO -0.8 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -0.8 TO -4 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -9/10 TO -44 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -44 TO 70 Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH, EL. -4 TO -9 (Protected Side) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2, EL. -4 TO -7 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 3, EL. -7 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill, EL. -0.8 TO -4 (Protected) Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.15.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 6B STA.47+00 TO STA. 59+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)___Global

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File Information

Created By: Liljegren, James
Revision Number: 304
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 11:46:14 AM
File Name: Reach 6B_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 11:46:38 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)___Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -9 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 3, EL. -7 TO -10

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. -0.8 TO -4 (Protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (101, -9.49412) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FIL, EL. +4 TO -0.8

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -0.8 TO -4

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -9/10 TO -44

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -44 TO 70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (156.8, -9) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (208.3, 3.92577) ft
Right-Zone Right Coordinate: (230, -0.93089) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (100.5, -9.5) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	100.5	0.4
	183	0.4
	227.4	-0.8
	271	-3
	310	-3

Unit Weight Functions

Marsh 3

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (179, 101)
Data Point: (200, 103)
Data Point: (227.4, 101)

Regions

	Material	Points	Area (ft²)
--	----------	--------	------------

Region 1	MARSH, EL. -4 TO -9 (Protected Side)	32,26,37,38,39,49	55.495
Region 2	Fill, EL. -0.8 TO -4 (Protected)	4,34,5,20,19	130.67
Region 3	MARSH 1, EL. -0.8 TO -4	9,19,23	43.84
Region 4	BAY SOUND CLAY, EL. -44 TO 70	13,7,8,14	5447
Region 5	MARSH, EL. -4 TO -9 (Protected Side)	36,19,20,6,21	330.4
Region 6	BEACH SAND, EL. -9/10 TO -44	11,10,21,6,8,7,12,18	6997.2
Region 7	EMBANKMENT FIL, EL. +4 TO -0.8	2,22,35,3,4,19,9	130.1
Region 8	EMBANKMENT FIL, EL. +4 TO -0.8	46,50,33,1,15,30,2,9,16	58.44
Region 9	BEACH SAND, EL. -9/10 TO -44	39,49,31,24,25,12,18,11,10,17	428.175
Region 10	MARSH 2, EL. -4 TO -7	29,23,19,36	82.2
Region 11	MARSH 3, EL. -7 TO -10	10,29,36,21	54.8
Region 12	MARSH 1, EL. -0.8 TO -4	16,9,23,27,37,26,46	80.8
Region 13	MARSH 2, EL. -4 TO -7	37,27,23,29,28,38	63
Region 14	MARSH 3, EL. -7 TO -10	38,28,29,10,17,39	41.8

Points

	X (ft)	Y (ft)
Point 1	192	2.7
Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	310	-3
Point 6	310	-8
Point 7	100.5	-44
Point 8	310	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2
Point 13	100.5	-70
Point 14	310	-70
Point 15	196	3.4
Point 16	196	-0.8
Point 17	196	-9.6
Point 18	196	-13.2

Point 19	227.4	-4
Point 20	310	-4
Point 21	227.4	-8
Point 22	201	3.9
Point 23	200	-4
Point 24	143	-9
Point 25	100.5	-9.5
Point 26	170.5	-4
Point 27	196	-4
Point 28	196	-7
Point 29	200	-7
Point 30	199	3.9
Point 31	156.8	-9
Point 32	164.3	-6.3
Point 33	186	1.4
Point 34	271.1	-3
Point 35	201	4.4
Point 36	227.4	-7
Point 37	179	-4
Point 38	179	-7
Point 39	179	-8
Point 40	179	-44
Point 41	200	-44
Point 42	227.4	-44
Point 43	227.4	-70
Point 44	200	-70
Point 45	179	-70
Point 46	179	-0.8
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	159.8	-8
Point 50	180.1	-0.4

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
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	Surface					
1	Optimized	1.40	(153.312, 113.955)	23.78402	(208.3, 3.92577)	(156.951, -8.94962)
2	4622	1.54	(153.312, 113.955)	123.005	(208.3, 3.92577)	(156.8, -9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	157.66335	-8.8157535	575.06325	587.9654	7.449059	0
2	Optimized	159.0878	-8.5480225	558.35945	582.34917	13.85047	0
3	Optimized	159.9169	-8.3921885	548.61547	580.48385	18.399219	0
4	Optimized	160.92645	-8.277665	541.48497	585.88908	25.636723	0
5	Optimized	162.71175	-8.092555	529.93544	587.83907	33.430673	0
6	Optimized	163.69025	-7.9911	523.60483	589.12858	27.813183	0
7	Optimized	164.03805	-7.9778795	522.78409	599.25045	32.458043	0
8	Optimized	165.1329	-7.9598225	521.65134	612.3587	38.502989	0
9	Optimized	166.7987	-7.9323495	519.94067	632.58658	47.815352	0
10	Optimized	168.4645	-7.9048765	518.224	652.81447	57.130262	0
11	Optimized	169.8987	-7.8854655	517.01029	671.47314	65.56559	0
12	Optimized	171.60795	-7.8693355	516.01776	693.90512	75.508706	0
13	Optimized	173.9684	-7.8018	511.81024	715.47355	86.449945	0
14	Optimized	176.16565	-7.678691	504.11025	730.13548	95.942022	0

15	Optimized	178.0552	-7.5466325	495.86916	742.80595	104.81845	0
16	Optimized	179.55	-7.4421645	489.35188	738.88869	105.92209	0
17	Optimized	180.75555	-7.3579105	484.09468	747.66284	111.87804	0
18	Optimized	182.06665	-7.266279	478.37305	756.00943	117.84965	0
19	Optimized	182.8611	-7.2107565	474.90567	763.78507	122.62203	0
20	Optimized	183.12325	-7.192435	473.55394	770.56205	126.07246	0
21	Optimized	183.7599	-7.09191	466.21206	763.88949	126.35657	0
22	Optimized	184.57205	-6.946515	455.77157	775.41792	135.68182	0
23	Optimized	185.4354	-6.7227545	440.34841	762.01006	136.53727	0
24	Optimized	186.90055	-6.2808795	410.3082	757.75295	147.48154	0
25	Optimized	188.6076	-5.659735	368.66829	716.56268	147.67241	0
26	Optimized	190.2206	-4.960645	322.32522	686.69879	154.66741	0
27	Optimized	191.51355	-4.354815	282.34526	644.81368	153.85872	0
28	Optimized	192.0935	-4.049265	262.29829	628.84037	155.58788	0
29	Optimized	192.96385	-3.59073	232.21661	600.41489	156.2909	0
30	Optimized	194.52955	-2.72916	175.81684	539.14049	154.22174	0
31	Optimized	195.6592	-2.064467	132.43569	489.2749	151.46926	0
32	Optimized	196.84405	-1.326037	84.356048	439.46188	150.73348	0
33	Optimized	198.30555	-0.41517516	25.054429	375.48312	148.74816	0

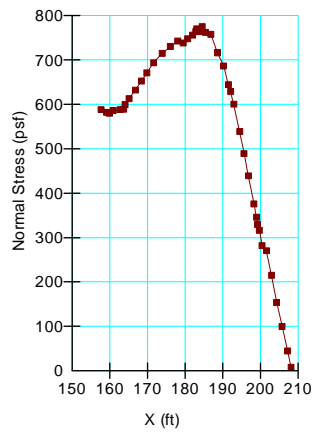
34	Optimized	198.9615	0.006343465	-1.5629766	345.62185	146.70777	0
35	Optimized	199.25535	0.1768217	-13.488207	329.95211	140.05636	0
36	Optimized	199.75535	0.4608343	-32.053564	316.38489	134.29742	0
37	Optimized	200.5	0.8408788	-57.024267	281.41603	119.45402	0
38	Optimized	201.63515	1.4202445	-95.090652	270.77908	114.9389	0
39	Optimized	202.9576	2.028055	-135.24964	214.98586	91.256085	0
40	Optimized	204.3322	2.595325	-172.96245	153.55461	65.180064	0
41	Optimized	205.7646	3.11673	-207.91501	99.412322	42.198027	0
42	Optimized	207.25485	3.59227	-240.10208	44.278789	18.795231	0
43	Optimized	208.15	3.877906	-259.43611	8.3560409	3.5469289	0

Slices of Slip Surface: 4622

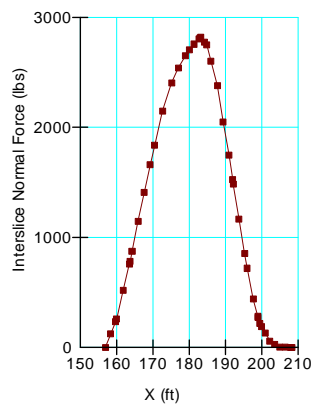
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4622	157.55	-8.974144	584.94588	611.72997	15.463802	0
2	4622	159.05	-8.913263	581.14655	632.81024	29.828043	0
3	4622	160.55	-8.8340285	576.20637	649.09317	42.081215	0
4	4622	162.05	-8.736405	570.10944	657.0692	50.206241	0
5	4622	163.55	-8.6203485	562.86676	662.66593	57.619075	0
6	4622	165.14095	-8.4764575	553.89157	665.55524	64.469049	0
7	4622	166.82285	-8.3022755	543.02167	665.84955	70.914708	0
8	4622	168.50475	-8.104671	530.69155	663.18005	76.492275	0

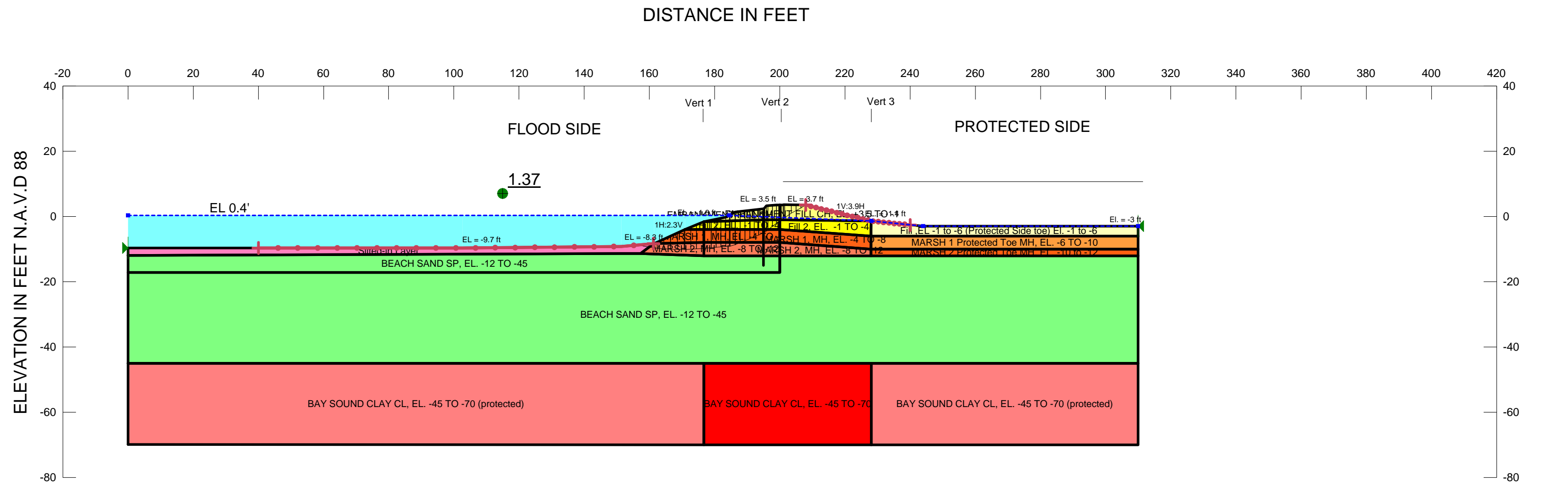
9	4622	169.92285	-7.921336	519.25467	661.29564	60.292814	0
10	4622	171.35	-7.716659	506.4821	659.14883	64.803185	0
11	4622	173.05	-7.452457	489.99605	654.46607	69.81338	0
12	4622	174.75	-7.163819	471.98139	647.29174	74.41483	0
13	4622	176.45	-6.8505695	452.43515	637.58738	78.59246	0
14	4622	178.15	-6.5125165	431.33918	625.37556	82.363556	0
15	4622	179.55	-6.2171795	412.90898	604.18469	81.191722	0
16	4622	180.75555	-5.94705	396.05506	594.45434	84.215496	0
17	4622	182.06665	-5.639387	376.85534	581.37526	86.813556	0
18	4622	182.8611	-5.447398	364.86912	575.45253	89.387353	0
19	4622	183.75	-5.2214755	349.51394	581.10648	98.305203	0
20	4622	185.25	-4.8282675	322.44794	589.27787	113.26259	0
21	4622	187.09675	-4.3133055	287.20116	586.42182	127.01164	0
22	4622	189.14515	-3.710202	246.11427	571.29272	138.03006	0
23	4622	191.0484	-3.113658	205.67997	552.24388	147.10765	0
24	4622	193	-2.466013	161.97204	524.93612	154.06911	0
25	4622	195	-1.764866	114.84975	489.31683	158.95185	0
26	4622	196.79985	-1.102309	70.468986	453.50778	162.59032	0
27	4622	198.29985	-0.5248519	31.907887	418.84751	164.24612	0
28	4622	199.25285	-0.14790179	6.7787992	390.55965	162.90531	0
29	4622	199.75285	0.054672665	-6.7050993	369.90163	157.01393	0
30	4622	200.5	0.3631529	-27.21422	339.40895	144.07055	0
31	4622	201.875	0.94687335	-65.956439	325.1149	138.00309	0
32	4622	203.625	1.715115	-116.84877	240.77865	102.20447	0
33	4622	205.375	2.5161325	-169.77969	154.28446	65.489868	0
34	4622	207.125	3.3506385	-224.80455	65.648067	27.865951	0
35	4622	208.15	3.8510645	-257.76181	10.459779	4.4399126	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





- Name: EMBANKMENT FILL CH, EL. +3.5 TO -1 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 1, MH, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BEACH SAND SP, EL. -12 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
- Name: BAY SOUND CLAY CL, EL. -45 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
- Name: MARSH 1 Protected Toe MH, EL. -6 TO -10 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Fill ,EL -1 to -6 (Protected Side toe) EL. -1 to -6 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Fill 2, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: fill Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 2 Protected Toe MH, EL. -10 to -12 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 2, MH, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BAY SOUND CLAY CL, EL. -45 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.04.

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 7 STA. 59+00 TO STA. 66+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 282
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Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 12:41:04 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 Protected Toe MH, EL. -6 TO -10

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill ,EL -1 to -6 (Protected Side toe) El. -1 to -6

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill 2, EL. -1 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2 Protected Toe MH, EL. -10 to -12

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +3.5 TO -1

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -45 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -45 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (40, -9.7) ft
Left-Zone Right Coordinate: (161.2, -8.32647) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (208, 3.5) ft
Right-Zone Right Coordinate: (240, -2.59748) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (0, -9.7) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
0	0.4
184.5	0.4
228.1	-1.4
244	-3
310	-3

Unit Weight Functions

Marsh 3

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 96

Data Points: X (ft), Unit Weight (pcf)

Data Point: (176.7, 96)

Data Point: (200, 98)

Data Point: (228, 96)

fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 96

Data Points: X (ft), Unit Weight (pcf)

Data Point: (176.7, 96)

Data Point: (200, 105)

Data Point: (228.1, 96)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +3.5 TO -1	4,38,5,18,39,40,6,13,19	57.67
Region 2	Fill 2, EL. -1 TO -4	3,4,19,13,14,20,55	71.37

Region 3	Fill 2, EL. -1 TO -4	13,8,27,25,14	106.55
Region 4	Fill ,EL -1 to -6 (Protected Side toe) EL. -1 to -6	8,41,9,10,28,25,27	258.75
Region 5	EMBANKMENT FILL CH, EL. +3.5 TO -1	6,32,61,7,8,13	83.523015
Region 6	BEACH SAND SP, EL. -12 TO -45	11,24,17,16,26,29,12,52,33,53	9190
Region 7	BAY SOUND CLAY CL, EL. -45 TO -70	53,33,52,59,35,58	1285
Region 8	MARSH 1, MH, EL. -4 TO -8	2,3,55,20,14,15,21,56	136.07
Region 9	BEACH SAND SP, EL. -12 TO -45	16,17,24,50,51,49,57,23	1102.375
Region 10	MARSH 2, MH, EL. -8 TO -12	15,44,16,23,57,49,37,2,56,21	155.01
Region 11	MARSH 2 Protected Toe MH, EL. -10 to -12	45,46,29,26	164
Region 12	MARSH 1 Protected Toe MH, EL. -6 TO -10	25,28,46,45,54	328
Region 13	MARSH 2, MH, EL. -8 TO -12	45,26,16,44,15	84
Region 14	Silted-in Layer	50,60,1,36,2,37,49,51	327.65
Region 15	MARSH 1, MH, EL. -4 TO -8	15,14,25,54,45	112
Region 16	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	31,11,53,58	4408.665
Region 17	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	59,52,12,30	2047.5

Points

	X (ft)	Y (ft)
Point 1	102.6	-9.7
Point 2	161.5	-8.3
Point 3	170.9	-4
Point 4	176.7	-1.6
Point 5	186.2	1.4
Point 6	200	3.5
Point 7	208	3.5
Point 8	228.1	-1.4
Point 9	310	-3

Point 10	310	-4
Point 11	0	-45
Point 12	310	-45
Point 13	200	-1
Point 14	200	-4
Point 15	200	-8
Point 16	200	-12
Point 17	200	-17.2
Point 18	195.1	2.4
Point 19	195	-1
Point 20	195	-4
Point 21	195	-8
Point 22	195	-15
Point 23	195	-12
Point 24	0	-17.2
Point 25	228	-6
Point 26	228	-12
Point 27	228	-4
Point 28	310	-6
Point 29	310	-12
Point 30	310	-70
Point 31	0	-69.9
Point 32	201	3.53
Point 33	200	-45
Point 34	200	-53
Point 35	200	-70
Point 36	151.3	-9.2
Point 37	160.5	-9
Point 38	183.4	-0.2
Point 39	195.9	3.3
Point 40	199	3.5
Point 41	244	-3
Point 42	201	3.7
Point 43	0	-12
Point 44	200	-9.9
Point 45	228	-10

Point 46	310	-10
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	157.3	-11.4
Point 50	0	-11.9
Point 51	151.3	-11.4
Point 52	228.1	-45
Point 53	176.7	-45
Point 54	228	-8
Point 55	176.7	-4
Point 56	176.7	-8
Point 57	176.7	-12
Point 58	176.7	-70
Point 59	228.1	-70
Point 60	0	-9.7
Point 61	201.2	3.69429

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.37	(170.19, 46.018)	24.24461	(208, 3.5)	(156.497, -8.74146)
2	4393	1.41	(170.19, 46.018)	56.898	(208, 3.5)	(155.161, -8.85929)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	157.38915	-8.8874235	579.50755	602.34501	12.142895	0
2	Optimized	159.17385	-9.179355	597.7554	639.72546	22.315877	0
3	Optimized	160.14745	-9.3386105	607.71149	658.66791	21.629717	0
4	Optimized	160.3643	-9.3755315	610.00921	663.2856	22.614485	0

	ed	5					
5	Optimiz ed	161	-9.4862775	616.90691	674.70623	24.534352	0
6	Optimiz ed	161.9537 5	-9.652446	627.27673	715.6563	37.514901	0
7	Optimiz ed	163.4197	-9.807315	636.9524	739.95043	43.720068	0
8	Optimiz ed	165.4441 5	-9.958945	646.4099	779.84923	56.641638	0
9	Optimiz ed	167.5168	-10.043585	651.67022	805.7588	65.406722	0
10	Optimiz ed	169.6376	-10.06123	652.80184	832.96477	76.474628	0
11	Optimiz ed	170.799	-10.065765	653.07761	840.70267	79.642111	0
12	Optimiz ed	171.796	-10.02346	650.4085	848.72009	84.178276	0
13	Optimiz ed	173.5880 5	-9.9474195	645.66954	865.16707	93.171176	0
14	Optimiz ed	175.5920 5	-9.81705	637.56283	873.25915	100.04715	0
15	Optimiz ed	177.8344 5	-9.630145	625.89822	878.45364	107.20342	0
16	Optimiz ed	179.7074	-9.4736875	616.12062	881.1072	112.48013	0
17	Optimiz ed	181.1844 5	-9.3498825	608.39575	883.26611	116.67555	0
18	Optimiz ed	182.6615	-9.226077	600.66414	885.35756	120.84519	0
19	Optimiz ed	183.95	-9.1180735	593.92657	896.03092	128.23569	0
20	Optimiz ed	184.6452 5	-9.0597965	589.93246	913.94943	137.53705	0
21	Optimiz ed	185.4952 5	-8.8507625	574.6824	910.54019	142.56317	0
22	Optimiz ed	186.2659 5	-8.6354825	559.26495	930.85475	157.73051	0
23	Optimiz	187.1138	-8.30853	536.67842	890.85548	150.33924	0

	ed	5					
24	Optimiz ed	188.6322	-7.709425	495.3848	854.76725	152.5488	0
25	Optimiz ed	190.1050 5	-7.128275	455.3243	821.60981	155.47898	0
26	Optimiz ed	191.5251	-6.5336025	414.56186	778.94913	154.67322	0
27	Optimiz ed	192.8923	-5.9254075	373.0883	742.46095	156.78939	0
28	Optimiz ed	194.2879 5	-5.2848615	329.51838	699.50359	157.04941	0
29	Optimiz ed	195.05	-4.9247885	305.08904	677.50146	158.07969	0
30	Optimiz ed	195.2440 5	-4.833102	298.86706	685.09917	163.9458	0
31	Optimiz ed	195.6440 5	-4.5761555	281.79796	664.82186	162.584	0
32	Optimiz ed	196.1624	-4.1936355	256.59201	659.31956	170.94771	0
33	Optimiz ed	197.0812	-3.51557	211.91967	604.3063	166.55824	0
34	Optimiz ed	198.3688	-2.554102	148.60855	520.3922	157.8128	0
35	Optimiz ed	199.5	-1.69917	92.342844	444.54603	149.50138	0
36	Optimiz ed	200.0657	-1.271613	64.207124	404.86243	144.5996	0
37	Optimiz ed	200.2934	-1.1142165	53.80054	400.74129	147.26761	0
38	Optimiz ed	200.7277	-0.82540365	34.660116	374.5213	144.26251	0
39	Optimiz ed	201.1	-0.577822	18.25196	358.7483	144.53212	0
40	Optimiz ed	201.3570 5	-0.4068689	6.9222478	349.16079	145.27164	0
41	Optimiz ed	202.5141	0.36260595	-44.073754	279.94286	118.82869	0
42	Optimiz	204.2617	1.439692	-115.78708	191.07885	81.108159	0

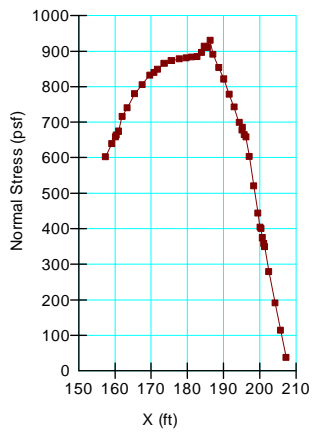
	ed	5					
43	Optimiz ed	205.7570 5	2.2638155	-171.06547	114.65082	48.666387	0
44	Optimiz ed	207.2523 5	3.0879385	-226.338	38.216355	16.22188	0

Slices of Slip Surface: 4393

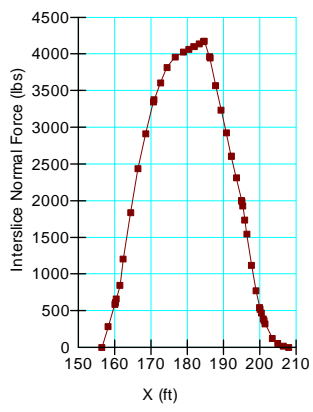
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	4393	156.2151	-9.1263185	594.43368	627.92031	17.805157	0
2	4393	158.3225	-9.618109	625.11834	685.4954	32.103051	0
3	4393	159.9381	-9.945804	645.57887	719.54662	31.397446	0
4	4393	161	-10.130575	657.10654	736.81593	33.834627	0
5	4393	162.44	-10.34167	670.28826	784.1108	48.3148	0
6	4393	164.32	-10.56844	684.41258	826.68109	60.389399	0
7	4393	166.2	-10.73204	694.61505	862.28624	71.172198	0
8	4393	168.08	-10.83302	700.95371	891.08879	80.707556	0
9	4393	169.96	-10.87171	703.34545	913.29059	89.116422	0
10	4393	171.86665	-10.84701	701.79829	929.64749	96.716248	0
11	4393	173.8	-10.757045	696.19737	941.80478	104.25416	0
12	4393	175.73335	-10.600935	686.45928	947.24688	110.69777	0
13	4393	177.5375	-10.397215	673.77243	941.65928	113.71122	0
14	4393	179.2125	-10.15362	658.54392	929.69519	115.09689	0
15	4393	180.8875	-9.8587615	640.13557	912.85431	115.76224	0
16	4393	182.5625	-9.5118215	618.50516	891.16256	115.7362	0
17	4393	183.95	-9.188134	598.29542	877.93983	118.70201	0
18	4393	185.35	-8.816048	572.91921	901.13586	139.3197	0
19	4393	187.13135	-8.290524	535.52182	904.93911	156.80834	0
20	4393	188.92985	-7.6974695	493.87266	866.59226	158.21008	0
21	4393	190.66415	-7.060443	449.65006	825.70781	159.62705	0
22	4393	192.3985	-6.358252	401.36851	779.27386	160.41131	0
23	4393	194.13285	-5.5882325	348.85102	727.18048	160.59133	0
24	4393	195.05	-5.161621	319.87083	698.01121	160.51107	0
25	4393	195.5	-4.9386555	304.79764	719.10568	175.86333	0
26	4393	196.60575	-4.3699885	266.46002	712.30023	189.24794	0

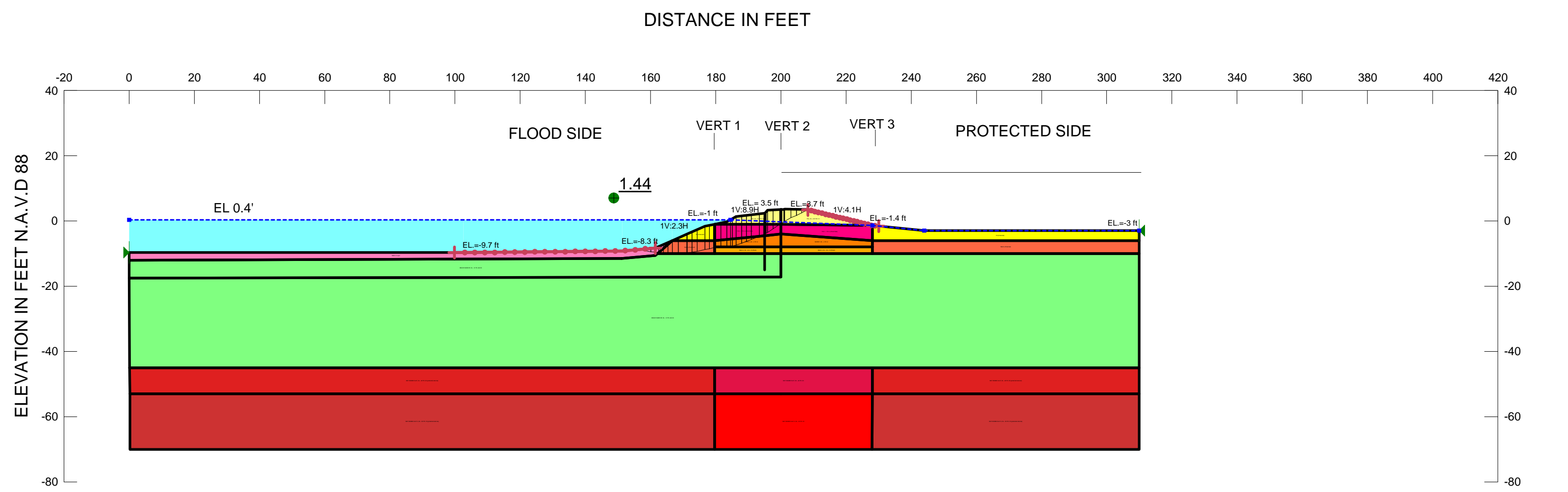
27	4393	198.15575	-3.523429	209.64526	639.52403	182.47271	0
28	4393	199.5	-2.746331	157.68818	565.45928	173.08856	0
29	4393	200.5	-2.131052	116.71904	504.1802	164.46751	0
30	4393	201.1	-1.7515935	91.49614	474.06217	162.38965	0
31	4393	201.6931	-1.3590035	65.469581	440.40425	159.15032	0
32	4393	202.66215	-0.70029215	21.870132	372.25976	148.73157	0
33	4393	203.94845	0.2279324	-39.364948	283.53947	120.35537	0
34	4393	205.5691	1.4688441	-120.97084	172.86243	73.375746	0
35	4393	207.1897	2.8061795	-208.59766	57.941452	24.594687	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





- Name: FILL, EL. +3.5 TO-1.0 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Fill 2. -1 TO -4 (Flood Side) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BEACH SAND SP, EL. -12 TO -48/-53 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
- Name: BAY SOUND CLAY, EL. -48 TO -53 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
- Name: Fill (Protected) Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 1,EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BAY SOUND CLAY 2, EL. -53 TO -70 Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Marsh 2, EL. -8 to -10 (Flood) Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Marsh (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BAY SOUND CLAY, EL. -48 TO -53 (protected side toe) Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe) Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.03.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



US Army Corps of Engineers®
New Orleans District
LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 8 STA. 66+00 TO STA. 69+06
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 317
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 12:53:01 PM
File Name: Reach 8_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 12:56:38 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1,EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -53 TO -70

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2, EL. -8 to -10 (Flood)

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL, EL. +3.5 TO-1.0

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill 2, -1 TO -4 (Flood Side)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -48/-53

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -53

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -53 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (99.9, -9.7) ft
Left-Zone Right Coordinate: (161.5, -8.3) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (208.3, 3.42687) ft
Right-Zone Right Coordinate: (230, -1.59119) ft
Right-Zone Increment: 20
Radius Increments: 5

Slip Surface Limits

Left Coordinate: (0, -9.7) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
0	0.4
184.5	0.4
228.1	-1.4
244	-3
310	-3

Regions

	Material	Points	Area (ft²)
Region 1	FILL, EL. +3.5 TO-1.0	26,14,31,4,10,52,34,30	52.9145
Region 2	FILL (Protected)	6,44,7,8,19,37	258.42
Region 3	BEACH SAND SP, EL. -12 TO -48/-53	46,47,48,36,49,32,13,22,45	1194.4515
Region 4	BEACH SAND SP, EL. -12 TO -48/-53	22,13,32,33,27,23,57,53,55,9	9378.625
Region 5	BAY SOUND CLAY 2, EL. -53 TO -70	54,58,28,59,41,56	821.95
Region 6	FILL, EL. +3.5 TO-1.0	4,40,24,5,6,10	83.525
Region 7	Marsh (Protected)	18,37,19,27,33	327.6
Region 8	Marsh 2, EL. -8 to -10 (Flood)	32,12,18,33	56.2
Region 9	Marsh 2, EL. -8 to -10 (Flood)	32,12,50,35,36,49	40.6
Region 10	FILL (Protected)	38,34,29,3,39	36.2
Region 11	Fill 2. -1 TO -4 (Flood Side)	10,11,37,6	106.78
Region 12	MARSH 1,EL. -4 TO -8	11,12,18,37	84.3
Region 13	Fill 2. -1 TO -4 (Flood Side)	10,52,34,38,51,11	81.199992
Region 14	MARSH 1,EL. -4 TO -8	11,12,50,35,38,51	60.900009
Region 15	Marsh (Protected)	39,38,35,36,48	61.04348
Region	Silted-in Layer	1,2,25,39,48,47,46,45,60	351.64

16			
Region 17	BAY SOUND CLAY, EL. -48 TO -53 (protected side toe)	9,55,56,16	1436.4
Region 18	BAY SOUND CLAY, EL. -48 TO -53	55,53,57,58,54,56	387.2
Region 19	BAY SOUND CLAY, EL. -48 TO -53 (protected side toe)	57,23,17,58	655.2
Region 20	BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe)	16,56,41,21	3051.5
Region 21	BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe)	58,17,20,28	1393.15

Points

	X (ft)	Y (ft)
Point 1	102.6	-9.7
Point 2	151.3	-9.2
Point 3	171.2	-4
Point 4	200	3.5
Point 5	208	3.5
Point 6	228.1	-1.4
Point 7	310	-3
Point 8	310	-5.2
Point 9	0.1	-45
Point 10	200	-1
Point 11	200	-4
Point 12	200	-8
Point 13	200	-17.2
Point 14	195.1	2.4
Point 15	195	-15
Point 16	0.2	-53
Point 17	310	-53
Point 18	228.1	-8
Point 19	310	-6
Point 20	310	-70
Point 21	0.2	-70
Point 22	0	-17.5

Point 23	310	-45
Point 24	201.2	3.7
Point 25	161.5	-8.3
Point 26	186.2	1.4
Point 27	310	-10
Point 28	228	-70
Point 29	176.7	-1.6
Point 30	183.4	-0.2
Point 31	195.9	3.31
Point 32	200	-10
Point 33	228.1	-10
Point 34	179.7	-1
Point 35	179.7	-8
Point 36	179.7	-10
Point 37	228.1	-6
Point 38	179.7	-6
Point 39	166.7	-6
Point 40	201	3.5
Point 41	179.7	-70
Point 42	200	12.9
Point 43	200.7	12.9
Point 44	244	-3
Point 45	0	-12
Point 46	151.1	-11.5
Point 47	161.5	-10.6
Point 48	162.17826	-10
Point 49	195	-10
Point 50	195	-8
Point 51	195	-4.49261
Point 52	195	-1
Point 53	200	-45
Point 54	200	-53
Point 55	179.7	-45
Point 56	179.7	-53
Point 57	228.1	-45
Point 58	228.1	-53

Point 59	200	-70
Point 60	0	-9.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.44	(163.853, 70.596)	24.10782	(208.3, 3.42687)	(155.739, -8.8083)
2	2144	1.48	(163.853, 70.596)	80.543	(208.3, 3.42687)	(152.29, -9.1127)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	156.50685	-8.9069545	580.755	596.63043	8.4411138	0
2	Optimized	158.0419	-9.1042715	593.06379	619.077	13.831471	0
3	Optimized	159.48205	-9.3008005	605.33327	642.3993	19.708355	0
4	Optimized	160.82735	-9.4965415	617.54395	664.2976	24.859358	0
5	Optimized	161.9881	-9.6654295	628.07898	704.78697	40.786362	0
6	Optimized	163.243	-9.8480135	639.47489	745.10763	44.838436	0
7	Optimized	164.68235	-9.9593535	646.42319	773.90577	54.113143	0
8	Optimized	166.02745	-9.9589005	646.39346	802.75067	66.3697	0
9	Optimized	167.6254	-9.958362	646.36565	834.60755	79.903948	0
10	Optimized	169.81655	-9.87557	641.17649	858.68614	92.327366	0
11	Optimized	171.14115	-9.7846515	635.52356	863.25403	96.665849	0

12	Optimiz ed	171.9846	-9.663675	627.97233	865.92293	101.00404	0
13	Optimiz ed	173.5538	-9.4385985	613.93034	871.15872	109.18697	0
14	Optimiz ed	175.5192	-9.062262	590.4508	856.91404	113.10693	0
15	Optimiz ed	177.3670 5	-8.6494455	564.68326	839.89229	116.8193	0
16	Optimiz ed	178.7011 5	-8.3514085	546.08727	821.45723	116.88761	0
17	Optimiz ed	179.5341	-8.1785245	535.30773	822.51329	121.91153	0
18	Optimiz ed	179.8487	-8.1332745	532.47211	774.67435	102.80875	0
19	Optimiz ed	180.7924	-8.055945	527.64877	784.51571	109.03355	0
20	Optimiz ed	182.4937	-7.9362245	520.17873	787.08394	113.29454	0
21	Optimiz ed	183.95	-7.833746	513.7841	798.5164	120.86169	0
22	Optimiz ed	184.7970 5	-7.7741415	509.30365	824.80996	133.92448	0
23	Optimiz ed	185.6470 5	-7.5684925	494.27936	814.90273	136.09655	0
24	Optimiz ed	187.074	-7.0917375	460.85255	812.09147	149.09208	0
25	Optimiz ed	188.6769	-6.524215	421.31315	772.24809	148.96305	0
26	Optimiz ed	190.1347	-5.973185	383.17237	739.00966	151.04397	0
27	Optimiz ed	192.1177	-5.175349	328.27793	684.13012	151.05029	0
28	Optimiz ed	194.1859	-4.313951	269.19965	627.78479	152.21036	0
29	Optimiz ed	195.05	-3.9540495	244.51036	602.57536	151.98958	0
30	Optimiz ed	195.2715	-3.8618025	238.18656	612.57816	158.91981	0

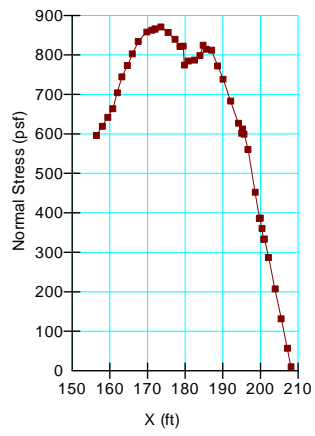
31	Optimiz ed	195.6715	-3.639647	223.28702	599.92519	159.87342	0
32	Optimiz ed	196.7494 5	-2.928617	176.14944	560.54919	163.16801	0
33	Optimiz ed	198.6186	-1.68416	93.681697	452.48814	152.3043	0
34	Optimiz ed	199.7623	-0.91682	42.850411	386.37374	145.817	0
35	Optimiz ed	199.9431 5	-0.80142465	35.184912	387.49926	149.54857	0
36	Optimiz ed	200.4353	-0.52253035	16.514572	360.61046	146.06004	0
37	Optimiz ed	200.9353	-0.2391938	-2.4540826	333.34611	141.49703	0
38	Optimiz ed	201.1	-0.14586887	-8.701939	333.93974	141.74901	0
39	Optimiz ed	202.1464	0.44710923	-48.399796	287.51226	122.04171	0
40	Optimiz ed	203.9107	1.367199	-110.3575	207.22748	87.962845	0
41	Optimiz ed	205.5464 5	2.134757	-162.47015	132.20762	56.118805	0
42	Optimiz ed	207.1821 5	2.902315	-214.57726	57.182231	24.272417	0
43	Optimiz ed	208.15	3.35648	-245.41053	9.8369412	4.1755338	0

Slices of Slip Surface: **2144**

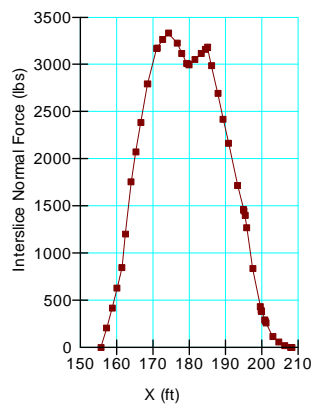
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	2144	153.21055	-9.235487	601.26764	617.78717	8.783587	0
2	2144	155.05265	-9.4595335	615.25777	642.02218	14.230892	0
3	2144	156.89475	-9.640668	626.54676	662.07902	18.892837	0
4	2144	158.73685	-9.7791805	635.15867	678.01183	22.785432	0
5	2144	160.57895	-9.8752915	641.17967	689.88785	25.898596	0
6	2144	161.87795	-9.9220425	644.09431	714.13504	37.241315	0

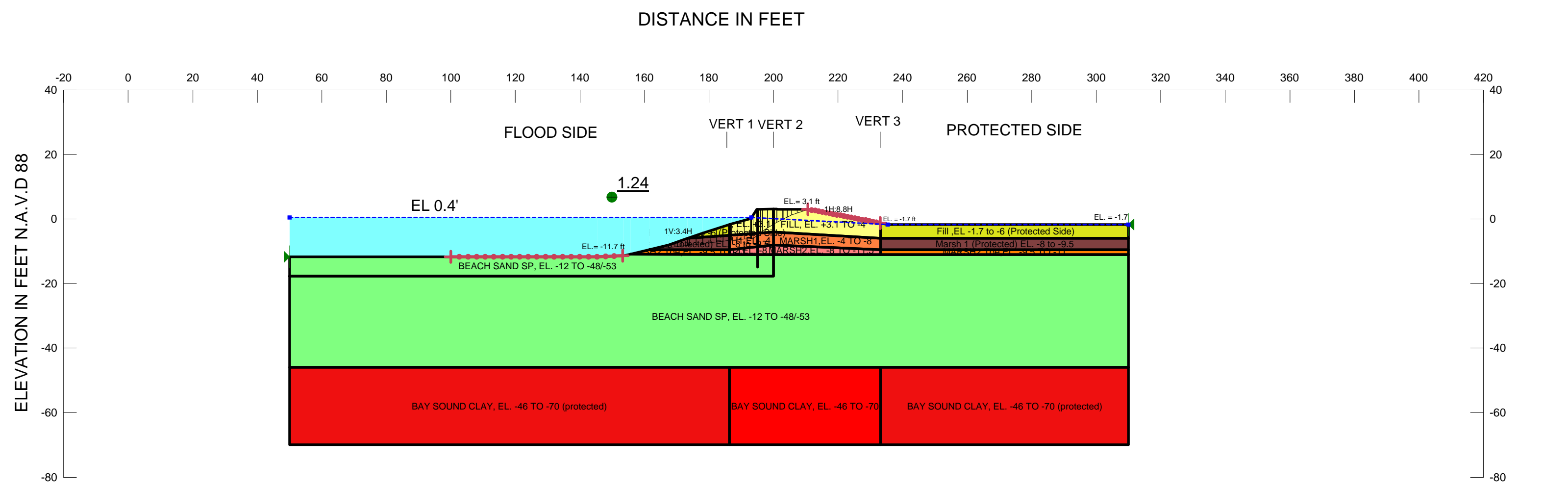
7	2144	163.36695	-9.9380255	645.11396	742.13983	41.185034	0
8	2144	165.589	-9.920787	644.03095	785.53418	60.06456	0
9	2144	167.825	-9.8412905	639.04372	819.17983	76.463242	0
10	2144	170.075	-9.698572	630.15566	843.07303	90.378062	0
11	2144	172.11665	-9.5168505	618.80785	858.5179	101.75088	0
12	2144	173.95	-9.306468	605.71066	867.14086	110.97054	0
13	2144	175.78335	-9.053336	589.87455	871.19103	119.41176	0
14	2144	177.45	-8.7875775	573.30487	862.11258	122.5916	0
15	2144	178.95	-8.515999	556.36066	844.88762	122.47243	0
16	2144	180.5782	-8.1864395	535.79663	777.57258	102.6278	0
17	2144	182.4282	-7.769661	509.81123	750.97401	102.36753	0
18	2144	183.95	-7.397603	486.57048	735.98725	105.87114	0
19	2144	185.35	-7.020468	460.84572	760.88608	127.35958	0
20	2144	187.21535	-6.4772835	422.14552	766.79614	146.29551	0
21	2144	189.24605	-5.8321705	376.66121	726.77856	148.616	0
22	2144	191.27675	-5.127111	327.43226	681.59878	150.33477	0
23	2144	193.69605	-4.199234	263.30327	616.11641	149.76029	0
24	2144	195.5	-3.468157	213.03033	600.13564	164.31645	0
25	2144	196.925	-2.8356085	169.89167	583.63708	175.6245	0
26	2144	198.975	-1.8772435	104.80935	496.96208	166.45896	0
27	2144	200.3639	-1.1954365	58.687181	434.03359	159.3251	0
28	2144	200.8639	-0.9399553	41.457419	408.66755	155.87145	0
29	2144	201.1	-0.8173931	33.20143	405.22041	157.91269	0
30	2144	201.6158	-0.54451015	14.844635	385.31051	157.25344	0
31	2144	203.02635	0.2299846	-37.117895	307.24286	130.41685	0
32	2144	205.0158	1.375273	-113.70735	196.71429	83.50026	0
33	2144	207.00525	2.598053	-195.13708	81.812514	34.727352	0
34	2144	208.15	3.3280895	-243.63959	11.806983	5.0117667	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: FILL, EL. +3.1 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH1,EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -12 TO -48/-53 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill ,EL -1.7 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH2,EL. -8 TO -11.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH2 Toe,EL. -9.5 TO -11 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 1 (Protected) EL. -8 to -9.5 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 0.67.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 9 STA. 70+18 TO STA. 74+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 340
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 1:05:07 PM
File Name: Reach 9_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:06:16 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill ,EL -1.7 to -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 102 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH2,EL. -8 TO -11.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH2 Toe,EL. -9.5 TO -11

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1 (Protected) EL. -8 to -9.5

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL, EL. +3.1 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH1,EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -48/-53

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (100, -11.7) ft
Left-Zone Right Coordinate: (153.3, -11.41111) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (210.7, 3) ft
Right-Zone Right Coordinate: (233, -1.26178) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (50, -11.7) ft
Right Coordinate: (310, -1.7) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
50	0.4
193.1	0.4
235.3	-1.7
310	-1.7

Unit Weight Functions

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 102
Data Points: X (ft), Unit Weight (pcf)
Data Point: (186.3, 102)

Data Point: (200, 106)
Data Point: (233.2, 102)

Regions

	Material	Points	Area (ft²)
Region 1	FILL, EL. +3.1 TO -4	35,3,38,51,4,15,36,5,11,12,56	75.381047
Region 2	FILL, EL. +3.1 TO -4	11,5,30,6,54,50,7,22,12	217.32501
Region 3	FILL, EL -1.7 to -6 (Protected Side)	7,44,8,18,9,23,22	330.66
Region 4	BEACH SAND SP, EL. -12 TO -48/-53	1,43,31,48,16,13,14,26,57	934.91
Region 5	BEACH SAND SP, EL. -12 TO -48/-53	26,14,13,32,33,29,28,27,52,10	8095
Region 6	MARSH2, EL. -8 TO -11.5	47,45,13,16,48	30.825
Region 7	MARSH2, EL. -8 TO -11.5	13,45,40,32	74.7
Region 8	BAY SOUND CLAY, EL. -46 TO -70 (protected)	34,28,29,20,24	1843.2
Region 9	Marsh 1 (Protected) EL. -8 to -9.5	21,22,23,39,40	268.8
Region 10	MARSH2 Toe, EL. -9.5 TO -11	32,40,39,33	115.2
Region 11	MARSH1, EL. -4 TO -8	47,45,12,56	58.018952
Region 12	MARSH2 Toe, EL. -9.5 TO -11	47,48,31,49	40.382415
Region 13	MARSH1, EL. -4 TO -8	45,12,22,21,40	124.5
Region 14	Marsh 1 (Protected) EL. -8 to -9.5	46,56,47,49,37	70.733572
Region 15	BAY SOUND CLAY, EL. -46 TO -70 (protected)	10,52,53,25,19	3271.2
Region 16	BAY SOUND CLAY, EL. -46 TO -70	52,27,28,34,55,53	1125.6
Region 17	Fill, EL -1.7 to -6 (Protected Side)	46,2,35,56	21.694016

Points

	X (ft)	Y (ft)
Point 1	145.5	-11.7
Point 2	178.1	-4.4

Point 3	187	-1.5
Point 4	194.8	3
Point 5	200	3.1
Point 6	201	3
Point 7	233.2	-1.3
Point 8	310	-1.7
Point 9	310	-4
Point 10	50	-46
Point 11	200	0.5
Point 12	200	-4
Point 13	200	-11
Point 14	200	-17.7
Point 15	195	3
Point 16	195	-11
Point 17	195	-15
Point 18	310	-3
Point 19	50	-53
Point 20	310	-53
Point 21	233.2	-8
Point 22	233.2	-6
Point 23	310	-6
Point 24	310	-70
Point 25	50	-70
Point 26	50	-17.7
Point 27	200	-46
Point 28	233.2	-46
Point 29	310	-46
Point 30	201	3.1
Point 31	155.7	-10.9
Point 32	233.2	-11
Point 33	310	-11
Point 34	233.2	-70
Point 35	186.3	-1.7
Point 36	195.4	3
Point 37	167.5	-8
Point 38	192.9	0.1

Point 39	310	-9.5
Point 40	233.2	-9.5
Point 41	200	12.7
Point 42	200.5	12.7
Point 43	153.6	-11.4
Point 44	235.3	-1.7
Point 45	200	-8
Point 46	173.4	-6
Point 47	186.3	-9.5
Point 48	186.3	-11
Point 49	161.39655	-9.5
Point 50	223.7814	0.5
Point 51	193.16207	0.5
Point 52	186.3	-46
Point 53	186.3	-70
Point 54	210.7	3
Point 55	200	-70
Point 56	186.3	-5.03008
Point 57	50	-11.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.24	(149.4, 125.643)	24.41953	(210.7, 3)	(159.036, -10.08)
2	4622	1.43	(149.4, 125.643)	137.109	(210.7, 3)	(153.3, -11.4111)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	159.2963	-10.036485	651.23314	655.33312	1.74034	0
2	Optimized	160.4763	-9.7916305	635.9433	639.39345	1.4645042	0
3	Optimized	161.4413	-9.5805005	622.7843	627.0914	1.8282539	0

	ed						
4	Optimized	161.698	-9.53535	619.97191	627.11728	3.0330321	0
5	Optimized	163.09895	-9.30164	605.37734	616.45208	4.7009459	0
6	Optimized	165.091	-9.0334555	588.64945	611.38405	9.6502667	0
7	Optimized	166.697	-8.893806	579.934	612.04159	13.628862	0
8	Optimized	168.4959	-8.7373855	570.1564	619.42423	20.912955	0
9	Optimized	170.46885	-8.5438745	558.09766	623.10985	27.59604	0
10	Optimized	172.42295	-8.3300435	544.76965	625.90772	34.441067	0
11	Optimized	173.6611	-8.194559	536.30761	627.7451	38.812911	0
12	Optimized	174.96665	-8.0316165	526.12912	626.54993	42.626108	0
13	Optimized	177.05555	-7.7628695	509.36857	626.02765	49.518841	0
14	Optimized	179.2421	-7.481563	491.7963	624.84097	56.47411	0
15	Optimized	181.36715	-7.2136015	475.08871	624.49232	63.418067	0
16	Optimized	183.3331	-6.971545	459.98377	624.34086	69.765445	0
17	Optimized	185.2991	-6.7294885	444.87883	624.18941	76.112823	0
18	Optimized	186.29105	-6.6077985	437.28835	629.4361	81.561878	0
19	Optimized	186.65	-6.58135	435.63353	613.38033	75.449041	0
20	Optimized	187.98335	-6.483114	429.50877	618.71291	80.312393	0
21	Optimized	189.95	-6.3382155	420.46717	626.82651	87.594343	0
22	Optimized	191.91665	-6.1933165	411.4205	635.3965	95.072171	0

	ed						
23	Optimiz ed	193	-6.1134995	406.44334	646.14861	101.74885	0
24	Optimiz ed	193.13105	-6.1038455	405.74733	655.89901	106.18309	0
25	Optimiz ed	193.40605	-6.0835845	403.62397	697.58862	124.78059	0
26	Optimiz ed	194.225	-5.6284585	372.67906	682.45581	131.49243	0
27	Optimiz ed	194.9	-5.1152815	338.56586	711.9595	158.4962	0
28	Optimiz ed	195.14115	-4.931938	326.38272	697.11965	157.36849	0
29	Optimiz ed	195.34115	-4.778826	316.20002	682.33271	155.41411	0
30	Optimiz ed	195.67535	-4.5187475	298.93423	661.77123	154.01517	0
31	Optimiz ed	196.25775	-4.0654865	268.84339	623.66886	150.61448	0
32	Optimiz ed	197.3347	-3.31964	218.95431	572.25584	149.9676	0
33	Optimiz ed	198.87455	-2.3059	150.91824	480.46167	139.88289	0
34	Optimiz ed	199.82225	-1.702741	110.33647	438.9321	139.48057	0
35	Optimiz ed	200.5	-1.335628	85.324505	403.43982	135.03194	0
36	Optimiz ed	201.90605	-0.57405292	33.436416	319.81161	121.55906	0
37	Optimiz ed	202.8645	0.05492091 5	-1.933633	269.21509	114.27502	0
38	Optimiz ed	203.59925	0.2837475	-25.347949	246.50917	104.63693	0
39	Optimiz ed	204.964	0.9043225	-68.309127	189.89284	80.604727	0
40	Optimiz ed	206.48865	1.512175	-110.97143	139.57906	59.247797	0

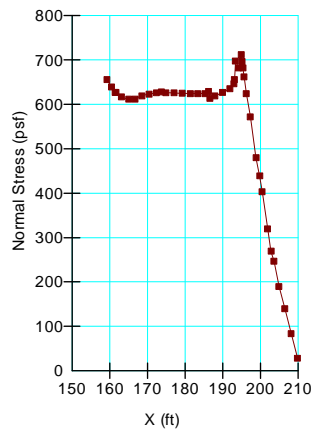
41	Optimiz ed	208.17315	2.107305	-153.34274	83.589595	35.481678	0
42	Optimiz ed	209.8577	2.702435	-195.70846	27.808905	11.80418	0

Slices of Slip Surface: 4622

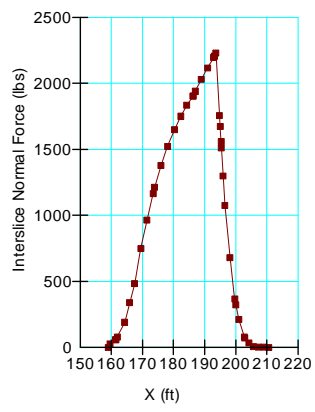
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4622	153.45	-11.40668	736.7452	737.11171	0.21160277	0
2	4622	154.65	-11.36201	733.93762	754.73188	12.005574	0
3	4622	156.64945	-11.271495	728.31592	766.65387	22.134427	0
4	4622	158.5483	-11.15773	721.19515	769.37992	27.819489	0
5	4622	160.4471	-11.01749	712.47698	768.80114	32.518768	0
6	4622	161.51675	-10.93007	707.00346	767.44279	34.894664	0
7	4622	162.61415	-10.82478	700.44253	766.39709	27.99605	0
8	4622	164.5685	-10.62138	687.75287	762.96631	31.926209	0
9	4622	166.52285	-10.3896	673.28204	756.59194	35.362953	0
10	4622	168.33975	-10.14947	658.27377	753.62705	40.475067	0
11	4622	170.0193	-9.904594	643.0183	749.03038	44.999458	0
12	4622	171.69885	-9.638424	626.42279	742.27252	49.175295	0
13	4622	172.9693	-9.424844	613.06494	735.87006	52.127681	0
14	4622	174.575	-9.1302	594.69232	725.70282	55.61066	0
15	4622	176.925	-8.669914	565.98189	708.05056	60.304571	0
16	4622	179.125	-8.201475	536.72758	687.15987	63.854721	0
17	4622	181.175	-7.7296325	507.26567	663.95334	66.509972	0
18	4622	183.225	-7.2244865	475.75197	637.42443	68.625891	0
19	4622	185.275	-6.6856565	442.14648	607.62655	70.242122	0
20	4622	186.65	-6.308965	418.63813	572.41374	65.273876	0
21	4622	187.88545	-5.9511985	396.31435	552.81527	66.430698	0
22	4622	189.65635	-5.4202645	363.18638	523.33104	67.977377	0
23	4622	191.4273	-4.863141	328.42009	491.90452	69.395023	0
24	4622	192.6064	-4.4804955	304.54019	469.20587	69.896433	0
25	4622	193	-4.3494595	296.36407	465.60796	71.839772	0
26	4622	193.13105	-4.3054745	293.5234	471.13689	75.392455	0
27	4622	193.98105	-4.013435	272.66534	564.93173	124.05972	0

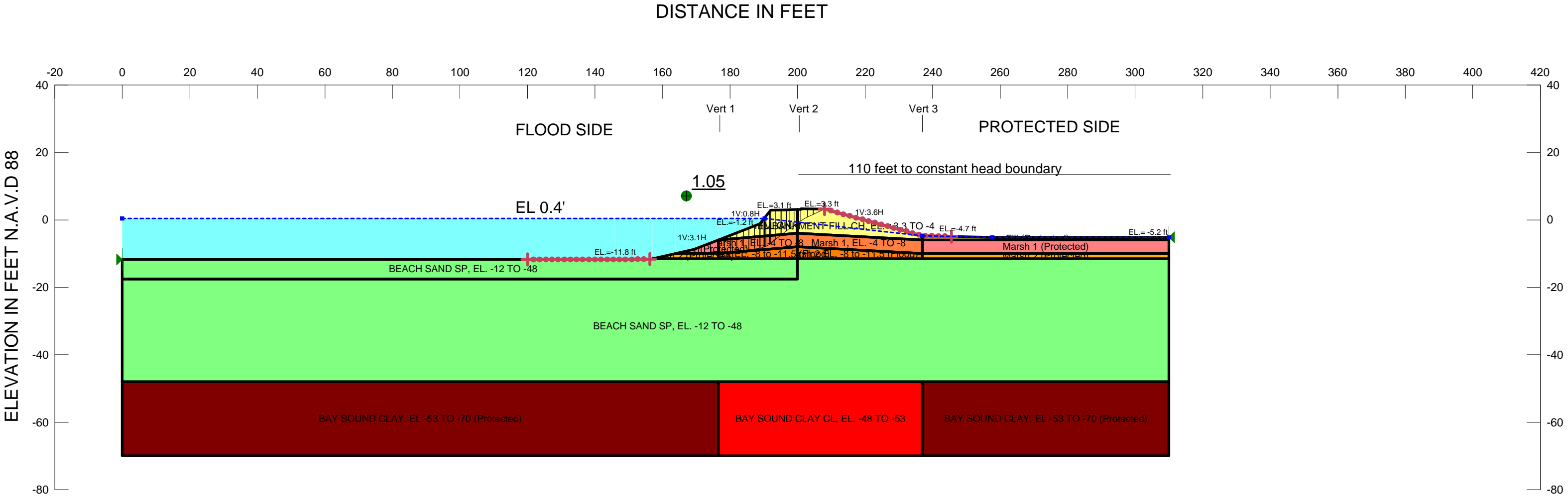
28	4622	194.9	-3.696661	250.04398	651.74726	170.51293	0
29	4622	195.2	-3.590602	242.49659	641.29285	169.27897	0
30	4622	196.55	-3.098545	207.59778	595.04368	164.46103	0
31	4622	198.85	-2.2326545	146.42431	513.62864	155.86899	0
32	4622	200.5	-1.5871225	101.01685	450.53923	148.36345	0
33	4622	201.7415	-1.0800267	65.519642	388.40627	137.05724	0
34	4622	203.22455	-0.4572388	22.052959	324.10904	128.2152	0
35	4622	204.8078	0.23116215	-25.819492	256.19543	108.74851	0
36	4622	206.49125	0.98857025	-78.308451	184.82955	78.455488	0
37	4622	208.17475	1.773489	-132.5169	111.91997	47.50721	0
38	4622	209.85825	2.586445	-188.47414	37.470378	15.905232	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +3.3 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -12 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -48 TO -53 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 1, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -53 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill (Protected) Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 1 (Protected) Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 2 EL. -8 to -11.5 (Flood) Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 2 (Protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.46.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 10 STA. 74+00 TO STA. 79+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

FS Slope Stability (Entry/Exit)_Global

Report generated using GeoStudio 2007, version 7.15. Copyright © 1991-2009 GEO-SLOPE International Ltd.

File Information

Created By: Liljegren, James
Revision Number: 404
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 1:27:48 PM
File Name: Reach 10_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:30:30 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL -53 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1 (Protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 EL. -8 to -11.5 (Flood)

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 (Protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +3.3 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -53

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1, EL. -4 TO -8

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -11.8) ft
Left-Zone Right Coordinate: (156.3, -11.6055) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (208, 3.2) ft
Right-Zone Right Coordinate: (245.6, -4.90773) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (0, -11.8) ft
Right Coordinate: (310, -5.2) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
0	0.4
190.2	0.4
237	-4.7
257.7	-5.2
310	-5.2

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96

Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.5, 96)
Data Point: (200, 98)
Data Point: (237, 96)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.5, 99)
Data Point: (200, 101)
Data Point: (237, 99)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +3.3 TO -4	2,47,27,3,7,43,25	99.529999
Region 2	Fill (Protected)	26,10,5,13,28,38	63.575
Region 3	EMBANKMENT FILL CH, EL. +3.3 TO -4	3,46,23,4,38,28,7	189.1
Region 4	BEACH SAND SP, EL. -12 TO -48	18,9,17,48,1,39,41,33	1154.0873
Region 5	Marsh 2 EL. -8 to -11.5 (Flood)	18,8,29,30	92.5
Region 6	Marsh 1, EL. -4 TO -8	7,8,29,28	148
Region 7	Marsh 1 (Protected)	28,29,14,13	292
Region 8	Marsh 2 (Protected)	29,30,31,14	109.5
Region 9	Marsh 2 EL. -8 to -11.5 (Flood)	8,18,33,32	58.75
Region 10	Marsh 1, EL. -4 TO -8	7,8,32,43	94
Region 11	BEACH SAND SP, EL. -12 TO -48	6,17,9,18,30,31,22,21,19,34	10115
Region 12	Marsh 2 (Protected)	41,42,32,33	24.066968
Region 13	Marsh 1 (Protected)	42,40,43,32	21.985716
Region 14	BAY SOUND CLAY CL, EL. -48 TO -53	45,35,34,19,21,20,24	1331
Region 15	BAY SOUND CLAY, EL. -53 TO -70 (Protected)	6,34,35,45,16,11	3883
Region	BAY SOUND CLAY, EL. -53 TO -70	21,22,12,15,24,20	1606

16	(Protected)		
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Points

	X (ft)	Y (ft)
Point 1	145.7	-11.8
Point 2	192	2.8
Point 3	200	3.1
Point 4	208	3.2
Point 5	310	-5.6
Point 6	0	-48
Point 7	200	-4
Point 8	200	-8
Point 9	200	-17.5
Point 10	310	-5.2
Point 11	0	-53
Point 12	310	-53
Point 13	310	-6
Point 14	310	-10
Point 15	310	-70
Point 16	0	-70
Point 17	0	-17.5
Point 18	200	-11.5
Point 19	200	-48
Point 20	237	-53
Point 21	237	-48
Point 22	310	-48
Point 23	201	3.3
Point 24	237	-70
Point 25	188.8	-1.2
Point 26	257.7	-5.2
Point 27	199	3.1
Point 28	237	-6
Point 29	237	-10
Point 30	237	-11.5
Point 31	310	-11.5

Point 32	176.5	-10
Point 33	176.5	-11.5
Point 34	176.5	-48
Point 35	176.5	-53
Point 36	200	12.9
Point 37	200.5	12.9
Point 38	237	-4.7
Point 39	156.6	-11.6
Point 40	169.3	-8.8
Point 41	157.05357	-11.5
Point 42	163.85714	-10
Point 43	176.5	-6
Point 44	200	3.5
Point 45	176.5	-70
Point 46	201	3.1
Point 47	196.66667	3
Point 48	0	-11.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.05	(161.443, 68.104)	23.66108	(208, 3.2)	(160.726, -10.6903)
2	4623	1.24	(161.443, 68.104)	79.875	(208, 3.2)	(156.3, -11.6055)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimized	161.37025	-10.58187	685.2672	688.85002	1.5208153	0
2	Optimized	162.9357	-10.36379	671.65808	681.73429	4.2771009	0
3	Optimized	164.4348	-10.18538	660.52841	675.69786	6.4390481	0

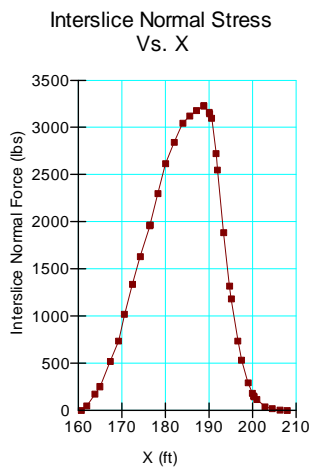
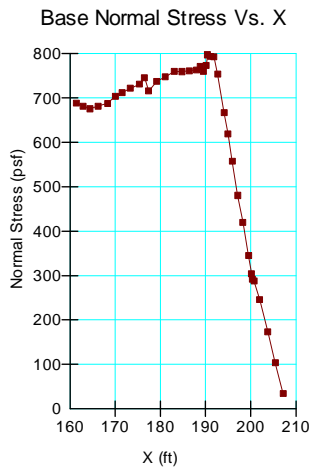
4	Optimized	166.1904	-10.058315	652.61272	681.3153	12.183522	0
5	Optimized	168.33415	-9.952183	645.9959	687.92824	17.799223	0
6	Optimized	169.97965	-9.870718	640.89555	704.00564	26.788646	0
7	Optimized	171.5574	-9.76467	634.27516	712.29711	33.118353	0
8	Optimized	173.3536	-9.61987	625.22995	722.17471	41.150613	0
9	Optimized	175.35205	-9.449575	614.60626	731.38099	49.567935	0
10	Optimized	176.4762	-9.351499	608.4979	745.7311	58.252034	0
11	Optimized	177.3937	-9.3445135	608.05867	715.75146	45.712877	0
12	Optimized	179.18115	-9.3309045	607.2195	737.73757	55.401632	0
13	Optimized	181.0592	-9.2501975	602.17529	747.29913	61.601415	0
14	Optimized	183.0278	-9.1023925	592.95625	759.60806	70.739496	0
15	Optimized	184.8101	-8.922286	581.71219	759.49226	75.463162	0
16	Optimized	186.4061	-8.709878	568.45772	761.41769	81.90665	0
17	Optimized	188.00205	-8.49747	555.20325	763.46735	88.402868	0
18	Optimized	188.8353	-8.386568	548.28149	771.67986	94.826986	0
19	Optimized	189.4753	-8.2141105	537.52038	760.47066	94.636782	0
20	Optimized	190.14	-8.029705	526.01614	773.30138	104.96636	0
21	Optimized	190.40885	-7.9551145	519.94499	797.3105	117.73467	0
22	Optimized	191.14105	-7.579255	491.50436	793.68592	128.26846	0

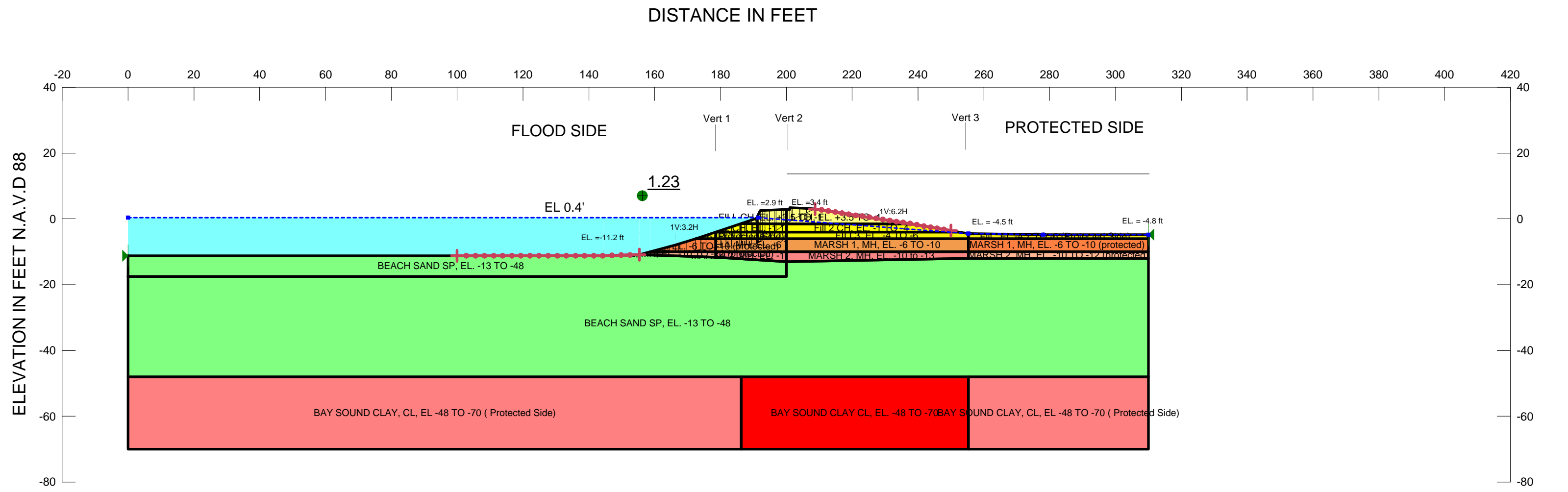
23	Optimized	191.8322	-7.123993	458.40899	792.31297	141.73383	0
24	Optimized	192.69225	-6.420082	408.62753	753.6704	146.46201	0
25	Optimized	194.0768	-5.286954	328.50393	667.42645	143.86407	0
26	Optimized	194.9691	-4.5657655	277.43997	618.76153	144.88241	0
27	Optimized	195.9179	-3.8322715	225.21456	557.55542	141.07032	0
28	Optimized	197.0851	-2.929951	160.97405	480.50177	135.63147	0
29	Optimized	198.25175	-2.0955285	100.96674	420.13463	135.47873	0
30	Optimized	199.5	-1.2431219	39.290982	345.02863	129.77793	0
31	Optimized	200.1476	-0.80090145	7.2926986	304.66677	126.22781	0
32	Optimized	200.363	-0.653818	-3.3500469	291.80068	123.86204	0
33	Optimized	200.7154	-0.44615175	-18.704137	287.99695	122.24745	0
34	Optimized	201.96145	0.26034825	-71.264259	245.57737	104.24141	0
35	Optimized	203.7691	1.204566	-142.47495	173.08737	73.471227	0
36	Optimized	205.46145	2.0027385	-203.79064	103.7605	44.043718	0
37	Optimized	207.1538	2.8009125	-265.10085	34.554926	14.667696	0

Slices of Slip Surface: 4623

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4623	156.45	-11.6149	749.73103	754.75452	2.9003137	0
2	4623	156.8268	-11.637425	751.12886	771.15838	11.564046	0
3	4623	157.90405	-11.688275	754.33243	786.28422	18.447375	0

4	4623	159.60495	-11.74558	757.87187	804.77599	27.080108	0
5	4623	161.3058	-11.766625	759.18854	818.39267	34.181517	0
6	4623	163.00665	-11.75144	758.22146	827.28962	39.876522	0
7	4623	164.898	-11.689725	754.41346	832.11037	44.858331	0
8	4623	166.9798	-11.57233	747.074	831.7967	48.914671	0
9	4623	168.66035	-11.441965	738.94214	828.85767	38.166876	0
10	4623	170.2	-11.28466	729.13336	835.37788	45.098121	0
11	4623	172	-11.06538	715.44529	836.43	51.354961	0
12	4623	173.8	-10.804435	699.1464	833.23454	56.917036	0
13	4623	175.6	-10.50141	680.22301	825.93432	61.850779	0
14	4623	177.1791	-10.202855	661.61816	770.91819	46.39511	0
15	4623	178.5373	-9.917603	643.81754	760.05538	49.340036	0
16	4623	180.01505	-9.577883	622.61117	746.52449	52.598085	0
17	4623	181.6123	-9.178525	597.69973	730.0265	56.16938	0
18	4623	183.20955	-8.743896	570.58112	710.62113	59.443457	0
19	4623	184.80685	-8.2733935	541.21867	688.25012	62.411144	0
20	4623	186.4041	-7.7663505	509.57933	662.86645	65.066524	0
21	4623	188.00135	-7.222028	475.61634	634.43459	67.41435	0
22	4623	189.44	-6.7009215	443.10058	626.38746	77.800661	0
23	4623	190.14	-6.4382945	426.71352	632.88048	87.512685	0
24	4623	191.1	-6.0552805	396.68895	704.06588	130.47377	0
25	4623	192.72015	-5.38889	344.09113	744.59379	170.00329	0
26	4623	194.16045	-4.759056	294.99396	692.7994	168.85839	0
27	4623	195.77365	-4.0105545	237.31951	627.24417	165.5132	0
28	4623	197.83335	-2.988229	159.51944	533.60079	158.78811	0
29	4623	199.5	-2.1200795	94.012165	452.40662	152.12942	0
30	4623	200.5	-1.568826	52.814668	398.18389	146.60054	0
31	4623	201.3728	-1.0733567	15.962552	365.66813	148.44121	0
32	4623	202.5274	-0.38922829	-34.578719	302.58573	128.44002	0
33	4623	204.091	0.57345036	-105.28274	218.81181	92.880104	0
34	4623	205.6546	1.5868155	-179.15009	132.75802	56.352437	0
35	4623	207.2182	2.653224	-256.32291	44.44038	18.863822	0





- Name: FILL CH, EL. +3.5 TO -1 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: FILL3, EL. -4 TO -6 Model: Mohr-Coulomb Unit Weight: 82 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BEACH SAND SP, EL. -13 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
- Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 1, MH, EL. -6 TO -10 Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Fill, EL. -4.7 TO -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: Fill 2 CH, EL. -1 TO -4 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: BAY SOUND CLAY, CL, EL. -48 TO -70 (Protected Side) Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 1, MH, EL. -6 TO -10 (protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 2, MH, EL. -10 TO -12 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
- Name: MARSH 2, MH, EL. -10 to -13 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1



THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.49.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 11 STA. 79+50 TO STA. 84+81
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 330
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 1:41:44 PM
File Name: Reach 11_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:43:56 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -6 TO -10

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL -4.7 TO -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill 2 CH, EL. -1 TO -4

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, CL, EL -48 TO -70 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -6 TO -10 (protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +3.5 TO -1

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL3, EL. -4 TO -6

Model: Mohr-Coulomb
Unit Weight: 82 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -13 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -10 TO -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -10 to -13

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (100, -11.2) ft
Left-Zone Right Coordinate: (155.3, -10.9) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (208.65, 3) ft
Right-Zone Right Coordinate: (250, -3.58621) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (0, -11.2) ft
Right Coordinate: (310, -4.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
0	0.4
191.5	0.4
255.3	-4.5
278	-4.8
310	-4.8

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (186.3, 96)
Data Point: (200, 100)
Data Point: (255.3, 96)

Regions

	Material	Points	Area (ft²)
Region 1	Fill 2 CH, EL -1 TO -4	3,4,10,11	45.075
Region 2	FILL3, EL -4 TO -6	11,12,46,3	43
Region 3	BAY SOUND CLAY CL, EL -48 TO -70	41,20,21,29,45,42	1518
Region 4	FILL CH, EL +3.5 TO -1	5,23,30,6,7,10	106.42
Region 5	BEACH SAND SP, EL -13 TO -48	8,1,26,47,19,25,18	1234.0708
Region 6	BEACH SAND SP, EL -13 TO -48	18,25,19,13,15,22,21,20,41,9	10032.35
Region 7	MARSH 1, MH, EL -6 TO -10	46,12,44,48	86
Region 8	MARSH 1, MH, EL -6 TO -10	12,32,27,44	221.2
Region 9	BAY SOUND CLAY, CL, EL -48 TO -70 (Protected Side)	29,21,22,16	1203.4
Region	Fill 2 CH, EL -1 TO -4	7,24,11,10	112.875

10			
Region 11	Fill, EL -4.7 TO -6 (Protected Side)	31,39,33,14,32	69.045
Region 12	FILL3, EL -4 TO -6	11,24,31,32,12	109.875
Region 13	MARSH 1, MH, EL -6 TO -10 (protected)	32,14,28,27	218.8
Region 14	FILL CH, EL +3.5 TO -1	4,34,35,36,5,10	40.105
Region 15	BAY SOUND CLAY, CL, EL -48 TO -70 (Protected Side)	9,17,42,41	4098.6
Region 16	MARSH 2, MH, EL -10 TO -12 (protected)	13,27,28,15	109.4
Region 17	MARSH 2, MH, EL -10 to -13	44,19,47,48	50.774722
Region 18	MARSH 2, MH, EL -10 to -13	44,19,13,27	138.25
Region 19	Fill, EL -4.7 TO -6 (Protected Side)	40,3,46	6.1
Region 20	MARSH 1, MH, EL -6 TO -10 (protected)	43,2,40,46,48	50.28621
Region 21	MARSH 2, MH, EL -10 TO -12 (protected)	26,43,48,47	28.893262

Points

	X (ft)	Y (ft)
Point 1	144.4	-11.2
Point 2	166.3	-8
Point 3	178.5	-4
Point 4	186.3	-1.4
Point 5	200	2.9
Point 6	208	3.1
Point 7	237.9	-1.5
Point 8	0	-11.2
Point 9	0	-48
Point 10	200	-1.5

Point 11	200	-4
Point 12	200	-6
Point 13	255.3	-12
Point 14	310	-6
Point 15	310	-12
Point 16	310	-70
Point 17	0	-70
Point 18	0	-17.5
Point 19	200	-13
Point 20	200	-48
Point 21	255.3	-48
Point 22	310	-48
Point 23	201	2.9
Point 24	252.4	-4
Point 25	200	-17.5
Point 26	155.3	-10.9
Point 27	255.3	-10
Point 28	310	-10
Point 29	255.3	-70
Point 30	201	3.4
Point 31	255.3	-4.5
Point 32	255.3	-6
Point 33	310	-4.8
Point 34	190.9	0.1
Point 35	192	2.5
Point 36	199	2.9
Point 37	200	12.9
Point 38	200.5	12.9
Point 39	278	-4.8
Point 40	172.4	-6
Point 41	186.3	-48
Point 42	186.3	-70
Point 43	158.71379	-10
Point 44	200	-10
Point 45	200	-70
Point 46	178.5	-6

Point 47	178.5	-11.72323
Point 48	178.5	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.23	(163.043, 68.713)	25.7832	(208.65, 3)	(155.301, -10.8999)
2	4623	1.37	(163.043, 68.713)	79.989	(208.65, 3)	(155.3, -10.9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz ed	156.4399	-10.791275	698.35606	712.77317	6.1197	0
2	Optimiz ed	158.1465	-10.650905	689.57506	716.15066	11.28067	0
3	Optimiz ed	159.757	-10.560645	683.96428	722.39032	16.310884	0
4	Optimiz ed	161.84345	-10.44371	676.64276	731.24314	23.176487	0
5	Optimiz ed	163.74	-10.319345	668.91352	735.98013	28.468088	0
6	Optimiz ed	165.44665	-10.187555	660.67624	739.66061	33.526877	0
7	Optimiz ed	166.7096	-10.09003	654.5782	745.69873	38.678373	0
8	Optimiz ed	167.4121	-10.0292	650.78682	746.212	40.505586	0
9	Optimiz ed	168.73275	-9.89755	642.5711	748.68997	45.044791	0
10	Optimiz ed	171.08025	-9.6485435	627.01567	750.33277	52.345003	0
11	Optimiz ed	173.2008	-9.413058	612.33393	753.7124	60.011603	0

12	Optimiz ed	174.80245	-9.2351995	601.23861	758.86292	66.90755	0
13	Optimiz ed	176.93155	-8.94913	583.3747	756.59606	73.528106	0
14	Optimiz ed	178.3799	-8.740928	570.41218	762.99521	81.746644	0
15	Optimiz ed	179.3095	-8.655315	565.0499	715.69994	63.947148	0
16	Optimiz ed	180.92845	-8.506213	555.74999	722.28124	70.688321	0
17	Optimiz ed	182.5474	-8.357111	546.44392	728.86253	77.432104	0
18	Optimiz ed	184.59835	-8.163655	534.38202	736.28373	85.702191	0
19	Optimiz ed	186.0699	-8.018222	525.30285	738.8306	90.637149	0
20	Optimiz ed	187.06665	-7.9032995	518.12417	740.72346	94.487793	0
21	Optimiz ed	188.6	-7.726511	507.09722	743.89809	100.516	0
22	Optimiz ed	190.13335	-7.5497225	496.06379	747.07271	106.54696	0
23	Optimiz ed	190.96875	-7.4534015	490.05534	755.28734	112.5843	0
24	Optimiz ed	191.13935	-7.4337325	488.83288	781.31325	124.15055	0
25	Optimiz ed	191.3706	-7.34192	483.09925	752.16677	114.21239	0
26	Optimiz ed	191.75	-7.1071615	467.24808	801.82035	142.01751	0
27	Optimiz ed	192.42065	-6.6922065	438.13723	812.66247	158.97654	0
28	Optimiz ed	193.14605	-6.21597	404.95205	759.61472	150.54537	0
29	Optimiz ed	194.1564	-5.5	355.42671	706.64432	149.08303	0
30	Optimiz ed	195.5676	-4.5	286.26553	636.85871	148.81797	0

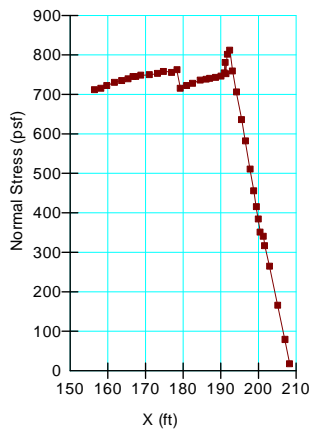
31	Optimiz ed	196.59395	-3.77272	235.97073	582.20614	146.96821	0
32	Optimiz ed	197.75465	-2.954595	179.34964	511.60682	141.03481	0
33	Optimiz ed	198.7973	-2.2329725	129.32468	455.54753	138.47339	0
34	Optimiz ed	199.46705	-1.800857	99.148485	415.62844	134.33777	0
35	Optimiz ed	199.96705	-1.4782675	76.626065	385.05637	130.9209	0
36	Optimiz ed	200.5	-1.1344269	52.615613	351.94716	127.0587	0
37	Optimiz ed	201.33395	-0.5963791	15.045621	341.49874	138.57113	0
38	Optimiz ed	201.70885	0.3544952 5	-1.8451969	317.13425	134.6155	0
39	Optimiz ed	202.94675	0.31272	-49.411733	265.59405	112.73798	0
40	Optimiz ed	205.10775	1.391335	-127.07362	166.75875	70.784889	0
41	Optimiz ed	207.0359	2.266985	-190.95515	79.559138	33.770851	0
42	Optimiz ed	208.325	2.852405	-233.66427	17.980424	7.6322372	0

Slices of Slip Surface: **4623**

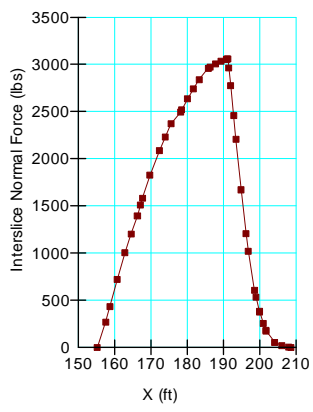
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4623	156.15345	-10.97379	709.69839	739.29105	17.085327	0
2	4623	157.86035	-11.102995	717.80601	768.084	29.028011	0
3	4623	159.51505	-11.19379	723.46225	792.03687	39.591576	0
4	4623	161.1176	-11.248465	726.88935	811.66816	48.947066	0
5	4623	162.72015	-11.270995	728.27954	826.99757	56.994886	0
6	4623	164.32265	-11.26141	727.69314	838.06691	63.724321	0
7	4623	165.71195	-11.22896	725.64698	845.10382	50.70642	0

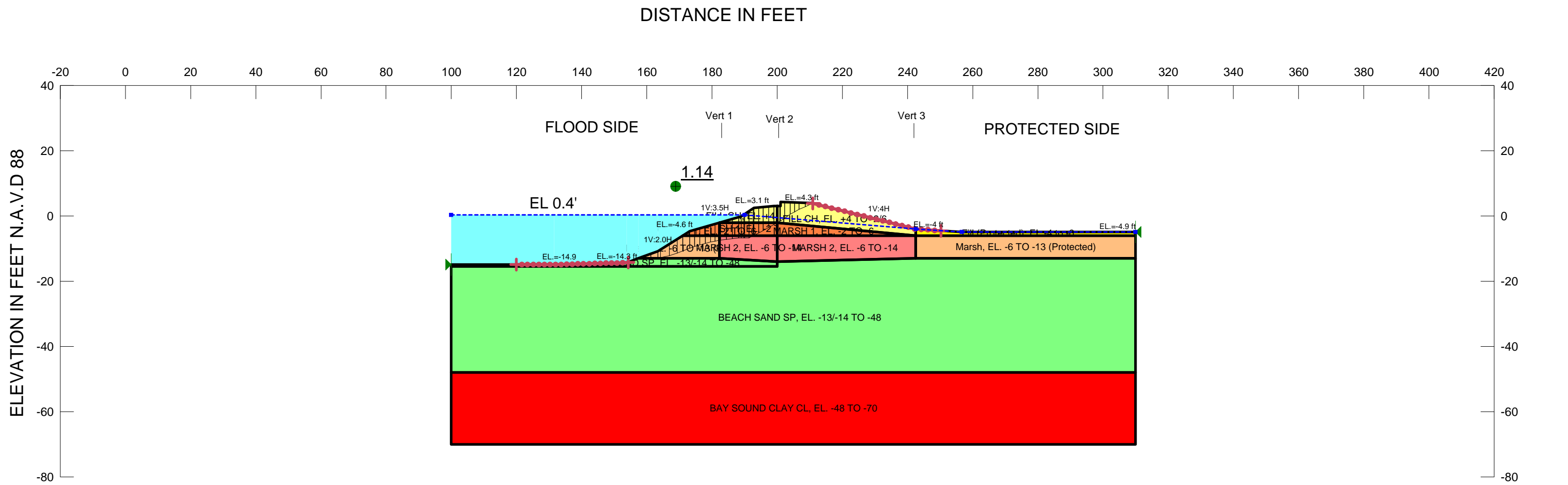
8	4623	167.31665	-11.15493	721.03414	856.13596	57.34732	0
9	4623	169.35	-11.02011	712.61038	864.69277	64.555141	0
10	4623	171.38335	-10.833095	700.96098	867.9962	70.902244	0
11	4623	173.21195	-10.622435	687.77933	868.76425	76.823539	0
12	4623	174.8358	-10.397335	673.76858	868.00543	82.448651	0
13	4623	176.45965	-10.13815	657.59798	863.82586	87.53854	0
14	4623	177.8858	-9.8840115	641.72056	857.12594	91.434163	0
15	4623	179.475	-9.5633495	621.73087	795.18113	73.625269	0
16	4623	181.425	-9.1284345	594.56996	774.99223	76.584707	0
17	4623	183.375	-8.6419255	564.22078	749.71531	78.737755	0
18	4623	185.325	-8.102841	530.59033	719.37273	80.133373	0
19	4623	187.06665	-7.5786075	497.86726	688.37372	80.865196	0
20	4623	188.6	-7.0786715	466.66613	657.84636	81.15119	0
21	4623	190.13335	-6.544176	433.31364	623.99864	80.94098	0
22	4623	190.96875	-6.2425865	414.4952	610.49786	83.198195	0
23	4623	191.26875	-6.129761	407.44701	651.71292	103.68472	0
24	4623	191.55575	-6.0212745	400.4229	700.07196	127.19348	0
25	4623	191.80575	-5.9251485	393.22966	743.03135	148.48201	0
26	4623	193.0937	-5.406868	354.70983	744.62587	165.50954	0
27	4623	195.28115	-4.4817195	286.49808	677.89079	166.13635	0
28	4623	197.68745	-3.369152	205.54229	585.1497	161.13379	0
29	4623	199.5	-2.4822695	141.51527	501.52962	152.81702	0
30	4623	200.5	-1.9612385	104.20891	448.82992	146.28294	0
31	4623	201.1809	-1.598121	78.287025	456.33012	160.46977	0
32	4623	202.2554	-0.99733725	35.648904	390.95242	150.8174	0
33	4623	203.9575	-0.0133582	-33.908834	289.32322	122.81042	0
34	4623	205.5745	0.97560155	-103.36713	194.17999	82.424518	0
35	4623	207.1915	2.0184275	-176.18969	96.24786	40.854793	0
36	4623	208.325	2.776805	-228.94793	23.379245	9.9239008	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: FILL CH, EL. +4 TO -2/6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, EL. -6 TO -14 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill (Protected), EL -4 to -6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh, EL. -6 TO -13 (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 0.84.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A STA. 85+90 TO STA. 89+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 296
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 1:56:43 PM
File Name: Reach 12A_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:58:22 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected), EL -4 to -6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -14.9) ft
Left-Zone Right Coordinate: (154.3, -14.15263) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (210.9, 3.9) ft
Right-Zone Right Coordinate: (250.3, -4.49787) ft
Right-Zone Increment: 20
Radius Increments: 10

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (100, -14.9) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	0.4
190	0.4
242.5	-4
256.6	-4.9
310	-4.9

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,37,32,33,36	143.13643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	7078.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	4620
Region 9	Fill (Protected), EL -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11

Points

	X (ft)	Y (ft)
Point 1	100	-15.5

Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	100	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	100	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13
Point 37	100	-14.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.14	(138.943, 131.751)	26.95105	(210.9, 3.9)	(156.493, -13.3447)
2	4622	1.24	(138.943, 131.751)	146.71	(210.9, 3.9)	(154.3, -14.1526)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	156.9607	-13.24931	851.71722	863.81132	6.9825269	0
2	Optimized	157.4741	-13.144585	845.18121	861.41834	9.3745157	0
3	Optimized	158.0371	-13.06765	840.38041	863.96701	13.61773	0
4	Optimized	158.8669	-12.95918	833.61304	863.03336	12.488189	0
5	Optimized	160.2344	-12.869665	828.00594	878.22685	21.31751	0
6	Optimized	162.3448	-12.772275	821.94725	897.39694	32.026494	0
7	Optimized	163.8079	-12.70476	817.74066	925.81923	45.876633	0
8	Optimized	165.5635	-12.401485	798.81981	918.64641	50.863375	0
9	Optimized	168.1213	-11.722695	756.44481	895.43737	58.998841	0
10	Optimized	170.1657	-11.01463	712.29634	864.42641	64.575385	0
11	Optimized	172.1	-10.28726	666.86436	821.4336	65.610749	0
12	Optimized	173.91585	-9.6044345	624.2743	762.96052	58.868807	0
13	Optimized	175.4546	-9.1038885	593.05889	729.75665	58.024758	0

	ed						
14	Optimized	177.1004	-8.641165	564.16928	692.14576	54.322793	0
15	Optimized	178.7462	-8.1784415	535.29721	654.53486	50.61338	0
16	Optimized	180.2518	-7.812412	512.4572	632.05354	50.765634	0
17	Optimized	181.61725	-7.543076	495.65121	611.71247	49.265082	0
18	Optimized	182.42905	-7.382949	485.64519	600.5384	48.769273	0
19	Optimized	183.49305	-7.2565165	477.76531	607.72755	55.1657	0
20	Optimized	185.36295	-7.05457	465.16413	610.12018	61.530192	0
21	Optimized	187.23285	-6.8526235	452.56296	612.51281	67.894683	0
22	Optimized	188.5839	-6.7422965	445.68445	626.67581	76.826272	0
23	Optimized	189.375	-6.7245125	444.56767	641.47792	83.583441	0
24	Optimized	189.875	-6.713272	443.88779	660.03314	91.748261	0
25	Optimized	190.6613	-6.695596	439.30625	715.1237	117.07756	0
26	Optimized	191.9972	-6.340365	410.15525	701.46904	123.65537	0
27	Optimized	192.7859	-5.942442	381.19942	711.87536	140.36361	0
28	Optimized	193.61025	-5.5265505	350.93442	692.94385	145.17439	0
29	Optimized	195.03075	-4.8098835	298.78608	650.33016	149.22161	0
30	Optimized	196.55575	-3.9913325	239.73309	592.3597	149.68112	0
31	Optimized	198.18525	-3.070898	173.77523	535.98775	153.75009	0
32	Optimized	199.5	-2.328254	120.55693	486.25907	155.23135	0

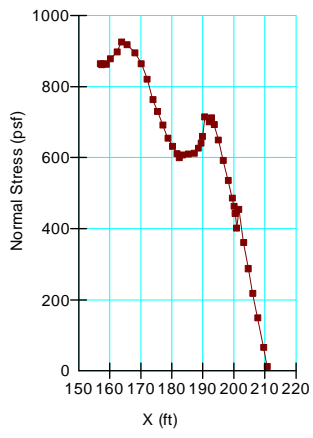
	ed						
33	Optimized	200.03475	-2.026186	98.91523	463.23789	154.64579	0
34	Optimized	200.4162	-1.8107225	83.474953	442.52161	152.40626	0
35	Optimized	200.88145	-1.535585	63.872531	402.5291	143.75119	0
36	Optimized	201.62055	-1.0410956	29.152363	454.18809	180.41696	0
37	Optimized	203.11045	-0.04430555	-40.839028	360.90226	153.19392	0
38	Optimized	204.6626	0.9133425	-108.71385	287.66291	122.10566	0
39	Optimized	206.02825	1.6654075	-162.78534	217.72916	92.420547	0
40	Optimized	207.6583	2.4617125	-220.99743	148.874	63.193264	0
41	Optimized	209.55275	3.3022575	-283.35516	66.54096	28.244962	0
42	Optimized	210.7	3.811266	-321.11745	12.686562	5.3851259	0

Slices of Slip Surface: 4622

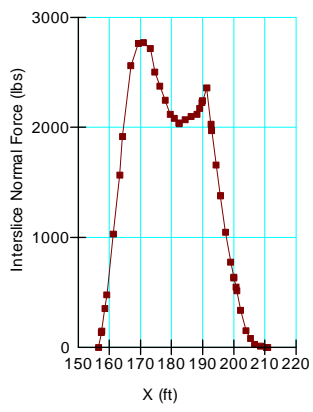
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4622	155.08215	-14.06606	902.69831	926.71604	13.866646	0
2	4622	156.64645	-13.884415	891.35677	936.73055	26.196563	0
3	4622	158.32975	-13.6692	877.92677	938.25914	34.832912	0
4	4622	160.13205	-13.417525	862.18776	931.03541	39.749208	0
5	4622	161.93435	-13.142995	845.10407	921.00014	43.818615	0
6	4622	163.11775	-12.952845	833.22384	915.17283	34.785285	0
7	4622	164.35	-12.738645	819.84294	927.66244	45.766665	0
8	4622	166.25	-12.391625	798.17147	933.75978	57.553824	0
9	4622	168.15	-12.018655	774.90792	937.01758	68.81147	0
10	4622	170.05	-11.61954	750.02263	937.50257	79.580513	0
11	4622	172.1	-11.1582	721.25071	921.30047	84.916089	0

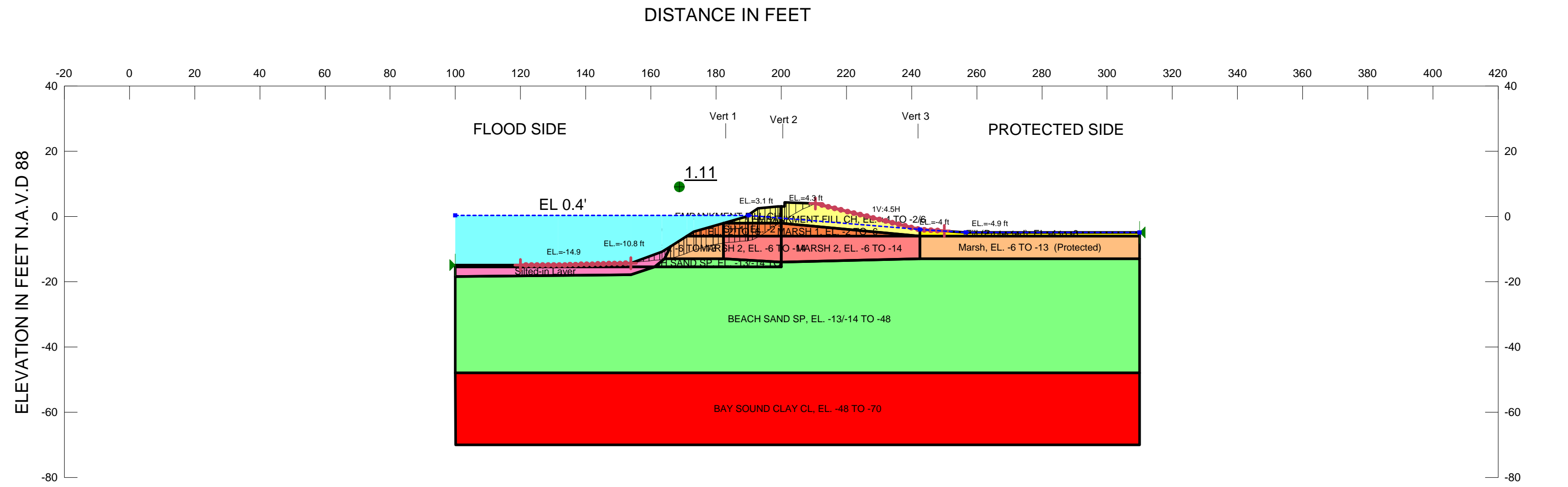
12	4622	174.11	-10.678295	691.27312	881.22787	80.631007	0
13	4622	175.93	-10.216524	662.44708	842.85345	76.57796	0
14	4622	177.75	-9.7298315	632.09243	802.23651	72.221879	0
15	4622	179.57	-9.2179635	600.18711	759.31483	67.545711	0
16	4622	181.39	-8.6806435	566.65806	714.08172	62.577632	0
17	4622	183.1375	-8.1410025	532.95601	674.25747	59.97891	0
18	4622	184.8125	-7.6007445	499.2489	639.95364	59.725617	0
19	4622	186.4875	-7.0381685	464.14208	603.53889	59.170436	0
20	4622	188.1625	-6.4530025	427.62505	565.00003	58.312221	0
21	4622	189.21215	-6.0773685	404.18861	543.60523	59.178842	0
22	4622	189.58715	-5.9400945	395.61872	540.774	61.61476	0
23	4622	189.875	-5.8339155	389.00143	544.41443	65.968909	0
24	4622	190.725	-5.5141415	365.25364	572.57807	88.004	0
25	4622	192.175	-4.958339	322.98531	619.13979	125.71012	0
26	4622	193.91665	-4.2651295	270.62223	618.02054	147.46183	0
27	4622	195.95	-3.425469	207.5946	568.93544	153.38009	0
28	4622	197.98335	-2.549775	142.31424	517.03156	159.05806	0
29	4622	199.11435	-2.051417	105.30472	486.22121	161.68946	0
30	4622	199.61435	-1.824827	88.549331	463.95855	159.35176	0
31	4622	200.5	-1.418531	58.563923	421.98739	154.26411	0
32	4622	201.59835	-0.90480285	20.764038	477.18752	193.74027	0
33	4622	203.2346	-0.1161626	-37.004738	395.68599	167.95874	0
34	4622	205.3104	0.91636875	-112.29014	293.73642	124.68371	0
35	4622	207.38625	1.990323	-190.16198	189.38222	80.387984	0
36	4622	209.4621	3.1067375	-270.68003	82.622948	35.071361	0
37	4622	210.7	3.787847	-319.64745	14.40714	6.1154681	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +4 TO -2/6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: MARSH 2, EL. -6 TO -14 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill (Protected), EL -4 to -6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh, EL. -6 TO -13 (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.84.



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12B STA. 89+50 TO STA. 93+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 280
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 2:04:25 PM
File Name: Reach 12B_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 2:05:30 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected), EL -4 to -6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -14.9) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (153.9, -14.3) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (210.5, 4) ft
Right-Zone Right Coordinate: (250, -4.47872) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (100, -14.9) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
100	0.4
190	0.4
242.5	-4
256.6	-4.9
310	-4.9

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	EMBANKMENT FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,38,40,34	109.57536
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	38,27,12,13,39	84.467862
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,37,36,39	6930.475
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	4618.9
Region 9	Fill (Protected), EL -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75

Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13	Silted-in Layer	1,41,32,33,20,40,38,39	69.721793
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11
Region 15	Silted-in Layer	1,39,36,37	148.275

Points

	X (ft)	Y (ft)
Point 1	100	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	100	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	100.1	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9

Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	153.8	-17.8
Point 37	100	-18.4
Point 38	164.24571	-13
Point 39	161.1	-15.5
Point 40	166	-9.15789
Point 41	100	-14.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.11	(137.756, 132.31)	28.31704	(210.5, 4)	(153.9, -14.3)
2	4622	1.20	(137.756, 132.31)	147.496	(210.5, 4)	(153.9, -14.3)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	154.85225	-14.16341	908.76345	926.43559	9.3964398	0
2	Optimized	156.7567	-13.890245	891.71504	919.83453	14.951394	0
3	Optimized	158.54045	-13.66897	877.92605	919.86024	22.296804	0
4	Optimized	160.2035	-13.499585	867.33781	920.39862	28.212932	0
5	Optimized	161.86655	-13.3302	856.74958	920.99683	34.160866	0
6	Optimized	163.04905	-13.190535	848.04509	914.87415	35.533645	0

7	Optimized	163.8327	-13.06778	840.38775	924.78727	44.876023	0
8	Optimized	165.1327	-12.86414	827.67906	946.26066	50.334903	0
9	Optimized	166.5029	-12.64951	814.29136	969.20082	65.755165	0
10	Optimized	167.7898	-12.32707	794.14331	947.97813	65.299006	0
11	Optimized	169.3578	-11.83973	763.75393	933.3011	71.9685	0
12	Optimized	170.5709	-11.423515	737.79048	908.18621	72.328696	0
13	Optimized	172.1	-10.80864	699.43312	867.82844	71.479574	0
14	Optimized	173.5317	-10.232925	663.49383	817.97294	65.572495	0
15	Optimized	174.63125	-9.8633475	640.42919	796.52214	66.257525	0
16	Optimized	176.167	-9.3909625	610.95327	757.68562	62.284187	0
17	Optimized	178.00405	-8.89685	580.14039	724.02757	61.076485	0
18	Optimized	179.85275	-8.51045	556.01295	701.5581	61.780248	0
19	Optimized	181.4119	-8.25349	539.97698	683.20595	60.797094	0
20	Optimized	182.24575	-8.120069	531.65194	680.83169	63.323049	0
21	Optimized	183.1375	-8.038847	526.58459	683.0831	66.429674	0
22	Optimized	184.8125	-7.8862855	517.06578	688.1368	72.615341	0
23	Optimized	186.4875	-7.7337245	507.54697	693.24997	78.826246	0
24	Optimized	188.1625	-7.581163	498.02222	698.30368	85.014437	0
25	Optimized	189.3517	-7.472851	491.26287	708.03813	92.015639	0

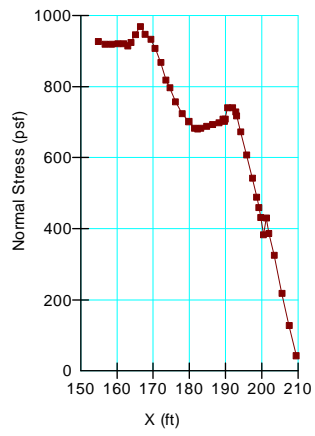
26	Optimized	189.7267	-7.436263	488.97708	701.8237	90.34803	0
27	Optimized	189.875	-7.407286	487.19016	707.97641	93.718206	0
28	Optimized	190.5526	-7.274913	476.02175	740.35888	112.20446	0
29	Optimized	191.92855	-6.77481	437.62261	740.48245	128.55638	0
30	Optimized	192.82595	-6.3351255	405.49485	729.07144	137.35011	0
31	Optimized	193.12405	-6.1437955	391.99703	717.44979	138.1465	0
32	Optimized	194.1613	-5.47806	345.02725	673.24788	139.32139	0
33	Optimized	195.7877	-4.43418	271.38446	607.73932	142.77417	0
34	Optimized	197.4141	-3.3903	197.74166	542.23077	146.22695	0
35	Optimized	198.61365	-2.6091245	142.71942	489.27154	147.10265	0
36	Optimized	199.26075	-2.1749445	112.24542	459.657	147.46747	0
37	Optimized	199.76075	-1.8394725	88.697741	430.91577	145.26294	0
38	Optimized	200.5	-1.3434735	53.880993	382.92582	139.67124	0
39	Optimized	201.322	-0.7919421	15.166692	429.48442	175.86744	0
40	Optimized	202.01125	-0.3294811	-17.295741	386.06202	163.8736	0
41	Optimized	203.43885	0.5023375	-76.667546	325.94027	138.35344	0
42	Optimized	205.55955	1.6731725	-160.81938	217.5068	92.32616	0
43	Optimized	207.5899	2.6939425	-235.13296	127.25141	54.01502	0
44	Optimized	209.52995	3.5646475	-299.60983	42.417608	18.005206	0

Slices of Slip Surface: 4622

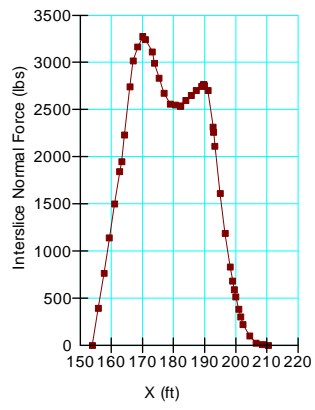
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4622	154.85	-14.18915	910.35031	927.86308	9.3117043	0
2	4622	156.75	-13.954935	895.74222	924.1876	15.124674	0
3	4622	158.65	-13.695625	879.56585	918.17255	20.527546	0
4	4622	160.55	-13.41108	861.83587	909.83119	25.519567	0
5	4622	162.45	-13.10115	842.46488	899.17922	30.155552	0
6	4622	163.87565	-12.85423	827.06426	901.56067	39.610442	0
7	4622	165.17565	-12.61268	811.96637	917.45525	44.777372	0
8	4622	166.83335	-12.289145	791.80956	934.10116	60.399204	0
9	4622	168.5	-11.94397	770.26132	935.2754	70.044322	0
10	4622	170.16665	-11.57866	747.47252	934.25286	79.283547	0
11	4622	172.1	-11.127575	719.3052	916.81354	83.837315	0
12	4622	174.11	-10.632765	688.46825	875.96123	79.586047	0
13	4622	175.93	-10.157498	658.79348	836.42837	75.401534	0
14	4622	177.75	-9.657309	627.55178	794.56749	70.893966	0
15	4622	179.57	-9.131933	594.77423	750.42298	66.068974	0
16	4622	181.39	-8.5810885	560.44168	703.98991	60.932608	0
17	4622	183.13695	-8.0286285	525.94451	663.02978	58.189246	0
18	4622	184.8108	-7.4762685	491.48203	627.58047	57.770363	0
19	4622	186.48465	-6.9015915	455.61759	590.04003	57.058941	0
20	4622	188.1608	-6.303474	418.29862	550.37966	56.065075	0
21	4622	189.375	-5.8582105	390.51717	528.93307	58.754061	0
22	4622	189.875	-5.6708975	378.8355	531.46984	64.789432	0
23	4622	190.725	-5.344706	354.67585	558.84102	86.662975	0
24	4622	192.175	-4.777932	311.7302	604.03175	124.07465	0
25	4622	193.8691	-4.091458	260.03466	602.71892	145.46084	0
26	4622	195.80735	-3.27786	199.12626	554.82541	150.98533	0
27	4622	197.7456	-2.431469	136.17671	504.27614	156.24894	0
28	4622	198.85735	-1.935075	99.386447	472.92546	158.55791	0
29	4622	199.5	-1.6396765	77.593511	443.70157	155.40365	0
30	4622	200.5	-1.1741796	43.316383	395.69651	149.57649	0
31	4622	201.3713	-0.7616499	13.01878	461.45234	190.34875	0

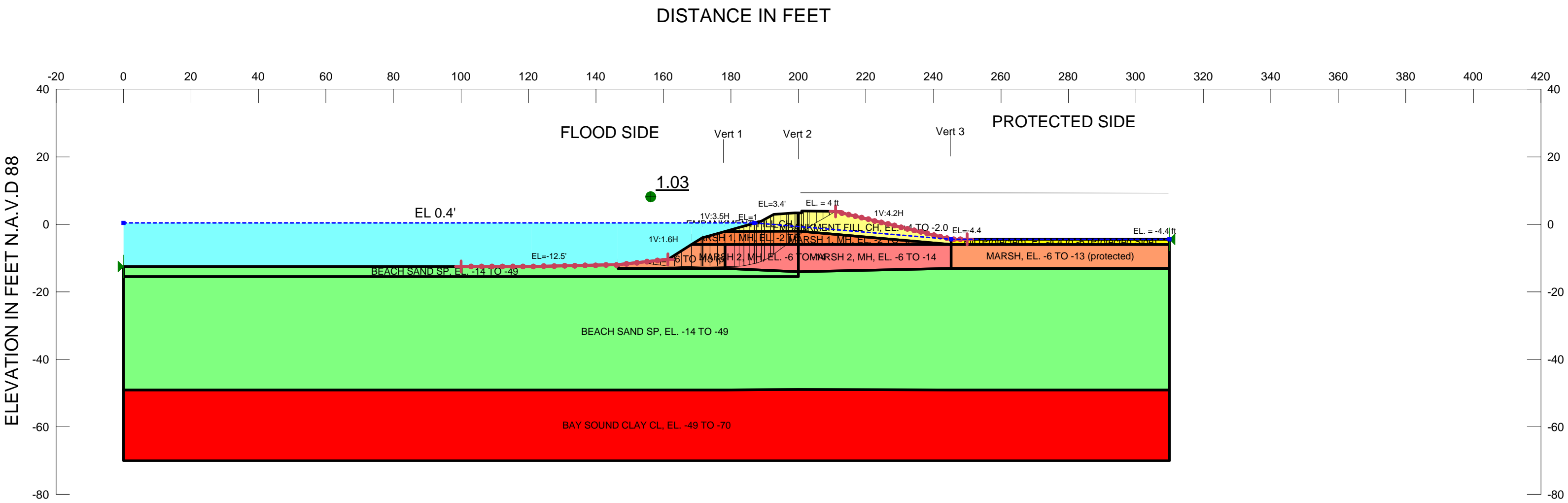
32	4622	202.61835	-0.15533565	-31.337236	399.40067	169.53553	0
33	4622	204.36985	0.7167782	-94.916397	313.52007	133.08138	0
34	4622	206.1213	1.6181835	-160.32297	225.9446	95.907792	0
35	4622	207.87275	2.549491	-227.59957	136.68733	58.020328	0
36	4622	209.62425	3.5113495	-296.77597	45.749887	19.419675	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +4 TO -2.0 Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, MH, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -14 TO -49 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -49 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, MH, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill (Protected) ,EL -4.4 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -6 TO -13 (protected) Model: Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.84.



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVELS

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 13 STA. 93+00 TO STA. 96+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012
LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 310
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 2:18:29 PM
File Name: Reach 13_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 2:20:00 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -6 TO -14

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected) ,EL -4.4 to -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -6 TO -13 (protected)

Model: Mohr-Coulomb
Unit Weight: 75 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (100, -12.5) ft
Left-Zone Right Coordinate: (161.3, -10.4) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (211, 3.8) ft
Right-Zone Right Coordinate: (250, -4.4) ft
Right-Zone Increment: 20
Radius Increments: 10

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +4 TO -2.0

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 75 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -14 TO -49

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -49 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (0, -12.5) ft
Right Coordinate: (310, -4.4) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
0	0.4
187	0.4
245.2	-4.4
310	-4.4

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 75
Data Points: X (ft), Unit Weight (pcf)
Data Point: (178.2, 75)
Data Point: (200, 105)
Data Point: (245.2, 75)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1, MH, EL. -2 TO -6	23,2,11,12,42,39	109.0625
Region 2	MARSH 1, MH, EL. -2 TO -6	11,15,12	90.4
Region 3	BEACH SAND SP, EL. -14 TO -49	7,1,34,35,31,40,30,14,41,32,33	568.775
Region 4	BAY SOUND CLAY CL, EL. -49 TO -70	9,38,37,36,10,17,18	6513.35
Region 5	Fill (Protected) ,EL -4.4 to -6 (Protected Side)	24,19,6,15	103.68
Region 6	BEACH SAND SP, EL. -14 TO -49	14,16,8,10,36,37,38,9,7,33,32,41	10634.05
Region 7	EMBANKMENT FILL CH, EL. +4 TO -	2,22,3,27,4,11	69.71

	2.0		
Region 8	EMBANKMENT FILL CH, EL. +4 TO -2.0	4,20,25,5,24,15,11	212.94
Region 9	MARSH 2, MH, EL. -6 TO -14	12,15,16,14,21,13	339
Region 10	MARSH, EL. -6 TO -13 (protected)	30,40,31,35,26,39,42	129.5125
Region 11	MARSH 2, MH, EL. -6 TO -14	30,42,12,13,21,14	163.5
Region 12	MARSH, EL. -6 TO -13 (protected)	16,15,6,8	453.6

Points

	X (ft)	Y (ft)
Point 1	0	-12.5
Point 2	178.2	-2.1
Point 3	192.7	3
Point 4	200	3.4
Point 5	211	3.8
Point 6	310	-6
Point 7	0	-15.5
Point 8	310	-13
Point 9	0	-49
Point 10	310	-49
Point 11	200	-2
Point 12	200	-6
Point 13	200	-7.9
Point 14	200	-14
Point 15	245.2	-6
Point 16	245.2	-13
Point 17	310	-70
Point 18	0	-70
Point 19	310	-4.4
Point 20	201	3.4
Point 21	200	-10.7
Point 22	189	1
Point 23	171.5	-4

Point 24	245.2	-4.4
Point 25	201	4
Point 26	161.3	-10.4
Point 27	199	3.4
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	178.2	-13
Point 31	146.5	-13
Point 32	151.7	-15.5
Point 33	138.6	-15.5
Point 34	120.8	-12.5
Point 35	146.5	-12
Point 36	245.2	-49
Point 37	199.9	-48.9
Point 38	178.2	-49
Point 39	168.3125	-6
Point 40	154.61111	-13
Point 41	200	-15.5
Point 42	178.2	-6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.03	(168.907, 49.664)	28.35862	(211, 3.8)	(153.012, -11.296)
2	4162	1.12	(168.907, 49.664)	62.252	(211, 3.8)	(155.196, -11.0598)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	154.0256	-11.424125	737.8122	753.37187	6.6046885	0
2	Optimized	156.0532	-11.680335	753.81224	775.97743	9.4085657	0

	ed						
3	Optimized	158.08085	-11.936545	769.81228	798.58299	12.212443	0
4	Optimized	160.1905	-12.221985	787.62526	824.84089	15.797094	0
5	Optimized	161.29315	-12.37953	797.43104	830.09108	13.863364	0
6	Optimized	162.33525	-12.41153	799.41646	863.18634	27.068706	0
7	Optimized	164.4058	-12.475105	803.4232	881.62699	33.195537	0
8	Optimized	166.8768	-12.47969	803.7062	893.26223	38.01428	0
9	Optimized	169.73895	-12.42547	800.30504	907.54507	45.520694	0
10	Optimized	171.3327	-12.397935	798.59152	917.44929	50.45213	0
11	Optimized	171.58505	-12.397155	798.55021	912.41048	48.330817	0
12	Optimized	172.7584	-12.407635	799.17932	918.57844	50.681919	0
13	Optimized	174.93505	-12.42913	800.55753	927.49088	53.880008	0
14	Optimized	177.1117	-12.450625	801.8898	936.40332	57.097598	0
15	Optimized	179.58095	-12.475005	803.39606	973.01798	72.000236	0
16	Optimized	181.6942	-12.43172	800.6682	1003.5241	86.107226	0
17	Optimized	183.1588	-12.317875	793.58866	1025.7838	98.560989	0
18	Optimized	184.64575	-12.099155	779.9361	1017.046	100.64718	0
19	Optimized	186.15505	-11.77556	759.72345	1019.8965	110.43691	0
20	Optimized	186.95485	-11.60408	749.05362	1021.6267	115.7004	0
21	Optimized	187.2813	-11.53409	743.23256	1027.3826	120.61455	0

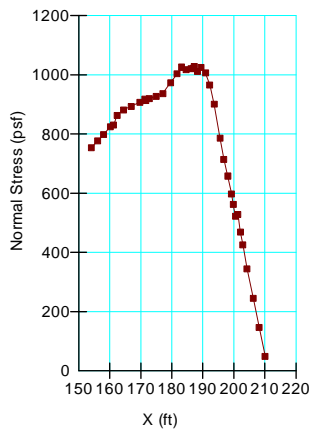
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22	Optimized	188.2813	-11.21643	718.30301	1010.6806	124.10691	0
23	Optimized	189.4879	-10.78438	685.1024	1025.1546	144.34361	0
24	Optimized	190.85585	-10.11967	636.57054	1006.3811	156.97527	0
25	Optimized	192.21795	-9.2631365	576.12251	965.26818	165.18254	0
26	Optimized	193.65245	-8.1724595	500.68054	901.31691	170.06005	0
27	Optimized	195.55735	-6.724153	400.50682	786.56282	163.87105	0
28	Optimized	196.77855	-5.79567	336.28425	713.93386	160.30275	0
29	Optimized	198.02365	-4.870442	272.14175	657.88119	163.73668	0
30	Optimized	199.264	-3.954617	208.6118	597.72492	165.16872	0
31	Optimized	199.764	-3.5728115	182.2096	562.69048	161.50455	0
32	Optimized	200.5	-2.9899955	142.06254	522.52139	161.4952	0
33	Optimized	201.28715	-2.3666865	99.114384	528.02211	182.06053	0
34	Optimized	202.12665	-1.7019075	53.311675	469.27048	176.56404	0
35	Optimized	202.91905	-1.0986037	11.587212	424.9501	175.46214	0
36	Optimized	204.23805	-0.18700865	-52.08246	344.29243	146.14347	0
37	Optimized	206.26415	1.098908	-142.75109	244.37027	103.72903	0
38	Optimized	208.1585	2.1793445	-219.9204	146.62125	62.237026	0
39	Optimized	210.05285	3.2597815	-297.08959	48.872198	20.745017	0

Slices of Slip Surface: 4162

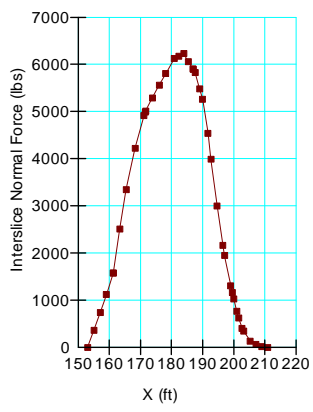
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4162	156.21375	-11.271735	728.32784	747.0461	7.9454285	0
2	4162	158.24825	-11.660435	752.58497	778.10535	10.83276	0
3	4162	160.28275	-11.979555	772.46634	803.57139	13.203309	0
4	4162	162.17655	-12.217205	787.31451	848.16069	25.827674	0
5	4162	163.9297	-12.38285	797.66608	870.8428	31.061676	0
6	4162	165.68285	-12.49862	804.85064	889.32891	35.858899	0
7	4162	167.43595	-12.564795	809.01452	903.8472	40.254082	0
8	4162	169.1094	-12.582915	810.16064	914.00326	44.078575	0
9	4162	170.70315	-12.557315	808.51021	920.33813	47.468135	0
10	4162	172.3375	-12.48808	804.20852	915.44216	47.215881	0
11	4162	174.0125	-12.37292	797.0069	909.81952	47.886117	0
12	4162	175.6875	-12.21221	786.98989	900.81589	48.316271	0
13	4162	177.3625	-12.005595	774.13005	888.34499	48.481365	0
14	4162	179.07095	-11.746605	757.97136	886.65035	54.620991	0
15	4162	180.8129	-11.43272	738.37707	893.89605	66.01389	0
16	4162	182.55485	-11.067255	715.53355	895.10306	76.222737	0
17	4162	184.29675	-10.649275	689.47257	889.83402	85.04839	0
18	4162	186.0387	-10.177683	660.07475	877.80007	92.418917	0
19	4162	186.95485	-9.9146545	643.63869	870.00997	96.088907	0
20	4162	188	-9.578684	617.52102	872.88614	108.39606	0
21	4162	189.925	-8.924555	566.79334	894.20044	138.97607	0
22	4162	191.775	-8.227321	513.74761	926.99797	175.41437	0
23	4162	193.7198	-7.4186395	453.29827	903.31406	191.02037	0
24	4162	195.75935	-6.4876765	384.71219	823.16686	186.11297	0
25	4162	197.88955	-5.415689	306.85698	738.85079	183.37049	0
26	4162	199.5	-4.5492205	244.50506	675.61777	182.99649	0
27	4162	200.5	-3.97255	203.3721	630.99376	181.51463	0
28	4162	202.1052	-2.9810735	133.24017	607.02168	201.10832	0
29	4162	204.0879	-1.6828955	42.031478	487.78814	189.21248	0
30	4162	205.97115	-0.3361162	-51.698337	354.95132	150.6679	0
31	4162	207.9827	1.2207373	-159.19842	216.42673	91.867697	0

32	4162	209.99425	2.916013	-275.33706	72.418013	30.739623	0
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Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 250
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 2:29:58 PM
File Name: Reach 14_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 2:35:58 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -6 TO -11.5

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL -4.4 to -6 (Protected)

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL -6 to -11.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (70, -11.9) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.8 TO -2

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -13 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (150.5, -11.61972) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (209.5, 3.5) ft
Right-Zone Right Coordinate: (250, -4.4) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (50, -11.9) ft
Right Coordinate: (310, -4.4) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
50	0.4
185.8	0.4
242.92	-4.4
310	-4.4

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (169.2, 80)
Data Point: (200, 109)
Data Point: (242.9, 80)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1, EL. -2 TO -6	3,28,34	3.76

Region 2	MARSH 1, EL. -2 TO -6	12,32,13	85.8
Region 3	BEACH SAND SP, EL. -13 TO -47	8,1,29,35,14,15	203.73
Region 4	BAY SOUND CLAY CL, EL. -47 TO -70	10,11,17,18	5980
Region 5	FILL, EL. -4.4 to -6 (Protected)	27,25,19,7,32	107.34186
Region 6	BEACH SAND SP, EL. -13 TO -47	36,11,10,37	7020
Region 7	EMBANKMENT FILL, EL. +3.8 TO -2	24,23,4,26,5,31,12,28	105.99085
Region 8	EMBANKMENT FILL, EL. +3.8 TO -2	31,30,20,6,27,32,12	191.10273
Region 9	MARSH, EL. -6 to -11.5 (Protected)	29,2,16,3,34,35	97.615
Region 10	Silted-in Layer	1,21,48,22,16,2,29	325.895
Region 11	MARSH 1, EL. -2 TO -6	12,13,34,28	86.22286
Region 12	MARSH, EL. -6 to -11.5 (Protected)	32,7,9,33	369.05
Region 13	BEACH SAND SP, EL. -13 TO -47	15,14,33,9,36,37,8	1610
Region 14	MARSH 2, EL. -6 TO -11.5	34,13,46,47,14,35	169.4
Region 15	MARSH 2, EL. -6 TO -11.5	13,32,33,14,47,46	235.95

Points

	X (ft)	Y (ft)
Point 1	50	-15.3
Point 2	148.1	-12.7
Point 3	164.5	-6
Point 4	191.1	3.1
Point 5	198.9	3.4
Point 6	209.5	3.5
Point 7	310	-6
Point 8	50	-15.5
Point 9	310	-11.5
Point 10	50	-47
Point 11	310	-47
Point 12	200	-2
Point 13	200	-6
Point 14	200	-11.5
Point 15	200	-15.5
Point 16	150.3	-11.7
Point 17	310	-70
Point 18	50	-70

Point 19	310	-4.4
Point 20	201	3.8
Point 21	50	-11.9
Point 22	146.3	-11.7
Point 23	188.1	1
Point 24	175.3	-2.2
Point 25	243.1	-4.4
Point 26	198.6	3.38846
Point 27	242.92268	-4.4
Point 28	169.20857	-4.4
Point 29	142.5	-15.2
Point 30	201	3.4
Point 31	200	3.4
Point 32	242.9	-6
Point 33	242.9	-11.5
Point 34	169.2	-6
Point 35	169.2	-11.5
Point 36	310	-20
Point 37	50	-20
Point 38	169.2	-47
Point 39	200	-47
Point 40	242.9	-47
Point 41	169.2	-70
Point 42	200	-70
Point 43	242.9	-70
Point 44	200	12.9
Point 45	200.5	12.9
Point 46	200	-6.9
Point 47	200	-10.3
Point 48	115.5	-11.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.24	(159.498,	28.97931	(209.5, 3.5)	(148.303, -11.7)

			75.945)			
2	4623	1.33	(159.498, 75.945)	88.025	(209.5, 3.5)	(150.5, -11.6197)

Slips of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Streng th (psf)
1	Optimized	149.13605	-11.775155	759.70458	766.33825	3.5271847	0
2	Optimized	150.13465	-11.865225	765.33624	773.58866	3.5029425	0
3	Optimized	151.7181	-12.00804	774.2462	813.29563	16.575499	0
4	Optimized	154.3848	-12.144315	782.75567	836.61317	22.861152	0
5	Optimized	156.88205	-12.161065	783.79678	854.51228	30.016947	0
6	Optimized	159.3872	-12.11439	780.89532	863.18689	34.930699	0
7	Optimized	161.90025	-12.00429	774.01781	870.70046	41.039353	0
8	Optimized	163.8284	-11.903565	767.72067	873.04458	44.707347	0
9	Optimized	165.8986	-11.762775	758.95839	872.3795	48.144403	0
10	Optimized	168.2529	-11.585855	747.89789	869.61961	51.667806	0
11	Optimized	170.7476	-11.372305	734.60316	886.51524	64.48285	0
12	Optimized	173.58225	-11.221235	725.14825	934.74785	88.969752	0
13	Optimized	175.08895	-11.180885	722.63547	947.94629	95.638769	0
14	Optimized	176.0961	-11.080545	716.35843	952.79047	100.35944	0
15	Optimi	177.6882	-10.92192	706.48366	960.1653	107.68146	0

	zed	5					
16	Optimized	179.38625	-10.684535	691.65024	950.73924	109.97676	0
17	Optimized	181.1902	-10.368385	671.93872	945.22438	116.00288	0
18	Optimized	182.99415	-10.052237	652.22721	938.67208	121.58863	0
19	Optimized	184.79805	-9.7360895	632.5157	931.13693	126.75719	0
20	Optimized	185.75	-9.569252	622.0789	927.46451	129.6285	0
21	Optimized	186.05095	-9.5165095	617.47924	930.50704	132.87242	0
22	Optimized	187.20095	-9.214956	592.63877	914.80758	136.75254	0
23	Optimized	188.37185	-8.879506	565.54919	924.40406	152.32485	0
24	Optimized	189.4001	-8.38999	529.61761	905.39772	159.5092	0
25	Optimized	190.62825	-7.6151565	474.82998	874.2448	169.54153	0
26	Optimized	191.9131	-6.6259815	406.36767	812.93999	172.57971	0
27	Optimized	193.5228	-5.38672	320.59606	712.00466	166.14309	0
28	Optimized	195.6158	-3.851135	213.79815	607.60146	167.15959	0
29	Optimized	197.51075	-2.5380985	121.93058	519.16502	168.61602	0
30	Optimized	198.35465	-1.987206	83.128025	475.64138	166.61204	0
31	Optimized	198.75	-1.729125	64.952012	451.73329	164.17891	0
32	Optimized	199.1961	-1.4378975	44.438984	423.8034	161.03064	0
33	Optimized	199.7461	-1.1064585	20.873638	405.06898	163.08125	0
34	Optimized	200.1393	-	5.4615994	383.83747	160.61103	0

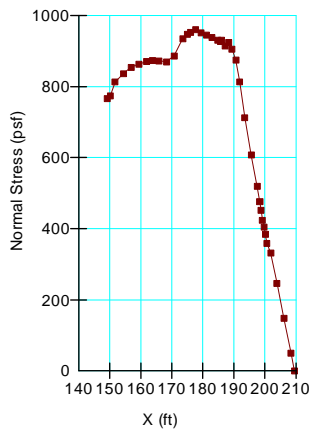
	zed	5	0.89251185				
35	Optimized	200.63935	-0.62047095	-14.136079	358.79679	152.3002	0
36	Optimized	201.8868	0.0582574	-63.030943	331.1316	140.55703	0
37	Optimized	203.8947	1.033966	-134.44311	246.36336	104.57504	0
38	Optimized	206.13685	2.0203775	-207.75158	147.8172	62.744678	0
39	Optimized	208.37895	3.006789	-281.06006	49.271038	20.914315	0
40	Optimized	209.5	3.4999965	-317.72064	0.00024212691	0.00010277678	0

Slices of Slip Surface: 4623

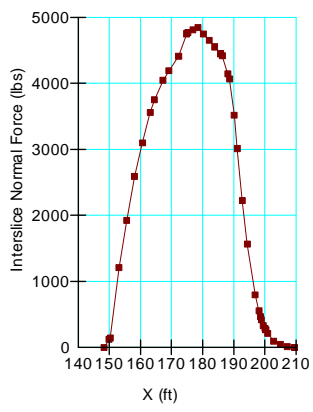
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4623	151.5	-11.710955	755.71115	784.54141	12.237717	0
2	4623	153.5	-11.87049	765.66638	809.96319	18.802881	0
3	4623	155.5	-11.984255	772.8017	831.34122	24.848556	0
4	4623	157.5	-12.05242	777.04991	848.78144	30.448228	0
5	4623	159.5	-12.07509	778.45	862.4	35.634661	0
6	4623	161.5	-12.052305	776.99876	872.12412	40.378321	0
7	4623	163.5	-11.98403	772.74982	877.99084	44.672164	0
8	4623	165.3578	-11.88127	766.35817	878.13934	47.448289	0
9	4623	167.0734	-11.749925	758.12744	875.60671	49.86699	0
10	4623	168.5699	-11.60964	749.39767	871.4524	70.468332	0
11	4623	169.40055	-11.52173	743.9254	870.93706	73.330213	0
12	4623	170.54375	-11.37967	735.05716	879.24225	61.20294	0
13	4623	172.44625	-11.11786	718.71231	890.01996	72.715786	0
14	4623	174.34875	-10.813545	699.72531	895.92402	83.281411	0
15	4623	176.34	-10.44796	676.9198	891.06145	90.897739	0
16	4623	178.42	-10.016275	649.96744	876.46769	96.143651	0
17	4623	180.5	-9.531802	619.73912	855.51451	100.08072	0

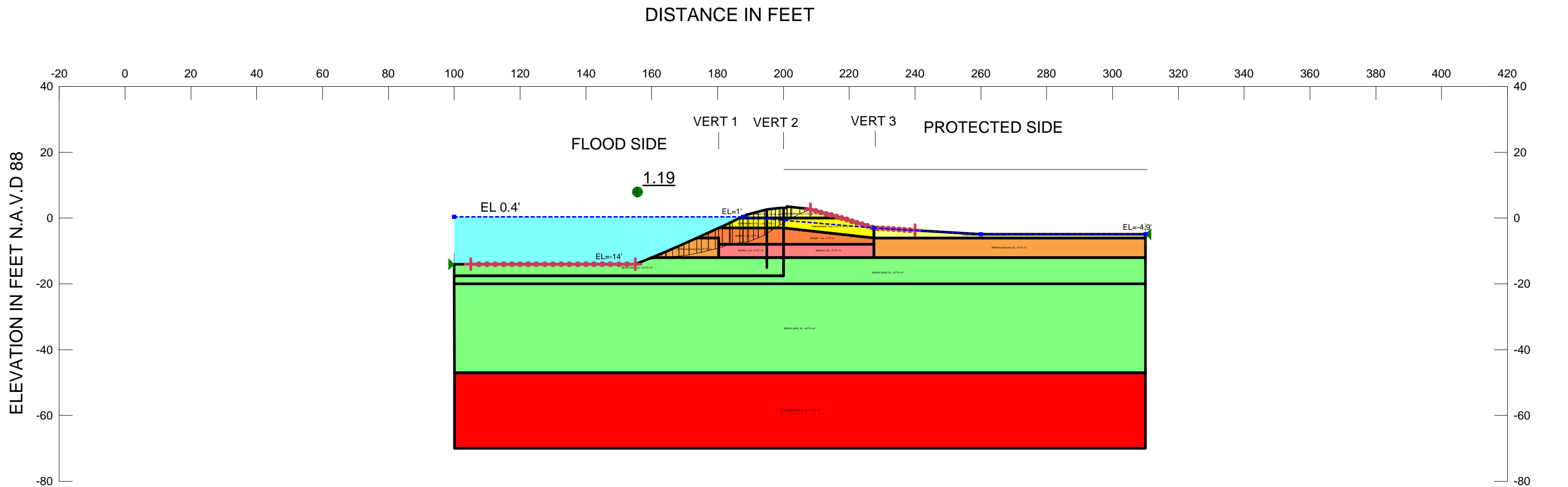
18	4623	182.58	-8.993637	586.14564	827.85997	102.60164	0
19	4623	184.71	-8.3851285	548.18036	792.31906	103.63073	0
20	4623	186.95	-7.6817295	498.27348	763.85134	112.73111	0
21	4623	188.85	-7.0389275	448.19496	776.96093	139.55287	0
22	4623	190.35	-6.4929525	406.26071	820.42598	175.80273	0
23	4623	191.3732	-6.1061315	376.75309	830.1397	192.4512	0
24	4623	192.5156	-5.6482615	342.198	791.80013	190.84478	0
25	4623	194.254	-4.9229445	287.82358	734.29075	189.51407	0
26	4623	195.9924	-4.1533335	230.68097	673.43892	187.9396	0
27	4623	197.7308	-3.338138	170.7009	609.22785	186.14365	0
28	4623	198.75	-2.844245	134.5352	570.39915	185.01327	0
29	4623	199.45	-2.489358	108.7174	540.6222	183.33271	0
30	4623	200.1703	-2.1204785	81.925529	509.87978	181.6558	0
31	4623	200.6703	-1.857273	62.879181	484.80985	179.09894	0
32	4623	201.6399	-1.3338248	25.131023	464.43859	186.475	0
33	4623	203.18235	-0.46889736	-36.928733	375.0588	159.20301	0
34	4623	204.9874	0.59190989	-112.58923	271.73849	115.34614	0
35	4623	206.79245	1.7117655	-191.93427	165.1899	70.118953	0
36	4623	208.5975	2.893388	-275.13267	55.396211	23.514296	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL 1 CH, EL. +3.5 TO -0 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -3 TO -8 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -20 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: Fill (protected) ,EL -3 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, EL. 0 TO -3 Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH (protected), EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.86.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN HE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 15 STA. 100+28 TO STA. 104+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 188
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 2:46:18 PM
File Name: Reach 15_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 2:46:38 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (protected) ,EL -3 to -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. 0 TO -3

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH (protected), EL. -6 TO -12

Model: Mohr-Coulomb
Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (105, -14) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.5 TO -0

Model: Mohr-Coulomb
Unit Weight: 113 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3 TO -8

Model: Mohr-Coulomb
Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -20 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (155, -14) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (208.3, 2.61735) ft
Right-Zone Right Coordinate: (240, -3.73077) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (100, -14) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
100	0.4
187.8	0.4
227.5	-3
260	-4.9
310	-4.9

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 88
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.3, 88)
Data Point: (200, 109)
Data Point: (227.5, 88)

Regions

	Material	Points	Area (ft²)
--	----------	--------	------------

Region 1	EMBANKMENT FILL 1 CH, EL. +3.5 TO -0	30,36,3,41,4,28,20	26.4
Region 2	MARSH 1, EL. -3 TO -8	47,46,45,21,11,12,22,31	108.4375
Region 3	Fill (protected) ,EL.-3 to -6 (Protected Side)	15,37,6,7,16	121.625
Region 4	MARSH 2, EL. -8 TO -12	31,22,12,13,23,48	78.8
Region 5	BEACH SAND, EL. -20 TO -47	27,24,13,17,8,34,33,32	1130
Region 6	MARSH (protected), EL. -6 TO -12	16,7,8,17,44	495
Region 7	BEACH SAND, EL. -20 TO -47	13,24,27,1,50,19,49,48,23	435.05263
Region 8	EMBANKMENT FILL 2, EL. 0 TO -3	21,11,28,20,30,35,45	49.175
Region 9	EMBANKMENT FILL 1 CH, EL. +3.5 TO -0	28,4,26,38,5,29	38.03
Region 10	EMBANKMENT FILL 2, EL. 0 TO -3	11,28,29,15,16	109.2
Region 11	BEACH SAND, EL. -20 TO -47	9,32,33,34,10,18,14	5668.65
Region 12	BAY SOUND CLAY CL, EL. -47 TO -70	9,14,18,10,40,39	4827.7
Region 13	MARSH 2, EL. -8 TO -12	12,44,17,13	110
Region 14	MARSH 1, EL. -3 TO -8	12,11,16,44	96.25
Region 15	MARSH (protected), EL. -6 TO -12	49,2,46,47,31,48	79.929867

Points

	X (ft)	Y (ft)
Point 1	100	-15.1
Point 2	164.4	-10.2
Point 3	195	2.6
Point 4	200	3.1
Point 5	208	2.7
Point 6	310	-4.9
Point 7	310	-6
Point 8	310	-12
Point 9	100.1	-47
Point 10	310	-47
Point 11	200	-3

Point 12	200	-8
Point 13	200	-12
Point 14	200	-47
Point 15	227.5	-3
Point 16	227.5	-6
Point 17	227.5	-12
Point 18	231.5	-47
Point 19	155	-14
Point 20	195	0
Point 21	195	-3
Point 22	195	-8
Point 23	195	-12
Point 24	200	-17.5
Point 25	195	-15
Point 26	201	3.1
Point 27	100	-17.5
Point 28	200	0
Point 29	217.8	0
Point 30	186.8	0
Point 31	180.3	-8
Point 32	100	-20
Point 33	200	-20
Point 34	310	-20
Point 35	181.5	-2.5
Point 36	189	1
Point 37	260	-4.9
Point 38	201	3.5
Point 39	100.1	-70
Point 40	310	-70
Point 41	199	3.1
Point 42	200	12.9
Point 43	200.5	12.9
Point 44	227.5	-8
Point 45	180.3	-3
Point 46	173.675	-6
Point 47	180.3	-6

Point 48	180.3	-12
Point 49	159.94737	-12
Point 50	100	-14

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.19	(141.744, -122.307)	25.03533	(208.3, 2.61735)	(157.31, -13.0663)
2	4622	1.30	(141.744, -122.307)	136.95	(208.3, 2.61735)	(155, -14)

Slips of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	157.9692	-12.92133	831.25224	845.54587	8.2524301	0
2	Optimized	159.288	-12.631495	813.18154	840.28759	15.649686	0
3	Optimized	160.32455	-12.40369	798.95651	831.22241	18.628726	0
4	Optimized	161.8656	-12.1604	783.76683	820.91883	21.449719	0
5	Optimized	163.6126	-11.91964	768.74267	811.07873	17.970591	0
6	Optimized	164.29785	-11.832945	763.35393	814.5113	21.715014	0
7	Optimized	165.37245	-11.76629	759.1612	821.51372	26.467075	0
8	Optimized	167.3173	-11.64565	751.66864	831.26432	33.786365	0
9	Optimized	169.046	-11.483425	741.54444	829.53651	37.350415	0
10	Optimized	170.5586	-11.279615	728.83375	827.24334	41.772393	0
11	Optimized	172.4949	-10.946075	707.99286	813.26875	44.686966	0

	ed	5					
12	Optimized	174.38225	-10.57561	684.87753	800.35574	49.017594	0
13	Optimized	176.1346	-10.173562	659.77371	778.91434	50.572196	0
14	Optimized	178.22475	-9.6471275	626.92652	754.6501	54.215443	0
15	Optimized	179.7849	-9.225354	600.62604	729.66494	54.773764	0
16	Optimized	180.9	-8.8821065	579.20538	711.03447	76.111565	0
17	Optimized	182.5335	-8.3792825	547.82841	692.92341	83.770636	0
18	Optimized	183.70945	-8.030575	526.07429	690.1186	94.711022	0
19	Optimized	184.20375	-7.924485	519.44634	691.98373	73.237776	0
20	Optimized	185.6778	-7.701246	505.51901	705.04971	84.695759	0
21	Optimized	187.24	-7.495603	492.6816	715.26147	94.479549	0
22	Optimized	187.74	-7.4297855	488.57688	722.0792	99.115854	0
23	Optimized	188.4	-7.3429065	479.95129	747.31979	113.4912	0
24	Optimized	189.24705	-7.231408	468.4721	774.63954	129.96037	0
25	Optimized	190.2207	-6.917875	443.69968	739.79896	125.68669	0
26	Optimized	191.6739	-6.355845	400.85975	730.87799	140.08443	0
27	Optimized	193.35895	-5.586615	343.85956	693.28811	148.32362	0
28	Optimized	194.6587	-4.879797	292.80056	649.61114	151.45711	0
29	Optimized	195.64845	-4.2458955	247.96324	613.40188	155.1195	0
30	Optimized	196.9453	-3.4152985	189.19956	560.19641	157.47882	0

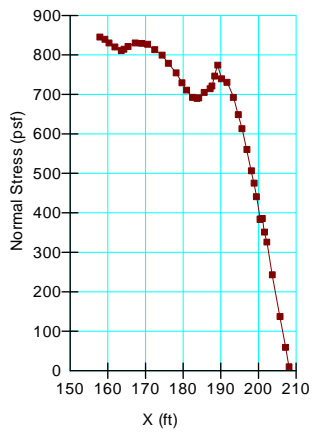
	ed	5					
31	Optimiz ed	198.1626 5	-2.635685	134.04856	506.44595	158.07332	0
32	Optimiz ed	198.8657 5	-2.18842	102.38199	476.08035	158.62555	0
33	Optimiz ed	199.5	-1.7965895	74.541422	441.36301	155.70653	0
34	Optimiz ed	200.5	-1.1788282	30.649287	384.20931	150.07733	0
35	Optimiz ed	201.0991 5	-0.8087034	4.3512382	385.54004	161.80505	0
36	Optimiz ed	201.6598	- 0.46236475	-20.256039	350.91358	148.95398	0
37	Optimiz ed	202.2958	-0.088635	-46.976816	325.92561	138.34721	0
38	Optimiz ed	203.7043 5	0.62676	-99.1446	243.63309	103.41611	0
39	Optimiz ed	205.7038	1.5640485	-168.31852	137.73716	58.465956	0
40	Optimiz ed	207.2346	2.185106	-215.24988	59.332791	25.185276	0
41	Optimiz ed	208.15	2.556491	-243.31798	10.06489	4.2722922	0

Slices of Slip Surface: 4622

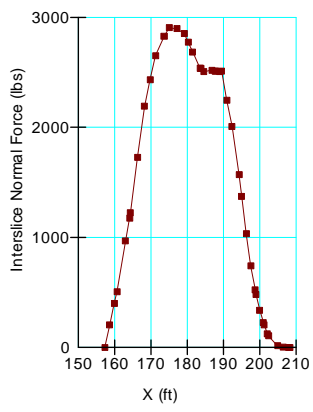
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4622	155.82455	-13.91477	893.23305	920.61692	15.810088	0
2	4622	157.47365	-13.7342	881.98975	935.8416	31.091382	0
3	4622	159.1228	-13.53337	869.43969	948.41405	45.595866	0
4	4622	160.6895	-13.324215	856.38788	947.87204	52.818408	0
5	4622	162.1737	-13.108595	842.96798	934.63983	52.926768	0
6	4622	163.6579	-12.87634	828.42008	919.46914	52.567199	0
7	4622	165.42995	-12.57517	809.67363	901.14083	52.808615	0
8	4622	167.4899	-12.19715	786.04402	875.63378	51.72467	0
9	4622	169.3791	-11.82298	762.7392	856.38593	39.750678	0

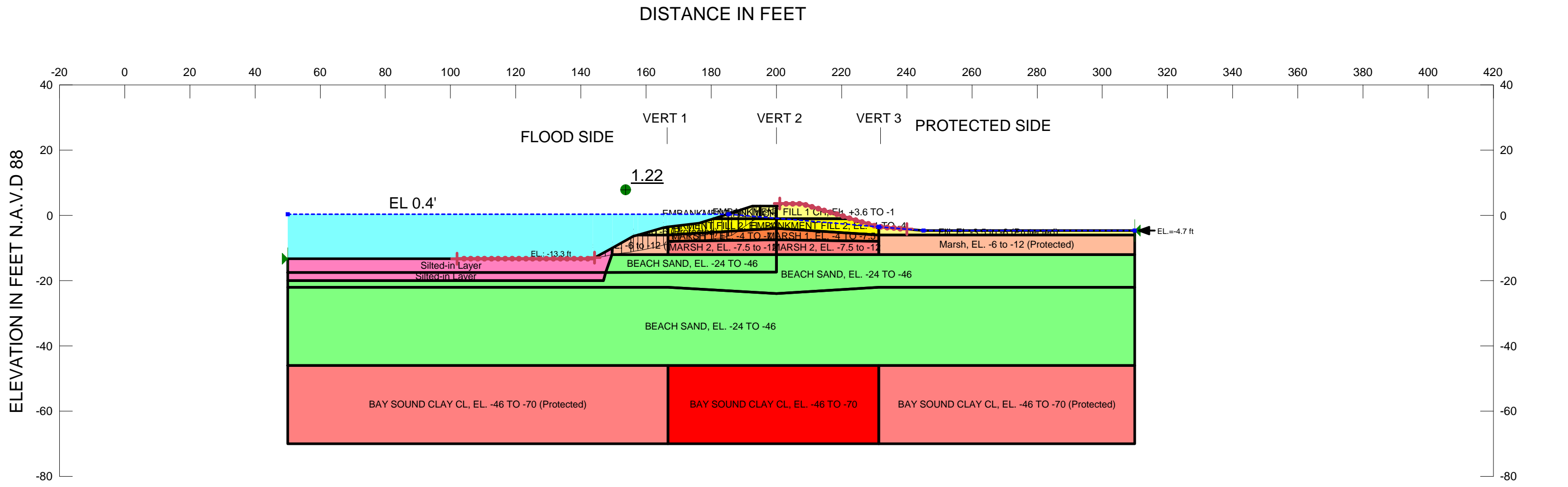
10	4622	171.09745	-11.45742	739.91295	841.37601	43.068513	0
11	4622	172.8158	-11.06872	715.65891	824.30849	46.119007	0
12	4622	174.50315	-10.66454	690.42053	805.61763	48.898271	0
13	4622	176.1594	-10.24551	664.28466	785.37183	51.398453	0
14	4622	177.81565	-9.8043865	636.73715	763.24585	53.699756	0
15	4622	179.4719	-9.3409475	607.86304	739.15171	55.728732	0
16	4622	180.9	-8.9245975	581.8521	717.0059	78.031085	0
17	4622	182.68975	-8.3727865	547.40354	695.9845	85.783258	0
18	4622	184.60965	-7.759376	509.14505	675.90288	70.7845	0
19	4622	186.0699	-7.268989	478.54718	656.24885	75.429881	0
20	4622	187.24	-6.8642515	453.28509	641.60456	79.936875	0
21	4622	187.74	-6.6878825	442.28276	638.09062	83.115506	0
22	4622	188.4	-6.449072	424.17699	647.67298	94.868419	0
23	4622	189.86765	-5.905992	382.44341	651.19938	114.08014	0
24	4622	191.60295	-5.241162	331.68309	639.66457	130.73038	0
25	4622	193.7353	-4.382983	266.74011	621.55237	150.60887	0
26	4622	196.0011	-3.431985	195.2886	584.49926	165.21012	0
27	4622	198.0011	-2.549927	129.55861	527.38009	168.8652	0
28	4622	199.5	-1.8672935	78.953501	472.78164	167.17013	0
29	4622	200.5	-1.397247	44.27826	426.92086	162.42215	0
30	4622	201.377	-0.97740665	13.393563	420.68301	172.88411	0
31	4622	202.5561	-0.39752615	-29.092388	354.87485	150.63544	0
32	4622	204.13185	0.3959044	-87.02056	263.88661	112.01322	0
33	4622	205.6791	1.2002264	-145.48152	168.73205	71.622504	0
34	4622	207.22635	2.029831	-205.5167	72.1403	30.621741	0
35	4622	208.15	2.5341825	-241.92519	11.801527	5.0094511	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL 1 CH, EL. +3.6 TO -1 Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -4 TO -7.5 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -24 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: MARSH 2, EL. -7.5 to -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: EMBANKMENT FILL 2, EL. -1 TO -4 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill, El. -3.5 to -6 (Protected) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh, EL. -6 to -12 (Protected) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -46 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.07.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 16 STA. 104+00 TO STA. 112+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global (2)

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File Information

Created By: Lijegren, James
Revision Number: 258
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 5:57:01 PM
File Name: Reach 16_S-case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/24/2013
Last Solved Time: 6:02:27 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global (2)

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: [Piezometric Line](#)
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: No
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: [Search for Tension Crack](#)
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 9.807 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

MARSH 2, EL. -7.5 to -12

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 2](#)
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

EMBANKMENT FILL 2, EL. -1 TO -4

Model: [Mohr-Coulomb](#)
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Fill, EL. -3.5 to -6 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Marsh, EL. -6 to -12 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FOS Distribution
 FOS Calculation Option: [Constant](#)
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 3 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.6 TO -1

Model: [Mohr-Coulomb](#)
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

MARSH 1, EL. -4 TO -7.5

Model: [Mohr-Coulomb](#)
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BEACH SAND, EL. -24 TO -46

Model: [Mohr-Coulomb](#)
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: 104 pcf

Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: (102, -13.3) ft
Left-Zone Right Coordinate: (144.15455, -13) ft
Left-Zone Increment: 20
Right Projection: [Range](#)
Right-Zone Left Coordinate: (201, 3.6) ft
Right-Zone Right Coordinate: (240, -4.24453) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (50, -13.3) ft
Right Coordinate: (310, -4.7) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
50	0.4
185.4	0.4
231.35	-3.5
231.5	-3.5
245.2	-4.7
310	-4.7

Unit Weight Functions

Marsh 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (166.7, 80)
Data Point: (200, 97)
Data Point: (231.4, 80)

Regions

	Material	Points	Area (ft ²)
Region 1	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	55,30,4,5,33,24,21	50.995458
Region 2	Marsh, EL. -6 to -12 (Protected)	25,3,8,58,41,42,43	87.847408
Region 3	Fill, EL. -3.5 to -6 (Protected)	36,31,32,7,9,18	110.58019
Region 4	Marsh, EL. -6 to -12 (Protected)	18,9,19,38,37	471.6
Region 5	Silted-in Layer	52,57,20,3,25,51	422.335
Region 6	EMBANKMENT FILL 2, EL. -1 TO -4	35,41,12,24,21,55,29	111.5815
Region 7	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	24,33,34,23,6,56	69.275
Region 8	EMBANKMENT FILL 2, EL. -1 TO -4	12,24,56,36,18	114.85463
Region 9	BEACH SAND, EL. -24 TO -46	10,26,44,39,40,27,11,47,17,45	6175.3
Region 10	MARSH 1, EL. -4 TO -7.5	12,13,42,41	91.575
Region 11	MARSH 2, EL. -7.5 to -12	42,43,14,54,13	141.525
Region 12	BEACH SAND, EL. -24 TO -46	25,43,14,22,51	280.301
Region 13	MARSH 1, EL. -4 TO -7.5	12,18,37,13	86.35
Region 14	MARSH 2, EL. -7.5 to -12	14,54,13,37,38	133.45
Region 15	BEACH SAND, EL. -24 TO -46	39,44,26,1,2,51,22,14,38,19,27,40	1599.169
Region	Silted-in Layer	52,51,2,1	243.15

16			
Region 17	BAY SOUND CLAY CL, EL. -46 TO -70	45,17,47,48,53,46	1552.8
Region 18	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	47,48,15,11	1886.4
Region 19	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	10,16,46,45	2800.8
Region 20	Fill, EL. -3.5 to -6 (Protected)	35,41,58,28	12.328367

Points

	X (ft)	Y (ft)
Point 1	50	-20
Point 2	146.9	-20
Point 3	149.7	-10
Point 4	195	2.8
Point 5	199	2.9
Point 6	208	3.5
Point 7	310	-4.7
Point 8	156.1	-6.4
Point 9	310	-6
Point 10	50	-46
Point 11	310	-46
Point 12	200	-4
Point 13	200	-7.5
Point 14	200	-12
Point 15	310	-70
Point 16	50	-70
Point 17	200	-46
Point 18	231.4	-6
Point 19	310	-12
Point 20	143.6	-13.3
Point 21	195	-1
Point 22	200	-17.4
Point 23	201	3.6
Point 24	200	-1

Point 25	149.5	-12
Point 26	50	-22
Point 27	310	-22
Point 28	165.3	-3.7
Point 29	176.2	-2.4
Point 30	192.6	2.8
Point 31	231.5	-3.5
Point 32	245.2	-4.7
Point 33	200	2.9
Point 34	201	2.9
Point 35	166.66154	-3.5
Point 36	231.35185	-3.5
Point 37	231.4	-8
Point 38	231.4	-12
Point 39	200	-24
Point 40	231.4	-22
Point 41	166.7	-6
Point 42	166.7	-8
Point 43	166.7	-12
Point 44	166.7	-22
Point 45	166.7	-46
Point 46	166.7	-70
Point 47	231.4	-46
Point 48	231.4	-70
Point 49	200	12.9
Point 50	200.5	12.9
Point 51	147.62	-17.5
Point 52	50	-17.5
Point 53	200	-70
Point 54	200	-11.6
Point 55	180.71818	-1
Point 56	222.9	-1
Point 57	50	-13.3
Point 58	157.46296	-6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.22	(134.942, 132.491)	27.77688	(202.452, 3.57926)	(143.604, -13.2978)
2	4633	1.39	(134.942, 132.491)	145.782	(203.003, 3.57139)	(144.155, -13)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	144.5835	-13.090845	841.81979	862.29716	10.888012	0
2	Optimized	146.54245	-12.67689	815.99832	851.55903	18.907962	0
3	Optimized	148.51095	-12.26091	790.0546	840.80249	26.983131	0
4	Optimized	149.58765	-12.033385	775.84047	827.51109	29.832045	0
5	Optimized	149.68765	-12.013205	774.59904	821.70276	27.195348	0
6	Optimized	151.08765	-11.825245	762.84082	818.37275	23.571904	0
7	Optimized	153.9149	-11.414605	737.21769	808.94215	30.445229	0
8	Optimized	155.72725	-11.12255	719.01345	799.72793	34.261264	0
9	Optimized	156.7815	-10.931025	707.05401	785.62359	33.350807	0
10	Optimized	158.22875	-10.66811	690.62238	773.81828	35.314566	0
11	Optimized	159.76025	-10.389885	673.27651	763.34652	38.23245	0
12	Optimized	161.86095	-9.939325	645.17117	740.15228	40.317086	0
13	Optimized	164.24795	-9.346664	608.16928	709.04109	42.817541	0

	ed						
14	Optimiz ed	165.98075	-8.88348	579.29202	681.361	43.325712	0
15	Optimiz ed	166.68075	-8.6963715	567.61778	668.99873	43.033661	0
16	Optimiz ed	166.76595	-8.6736055	566.19295	667.46758	42.988531	0
17	Optimiz ed	167.59435	-8.4932775	554.94129	658.97996	44.161793	0
18	Optimiz ed	169.11925	-8.1678725	534.63637	637.14223	43.511154	0
19	Optimiz ed	170.1194	-7.9751295	522.60846	629.80965	45.504209	0
20	Optimiz ed	171.7917	-7.7637895	509.40526	617.18534	45.749931	0
21	Optimiz ed	173.9697	-7.5463835	495.85422	610.63144	48.720037	0
22	Optimiz ed	175.45655	-7.47417	491.3467	608.6363	49.786482	0
23	Optimiz ed	177.1661	-7.3911425	486.16492	612.93369	53.81015	0
24	Optimiz ed	179.0983	-7.297301	480.31318	620.22252	59.387991	0
25	Optimiz ed	180.3913	-7.216823	475.29379	619.32129	61.136046	0
26	Optimiz ed	182.00135	-7.051548	464.95924	629.856	69.994522	0
27	Optimiz ed	184.1901	-6.6648755	440.85072	619.09682	75.66098	0
28	Optimiz ed	185.24785	-6.367085	422.25364	615.08144	81.850542	0
29	Optimiz ed	185.80045	-6.2115145	410.44318	621.59624	89.629156	0
30	Optimiz ed	187.2029	-5.480675	357.40389	579.4568	94.255868	0
31	Optimiz ed	188.3238	-4.7783495	307.64401	551.3309	103.43895	0
32	Optimiz	189.48205	-3.9581965	250.33245	517.75186	113.5128	0

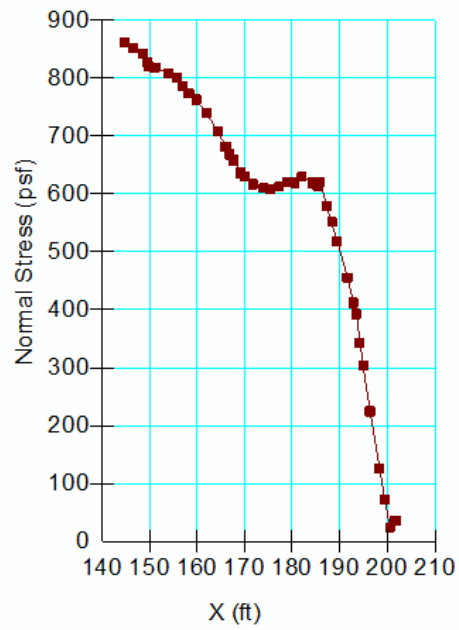
	ed						
33	Optimiz ed	191.5607	-2.486331	147.47702	456.38489	131.12361	0
34	Optimiz ed	192.8337	-1.584909	84.487266	411.84683	138.95589	0
35	Optimiz ed	193.42365	-1.20971	57.950821	393.14441	142.28124	0
36	Optimiz ed	194.2912	-0.69901745	21.489002	342.8178	136.39598	0
37	Optimiz ed	194.90125	-0.3398999	-4.1506758	304.67202	129.3256	0
38	Optimiz ed	196.3609	0.51935255	-65.499162	224.5975	95.335985	0
39	Optimiz ed	198.3609	1.625664	-145.12715	126.6871	53.775484	0
40	Optimiz ed	199.5	2.169623	-185.09846	73.533141	31.212966	0
41	Optimiz ed	200.5	2.6471535	-220.19244	25.456452	10.805623	0
42	Optimiz ed	201.72595	3.2325885	-263.21645	35.946376	15.258331	0

Slices of Slip Surface: **4633**

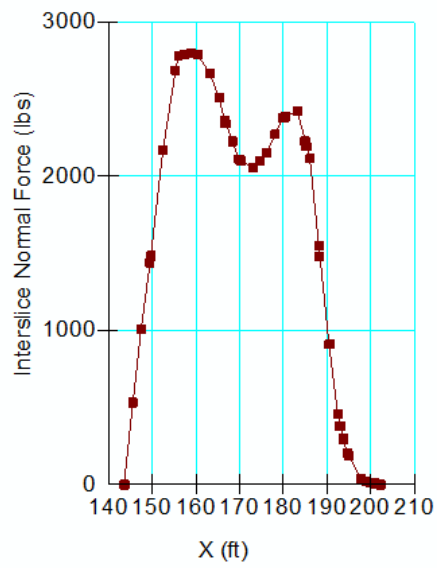
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4633	145.01225	-12.94061	832.42612	858.2468	13.729098	0
2	4633	146.7277	-12.81165	824.42516	870.15231	24.313559	0
3	4633	148.44315	-12.662305	815.10335	880.05391	34.534823	0
4	4633	149.40045	-12.572605	809.47826	893.53447	48.529874	0
5	4633	149.6	-12.552575	808.23326	893.10099	48.998405	0
6	4633	150.8508	-12.416125	799.70667	878.56741	45.530271	0
7	4633	153.15245	-12.14489	782.82104	865.28452	47.610308	0
8	4633	155.20165	-11.87393	765.90847	855.96996	38.228834	0
9	4633	156.7815	-11.644605	751.60535	843.95103	39.198416	0
10	4633	158.4426	-11.381335	735.13078	833.15493	41.608785	0
11	4633	160.40185	-11.04756	714.32843	820.71884	45.16005	0

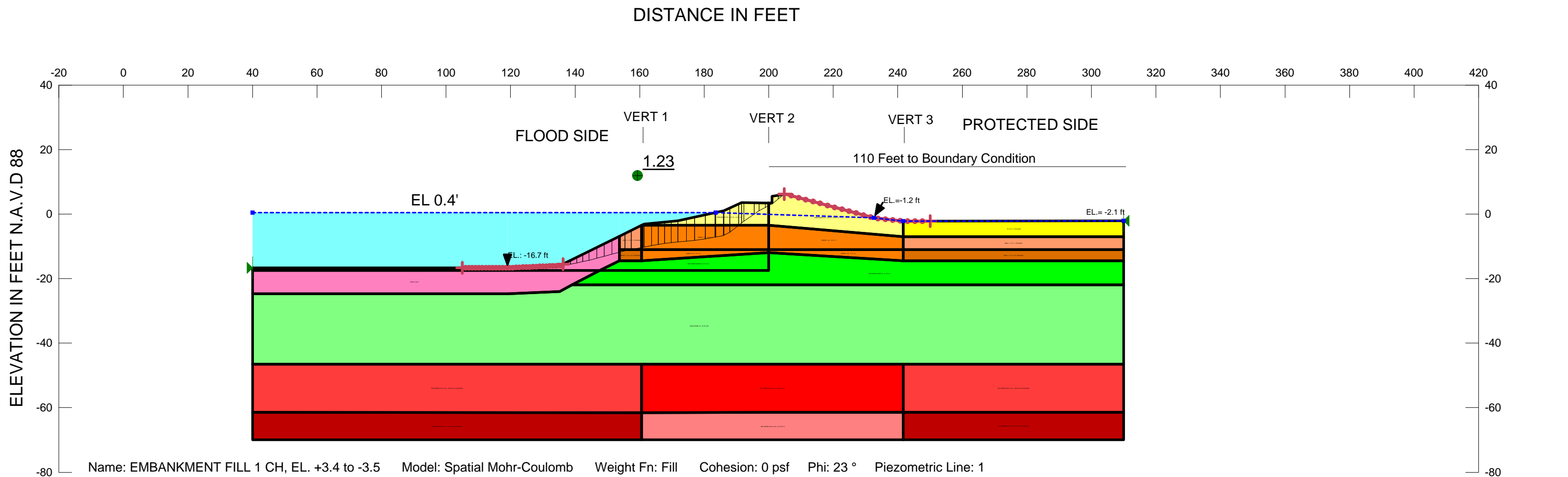
12	4633	162.3611	-10.6862	691.77683	806.12052	48.536018	0
13	4633	164.32035	-10.297045	667.50021	789.23201	51.672084	0
14	4633	165.98075	-9.9471455	645.659	769.43446	52.539569	0
15	4633	167.62705	-9.5766655	622.5527	744.88309	51.926172	0
16	4633	169.5389	-9.123346	594.2702	713.96602	50.807858	0
17	4633	171.4315	-8.6475085	564.54748	680.4649	49.204024	0
18	4633	173.3241	-8.1445925	533.17539	643.99023	47.038111	0
19	4633	175.2352	-7.608859	499.75919	605.1499	44.735704	0
20	4633	177.32955	-6.988123	461.01315	567.48877	45.196217	0
21	4633	179.58865	-6.281457	416.92266	527.53204	46.950897	0
22	4633	182.0678	-5.4570035	365.48337	491.16757	53.349781	0
23	4633	184.25655	-4.694303	317.88273	462.25661	61.283079	0
24	4633	185.24785	-4.336715	295.57171	449.25938	65.236545	0
25	4633	186.3	-3.9419865	266.17176	449.78259	77.938175	0
26	4633	188.1	-3.2507495	213.50669	448.81773	99.883609	0
27	4633	189.9	-2.5319785	159.12392	445.04168	121.36489	0
28	4633	191.7	-1.785232	102.99366	438.42026	142.38015	0
29	4633	193.06555	-1.202404	59.39142	416.2649	151.48381	0
30	4633	194.2011	-0.7019271	22.147792	364.33633	145.25042	0
31	4633	194.93555	-0.37474195	-2.1580471	327.4566	138.99708	0
32	4633	196	0.11561715	-38.39415	278.64283	118.27686	0
33	4633	198	1.05663	-107.7058	185.96967	78.93944	0
34	4633	199.5	1.7833505	-160.99372	113.71594	48.269551	0
35	4633	200.5	2.2820455	-197.41067	62.753049	26.637089	0
36	4633	202.0014	3.0525875	-253.44751	53.901043	22.879635	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.19.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 17 STA. 118+90 TO STA. 119+63
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: Liljegren, James
Revision Number: 238
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 5:54:18 PM
File Name: Reach 17_S-case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/24/2013
Last Solved Time: 6:02:29 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: [Piezometric Line](#)
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: No
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: [Search for Tension Crack](#)
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 9.807 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

SILTY BEACH SAND, EL -12 TO -22

Model: [Mohr-Coulomb](#)
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Fill -2.2 to -7 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Marsh 1, -7 to -11 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 85 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Marsh 2, -11 to -14.5 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FOS Distribution
 FOS Calculation Option: [Constant](#)
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 3 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.4 to -3.5

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill](#)
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

MARSH 1, EL. -3.5 to -11

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 1](#)
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BEACH SAND, EL. -22 TO -46.5

Model: [Mohr-Coulomb](#)
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46.5 TO -61.5

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay 1](#)

Pore Water Pressure
 Piezometric Line: 1

MARSH 1, EL. -11 to -12

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 2](#)
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -61.5 TO -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay 2](#)
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -61.5 TO -70 (protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 119 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46.5 TO -61.5 (protected)

Model: [Mohr-Coulomb](#)
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: (105, -16.68612) ft
Left-Zone Right Coordinate: (136.216, -15.5) ft
Left-Zone Increment: 30
Right Projection: [Range](#)
Right-Zone Left Coordinate: (204.8, 6.14878) ft

Right-Zone Right Coordinate: (250, -2.18785) ft
Right-Zone Increment: 20
Radius Increments: 10

Data Point: (200, 110)
Data Point: (241.7, 100)

Slip Surface Limits

Left Coordinate: (40, -16.7) ft
Right Coordinate: (310, -2.1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	40	0.4
	183.6	0.4
	232.6	-1.2
	241.7	-2.2
	310	-2.1

Unit Weight Functions

Marsh 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 85
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 85)
Data Point: (200, 90)
Data Point: (241.7, 85)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 100
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 100)

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 116
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 116)
Data Point: (200, 90)
Data Point: (241.7, 116)

Clay 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 109)
Data Point: (200, 110)
Data Point: (241.7, 109)

Clay 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 119
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 119)
Data Point: (200, 102)
Data Point: (241.7, 119)

Regions

	Material	Points	Area (ft ²)
Region 1	Marsh 1, -7 to -11 (Protected)	47,46,42,45	40.034938
Region 2	Fill -2.2 to -7 (Protected)	27,5,7,15	331.255
Region 3	Marsh 1, -7 to -11 (Protected)	15,7,43,30	273.2

Region 4	Silted-in Layer	40,17,57,2,46,47,21,39	185.47806
Region 5	EMBANKMENT FILL 1 CH, EL. +3.4 to -3.5	10,28,3,25,20,24,6,42	141.455
Region 6	BEACH SAND, EL. -22 TO -46.5	8,22,58,1,56,55,53,54,23,9,35,14,33	6360.6115
Region 7	SILTY BEACH SAND, EL -12 TO -22	21,32,11,18,39	197.27
Region 8	Silted-in Layer	40,39,56,1,58,22	719.33199
Region 9	EMBANKMENT FILL 1 CH, EL. +3.4 to -3.5	10,28,29,19,4,26,27,15	299.59
Region 10	MARSH 1, EL. -3.5 to -11	30,15,10,44	239.775
Region 11	MARSH 1, EL. -3.5 to -11	44,10,42,45	295.5
Region 12	Marsh 2, -11 to -14.5 (Protected)	31,30,43,16	239.05
Region 13	MARSH 1, EL. -11 to -12	11,32,45,44	88.65
Region 14	MARSH 1, EL. -11 to -12	44,30,31,11	93.825
Region 15	Marsh 2, -11 to -14.5 (Protected)	21,47,45,32	24.15
Region 16	BAY SOUND CLAY CL, EL. -46.5 TO -61.5 (protected)	8,33,49,48	1815.03
Region 17	BAY SOUND CLAY CL, EL. -61.5 TO -70 (protected)	48,49,34,13	1019.07
Region 18	BAY SOUND CLAY CL, EL. -46.5 TO -61.5	33,14,35,51,50,49	1218.47
Region 19	BAY SOUND CLAY CL, EL. -61.5 TO -70	49,50,51,36,41,34	687.38
Region 20	BAY SOUND CLAY CL, EL. -46.5 TO -61.5 (protected)	35,9,52,51	1024.5
Region 21	BAY SOUND CLAY CL, EL. -61.5 TO -70 (protected)	51,52,12,36	580.55
Region 22	SILTY BEACH SAND, EL -12 TO -22	56,39,18,11,31,16,23,54,53,55	1132.1815

Points

	X (ft)	Y (ft)
Point 1	135.2	-24
Point 2	135.2	-16
Point 3	199	3.4
Point 4	205.1	6.2
Point 5	310	-2.1
Point 6	161.4	-3.1
Point 7	310	-7
Point 8	40	-46.5
Point 9	310	-46.5
Point 10	200	-3.5
Point 11	200	-12
Point 12	310	-70
Point 13	40	-70
Point 14	200	-46.5
Point 15	241.7	-7
Point 16	310	-14.5
Point 17	40	-16.7
Point 18	200	-17.5
Point 19	201	5.5
Point 20	186.1	1
Point 21	153.7	-14.5
Point 22	40	-24.7
Point 23	310	-22
Point 24	171.9	-2.1
Point 25	191.6	3.5
Point 26	232.6	-1.2
Point 27	241.7	-2.2
Point 28	200	3.4
Point 29	201	3.4
Point 30	241.7	-11
Point 31	241.7	-14.5
Point 32	160.6	-14.5
Point 33	160.6	-46.5

Point 34	160.6	-70
Point 35	241.7	-46.5
Point 36	241.7	-70
Point 37	200	12.9
Point 38	200.5	12.9
Point 39	147.62	-17.5
Point 40	40	-17.5
Point 41	200	-70
Point 42	160.6	-3.5
Point 43	310	-11
Point 44	200	-11
Point 45	160.6	-11
Point 46	153.7	-6.89567
Point 47	153.7	-11
Point 48	40	-61.5
Point 49	160.6	-61.6
Point 50	200	-61.5
Point 51	241.7	-61.5
Point 52	310	-61.5
Point 53	200	-22
Point 54	241.7	-22
Point 55	160.6	-22
Point 56	139.02154	-22
Point 57	119	-16.68313
Point 58	119	-24.68313

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.23	(119.707, 165.478)	34.41864	(204.8, 6.14884)	(135.203, -15.9985)
2	6712	1.34	(119.707, 165.478)	182.106	(207.039, 5.67835)	(135.279, -15.9614)

Slices of Slip Surface: **Optimized**

	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictional	Cohesi
--	------	--------	--------	-----------	------	------------	--------

	Surface				Normal Stress (psf)	Strength (psf)	ve Strengt h (psf)
1	Optimiz ed	136.86005	-15.769905	1008.9919	1046.3886	19.884148	0
2	Optimiz ed	139.48375	-15.34128	982.26305	1034.1237	27.574798	0
3	Optimiz ed	141.4173	-14.941145	957.29498	1021.8676	34.333855	0
4	Optimiz ed	143.35085	-14.54101	932.32691	1009.5608	41.065984	0
5	Optimiz ed	145.4904	-14.02314	900.01564	983.3428	44.305837	0
6	Optimiz ed	147.836	-13.387545	860.34779	955.11444	50.388318	0
7	Optimiz ed	150.1816	-12.75195	820.67995	926.92722	56.492678	0
8	Optimiz ed	152.5272	-12.11635	781.01211	898.69886	62.575158	0
9	Optimiz ed	153.7939	-11.773105	759.62404	884.86616	53.162126	0
10	Optimiz ed	154.67815	-11.548685	745.61993	870.03306	52.810242	0
11	Optimiz ed	156.41885	-11.174855	722.25479	851.20299	54.735263	0
12	Optimiz ed	158.9846	-10.702775	692.80782	831.43635	58.844321	0
13	Optimiz ed	160.85055	-10.35945	671.38818	822.98437	64.348763	0
14	Optimiz ed	161.25055	-10.28078	666.49298	820.09789	65.201416	0
15	Optimiz ed	162.5748	-9.99221	648.48276	798.27337	63.582345	0
16	Optimiz ed	164.7387	-9.5628925	621.70129	776.05609	65.519724	0
17	Optimiz ed	166.7169	-9.2162575	600.04183	755.69121	66.069244	0
18	Optimiz ed	168.7545	-8.9417845	582.93829	749.78367	70.821661	0

	ed					
38	Optimiz ed	203.90785	5.447301	-356.32926	46.059099	19.550928

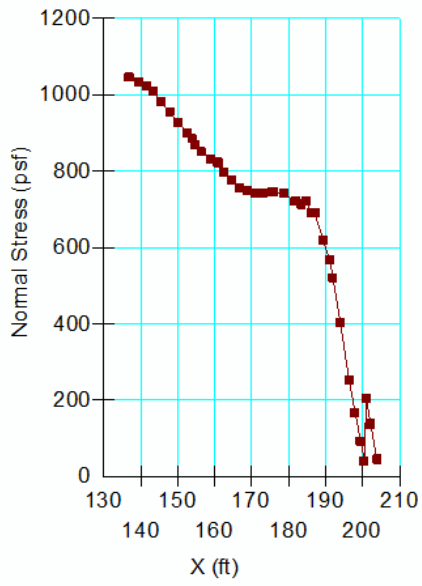
Slices of Slip Surface: **6712**

	ed					
19	Optimiz ed	170.8515	-8.7394735	570.31216	742.28394	72.99769
20	Optimiz ed	173.19325	-8.5135485	556.19501	741.52921	78.6697
21	Optimiz ed	175.7798	-8.2640095	540.64788	745.26207	86.853571
22	Optimiz ed	178.68645	-7.934955	520.0932	742.16893	94.265557
23	Optimiz ed	181.8257	-7.4331685	488.79719	722.1964	99.072087
24	Optimiz ed	183.4758	-7.111453	468.69567	712.90266	103.65972
25	Optimiz ed	184.79655	-6.8539545	450.22413	721.45781	115.13187
26	Optimiz ed	186.04655	-6.594623	431.4788	690.815	110.08168
27	Optimiz ed	187.0248	-6.118073	399.75017	691.55749	123.86486
28	Optimiz ed	189.29955	-4.583785	299.36289	620.24294	136.2055
29	Optimiz ed	191.12475	-3.11846	204.21692	567.323	154.12939
30	Optimiz ed	191.96545	-2.44351	160.38775	521.55356	153.30579
31	Optimiz ed	193.93565	-1.0699956	70.668748	404.34207	141.63592
32	Optimiz ed	196.2946	0.51774937	-33.213733	253.87123	107.76194
33	Optimiz ed	198.0244	1.5660135	-102.1512	167.85664	71.250919
34	Optimiz ed	199.5	2.3837165	-156.18208	92.67188	39.336879
35	Optimiz ed	200.5	2.9378755	-192.796	42.140996	17.887792
36	Optimiz ed	201.11525	3.2788275	-215.32602	204.06816	86.621794
37	Optimiz ed	202.12295	4.0442335	-265.14044	138.71466	58.880881

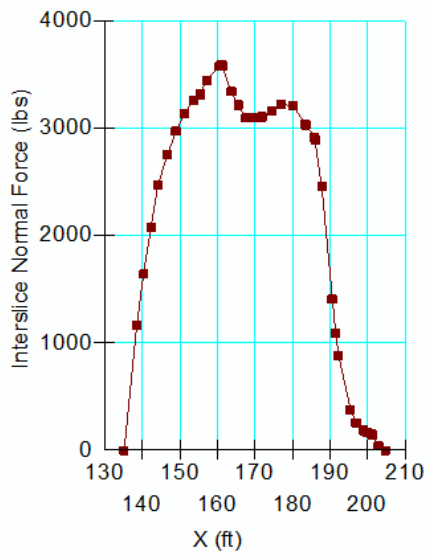
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	6712	136.42985	-15.8552	1014.3311	1047.9749	17.888739	0
2	6712	138.73255	-15.62807	1000.1468	1055.473	29.417446	0
3	6712	141.03525	-15.37134	984.15153	1060.1441	40.405979	0
4	6712	143.3379	-15.08488	966.27302	1061.9961	50.896841	0
5	6712	145.64055	-14.768545	946.52642	1060.9521	60.84121	0
6	6712	147.94325	-14.422185	924.88674	1057.1115	70.305141	0
7	6712	150.24595	-14.045625	901.41619	1050.4035	79.217972	0
8	6712	152.54865	-13.638665	876.00782	1040.8893	87.669058	0
9	6712	154.85	-13.201375	848.73962	1062.5563	90.759799	0
10	6712	157.15	-12.733575	819.54134	1030.7559	89.655253	0
11	6712	159.45	-12.234775	788.39518	995.53932	87.927747	0
12	6712	161	-11.884465	766.54931	973.3803	87.794545	0
13	6712	163.0159	-11.39567	736.05741	926.72125	80.932	0
14	6712	165.8432	-10.68275	691.57536	867.66354	74.744999	0
15	6712	168.26595	-10.030345	650.86389	822.79921	72.982213	0
16	6712	170.68865	-9.3419295	607.89322	774.87465	70.879409	0
17	6712	173.04515	-8.6378645	563.9611	731.45032	71.094957	0
18	6712	175.33545	-7.919676	519.14565	690.80837	72.866502	0
19	6712	177.6258	-7.1681175	472.23058	647.57847	74.430764	0
20	6712	179.91615	-6.3827515	423.23084	601.61331	75.718865	0
21	6712	182.20645	-5.5631115	372.09901	552.89515	76.743409	0
22	6712	183.4758	-5.098234	343.08808	526.62978	77.908828	0
23	6712	184.85	-4.5729565	307.76644	511.28808	86.389812	0
24	6712	186.8489	-3.797054	255.27505	504.53033	105.80259	0
25	6712	188.59835	-3.091096	207.66104	513.9369	130.00639	0
26	6712	190.59945	-2.259324	151.68037	516.37243	154.80259	0
27	6712	192.6349	-1.3841488	92.923514	469.70866	159.93581	0
28	6712	194.7047	-0.46411828	31.294769	373.80524	145.38707	0

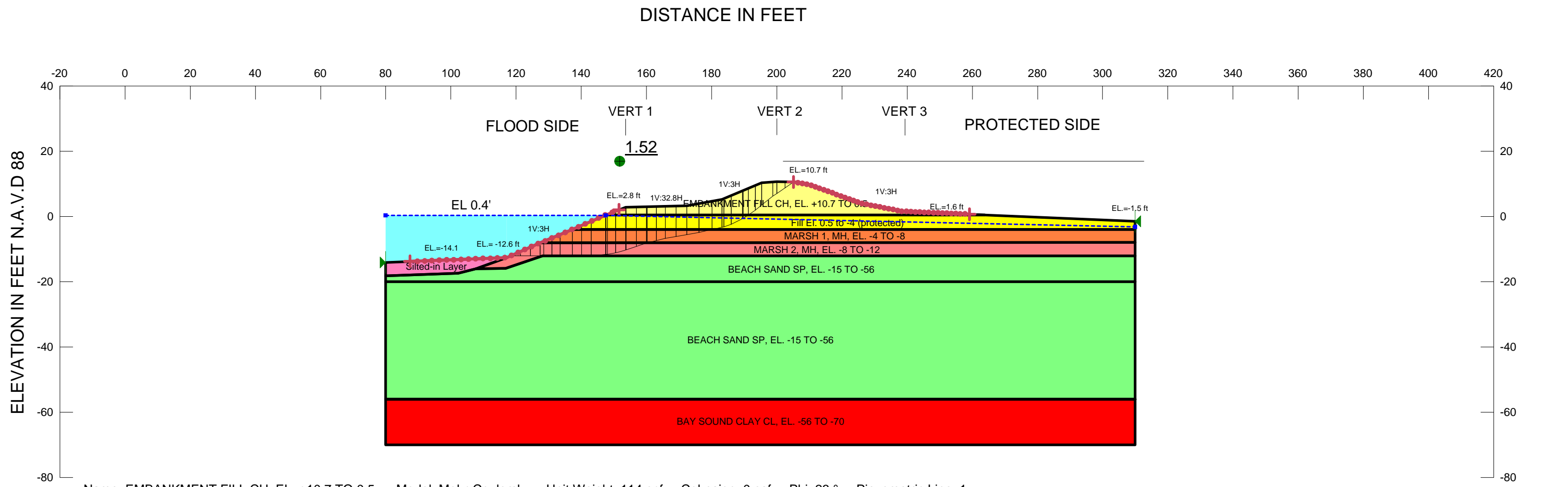
29	6712	197.3698	0.77228502	-51.286106	250.20251	106.20467	0
30	6712	199.5	1.7846925	-118.79764	152.49712	64.731188	0
31	6712	200.5	2.275944	-151.49275	105.86748	44.938077	0
32	6712	202.025	3.0429125	-202.46156	246.16071	104.48902	0
33	6712	204.075	4.098218	-272.4877	178.48111	75.760736	0
34	6712	206.0693	5.156214	-342.57049	71.850245	30.498619	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +10.7 TO 0.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, MH, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -15 TO -56 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -56 TO -70 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: MARSH 2, MH, EL. -8 TO -12 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill El. 0.5 to -4 (protected) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.00.



GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 18A STA. 120+29 TO STA. 122+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 193
Last Edited By: Johnson, Andrew S MVN
Date: 2/7/2012
Time: 1:31:46 PM
File Name: Reach 18A_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 2/7/2012
Last Solved Time: 1:34:54 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill El. 0.5 to -4 (protected)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (87.5, -13.79677) ft
Left-Zone Right Coordinate: (151.6, 2.03333) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (205.1, 10.58269) ft
Right-Zone Right Coordinate: (259.1, 0.70685) ft
Right-Zone Increment: 40
Radius Increments: 4

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +10.7 TO 0.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -15 TO -56

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -56 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (80, -14.1) ft
Right Coordinate: (310, -1.5) ft

Piezometric Lines

Piezometric Line 1

Coordinates		
	X (ft)	Y (ft)
	80	0.4
	147.5	0.4
	310	-3.2

Regions

	Material	Points	Area (ft ²)
Region 1	Fill El. 0.5 to -4 (protected)	9,10,4,5,30	708.07097
Region 2	MARSH 1, MH, EL. -4 TO -8	3,4,10,11	719.44
Region 3	BEACH SAND SP, EL. -15 TO -56	13,1,2,23,29,24,12,14	1627.215
Region 4	BEACH SAND SP, EL. -15 TO -56	15,13,14,16	8280
Region 5	BAY SOUND CLAY CL, EL. -56 TO -70	15,16,18,17	3220
Region 6	Silted-in Layer	1,20,21,23,2	126.145
Region 7	EMBANKMENT FILL CH, EL. +10.7 TO 0.5	5,6,19,25,7,22,8,26,27,28,30	474.59403
Region 8	MARSH 2, MH, EL. -8 TO -12	23,21,3,11,12,24,29	774.82

Points

	X (ft)	Y (ft)
Point 1	80	-18.2
Point 2	102.2	-17.4
Point 3	127.4	-8.1
Point 4	137.2	-4
Point 5	147.6	0.5
Point 6	153.6	2.8
Point 7	195.4	10.4
Point 8	205	10.6

Point 9	310	-1.5
Point 10	310	-4
Point 11	310	-8
Point 12	310	-12
Point 13	80	-20
Point 14	310	-20
Point 15	80	-56
Point 16	310	-56
Point 17	80	-70
Point 18	310	-70
Point 19	172.4	3.3
Point 20	80	-14.1
Point 21	117.1	-12.6
Point 22	200	10.7
Point 23	107.7	-16
Point 24	128.2	-12
Point 25	183.2	5.2
Point 26	210.2	9.7
Point 27	226	4
Point 28	238.5	1.6
Point 29	116.8	-15.9
Point 30	263.87097	0.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.52	(140.879, 91.84)	40.2451	(205.1, 10.5827)	(118.251, -12.097)
2	3282	1.61	(140.879, 91.84)	103.572	(205.1, 10.5827)	(122.749, -10.1322)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
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1	Optimiz ed	119.77615	-12.08197	778.86835	857.43394	33.349116	0
2	Optimiz ed	122.8257	-12.051995	776.9993	914.48909	58.360953	0
3	Optimiz ed	125.87525	-12.02202	775.13025	971.54424	83.37279	0
4	Optimiz ed	127.9418	-12.001705	773.86555	1008.2945	99.509176	0
5	Optimiz ed	129.7407	-11.99714	773.59823	1044.4968	114.98963	0
6	Optimiz ed	132.2549	-11.99866	773.67777	1092.7423	135.43485	0
7	Optimiz ed	135.356	-11.999375	773.72769	1151.9283	160.53663	0
8	Optimiz ed	138.67275	-11.99929	773.69918	1219.47	189.21847	0
9	Optimiz ed	141.6182	-11.999215	773.69918	1282.8217	216.10969	0
10	Optimiz ed	145.29545	-11.81379	762.14058	1311.4052	233.14901	0
11	Optimiz ed	147.55	-11.624195	750.24165	1342.6604	251.46685	0
12	Optimiz ed	147.84025	-11.599785	748.31073	1353.0107	256.6799	0
13	Optimiz ed	149.31675	-11.36984	731.92167	1360.9237	266.99553	0
14	Optimiz ed	152.0765	-10.69408	685.94609	1355.2276	284.09315	0
15	Optimiz ed	153.69255	-10.19975	652.88801	1365.2939	302.39834	0
16	Optimiz ed	155.34745	-9.6628875	617.08615	1307.3596	293.0037	0
17	Optimiz ed	158.47215	-8.6457825	549.28518	1210.8923	280.83558	0
18	Optimiz ed	160.14385	-8.109619	513.51098	1183.7495	284.49936	0
19	Optimiz ed	161.6455	-7.7303135	487.78925	1148.1675	280.31392	0

20	Optimiz ed	164.43015	-7.0269245	440.02003	1082.154	272.56971	0
21	Optimiz ed	167.4669	-6.387568	395.93397	1047.7169	276.66546	0
22	Optimiz ed	170.75565	-5.8122445	355.49893	995.78038	271.78335	0
23	Optimiz ed	174.24145	-5.2024415	312.63457	971.0688	279.48875	0
24	Optimiz ed	178.0767	-4.44015	259.74726	949.3619	292.72405	0
25	Optimiz ed	181.63525	-3.654566	205.81696	932.65245	308.52336	0
26	Optimiz ed	183.4875	-3.245661	177.73168	930.84122	319.67603	0
27	Optimiz ed	184.8962	-2.801715	148.08906	908.66976	322.84735	0
28	Optimiz ed	187.75265	-1.552	66.159189	851.31006	333.27677	0
29	Optimiz ed	189.5985	-0.6089269	4.7602166	783.99587	330.76591	0
30	Optimiz ed	190.4845	-0.0175469	-33.366764	763.83041	324.22677	0
31	Optimiz ed	192.35465	1.23065	-113.84004	722.4128	306.64604	0
32	Optimiz ed	194.4247	2.7458335	-211.24946	634.77899	269.44769	0
33	Optimiz ed	197.06925	4.8730835	-347.64728	494.24497	209.79454	0
34	Optimiz ed	199.36925	6.648785	-461.62593	365.68015	155.22202	0
35	Optimiz ed	201.25	7.939839	-544.79253	249.41737	105.87139	0
36	Optimiz ed	203.75	9.655979	-655.33397	88.363898	37.508249	0
37	Optimiz ed	205.05	10.54837	-712.81586	3.9190404	1.6635339	0

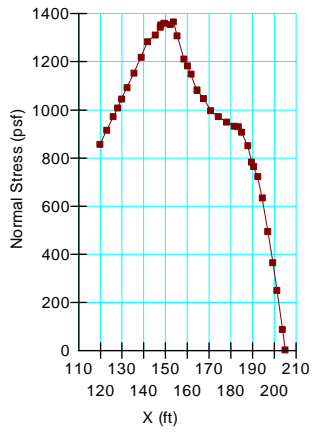
Slices of Slip Surface: **3282**

	Slip	X (ft)	Y (ft)	PWP (psf)	Base Normal	Frictional	Cohesi
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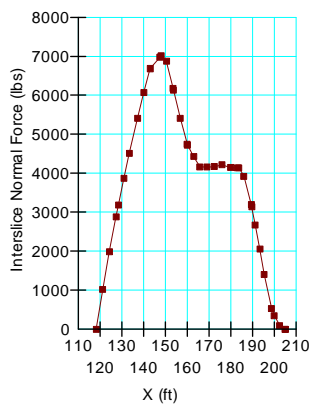
	Surfac e				Stress (psf)	Strength (psf)	ve Strengt h (psf)
1	3282	123.9114	-10.325325	669.24246	778.20962	46.253816	0
2	3282	126.23715	-10.684535	691.68598	865.1821	73.644736	0
3	3282	128.625	-10.99658	711.13222	943.48837	98.629335	0
4	3282	131.075	-11.25904	727.53411	1016.5567	122.68283	0
5	3282	133.525	-11.46274	740.24886	1081.5483	144.87301	0
6	3282	135.975	-11.608025	749.28081	1138.6801	165.29021	0
7	3282	138.4711	-11.695665	754.76521	1192.6887	185.88749	0
8	3282	141.0133	-11.723585	756.50297	1242.0227	206.09091	0
9	3282	143.55555	-11.68908	754.36323	1283.3298	224.53298	0
10	3282	146.0978	-11.592085	748.31386	1316.8171	241.31531	0
11	3282	147.43445	-11.523795	744.0485	1334.125	250.4726	0
12	3282	147.55	-11.51641	743.51275	1338.7141	252.648	0
13	3282	149.1	-11.393735	733.71065	1388.1722	277.80244	0
14	3282	152.1	-11.1108	711.91736	1476.3902	324.49945	0
15	3282	155.05465	-10.746305	685.09779	1493.1802	343.01062	0
16	3282	157.96395	-10.30199	653.34882	1441.2186	334.43088	0
17	3282	160.87325	-9.772451	616.2703	1380.8327	324.53746	0
18	3282	163.78255	-9.1563445	573.81739	1312.0232	313.34977	0
19	3282	166.69185	-8.452076	525.84398	1234.7697	300.92111	0
20	3282	169.2099	-7.775264	480.13105	1161.7037	289.31041	0
21	3282	171.33665	-7.145652	437.89899	1094.5902	278.74888	0
22	3282	173.6907	-6.387315	387.33913	1034.7047	274.79039	0
23	3282	176.27215	-5.4868	327.56024	980.25974	277.0545	0
24	3282	178.8536	-4.5087155	262.96148	918.15232	278.11201	0
25	3282	181.67215	-3.3452215	186.46196	838.71637	276.86557	0
26	3282	184.3504	-2.158432	108.70324	782.08738	285.83461	0
27	3282	186.65115	-1.0596273	36.958338	757.23402	305.73889	0
28	3282	188.75375	0.0035832	-32.292909	730.52243	310.08837	0
29	3282	191.1295	1.289565	-115.84531	695.58167	295.2569	0
30	3282	193.9765	2.9300225	-222.12137	645.07958	273.82003	0
31	3282	196.55	4.513255	-324.47406	552.46087	234.50573	0
32	3282	198.85	6.0232215	-421.89107	420.88227	178.65393	0
33	3282	201.25	7.69691	-529.6238	268.49093	113.96764	0

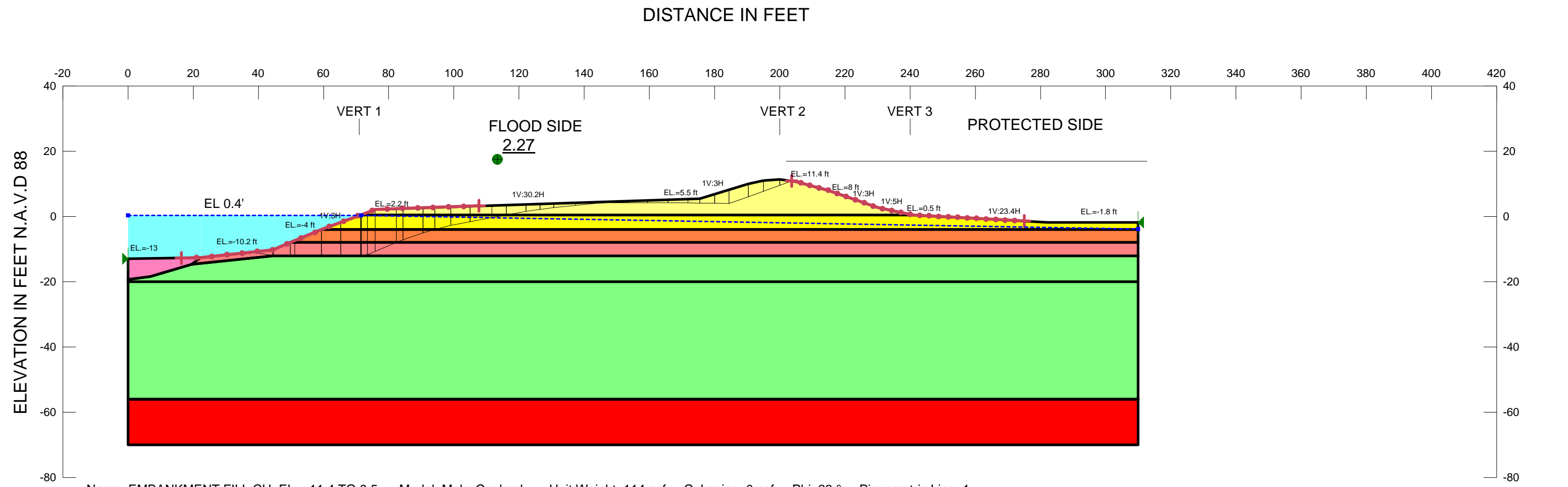
34	3282	203.75	9.5487575	-648.63879	95.520619	40.546097	0
35	3282	205.05	10.543225	-712.49831	4.2612379	1.8087882	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +11.4 TO 0.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, MH, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -15 TO -56 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -56 TO -70 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
Name: MARSH 2, MH, EL. -8 TO -12 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill El. 0.5 to -4 (protected) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 1.10.



GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 18B STA. 122+00 TO STA. 125+80
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 191
Last Edited By: Johnson, Andrew S MVN
Date: 2/7/2012
Time: 1:37:27 PM
File Name: Reach 188_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 2/7/2012
Last Solved Time: 1:41:24 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill El. 0.5 to -4 (protected)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (16.4, -12.7045) ft
Left-Zone Right Coordinate: (107.7, 3.25361) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (203.6, 10.896) ft
Right-Zone Right Coordinate: (275, -1.40096) ft
Right-Zone Increment: 25
Radius Increments: 4

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +11.4 TO 0.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -15 TO -56

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -56 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (0, -13) ft
Right Coordinate: (310, -1.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates		
	X (ft)	Y (ft)
	0	0.4
	71.5	0.4
	310	-3.8

Regions

	Material	Points	Area (ft²)
Region 1	Fill El. 0.5 to -4 (protected)	9,10,3,26,25,29	989.035
Region 2	MARSH 1, MH, EL. -4 TO -8	28,3,10,11	1021.6
Region 3	BEACH SAND SP, EL. -15 TO -56	13,1,2,27,32,12,14	2341.2
Region 4	BEACH SAND SP, EL. -15 TO -56	15,13,14,16,30	11160
Region 5	BAY SOUND CLAY CL, EL. -56 TO -70	15,30,16,18,31,17	4340
Region 6	Silted-in Layer	1,20,23,27,2	91.58
Region 7	EMBANKMENT FILL CH, EL. +11.4 TO 0.5	26,4,5,19,6,21,7,8,24,25	771.43
Region 8	MARSH 2, MH, EL. -8 TO -12	27,23,22,28,11,12,32	1099.01

Points

	X (ft)	Y (ft)
Point 1	0	-19.3
Point 2	6.9	-18.4
Point 3	59.4	-4
Point 4	75.9	2.2
Point 5	175.5	5.5
Point 6	195	11
Point 7	205	10.7
Point 8	215	8

Point 9	310	-1.8
Point 10	310	-4
Point 11	310	-8
Point 12	310	-12
Point 13	0	-20
Point 14	310	-20
Point 15	0	-56
Point 16	310	-56
Point 17	0	-70
Point 18	310	-70
Point 19	190.3	10
Point 20	0	-13
Point 21	200	11.4
Point 22	44.5	-10.2
Point 23	22.2	-12.6
Point 24	230.1	2.7
Point 25	240.7	0.5
Point 26	71.4	0.5
Point 27	19.6	-14.7
Point 28	49.8	-8
Point 29	282.2	-1.8
Point 30	281.4	-56
Point 31	281.1	-70
Point 32	44.6	-12

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.27	(-21.098, 1034.81)	62.16709	(203.6, 10.896)	(37.7905, -10.9221)
2	131	3.44	(-21.098, 1034.81)	1048.276	(203.6, 10.896)	(22.5828, -12.5588)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal	Frictional Strength	Cohesive
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					Stress (psf)	(psf)	Strengt h (psf)
1	Optimiz ed	41.14525	-11.44508	739.1312	788.89161	21.122037	0
2	Optimiz ed	44.53087	-11.97287	772.06452	872.9836	42.837605	0
3	Optimiz ed	47.18087	-11.9862	772.90519	919.32708	62.152402	0
4	Optimiz ed	50.47791	-11.996925	773.55002	985.08143	89.789757	0
5	Optimiz ed	55.27791	-11.995705	773.49084	1078.797	129.59478	0
6	Optimiz ed	62.333335	-11.98984	773.13037	1214.9313	187.53338	0
7	Optimiz ed	68.333335	-11.98485	772.80957	1329.5214	236.31014	0
8	Optimiz ed	71.45	-11.98226	772.65	1396.6	264.85106	0
9	Optimiz ed	71.535625	-11.98219	772.60329	1400.2943	266.43904	0
10	Optimiz ed	72.5037	-11.856925	763.74662	1406.5884	272.87014	0
11	Optimiz ed	74.668075	-11.2176	721.44548	1382.3616	280.54225	0
12	Optimiz ed	79.139225	-9.351755	600.1208	1245.2991	273.86194	0
13	Optimiz ed	83.37872	-7.58258	485.0665	1073.0049	249.56506	0
14	Optimiz ed	87.472265	-6.07871	386.7136	936.22909	233.25549	0
15	Optimiz ed	92.383525	-4.49613	282.57364	793.88601	217.03922	0
16	Optimiz ed	96.60036	-3.34535	206.12686	683.06794	202.44948	0
17	Optimiz ed	101.99166	-2.116915	123.54903	573.7506	191.09923	0
18	Optimiz ed	108.34695	-0.9256138	42.22774	464.18926	179.11204	0

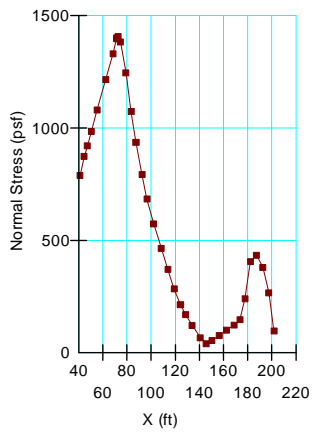
19	Optimiz ed	113.91015	0.0959512	- 27.631169	370.73997	157.36978	0
20	Optimiz ed	119.1449	1.0572	- 93.364308	283.89505	120.5063	0
21	Optimiz ed	124.29615	1.8844125	-150.6432	214.05182	90.859605	0
22	Optimiz ed	128.5299	2.4244375	- 188.99343	169.46452	71.933422	0
23	Optimiz ed	134.02005	3.047915	- 233.93677	120.79681	51.275206	0
24	Optimiz ed	140.76655	3.754845	- 285.45917	66.615002	28.276391	0
25	Optimiz ed	145.6429	4.153605	- 315.69848	40.68048	17.267839	0
26	Optimiz ed	150.2279	4.19926	- 323.58627	53.128501	22.551711	0
27	Optimiz ed	156.39165	4.19998	- 330.40032	76.458511	32.454712	0
28	Optimiz ed	162.55535	4.2007	- 337.21437	99.788521	42.357714	0
29	Optimiz ed	168.7191	4.20142	- 344.04464	123.12015	52.261405	0
30	Optimiz ed	173.6505	4.1701225	- 347.49966	145.98986	61.969019	0
31	Optimiz ed	177.7476	4.099994	- 347.63225	239.75481	101.76988	0
32	Optimiz ed	182.2428	4.0230515	-347.7657	405.9083	172.29785	0
33	Optimiz ed	187.3952	5.0351705	- 416.59619	433.67312	184.08332	0
34	Optimiz ed	192.65	6.93569	- 540.96158	378.71512	160.75503	0
35	Optimiz ed	197.5	8.6897995	- 655.74942	266.71206	113.21255	0
36	Optimiz ed	201.8	10.24499	-757.5061	95.945374	40.726395	0

Slices of Slip Surface: **131**

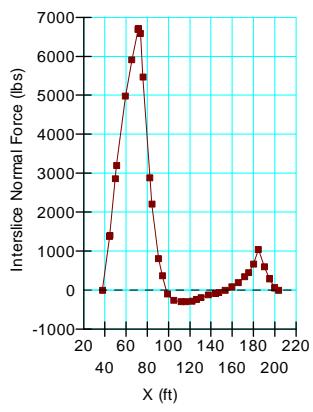
	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictional	Cohesi
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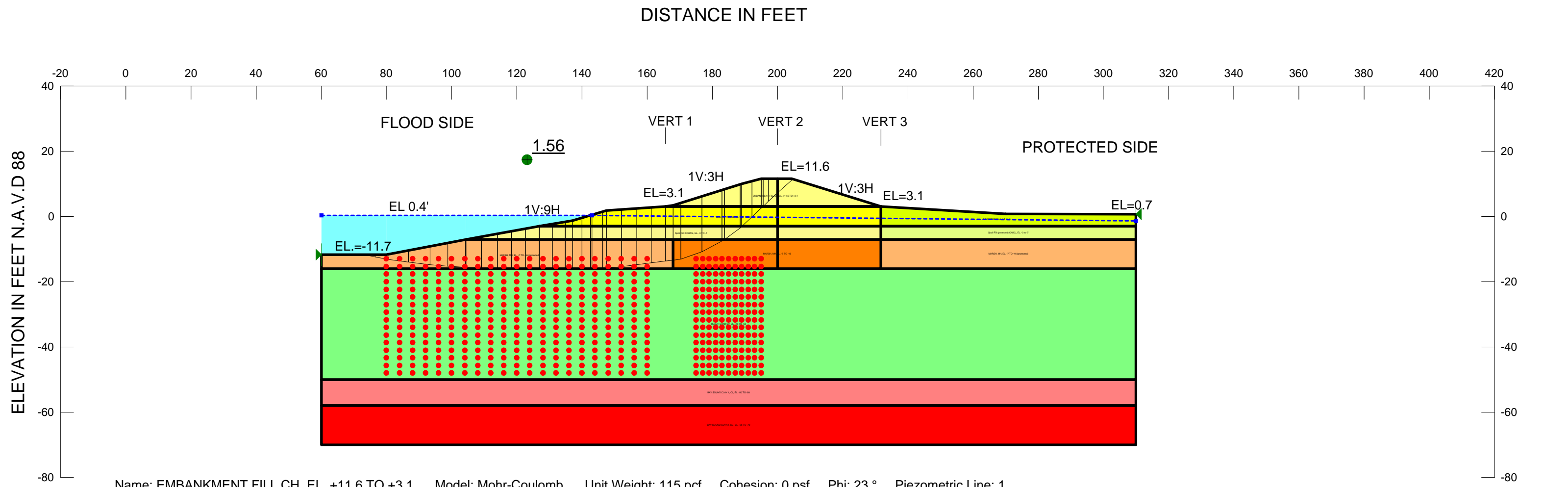
	Surfac e				Normal Stress (psf)	Strength (psf)	ve Strengt h (psf)
1	131	25.322425	-12.43736	801.04845	813.57423	5.3168795	0
2	131	30.801735	-12.180115	784.99317	812.69988	11.760802	0
3	131	36.28104	-11.894125	767.15698	808.66925	17.620914	0
4	131	41.760345	-11.57936	747.50637	801.44881	22.897209	0
5	131	47.15	-11.241885	726.45539	845.10877	50.36537	0
6	131	52.2	-10.90076	705.16568	902.32777	83.690341	0
7	131	57	-10.55323	683.49103	954.13262	114.88054	0
8	131	62.333335	-10.139722	657.68536	1006.6713	148.13575	0
9	131	68.333335	-9.642928	626.67972	1062.4493	184.97322	0
10	131	71.45	-9.3759105	610.01873	1097.9959	207.134	0
11	131	73.7	-9.171708	594.84806	1171.453	244.75427	0
12	131	78.386045	-8.734933	562.4435	1226.2157	281.75459	0
13	131	83.358135	-8.2489645	526.66	1190.9436	281.97167	0
14	131	88.647425	-7.7049005	486.90307	1150.499	281.67975	0
15	131	94.253915	-7.0994455	442.95583	1104.5353	280.82384	0
16	131	99.86038	-6.463452	397.11647	1055.2802	279.37394	0
17	131	105.46685	-5.796864	349.35702	1002.7614	277.35371	0
18	131	111.07335	-5.099622	299.68552	946.97228	274.75693	0
19	131	116.67985	-4.371665	248.11026	887.90657	271.57742	0
20	131	122.199	-3.625222	195.46748	825.11059	267.26764	0
21	131	127.6308	-2.861174	141.81651	758.64241	261.82706	0
22	131	133.0626	-2.068108	86.360755	688.9922	255.80187	0
23	131	138.4944	-1.2459572	29.089185	616.17324	249.2024	0
24	131	145.33805	-0.16380115	-45.957508	519.76664	220.62785	0
25	131	152.7201	1.0471805	-129.63374	411.46066	174.65469	0
26	131	159.22865	2.162643	-206.3862	310.92634	131.9804	0
27	131	165.7372	3.320379	-285.78353	205.97338	87.430512	0
28	131	172.24575	4.520532	-367.82605	96.596997	41.002993	0
29	131	179.2	5.8514805	-458.51505	85.601325	36.335607	0
30	131	186.6	7.3196565	-558.26252	171.86173	72.950974	0
31	131	192.65	8.557044	-642.13455	214.41978	91.015798	0
32	131	197.5	9.5795525	-711.25205	178.65215	75.833338	0
33	131	201.8	10.5043	-773.69843	70.904488	30.097169	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 1.61.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 19 STA. 129+40 TO STA. 137+90
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

FS Slope Stability (Block)_Global

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File Information

Created By: Liljegren, James
Revision Number: 181
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/19/2013
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File Name: Reach 19_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/19/2013
Last Solved Time: 3:25:37 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Block)_Global

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Block
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 1
 Tension Crack Fluid Unit Weight: 62.4 pcf

Unit Weight: 121 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, CL, EL. -50 TO -58

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (protected) EL 3.1 to -3

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -7 TO -16

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 2 CH/CL, EL. -3 TO -7

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill (protected) CH/CL, EL. -3 to -7

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °

FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 5 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +11.6 TO +3.1

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 1 CH/CL, EL. +3.1 TO -3

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -16 TO -50

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, CL , EL. -58 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -7 TO -16 (protected)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (60, -11.7) ft
Right Coordinate: (310, 0.7) ft

Slip Surface Block

Left Grid
 Upper Left: (80, -13) ft
 Lower Left: (80, -48) ft
 Lower Right: (160, -48) ft
 X Increments: 20
 Y Increments: 15
 Starting Angle: 145 °
 Ending Angle: 180 °
 Angle Increments: 4
Right Grid
 Upper Left: (175, -13) ft
 Lower Left: (175, -48) ft
 Lower Right: (195, -48) ft
 X Increments: 10
 Y Increments: 15
 Starting Angle: 25 °
 Ending Angle: 45 °
 Angle Increments: 4

Piezometric Lines

Piezometric Line 1

Coordinates		
	X (ft)	Y (ft)
	60	0.4
	143	0.4
	310	-1.3

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +11.6 TO +3.1	2,25,22,3,18,4,5,19	317.66
Region 2	Fill (protected) EL 3.1 to -3	24,6,8,7,5	339.585
Region 3	Spoil Fill (protected) CH/CL, EL. -3 to -7	7,8,9,30	313.2
Region 4	MARSH, MH, EL. -7 TO -16	29,20,30,27,28	573.3
Region 5	BEACH SAND SP, EL. -16 TO -50	35,28,27,10,12,11	8500
Region 6	BAY SOUND CLAY 1, CL, EL. -50 TO -58	11,12,14,13	2000
Region 7	BAY SOUND CLAY 2, CL , EL. -58 TO -70	13,14,16,15	3000
Region 8	Spoil Fill 1 CH/CL, EL. +3.1 TO -3	5,7,23,31,32,17,26,2,19	545.32414
Region 9	Spoil Fill 2 CH/CL, EL. -3 TO -7	33,29,20,30,7,23,31,32	464.2438
Region 10	MARSH, MH, EL. -7 TO -16 (protected)	27,30,9,10	704.7
Region 11	MARSH, MH, EL. -7 TO -16 (protected)	35,34,1,33,29,28	820.79205

Points

	X (ft)	Y (ft)
Point 1	80	-11.7
Point 2	165.6	3.1
Point 3	195	11.6
Point 4	204.3	11.6
Point 5	231.7	3.1
Point 6	310	0.7
Point 7	231.7	-3
Point 8	310	-3
Point 9	310	-7

Point 10	310	-16
Point 11	60	-50
Point 12	310	-50
Point 13	60	-58
Point 14	310	-58
Point 15	60	-70
Point 16	310	-70
Point 17	137.1	-1.2
Point 18	200	11.6
Point 19	200	3.1
Point 20	200	-7
Point 21	200	-16
Point 22	189	10
Point 23	200	-3
Point 24	270	0.8
Point 25	168	3.4
Point 26	147.5	1.8
Point 27	231.7	-16
Point 28	168	-16
Point 29	168	-7
Point 30	231.7	-7
Point 31	168	-3
Point 32	126.93429	-3
Point 33	104.34381	-7
Point 34	60	-11.7
Point 35	60	-16

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.56	(138.403, 16.633)	57.68322	(204.644, 11.4934)	(73.1106, -11.7)
2	7319	1.64	(138.403, 16.633)	57.033	(206.343, 10.9663)	(76.3939, -11.7)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	74.832935	-12.0285	775.54881	806.37457	13.08476	0
2	Optimized	78.277645	-12.6855	816.52626	871.61911	23.385528	0
3	Optimized	80.37464	-13.085455	841.49366	932.71184	38.719822	0
4	Optimized	83.7848	-13.577695	872.20097	995.12293	52.177276	0
5	Optimized	90.08583	-14.388705	922.81458	1111.0324	79.89372	0
6	Optimized	96.070565	-14.989155	960.27649	1198.1457	100.96947	0
7	Optimized	101.509	-15.40961	986.51085	1272.5772	121.42795	0
8	Optimized	104.286	-15.62208	999.76742	1300.8303	127.79361	0
9	Optimized	106.76505	-15.71824	1005.7801	1331.1972	138.13134	0
10	Optimized	111.60955	-15.90616	1017.5009	1392.6593	159.24532	0
11	Optimized	116.207	-15.99532	1023.0605	1430.5416	172.96545	0
12	Optimized	120.5195	-15.98572	1022.4635	1467.6839	188.98483	0
13	Optimized	124.79605	-15.976205	1021.8789	1504.5362	204.87583	0
14	Optimized	128.9175	-15.967035	1021.3014	1541.1165	220.64844	0
15	Optimized	132.8839	-15.958205	1020.7467	1577.4466	236.30508	0
16	Optimized	135.98355	-15.947935	1020.0896	1604.4759	248.05724	0
17	Optimized	138.56345	-15.934405	1019.2828	1636.9202	262.17153	0

	ed					
18	Optimized	141.3368	-15.93478	1019.2778	1682.9936	281.73064
19	Optimized	142.82335	-15.943915	1019.8675	1709.6847	292.81002
20	Optimized	144.6861	-15.955365	1019.5022	1774.7879	320.59974
21	Optimized	146.9361	-15.901055	1014.6905	1794.3611	330.95054
22	Optimized	149.8278	-15.56942	992.14551	1801.0045	343.34029
23	Optimized	154.4834	-15.035495	955.8894	1789.4384	353.82058
24	Optimized	159.0084	-14.49297	919.15841	1771.3692	361.74201
25	Optimized	163.4028	-13.941855	881.97029	1756.0152	371.01007
26	Optimized	166.8	-13.5158	853.23266	1751.3636	381.23396
27	Optimized	169.148	-13.22133	833.37799	1781.8835	402.6167
28	Optimized	173.5694	-11.930825	750.01982	1717.2307	410.55666
29	Optimized	179.90735	-9.16339	573.3048	1603.4824	437.28444
30	Optimized	183.3479	-7.271245	453.05817	1472.8435	432.87318
31	Optimized	186.15245	-5.248065	325.02873	1359.5905	439.14543
32	Optimized	188.7905	-3.2972395	201.61824	1171.7016	411.77595
33	Optimized	190.5791	-1.5993807	94.539156	1050.0651	405.59669
34	Optimized	193.5791	1.2484193	-85.069035	857.91279	364.16237
35	Optimized	195.2648	2.8486255	-185.99344	752.84755	319.56483
36	Optimized	196.3437	3.87278	-250.58799	664.74529	282.16764

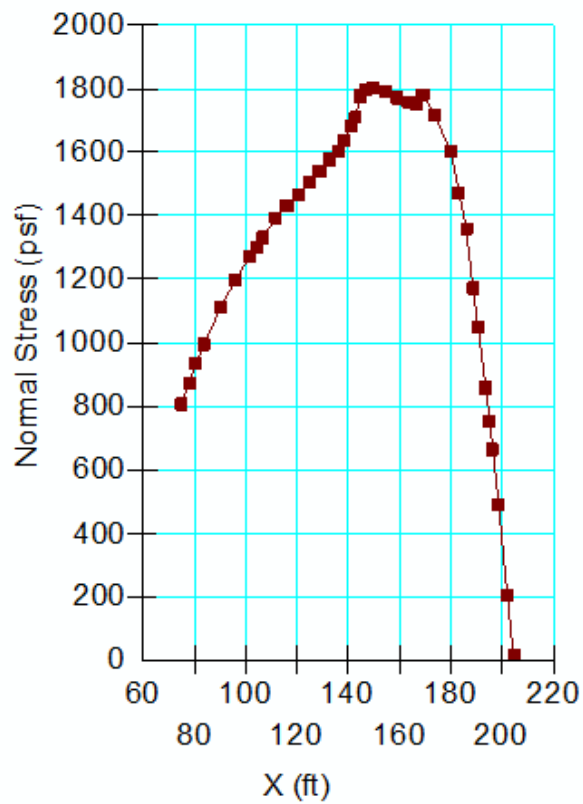
	ed						
37	Optimized	198.5789	5.945554	-381.35716	491.35106	208.56615	0
38	Optimized	202.15	9.212309	-587.46545	207.47297	88.067052	0
39	Optimized	204.4718	11.336235	-721.47646	18.288255	7.7629036	0

25	7319	177.4828	-13.25	829.85932	1765.1461	397.00568	0
26	7319	182.44845	-9.083335	566.70723	1561.8195	422.40011	0
27	7319	186.96565	-5.292969	327.31871	1353.1056	435.42071	0
28	7319	189.34915	-3.292969	200.99643	1226.0321	435.10184	0
29	7319	191.42015	-1.5552135	91.249299	1104.8017	430.22745	0
30	7319	194.071	0.66911595	-49.235047	955.79977	405.71293	0
31	7319	195.984	2.2743295	-150.61327	834.36161	354.16549	0
32	7319	198.484	4.3720785	-283.09709	646.664	274.49258	0
33	7319	202.15	7.4482215	-477.38824	371.46032	157.67555	0
34	7319	205.32135	10.109303	-645.43904	105.02307	44.579648	0

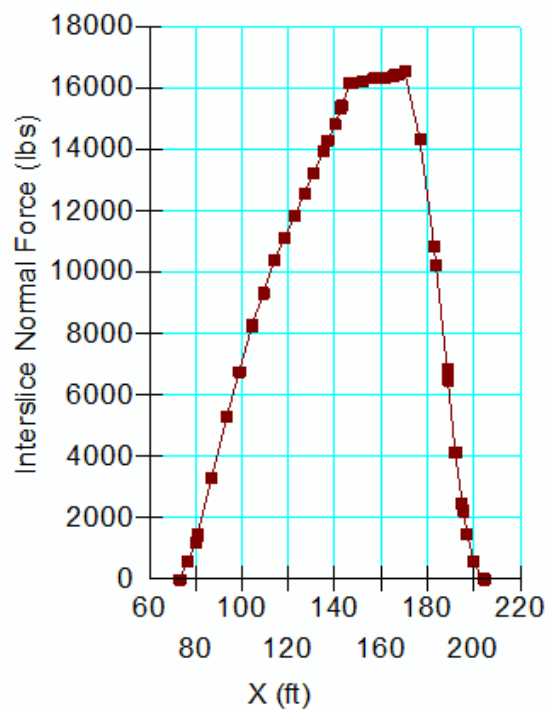
Slices of Slip Surface: 7319

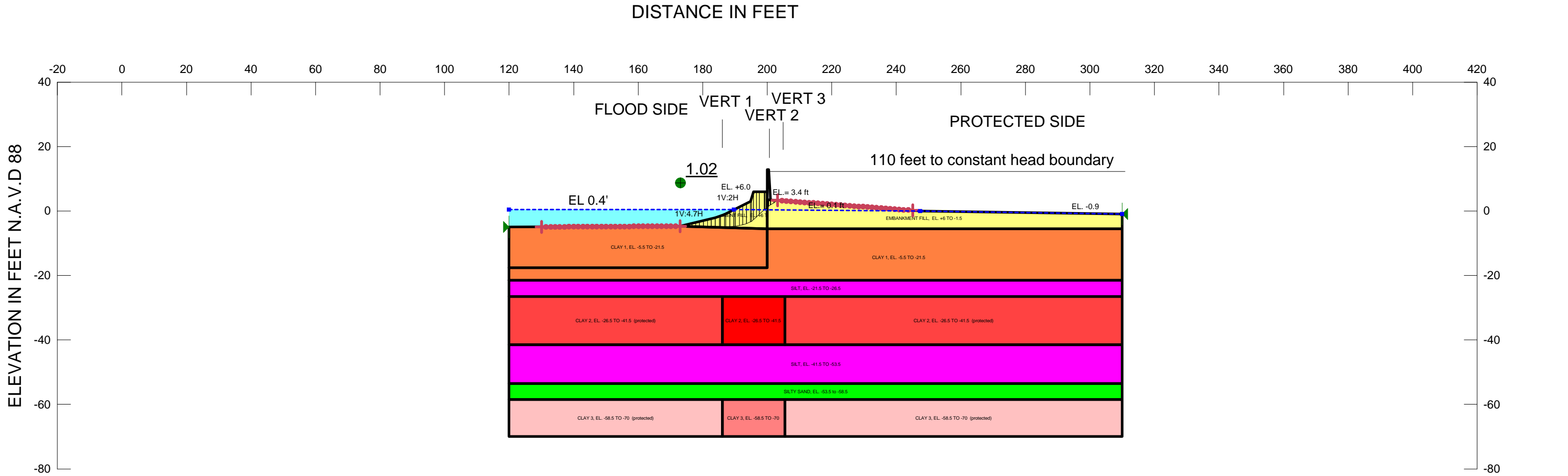
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	7319	78.196925	-11.97752	772.34892	797.37215	10.62173	0
2	7319	82	-12.56287	808.87509	886.60973	32.996395	0
3	7319	86	-13.17853	847.29765	972.69602	53.228451	0
4	7319	90	-13.79419	885.7202	1058.7823	73.460506	0
5	7319	94	-14.409845	924.14276	1144.8933	93.70305	0
6	7319	98	-15.0255	962.5406	1230.9796	113.94559	0
7	7319	102.1719	-15.33333	981.76486	1251.1827	114.3611	0
8	7319	106.60285	-15.33333	981.76311	1283.2618	127.9786	0
9	7319	111.12095	-15.33333	981.76311	1323.1237	144.89898	0
10	7319	115.63905	-15.33333	981.76311	1362.9856	161.81936	0
11	7319	120.15715	-15.33333	981.76311	1402.8254	178.73035	0
12	7319	124.67525	-15.33333	981.76311	1442.6874	195.65074	0
13	7319	129.4757	-15.33333	981.7514	1486.4087	214.21432	0
14	7319	134.55855	-15.33333	981.7514	1534.0394	234.43236	0
15	7319	139.87335	-15.33333	981.76076	1600.8533	262.78918	0
16	7319	142.82335	-15.33333	981.76424	1648.5568	283.03663	0
17	7319	145.25	-15.33333	980.33333	1731.6222	318.90321	0
18	7319	149.7625	-15.33333	977.45856	1827.9779	361.02404	0
19	7319	154.2875	-15.33333	974.58564	1866.6298	378.6503	0
20	7319	158.8125	-15.33333	971.71271	1905.2597	396.26717	0
21	7319	163.3375	-15.33333	968.83978	1943.9116	413.89343	0
22	7319	166.8	-15.33333	966.625	1981.0417	430.59433	0
23	7319	169.75	-15.33333	964.77143	2064.1429	466.65549	0
24	7319	173.25	-15.33333	962.54286	2194.6857	523.01361	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +6 TO -1.5 Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 1, EL. -5.5 TO -21.5 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: SILT, EL. -21.5 TO -26.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: CLAY 2, EL. -26.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: SILTY SAND, EL. -53.5 to -58.5 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: CLAY 3, EL. -58.5 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 2, EL. -26.5 TO -41.5 (protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 3, EL. -58.5 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: SILT, EL. -41.5 TO -53.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1



THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.69.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 20 STA. 1+57 TO STA. 6+30
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 298
Last Edited By: Serrano-Canals, Josinell M MVN
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Time: 4:36:55 PM
File Name: Reach 20_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/19/2013
Last Solved Time: 4:41:39 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILTY SAND, EL. -53.5 to -58.5

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -41.5 TO -53.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +6 TO -1.5

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -21.5 TO -26.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 101 pcf

Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -4.94329) ft
Left-Zone Right Coordinate: (173, -4.67636) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (203.2, 3.28514) ft
Right-Zone Right Coordinate: (245.07548, 0.17277) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -5) ft
Right Coordinate: (310, -0.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
189.6	0.4
247.4	0
310	-0.9

Regions

	Material	Points	Area (ft²)
Region 1	CLAY 3, EL. -58.5 TO -70	40,11,12,41	223.1
Region 2	EMBANKMENT FILL, EL. +6 TO -1.5	2,3,4,9,24,10,19,21,27	134.177
Region 3	EMBANKMENT FILL, EL. +6 TO -1.5	10,24,17,18,22,23,5	660.19
Region 4		17,24,9,25,26	7.125
Region 5	SILTY SAND, EL. -53.5 to -58.5	7,32,33,8,11,40	950
Region 6	SILT, EL. -41.5 TO -53.5	32,31,37,39,30,33	2280

Region 7	CLAY 2, EL. -26.5 TO -41.5	36,38,39,37	291
Region 8	CLAY 1, EL. -5.5 TO -21.5	16,35,34,42,10,5,6,15	2072
Region 9	SILT, EL. -21.5 TO -26.5	16,28,36,38,29,6,15	950
Region 10	CLAY 1, EL. -5.5 TO -21.5	35,34,42,10,19,20	1013.225
Region 11	CLAY 2, EL. -26.5 TO -41.5 (protected)	38,29,30,39	1567.5
Region 12	CLAY 2, EL. -26.5 TO -41.5 (protected)	37,31,28,36	991.5
Region 13	CLAY 3, EL. -58.5 TO -70 (protected)	14,41,40,7	760.15
Region 14	CLAY 3, EL. -58.5 TO -70 (protected)	12,11,8,13	1201.75

Points

	X (ft)	Y (ft)
Point 1	205.5	0.1
Point 2	186.8	-1
Point 3	194.8	3
Point 4	195.7	6
Point 5	310	-5.5
Point 6	310	-21.5
Point 7	120	-58.5
Point 8	310	-58.5
Point 9	200	6
Point 10	200	-5.5
Point 11	205.5	-58.5
Point 12	205.5	-70
Point 13	310	-70
Point 14	120	-70
Point 15	200	-21.5
Point 16	120	-21.5
Point 17	201	3.4
Point 18	203	3.3
Point 19	172.9	-4.7
Point 20	120	-5
Point 21	183.9	-2.1
Point 22	247.4	0
Point 23	310	-0.9
Point 24	200	3.4

Point 25	200	12.9
Point 26	200.5	12.9
Point 27	185.46	-1.5
Point 28	120	-26.5
Point 29	310	-26.5
Point 30	310	-41.5
Point 31	120	-41.5
Point 32	120	-53.5
Point 33	310	-53.5
Point 34	200	-17.6
Point 35	120	-17.6
Point 36	186.1	-26.5
Point 37	186.1	-41.5
Point 38	205.5	-26.5
Point 39	205.5	-41.5
Point 40	186.1	-58.5
Point 41	186.1	-70
Point 42	200	-13.1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.02	(180.519, 28.063)	14.88345	(203.2, 3.28513)	(172.904, -4.69905)
2	28840	1.12	(180.519, 28.063)	33.591	(203.2, 3.28513)	(173, -4.67636)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	173.66295	-4.793905	324.09874	362.95555	16.493737	0
2	Optimized	174.9694	-4.925575	332.31489	390.53309	24.712163	0

3	Optimized	176.08805	-4.9810075	335.77395	408.09987	30.700535	0
4	Optimized	177.2303	-5.0182425	338.1014	427.41945	37.913266	0
5	Optimized	178.40125	-5.049955	340.07505	445.08022	44.572047	0
6	Optimized	179.6009	-5.076145	341.70847	463.80614	51.827386	0
7	Optimized	180.8247	-5.0936025	342.7978	479.62044	58.077764	0
8	Optimized	182.07265	-5.1023275	343.34269	496.87251	65.169544	0
9	Optimized	183.2983	-5.108879	343.75161	513.02229	71.851142	0
10	Optimized	183.9154	-5.111124	343.89783	525.69419	77.167974	0
11	Optimized	184.553	-5.086774	342.37154	528.25607	78.903302	0
12	Optimized	185.3176	-5.056782	340.50424	540.08139	84.71547	0
13	Optimized	186.13	-5.024915	338.51566	551.65019	90.470237	0
14	Optimized	186.9455	-4.992927	336.51815	566.28953	97.532162	0
15	Optimized	187.71825	-4.935225	332.91548	569.70904	100.5129	0
16	Optimized	188.97275	-4.8312355	326.42527	588.03576	111.04707	0
17	Optimized	189.87315	-4.7566005	321.65522	610.65416	122.67277	0
18	Optimized	190.76125	-4.628085	313.25243	626.45679	132.94736	0
19	Optimized	191.90725	-4.3655525	296.3769	631.64882	142.31448	0
20	Optimized	192.96935	-4.0522375	276.36498	653.45784	160.06642	0
21	Optimized	194.1502	-3.612132	248.39197	633.50213	163.46957	0

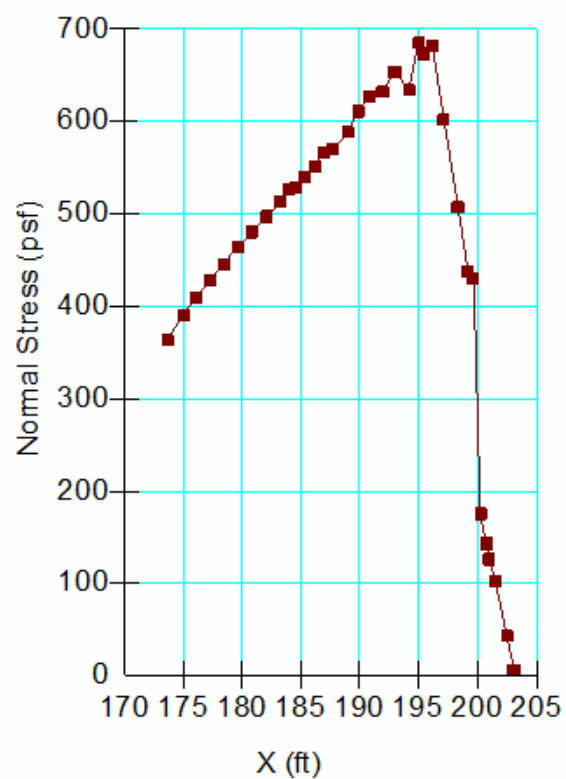
22	Optimized	194.9761	-3.251867	225.55585	684.97963	195.01383	0
23	Optimized	195.4261	-2.9251295	204.97264	672.68783	198.53332	0
24	Optimized	196.17825	-2.2388145	161.82344	681.46715	220.57566	0
25	Optimized	197.13475	-1.366025	106.94526	601.37404	209.87256	0
26	Optimized	198.32075	-0.2974397	39.754517	507.00932	198.3379	0
27	Optimized	199.18355	0.4732153	-8.7072157	437.79041	185.83101	0
28	Optimized	199.6693	0.8644635	-33.331051	429.12722	182.1537	0
29	Optimized	200.25	1.308333	-61.279534	174.77339	74.186904	0
30	Optimized	200.75	1.690505	-85.343251	142.84416	60.633748	0
31	Optimized	201.01105	1.8900255	-97.906337	126.12591	53.537273	0
32	Optimized	201.51655	2.213294	-118.2953	102.57548	43.540706	0
33	Optimized	202.5055	2.842962	-158.01707	42.568055	18.069067	0
34	Optimized	203.1	3.2214655	-181.89065	6.2821992	2.6666353	0

Slices of Slip Surface: 28840

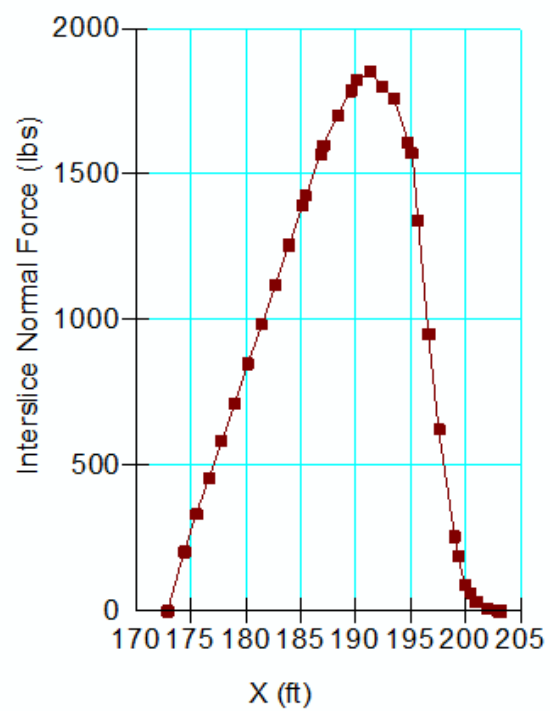
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	28840	173.06715	-4.69164	317.71501	344.34615	11.304248	0
2	28840	173.62365	-4.8095585	325.08091	365.21102	17.034222	0
3	28840	174.60235	-4.9997655	336.94897	398.92562	26.307525	0
4	28840	175.58105	-5.1600585	346.9505	428.32909	34.54316	0
5	28840	176.55975	-5.2908695	355.11437	453.62591	41.815668	0
6	28840	177.53845	-5.392544	361.45838	475.0273	48.20715	0

7	28840	178.51715	-5.465347	365.99819	492.66555	53.767104	0
8	28840	179.49585	-5.5094665	368.74697	506.69262	58.554451	0
9	28840	180.47455	-5.525016	369.72492	517.20618	62.602082	0
10	28840	181.45325	-5.512036	368.90796	524.32955	65.972551	0
11	28840	182.43195	-5.4704925	366.31957	528.12857	68.683844	0
12	28840	183.41065	-5.4002785	361.93891	528.67207	70.774026	0
13	28840	184.29	-5.313918	356.55152	532.49596	74.683985	0
14	28840	185.07	-5.2165115	350.46827	533.67308	77.765827	0
15	28840	185.7085	-5.12431	344.70941	532.89718	79.880967	0
16	28840	186.3785	-5.010768	337.63232	529.55886	81.467983	0
17	28840	187.26665	-4.84038	326.99736	526.35501	84.622304	0
18	28840	188.2	-4.635041	314.18251	520.75527	87.684934	0
19	28840	189.13335	-4.4015755	299.61616	511.89087	90.10527	0
20	28840	190.12	-4.122615	281.98915	514.63664	98.753003	0
21	28840	191.16	-3.7937875	261.01469	527.80235	113.24464	0
22	28840	192.2	-3.4271865	237.69171	535.83857	126.55583	0
23	28840	193.24	-3.0214735	211.92889	538.72563	138.71699	0
24	28840	194.28	-2.5750925	183.62521	536.36805	149.73045	0
25	28840	195.25	-2.1219055	154.92304	651.73521	210.88425	0
26	28840	196.17195	-1.6536875	125.3166	736.61112	259.47913	0
27	28840	197.1158	-1.1368365	92.650245	673.26397	246.4559	0
28	28840	198.05965	-0.57955805	57.471212	606.68675	233.12817	0
29	28840	199.00355	0.02056215	19.616186	536.73833	219.50533	0
30	28840	199.73775	0.5146216	-11.530177	482.19093	204.67791	0
31	28840	200.25	0.87905085	-34.491504	219.16915	93.031785	0
32	28840	200.75	1.249147	-57.802185	184.90952	78.489434	0
33	28840	201.5	1.837809	-94.857117	129.87023	55.126643	0
34	28840	202.5	2.6706835	-147.26452	53.93474	22.893939	0
35	28840	203.1	3.194331	-180.19572	7.9725872	3.3841625	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 222
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/19/2013
Time: 5:14:11 PM
File Name: Reach 21_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/19/2013
Last Solved Time: 5:15:59 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILTY SAND, EL. -53.5 TO -58.5

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -41.5 TO -53.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.7 TO -5.5

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -21.5 TO -26.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 99 pcf

Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -6.07358) ft
Left-Zone Right Coordinate: (166.63182, -5.9) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (203, 3.2) ft
Right-Zone Right Coordinate: (241.21199, 3.1) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (117, -6.1) ft
Right Coordinate: (310, 3.1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
117	0.4
185.2	0.4
310	0.4

Regions

	Material	Points	Area (ft²)
Region 1	CLAY 3, EL. -58.5 TO -70	45,12,42,43,13,44	295.55
Region 2	EMBANKMENT FILL, EL. +3.7 TO -5.5	2,3,4,9,25,10,11,21,22,23	196.39
Region 3	EMBANKMENT FILL, EL. +3.7 TO -5.5	10,25,18,1,19,24,5,39,11	949.15
Region 4	CLAY 1, EL. -5.5 TO -21.5	17,20,21,11,48,16	943.89
Region 5		25,9,26,27,18	6.825
Region 6	SILTY SAND, EL. -53.5 TO -58.5	7,32,28,35,8,42,12,45	965
Region 7	SILT, EL. -41.5 TO -53.5	32,6,46,29,41,36,35,28	2316

Region 8	CLAY 2, EL. -26.5 TO -41.5	47,30,40,41,29,46	385.5
Region 9	SILT, EL. -21.5 TO -26.5	33,34,31,38,37,40,30,47	965
Region 10	CLAY 1, EL. -5.5 TO -21.5	34,17,16,48,11,39,38,31	2108.6
Region 11	CLAY 2, EL. -26.5 TO -41.5 (protected)	6,46,47,33	1038
Region 12	CLAY 3, EL. -58.5 TO -70 (protected)	7,15,44,45	795.8
Region 13	CLAY 3, EL. -58.5 TO -70 (protected)	43,42,8,14	1128.15
Region 14	CLAY 2, EL. -26.5 TO -41.5 (protected)	41,40,37,36	1471.5

Point 26	200	12.8
Point 27	200.5	12.8
Point 28	200	-53.5
Point 29	200	-41.5
Point 30	200	-26.5
Point 31	200	-21.5
Point 32	117	-53.5
Point 33	117	-26.5
Point 34	117	-21.5
Point 35	310	-53.5
Point 36	310	-41.5
Point 37	310	-26.5
Point 38	310	-21.5
Point 39	310	-5.5
Point 40	211.9	-26.5
Point 41	211.9	-41.5
Point 42	211.9	-58.5
Point 43	211.9	-70
Point 44	186.2	-70
Point 45	186.2	-58.5
Point 46	186.2	-41.5
Point 47	186.2	-26.5
Point 48	200	-6.9

Points

	X (ft)	Y (ft)
Point 1	203	3.2
Point 2	186.2	1
Point 3	189.9	3
Point 4	191.8	6
Point 5	310	3.1
Point 6	117	-41.5
Point 7	117	-58.5
Point 8	310	-58.5
Point 9	200	6
Point 10	200	1
Point 11	200	-5.5
Point 12	200	-58.5
Point 13	200	-70
Point 14	310	-70
Point 15	117	-70
Point 16	200	-17.3
Point 17	117	-17.3
Point 18	201	3.7
Point 19	240	3.1
Point 20	117	-6.1
Point 21	166.2	-6
Point 22	175.7	-3.8
Point 23	182.6	-1
Point 24	247.3	3.1
Point 25	200	3.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.07	(175.92, 30.972)	18.65854	(203, 3.2)	(163.883, -6.00471)
2	26919	1.17	(175.92, 30.972)	38.789	(203, 3.2)	(164.2, -6.00406)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt
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							h (psf)
1	Optimized	164.78405	-6.235705	414.06924	447.62398	14.243142	0
2	Optimized	165.94275	-6.5209545	431.8715	477.17151	19.228713	0
3	Optimized	166.55535	-6.6501495	439.93442	514.94342	31.839433	0
4	Optimized	167.4682	-6.8049375	449.58664	537.26668	37.217972	0
5	Optimized	168.5832	-6.9646325	459.55673	571.545	47.536199	0
6	Optimized	169.94875	-7.1262775	469.63756	602.53306	56.410793	0
7	Optimized	171.56485	-7.2898725	479.85082	643.45382	69.445352	0
8	Optimized	172.9274	-7.404826	487.01787	667.22951	76.495304	0
9	Optimized	174.03645	-7.471138	491.15818	689.5872	84.228122	0
10	Optimized	175.1455	-7.53745	495.29849	711.94489	91.960941	0
11	Optimized	176.4177	-7.613518	500.04034	752.18506	107.02909	0
12	Optimized	177.88835	-7.644645	501.98823	770.79312	114.10091	0
13	Optimized	179.39425	-7.621075	500.51424	801.26896	127.66281	0
14	Optimized	180.9002	-7.597505	499.04688	831.7448	141.22189	0
15	Optimized	182.1266	-7.5427625	495.62973	832.08701	142.81764	0
16	Optimized	183.23	-7.4426395	489.37817	851.10621	153.54444	0
17	Optimized	184.49	-7.3283085	482.24873	874.26502	166.40104	0
18	Optimized	185.16	-7.267513	478.44686	888.1138	173.8933	0
19	Optimiz	185.52635	-7.2342715	476.37838	908.78102	183.54403	0

	ed						
20	Optimized	186.02635	-7.1620125	471.87102	887.23272	176.31058	0
21	Optimized	186.73985	-6.9867935	460.93718	911.99791	191.46392	0
22	Optimized	187.8195	-6.721651	444.39547	948.96715	214.17797	0
23	Optimized	189.12965	-6.264671	415.87383	924.25046	215.79308	0
24	Optimized	190.2134	-5.808291	387.40198	971.6958	248.01801	0
25	Optimized	191.1634	-5.2002635	349.45822	952.7248	256.07147	0
26	Optimized	191.9051	-4.6456185	314.84573	986.1361	284.94586	0
27	Optimized	192.6656	-4.00865	275.10213	894.06887	262.73579	0
28	Optimized	193.9764	-2.89189	205.41633	786.75273	246.76266	0
29	Optimized	195.13515	-1.938965	145.95099	711.20326	239.93535	0
30	Optimized	196.14185	-1.149875	96.714324	634.23676	228.16474	0
31	Optimized	197.45265	-0.177665	36.046245	553.83317	219.78751	0
32	Optimized	198.5508	0.607975	-12.977646	478.19522	202.98183	0
33	Optimized	199.42075	1.19501	-49.608625	437.09646	185.53644	0
34	Optimized	200.02095	1.58779	-74.11808	192.14106	81.559041	0
35	Optimized	200.27095	1.7252765	-82.69677	188.70374	80.099986	0
36	Optimized	200.75	1.9841385	-98.850359	163.96702	69.599871	0
37	Optimized	201.5	2.3894255	-124.14355	113.29605	48.091322	0
38	Optimiz	202.5	2.9298085	-157.85612	37.763885	16.029818	0

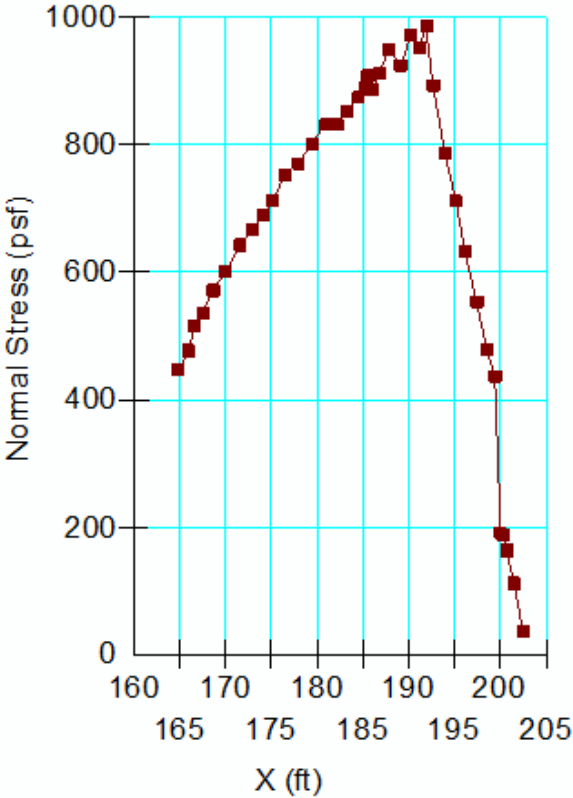
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Slices of Slip Surface: 26919

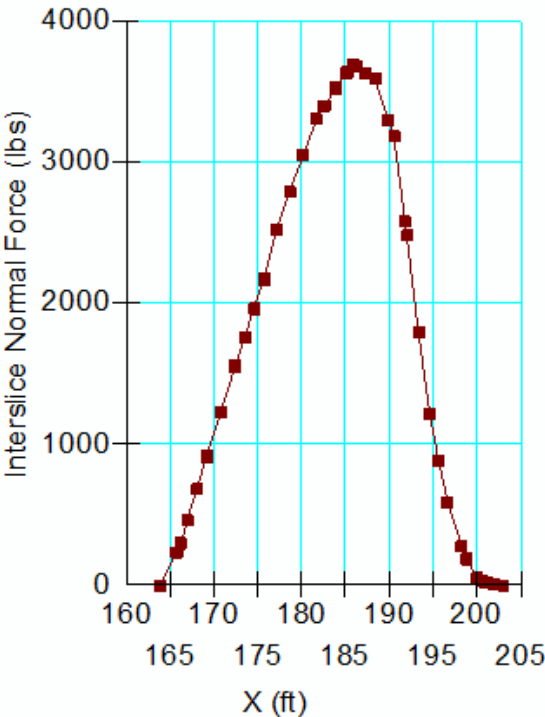
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	26919	164.7003	-6.1551435	409.03647	437.3951	12.037527	0
2	26919	165.7001	-6.442782	426.98594	469.51568	18.052807	0
3	26919	166.87855	-6.74203	445.66399	525.98769	34.095389	0
4	26919	168.2357	-7.0418985	464.37339	576.18209	47.45998	0
5	26919	169.59285	-7.291295	479.93748	619.15926	59.096139	0
6	26919	170.95	-7.491203	492.41173	655.3286	69.154106	0
7	26919	172.30715	-7.642392	501.84436	685.05552	77.768523	0
8	26919	173.6643	-7.7454335	508.2736	708.62742	85.045151	0
9	26919	175.02145	-7.800712	511.72442	726.29406	91.079408	0
10	26919	176.39	-7.808093	512.18715	750.74216	101.26059	0
11	26919	177.77	-7.766796	509.6079	769.41339	110.28089	0
12	26919	179.15	-7.676195	503.95361	782.05674	118.04778	0
13	26919	180.53	-7.5359415	495.20381	788.78902	124.61953	0
14	26919	181.91	-7.345489	483.31923	789.75742	130.0753	0
15	26919	183.23	-7.116729	469.04387	791.27478	136.77891	0
16	26919	184.49	-6.8530945	452.59348	790.59889	143.47478	0
17	26919	185.16	-6.7005525	443.06866	790.09622	147.30446	0
18	26919	185.7	-6.56046	434.32822	805.2921	157.46483	0
19	26919	186.8132	-6.2507325	415.00858	832.4275	177.18382	0
20	26919	188.0396	-5.8695725	391.21766	855.89514	197.24389	0
21	26919	189.2764	-5.439112	364.359	871.15253	215.12109	0
22	26919	190.85	-4.814033	325.35782	978.27872	277.14848	0
23	26919	192.46615	-4.1034595	281.01809	1035.4977	320.25761	0
24	26919	193.79845	-3.4431605	239.81558	950.13728	301.51367	0
25	26919	195.13075	-2.717241	194.51653	859.22931	282.15384	0
26	26919	196.4631	-1.921346	144.85022	762.41648	262.14133	0
27	26919	197.79545	-1.0502439	90.492269	659.55669	241.55352	0
28	26919	199.12775	-0.09758785	31.049473	550.26011	220.39184	0
29	26919	199.89695	0.4810412	-5.0569633	486.13206	206.35082	0

30	26919	200.25	0.7634311	-22.677538	256.88438	109.04095	0
31	26919	200.75	1.1730914	-48.240214	218.82951	92.887616	0
32	26919	201.5	1.8201375	-88.620297	149.57964	63.492789	0
33	26919	202.5	2.729436	-145.35951	49.644047	21.072648	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 260
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/19/2013
Time: 4:38:44 PM
File Name: Reach 22_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/19/2013
Last Solved Time: 4:44:57 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL 2, EL. 1.5 TO -5.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL2, EL. -1.5 TO -5.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY1, EL. -5.5 TO -41.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL1, EL. +6 TO -1.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY1, EL. -5.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silt, EL. -41.5 to -58.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL 1, EL. +1.6 TO -1.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 114 pcf

Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (140, -6.29231) ft
Left-Zone Right Coordinate: (178, -5.70769) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (201.1, 3.48972) ft
Right-Zone Right Coordinate: (255, 1.04762) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -6.6) ft
Right Coordinate: (310, 1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
190.8	0.4
310	0.4

Regions

	Material	Points	Area (ft²)
Region 1	CLAY 2, EL. -58.5 TO -70	30,8,32,33,9,31	228.85
Region 2	EMBANKMENT FILL1, EL. +6 TO -1.5	41,6,14,43,21,28	52.615
Region 3		6,18,19,20,14	6.975
Region 4	EMBANKMENT FILL1, EL. +6 TO -1.5	39,40,1,22,23,24,18,6,41	51.118363
Region 5	FILL 1, EL. +1.6 TO -1.5 (Protected)	43,21,28,29,2,15,42	274.76
Region 6	FILL 2, EL. 1.5 TO -5.5 (Protected)	28,27,25,29	393.2
Region 7	CLAY 2, EL. -58.5 TO -70 (protected)	4,11,31,30	825.7

Region 8	CLAY 2, EL. -58.5 TO -70 (protected)	32,33,10,5	1130.45
Region 9	Silt, EL. -41.5 to -58.5	34,4,30,8,32,5,3,37,36	3230
Region 10	CLAY1, EL. -5.5 TO -41.5	7,12,38,36,37,27	620.46
Region 11	CLAY1, EL. -5.5 TO -41.5 (Protected)	35,26,17,16,13,38	801.9953
Region 12	CLAY1, EL. -5.5 TO -41.5 (Protected)	13,38,36,34	1744.74
Region 13	CLAY1, EL. -5.5 TO -41.5 (Protected)	27,37,3,25	3538.8
Region 14	CLAY1, EL. -5.5 TO -41.5	35,38,12,7	95.94
Region 15	FILL 2, EL. 1.5 TO -5.5 (Protected)	40,39,35,26	35.73136
Region 16	FILL2, EL. -1.5 TO -5.5	39,35,7,41	32.8
Region 17	FILL2, EL. -1.5 TO -5.5	28,27,7,41	46.8

Points

	X (ft)	Y (ft)
Point 1	191.8	1
Point 2	310	1
Point 3	310	-41.5
Point 4	120	-58.5
Point 5	310	-58.5
Point 6	200	3.5
Point 7	200	-5.5
Point 8	200	-58.5
Point 9	200	-70
Point 10	310	-70
Point 11	120	-70
Point 12	200	-17.2
Point 13	120	-17.2
Point 14	201	3.5
Point 15	256.7	1
Point 16	120	-6.6
Point 17	178.5	-5.7
Point 18	200	6.1
Point 19	200	12.8
Point 20	200.5	12.8
Point 21	211.7	1.6
Point 22	196.1	3.3

Point 23	196.4	6.1
Point 24	199	6.1
Point 25	310	-5.5
Point 26	178.89701	-5.5
Point 27	211.7	-5.5
Point 28	211.7	-1.5
Point 29	310	-1.5
Point 30	191.8	-58.5
Point 31	191.8	-70
Point 32	211.7	-58.5
Point 33	211.7	-70
Point 34	120	-41.5
Point 35	191.8	-5.5
Point 36	191.8	-41.5
Point 37	211.7	-41.5
Point 38	191.8	-17.2
Point 39	191.8	-1.5
Point 40	186.83731	-1.5
Point 41	200	-1.5
Point 42	221	2
Point 43	211.7	2.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.78	(179.454, 24.248)	13.17352	(201.1, 3.48972)	(177.689, -5.71248)
2	28840	0.83	(179.454, 24.248)	29.991	(201.1, 3.48972)	(178, -5.70769)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz	178.0942	-5.713532	381.48152	383.72429	0.9520022	0

	ed	5					
2	Optimiz ed	178.5098	-5.714605	381.55283	433.08127	21.872527	0
3	Optimiz ed	178.7083	-5.6823245	379.53717	412.20546	13.866868	0
4	Optimiz ed	179.3352	-5.5750095	372.84384	414.16471	17.53967	0
5	Optimiz ed	180.2322	-5.4214675	363.26132	416.76867	22.712524	0
6	Optimiz ed	181.14975	-5.2644025	353.45361	419.66909	28.106805	0
7	Optimiz ed	181.95915	-5.123175	344.64627	420.89433	32.36538	0
8	Optimiz ed	182.7611	-4.977755	335.57497	421.8336	36.614618	0
9	Optimiz ed	183.66365	-4.812305	325.24355	423.39203	41.66156	0
10	Optimiz ed	184.57885	-4.6391225	314.4362	422.58745	45.907479	0
11	Optimiz ed	185.5067	-4.4582075	303.14929	422.91537	50.837684	0
12	Optimiz ed	186.40395	-4.2826135	292.19747	422.92097	55.488833	0
13	Optimiz ed	187.24475	-4.11743	281.88919	423.0686	59.927105	0
14	Optimiz ed	188.0596	-3.9573365	271.8944	423.2131	64.230979	0
15	Optimiz ed	188.824	-3.807502	262.54541	423.5641	68.348378	0
16	Optimiz ed	189.538	-3.6679255	253.8443	423.77028	72.129302	0
17	Optimiz ed	190.252	-3.528349	245.12944	423.97647	75.916061	0
18	Optimiz ed	190.7045	-3.4398875	239.61032	427.37177	79.700006	0
19	Optimiz ed	190.8302	-3.415307	238.07169	431.69272	82.187251	0
20	Optimiz ed	191.3302	-3.2894355	230.221	433.57859	86.320174	0

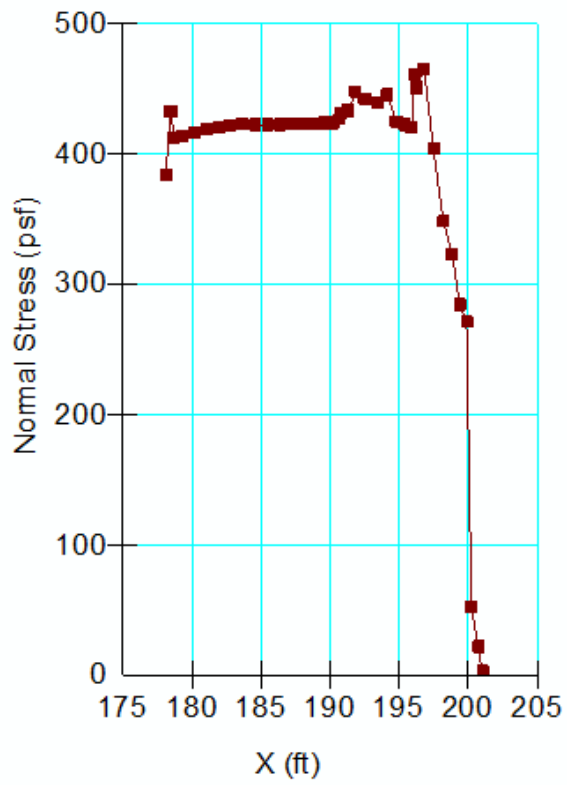
	ed						
21	Optimiz ed	191.87425	-3.1505055	221.5495	448.04333	96.14093	0
22	Optimiz ed	192.49975	-2.942675	208.58718	442.71897	99.383049	0
23	Optimiz ed	193.4163	-2.59913	187.14381	439.32851	107.04605	0
24	Optimiz ed	194.14685	-2.28977	167.84583	445.3158	117.77902	0
25	Optimiz ed	194.81045	-1.9763175	148.27819	425.09769	117.5029	0
26	Optimiz ed	195.4071	-1.6587725	128.46733	422.67127	124.88216	0
27	Optimiz ed	195.9027	-1.3950045	112.00892	420.6599	131.01457	0
28	Optimiz ed	196.1537	-1.2614345	103.67427	461.44955	151.8666	0
29	Optimiz ed	196.3037	-1.130781	95.520672	451.04312	150.91032	0
30	Optimiz ed	196.82125	-0.582236	61.291933	465.39153	171.5301	0
31	Optimiz ed	197.49465	0.132115	16.715892	405.02743	164.82847	0
32	Optimiz ed	198.22355	0.906395	-31.598903	348.57789	147.96254	0
33	Optimiz ed	198.85015	1.5539535	-72.006796	322.81505	137.02686	0
34	Optimiz ed	199.4238	2.0943085	-105.72114	284.45083	120.74222	0
35	Optimiz ed	199.9238	2.5541235	-134.41926	270.94868	115.01089	0
36	Optimiz ed	200.25	2.8136045	-150.60868	52.448984	22.263273	0
37	Optimiz ed	200.75	3.2113195	-175.42995	22.058657	9.3633442	0
38	Optimiz ed	201.05	3.4499485	-190.31669	3.4317734	1.4567014	0

Slices of Slip Surface: 28840

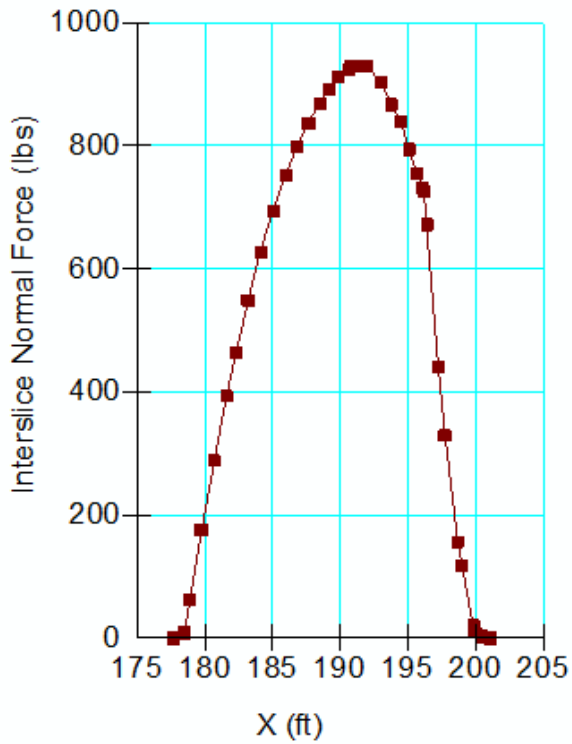
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	28840	178.25	-5.717737	381.752	387.22758	2.3242468	0
2	28840	178.6985	-5.732784	382.69006	433.52907	21.579878	0
3	28840	179.2609	-5.740129	383.14203	446.89598	27.061948	0
4	28840	179.9887	-5.7359825	382.883	461.53407	33.385396	0
5	28840	180.7165	-5.71416	381.51984	473.51237	39.048513	0
6	28840	181.44425	-5.674623	379.05595	482.89601	44.077487	0
7	28840	182.172	-5.617301	375.48365	489.77081	48.512018	0
8	28840	182.8998	-5.5420915	370.78465	494.21575	52.39339	0
9	28840	183.62105	-5.4498565	365.02965	496.40984	55.767582	0
10	28840	184.33575	-5.3407525	358.2221	496.5053	58.697736	0
11	28840	185.0505	-5.2139085	350.30865	494.41836	61.170942	0
12	28840	185.76525	-5.069094	341.26925	490.19668	63.215946	0
13	28840	186.47995	-4.9060405	331.10142	483.86619	64.844797	0
14	28840	187.21445	-4.718872	319.41358	475.15075	66.106507	0
15	28840	187.9688	-4.506138	306.14929	463.94614	66.980791	0
16	28840	188.72315	-4.2718685	291.52685	450.45897	67.462683	0
17	28840	189.47745	-4.015528	275.52557	434.66619	67.551189	0
18	28840	190.2318	-3.7365095	258.12161	416.58218	67.262521	0
19	28840	190.7045	-3.552593	246.64162	407.13432	68.12511	0
20	28840	191.3	-3.2989205	230.8129	406.55224	74.596922	0
21	28840	192.17905	-2.90627	206.31144	404.21419	84.004733	0
22	28840	192.93715	-2.5378285	183.31811	399.72043	91.857336	0
23	28840	193.69525	-2.142468	158.65002	391.8947	99.00649	0
24	28840	194.4534	-1.718957	132.22115	380.68406	105.46625	0
25	28840	195.14935	-1.305362	106.41507	367.47613	110.81384	0
26	28840	195.7831	-0.9050035	81.431897	352.77318	115.17754	0
27	28840	196.25	-0.59788155	62.267082	449.79875	164.49743	0
28	28840	196.71	-0.27838104	42.330953	528.65871	206.43389	0
29	28840	197.33	0.16985902	14.36101	477.68585	196.66973	0
30	28840	197.98	0.6671259	-16.668852	425.94323	180.80218	0
31	28840	198.66	1.2178049	-51.031085	374.05404	158.77652	0

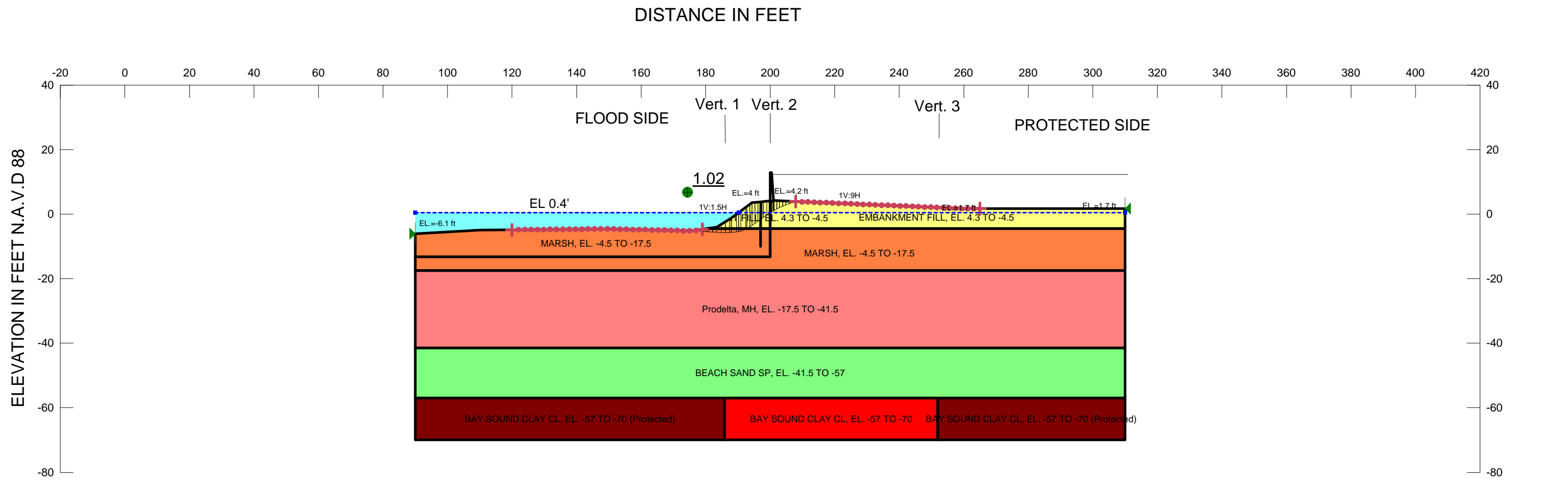
32	28840	199.5	1.9508795	-96.778296	308.41296	130.91353	0
33	28840	200.25	2.6410185	-139.83993	62.049248	26.338343	0
34	28840	200.75	3.1337895	-170.58159	25.920967	11.002798	0
35	28840	201.05	3.4378315	-189.56192	3.9860807	1.6919909	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.64.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 23 STA. 21+00 TO STA. 24+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Global Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 167
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 1:05:16 PM
File Name: Reach 23_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 1:07:48 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Global Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70

Model: Mohr-Coulomb

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, MH, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -4.8977) ft
Left-Zone Right Coordinate: (179, -4.72791) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (207.9, 3.90441) ft
Right-Zone Right Coordinate: (265, 1.7) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (90, -6.1) ft
Right Coordinate: (310, 1.7) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
90	0.4
190.2	0.4
310	0.4

Regions

	Material	Points	Area (ft²)
Region 1	MARSH, EL. -4.5 TO -17.5	14,10,11,16,17,21,22,23,40	911.965
Region 2	MARSH, EL. -4.5 TO -17.5	16,11,10,1,2,4,12,3	1903
Region 3	Prodelta, MH, EL. -17.5 TO -41.5	3,12,4,6,5	5280
Region 4	BEACH SAND SP, EL. -41.5 TO -57	5,6,7,38,13,39,8	3410
Region 5	EMBANKMENT FILL, EL. 4.3 TO -4.5	10,33,28,27,29,30,31,32,1	757.98
Region 6	EMBANKMENT FILL, EL. 4.3 TO -4.5	20,9,24,33,10,14,40,18,19	91.95
Region 7		25,26,27,28,33	6.725
Region 8	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	8,34,35,39	1246.7
Region 9	BAY SOUND CLAY CL, EL. -57 TO -70	39,35,36,38,13	858
Region 10	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	38,36,37,7	755.3

Points

	X (ft)	Y (ft)
Point 1	310	-4.5
Point 2	310	-7.5
Point 3	90	-17.5
Point 4	310	-17.5
Point 5	90	-41.5
Point 6	310	-41.5
Point 7	310	-57
Point 8	90	-57

Point 9	197.1	3.8
Point 10	200	-4.5
Point 11	200	-13.2
Point 12	200	-17.5
Point 13	200	-57
Point 14	197	-4.5
Point 15	197	-10
Point 16	90	-13.2
Point 17	90	-6.1
Point 18	183.5	-4
Point 19	188	-1.2
Point 20	194.4	3.5
Point 21	110	-5
Point 22	149.1	-4.6
Point 23	176.1	-5.2
Point 24	199	4
Point 25	200	12.9
Point 26	200.5	12.9
Point 27	201	4.2
Point 28	201	4
Point 29	201.2	4.2
Point 30	208	3.9
Point 31	260	1.7
Point 32	310	1.7
Point 33	200	4
Point 34	90	-70
Point 35	185.9	-70
Point 36	251.9	-70
Point 37	310	-70
Point 38	251.9	-57
Point 39	185.9	-57
Point 40	180.4	-4.5

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
--	------	-----	-------------	-------------	------------	-----------

15	Optimized	190.55125	-5.3426155	358.34107	675.48501	134.61961	0
16	Optimized	191.6267	-5.006975	337.39492	686.42459	148.15431	0
17	Optimized	192.5649	-4.620025	313.24913	674.79703	153.46798	0
18	Optimized	193.2245	-4.25005	290.16553	682.53634	166.55153	0
19	Optimized	194.03505	-3.7403125	258.35851	654.90929	168.32582	0
20	Optimized	194.84055	-3.1669265	222.57872	626.15522	171.30806	0
21	Optimized	195.7216	-2.539729	183.43882	572.97007	165.34621	0
22	Optimized	196.63105	-1.8875555	142.74155	515.86478	158.38142	0
23	Optimized	197.47185	-1.2805205	104.86428	464.18338	152.52191	0
24	Optimized	198.42185	-0.63060175	64.30952	418.66767	150.41611	0
25	Optimized	199.358	-0.01295175	25.767658	362.59851	142.97621	0
26	Optimized	199.8575	0.31162	5.5149615	335.26075	139.96878	0
27	Optimized	199.9995	0.40029905	0.018661894	326.36619	138.53423	0
28	Optimized	200.25	0.55671775	-9.7792024	312.18739	132.51568	0
29	Optimized	200.6617	0.8138187	-25.822265	288.88689	122.62521	0
30	Optimized	200.9117	0.9606115	-34.982188	288.81982	122.59674	0
31	Optimized	201.1	1.0583075	-41.078478	298.54317	126.72406	0
32	Optimized	201.62575	1.3310965	-58.100681	270.83838	114.96407	0
33	Optimized	202.4773	1.7729055	-85.669239	225.28516	95.627878	0

	Surface					
1	Optimized	1.02	(181.71, 34.722)	15.70719	(207.9, 3.90441)	(175.462, -5.18583)
2	26917	1.16	(181.71, 34.722)	40.443	(207.9, 3.90441)	(175.102, -5.17782)

Slices of Slip Surface: Optimized

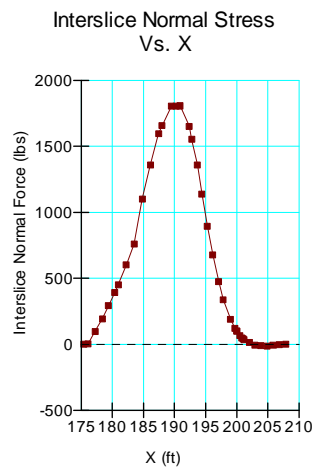
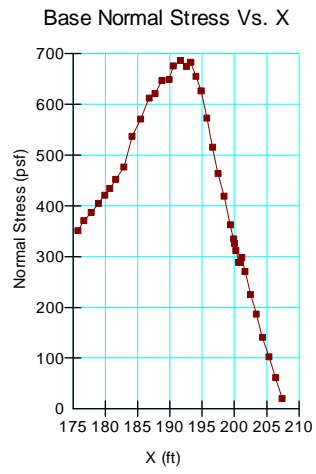
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	175.7811	-5.199951	349.43283	351.03041	0.67813511	0
2	Optimized	176.6734	-5.239472	351.90532	370.53944	7.9097167	0
3	Optimized	177.82015	-5.290264	355.07634	386.82143	13.474992	0
4	Optimized	178.89515	-5.3466225	358.58722	404.59081	19.527364	0
5	Optimized	179.8984	-5.408548	362.45733	421.05619	24.873741	0
6	Optimized	180.68025	-5.4568105	365.45792	433.95903	29.076993	0
7	Optimized	181.5954	-5.5239865	369.65501	452.51942	35.173853	0
8	Optimized	182.86515	-5.62374	375.88123	476.70979	42.799187	0
9	Optimized	184.15205	-5.7248435	382.19029	537.35213	65.862295	0
10	Optimized	185.46575	-5.7686375	384.92084	571.40029	79.155829	0
11	Optimized	186.78905	-5.7537725	383.99895	612.33388	96.922428	0
12	Optimized	187.72535	-5.719703	381.86894	621.43391	101.68929	0
13	Optimized	188.7534	-5.620003	375.64677	646.90538	115.14245	0
14	Optimized	189.8534	-5.4791355	366.86298	649.07835	119.79331	0

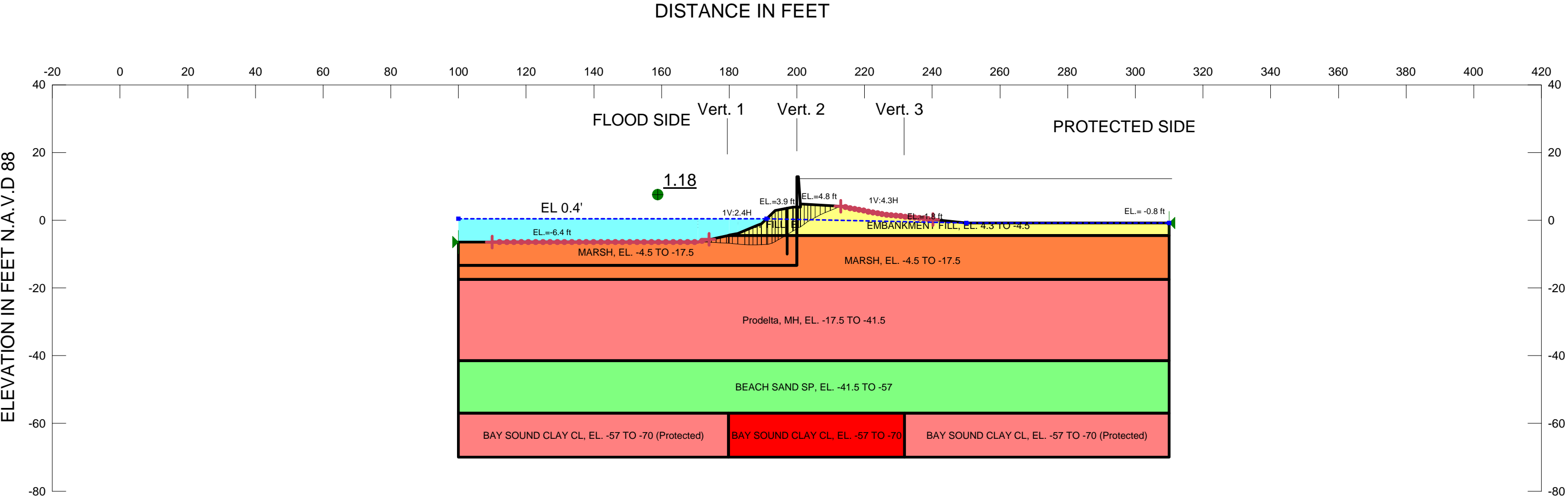
34	Optimized	203.38995	2.2074375	-112.78008	186.98567	79.370708	0
35	Optimized	204.3637	2.6346925	-139.44933	140.606	59.683707	0
36	Optimized	205.35885	3.0243355	-163.75505	102.32483	43.434313	0
37	Optimized	206.3753	3.376366	-185.72231	61.392109	26.059404	0
38	Optimized	207.39175	3.7283965	-207.68956	20.464036	8.686468	0

Slices of Slip Surface: 26917

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	26917	175.601	-5.254073	352.81719	366.52575	5.8189395	0
2	26917	176.6375	-5.3982765	361.80838	399.99742	16.210285	0
3	26917	177.7125	-5.519618	369.3823	422.09036	22.373248	0
4	26917	178.7875	-5.611948	375.14682	440.12997	27.583707	0
5	26917	179.8625	-5.6754655	379.11094	454.27893	31.906918	0
6	26917	180.91665	-5.7101755	381.27508	464.68808	35.406716	0
7	26917	181.95	-5.717238	381.71891	471.7947	38.234905	0
8	26917	182.98335	-5.697886	380.51122	475.62209	40.372172	0
9	26917	184.0625	-5.648822	377.4484	512.01117	57.118508	0
10	26917	185.1875	-5.567483	372.3751	532.65013	68.032714	0
11	26917	186.3125	-5.454484	365.31701	548.94252	77.944405	0
12	26917	187.4375	-5.3095565	356.27362	560.97982	86.892627	0
13	26917	188.5447	-5.135667	345.4291	573.07627	96.630493	0
14	26917	189.6447	-4.931137	332.66028	581.39401	105.5812	0
15	26917	190.88665	-4.660006	315.74648	620.30924	129.27923	0
16	26917	192.0444	-4.375468	297.98974	675.11987	160.08224	0
17	26917	192.98665	-4.114136	281.67837	714.42367	183.68948	0
18	26917	193.9289	-3.828006	263.83099	749.58839	206.19178	0
19	26917	195.075	-3.4422875	239.75962	742.66407	213.47027	0
20	26917	196.425	-2.942178	208.55153	693.67687	205.92349	0

21	26917	197.575	-2.475864	179.45391	647.93765	198.85955	0
22	26917	198.525	-2.056096	153.25689	606.6231	192.44254	0
23	26917	199.5	-1.5939835	124.42268	556.30541	183.32335	0
24	26917	200.25	-1.2200865	101.09258	512.45718	174.61391	0
25	26917	200.75	-0.9577156	84.721389	482.16113	168.70316	0
26	26917	201.1	-0.7696708	72.987576	479.6364	172.61219	0
27	26917	201.67565	-0.44499005	52.727708	440.75355	164.7072	0
28	26917	202.62695	0.11252865	17.938176	374.58841	151.38904	0
29	26917	203.70225	0.7886565	-24.25244	299.77253	127.24589	0
30	26917	204.9016	1.5971685	-74.701692	216.76263	92.010278	0
31	26917	206.10095	2.4705495	-129.19916	131.39371	55.773319	0
32	26917	207.3003	3.4142435	-188.09142	43.767922	18.578381	0





Name: EMBANKMENT FILL, EL. 4.3 TO -4.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -4.5 TO -17.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -41.5 TO -57 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO -70 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Prodelta, MH, EL. -17.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 0.78.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 24 STA. 24+00 TO STA. 33+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 214
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 1:41:03 PM
File Name: Reach 24_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 1:41:38 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, MH, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (110, -6.4) ft
Left-Zone Right Coordinate: (174.04066, -5.7) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (213, 4.1) ft
Right-Zone Right Coordinate: (240.21968, 0.21715) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (100, -6.4) ft
Right Coordinate: (310, -0.8) ft

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 6000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70

Model: Mohr-Coulomb

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	0.4
191	0.4
250	-0.8
310	-0.8

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. 4.3 TO -4.5	32,18,21,19,22,20,10,23,31,11,15	89.001625
Region 2	MARSH, EL. -4.5 TO -17.5	1,2,32,15,11,12,17	737.05588
Region 3	MARSH, EL. -4.5 TO -17.5	17,12,11,4,5,7,13,6	1850
Region 4	Prodelta, MH, EL. -17.5 TO -41.5	6,13,7,9,14,8	5040
Region 5		31,24,25,26,41	6.9
Region 6	EMBANKMENT FILL, EL. 4.3 TO -4.5	26,27,30,28,29,3,4,11,31,41	552.2
Region 7	BEACH SAND SP, EL. -41.5 TO -57	8,33,35,36,34,9,14	3255
Region 8	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	33,37,38,35	1037.4
Region 9	BAY SOUND CLAY CL, EL. -57 TO -70	35,38,39,36	676
Region 10	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	36,39,40,34	1016.6

Points

	X (ft)	Y (ft)
Point 1	100	-6.4
Point 2	170.7	-6.4
Point 3	310	-2.5
Point 4	310	-4.5
Point 5	310	-7.5
Point 6	100	-17.5

Point 7	310	-17.5
Point 8	100	-41.5
Point 9	310	-41.5
Point 10	197.1	3.6
Point 11	200	-4.5
Point 12	200	-13.3
Point 13	200	-17.5
Point 14	200	-41.5
Point 15	197.1	-4.5
Point 16	197.1	-10
Point 17	100	-13.3
Point 18	180	-4.4
Point 19	188.3	-1.5
Point 20	193.5	2.9
Point 21	182.5	-3.9
Point 22	189.5	-1
Point 23	199	3.9
Point 24	200	12.8
Point 25	200.5	12.8
Point 26	201	4.8
Point 27	213	4.1
Point 28	250	-0.8
Point 29	310	-0.8
Point 30	225	1.8
Point 31	200	3.9
Point 32	179.7675	-4.5
Point 33	100	-57
Point 34	310	-57
Point 35	179.8	-57
Point 36	231.8	-57
Point 37	100	-70
Point 38	179.8	-70
Point 39	231.8	-70
Point 40	310	-70
Point 41	201	3.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.18	(179.841, 46.445)	20.13455	(213, 4.1)	(170.318, -6.4)
2	12354	1.33	(179.841, 46.445)	53.783	(213, 4.1)	(169.839, -6.4)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	170.50915	-6.405408	424.65186	426.56364	0.81150437	0
2	Optimized	171.3953	-6.4305195	426.22258	449.20996	9.7575648	0
3	Optimized	172.78595	-6.4699265	428.68089	469.30775	17.245077	0
4	Optimized	174.1249	-6.5189885	431.74278	491.5001	25.365479	0
5	Optimized	175.4121	-6.577705	435.40583	512.88081	32.886179	0
6	Optimized	176.6993	-6.6364215	439.07663	534.26151	40.403584	0
7	Optimized	178.27895	-6.72451	444.57038	564.5025	50.908167	0
8	Optimized	179.49125	-6.8052645	449.60225	590.10521	59.639968	0
9	Optimized	179.88375	-6.8365575	451.55631	609.12082	66.882167	0
10	Optimized	180.45555	-6.882148	454.40849	613.10628	67.363214	0
11	Optimized	181.70555	-6.992038	461.26185	642.73216	77.029578	0
12	Optimized	183.5436	-7.162248	471.88669	704.7649	98.850938	0
13	Optimized	185.206	-7.2648025	478.28701	738.82192	110.59051	0
14	Optimized	186.4436	-7.2766275	479.02227	767.869	122.60816	0

	ed						
15	Optimized	187.6812	-7.288453	479.75754	796.92416	134.62924	0
16	Optimized	188.9	-7.300099	480.48631	825.66216	146.51845	0
17	Optimized	189.51825	-7.306006	480.86127	847.21869	155.5095	0
18	Optimized	190.26825	-7.235871	476.48067	848.34181	157.84569	0
19	Optimized	191.19905	-7.146436	470.64306	898.73223	181.71307	0
20	Optimized	192.02535	-6.93285	456.26522	909.36294	192.32857	0
21	Optimized	193.0763	-6.5141865	428.81377	915.48344	206.57902	0
22	Optimized	193.98565	-6.0330215	397.63534	915.5059	219.82301	0
23	Optimized	195.01205	-5.457045	360.39028	861.65568	212.77454	0
24	Optimized	196.0936	-4.819015	319.20282	817.29873	211.42917	0
25	Optimized	196.8672	-4.3626555	289.74082	785.31896	210.36044	0
26	Optimized	197.92225	-3.7402605	249.56541	737.76541	207.2286	0
27	Optimized	198.87225	-3.181276	213.48193	696.7258	205.12485	0
28	Optimized	199.5	-2.818018	190.02034	661.16761	199.99015	0
29	Optimized	200.25	-2.384032	161.98381	616.38465	192.88171	0
30	Optimized	200.74055	-2.100185	143.64951	587.09524	188.23155	0
31	Optimized	200.99055	-1.954397	134.23322	550.96144	176.89064	0
32	Optimized	201.55655	-1.559518	108.87729	589.68506	204.09079	0
33	Optimized	202.6696	-0.782966	59.00682	505.65275	189.58995	0

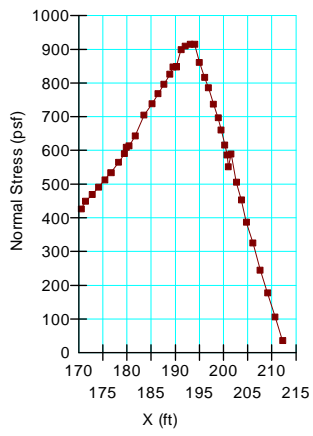
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34	Optimized	203.67885	-0.1308858	17.036225	453.6822	185.34522	0
35	Optimized	204.7337	0.4838742	-22.663704	387.48457	164.47744	0
36	Optimized	206.0892	1.1993825	-69.031362	324.95644	137.93583	0
37	Optimized	207.5958	1.9284875	-116.44039	244.5971	103.82531	0
38	Optimized	209.12425	2.5942005	-159.91958	177.2475	75.237102	0
39	Optimized	210.67455	3.196521	-199.47559	106.3485	45.142261	0
40	Optimized	212.22485	3.7988405	-239.0256	35.449501	15.04742	0

Slices of Slip Surface: 12354

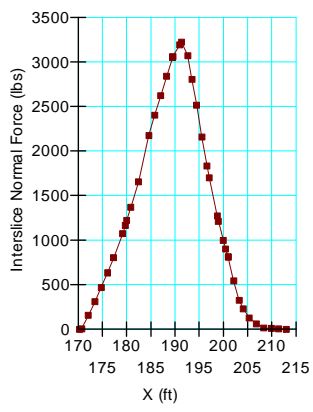
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	12354	170.2695	-6.4778575	429.18013	444.2435	6.3940184	0
2	12354	171.45565	-6.6749925	441.48155	487.48923	19.529101	0
3	12354	172.9669	-6.891653	454.9962	528.76163	31.311567	0
4	12354	174.4781	-7.0647635	465.8024	563.99705	41.681156	0
5	12354	175.98935	-7.1947455	473.90969	593.41012	50.724923	0
6	12354	177.50065	-7.2819125	479.35357	617.18814	58.507301	0
7	12354	179.0119	-7.326473	482.13281	635.50413	65.102259	0
8	12354	179.88375	-7.338028	482.8385	654.02122	72.662754	0
9	12354	180.625	-7.3288205	482.27669	652.06662	72.071551	0
10	12354	181.875	-7.2960485	480.23215	658.72835	75.76714	0
11	12354	183.225	-7.226677	475.90303	676.60784	85.194136	0
12	12354	184.675	-7.1155265	468.96958	690.91568	94.210531	0
13	12354	186.125	-6.9647865	459.56101	700.34151	102.20526	0
14	12354	187.575	-6.7741205	447.6629	704.87131	109.17849	0
15	12354	188.9	-6.566223	434.69011	705.04585	114.7592	0
16	12354	190.25	-6.31572	419.06216	723.97793	129.42907	0

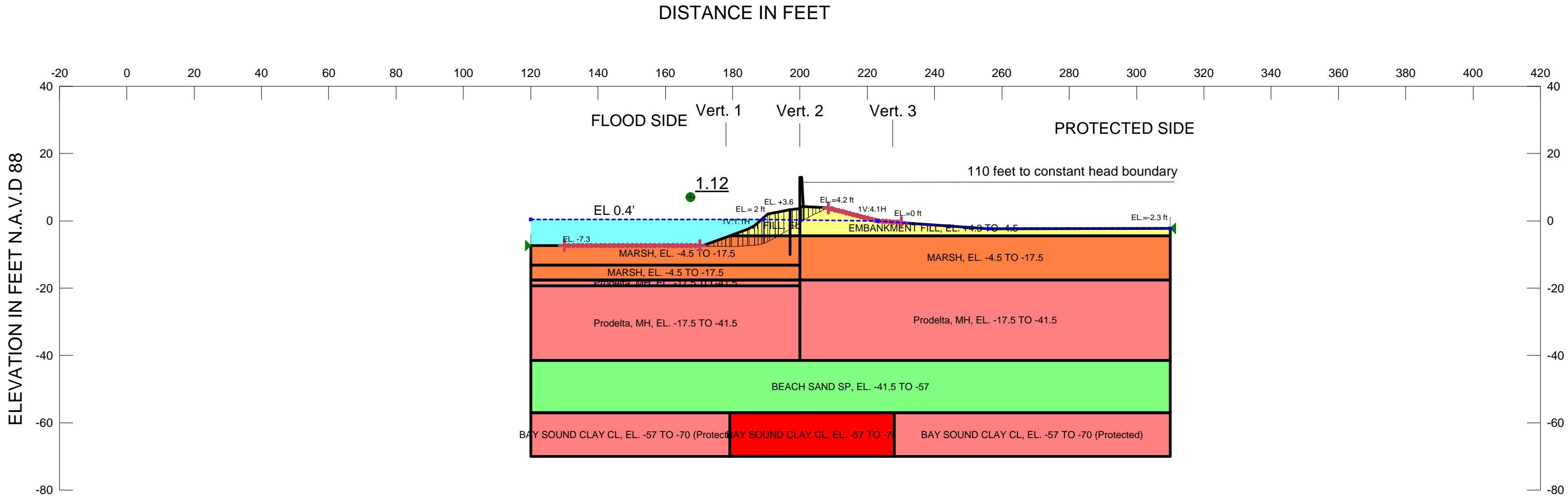
17	12354	191.625	-6.0273905	400.27788	791.64179	166.12412	0
18	12354	192.875	-5.730896	380.18836	887.21482	215.21997	0
19	12354	194.39535	-5.32304	352.80842	919.73401	240.64564	0
20	12354	196.19535	-4.7825015	316.7919	888.80535	242.8053	0
21	12354	198.05	-4.1517925	275.0857	844.40236	241.66059	0
22	12354	199.5	-3.6135375	239.66074	793.40849	235.05197	0
23	12354	200.25	-3.314637	220.04993	757.0369	227.93744	0
24	12354	200.75	-3.1066065	206.43404	731.98125	223.08155	0
25	12354	201.76065	-2.6615855	177.38711	765.44409	249.61538	0
26	12354	203.28195	-1.953652	131.2826	672.47502	229.72255	0
27	12354	204.80325	-1.1866174	81.488831	574.61387	209.31916	0
28	12354	206.3245	-0.35757106	27.823418	471.75208	188.43654	0
29	12354	207.8245	0.52339329	-29.052805	369.03167	156.64465	0
30	12354	209.30325	1.4581549	-89.256064	267.53058	113.55999	0
31	12354	210.78195	2.4624955	-153.80846	162.6416	69.037264	0
32	12354	212.26065	3.5413115	-222.99965	54.418583	23.099318	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +4.3 TO -4.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH, EL. -4.5 TO -17.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -41.5 TO -57 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -57 TO -70 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Prodelta, MH, EL. -17.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -57 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.85.

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



US Army Corps
of Engineers®
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 25 STA. 33+00 TO STA. 37+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 180
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 1:39:31 PM
File Name: Reach 25_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 1:43:02 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, MH, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -7.3) ft
Left-Zone Right Coordinate: (170.3, -7.3) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (208.38462, 3.8) ft
Right-Zone Right Coordinate: (230.0628, -0.51211) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (120, -7.3) ft
Right Coordinate: (310, -2.3) ft

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70

Model: Mohr-Coulomb

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
120	0.4
189	0.4
223	0
256.1	-2.4
310	-2.3

Regions

	Material	Points	Area (ft ²)
Region 1	EMBANKMENT FILL, EL. +4.3 TO -4.5	32,3,20,21,12,40,41,13,17	100.28
Region 2	MARSH, EL. -4.5 TO -17.5	1,2,32,17,13,14,19	541.51
Region 3	MARSH, EL. -4.5 TO -17.5	14,13,5,7,15,31	1430
Region 4	Prodelta, MH, EL. -17.5 TO -41.5	15,7,9,30,29	2640
Region 5	BEACH SAND SP, EL. -41.5 TO -57	30,9,10,38,16,37,11,8	2945
Region 6		4,22,23,28	6.525
Region 7	EMBANKMENT FILL, EL. +4.3 TO -4.5	4,28,24,25,26,27,5,13,41	390.415
Region 8	MARSH, EL. -4.5 TO -17.5	6,19,14,31,15	344
Region 9	Prodelta, MH, EL. -17.5 TO -41.5	6,33,29,15	144
Region 10	Prodelta, MH, EL. -17.5 TO -41.5	33,29,30,8	1776
Region 11	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	11,34,36,37	769.6
Region 12	BAY SOUND CLAY CL, EL. -57 TO -70	37,36,39,38,16	634.4
Region 13	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	38,39,35,10	1066

Points

	X (ft)	Y (ft)
Point 1	120	-7.3

Point 2	171.2	-7.3
Point 3	184.4	-2.5
Point 4	200	4.2
Point 5	310	-4.5
Point 6	120	-17.5
Point 7	310	-17.5
Point 8	120	-41.5
Point 9	310	-41.5
Point 10	310	-57
Point 11	120	-57
Point 12	197	-3.3
Point 13	200	-4.5
Point 14	200	-13.2
Point 15	200	-17.5
Point 16	200	-57
Point 17	197	-4.5
Point 18	197	-10
Point 19	120	-13.2
Point 20	186.5	-1.4
Point 21	190.5	2
Point 22	200	12.9
Point 23	200.5	12.9
Point 24	208	3.9
Point 25	223	0
Point 26	256.1	-2.4
Point 27	310	-2.3
Point 28	201	4.2
Point 29	200	-19.3
Point 30	200	-41.5
Point 31	200	-14.6
Point 32	179.15	-4.5
Point 33	120	-19.3
Point 34	120	-70
Point 35	310	-70
Point 36	179.2	-70
Point 37	179.2	-57

Point 38	228	-57
Point 39	228	-70
Point 40	199	3.6
Point 41	200	3.6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.12	(175.925, 43.525)	19.056	(208.385, 3.8)	(169.563, -7.3)
2	12795	1.20	(175.925, 43.525)	51.3	(208.385, 3.8)	(168.957, -7.3)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	170.3766	-7.412555	487.50488	503.7384	6.89072	0
2	Optimized	171.195	-7.5252755	494.53417	509.17081	6.2128829	0
3	Optimized	171.9959	-7.5517755	496.18855	549.75793	22.738851	0
4	Optimized	173.58775	-7.604445	499.47856	585.2197	36.394955	0
5	Optimized	174.97945	-7.6265415	500.85808	608.35085	45.627975	0
6	Optimized	176.171	-7.618064	500.32938	628.7937	54.529865	0
7	Optimized	177.3626	-7.6095865	499.80069	649.24493	63.435317	0
8	Optimized	178.5542	-7.6011095	499.272	669.69617	72.340769	0
9	Optimized	179.41995	-7.5949505	498.88522	686.40709	79.598311	0
10	Optimized	180.65075	-7.56562	497.05543	704.5433	88.073377	0

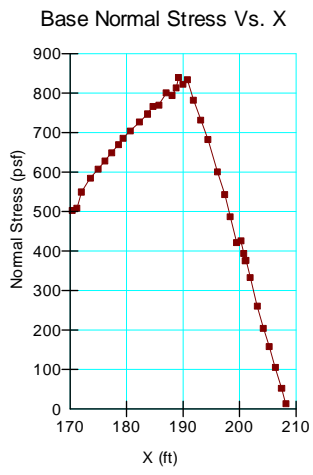
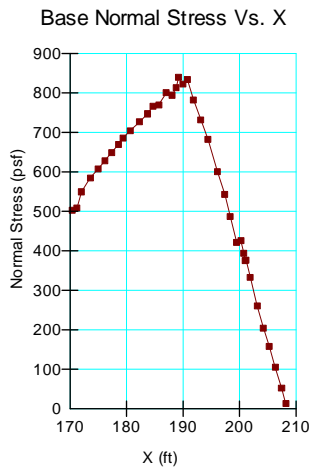
11	Optimized	182.3087	-7.5040085	493.21141	727.28732	99.359326	0
12	Optimized	183.7029	-7.435606	488.94168	747.48974	109.74714	0
13	Optimized	184.66575	-7.3883675	485.99951	766.62382	119.11795	0
14	Optimized	185.71575	-7.288394	479.75886	770.46055	123.39555	0
15	Optimized	187.02775	-7.142959	470.67853	800.51039	140.00532	0
16	Optimized	188.08655	-6.9596795	459.24254	794.62854	142.36291	0
17	Optimized	188.8088	-6.7899815	448.66569	814.10086	155.11803	0
18	Optimized	189.20015	-6.698037	442.76572	840.42074	168.79454	0
19	Optimized	189.95015	-6.395772	423.36002	822.53653	169.44037	0
20	Optimized	190.7709	-6.014782	398.97644	834.71658	184.96071	0
21	Optimized	191.84705	-5.4565	363.3539	782.62439	177.96976	0
22	Optimized	193.12075	-4.761985	319.07927	732.15059	175.33837	0
23	Optimized	194.4207	-4.034995	272.76463	682.38392	173.87307	0
24	Optimized	196.1261	-3.030637	208.84233	600.51785	166.25639	0
25	Optimized	197.3749	-2.259897	159.82731	543.34251	162.79254	0
26	Optimized	198.3749	-1.621546	119.26029	486.78792	156.00622	0
27	Optimized	199.5	-0.889055	72.728431	421.23224	147.93109	0
28	Optimized	200.25	-0.40076455	41.709239	426.61252	163.38175	0
29	Optimized	200.75	-0.07523761	21.02977	393.67756	158.1796	0

30	Optimized	201.0259	0.10439794	9.6171663	375.39594	155.26388	0
31	Optimized	201.1672	0.1883843	4.2724927	376.57264	158.03204	0
32	Optimized	201.89875	0.61383145	-22.811933	333.08733	141.38719	0
33	Optimized	203.131	1.3304972	-68.436501	260.83809	110.7192	0
34	Optimized	204.23835	1.94122	-107.35984	204.67082	86.877608	0
35	Optimized	205.27465	2.4331685	-138.81727	157.77133	66.969957	0
36	Optimized	206.3648	2.912285	-169.51159	105.38524	44.733379	0
37	Optimized	207.45495	3.3914015	-200.21431	52.997462	22.496088	0
38	Optimized	208.1923	3.71548	-220.9755	13.402012	5.6888164	0

Slices of Slip Surface: 12795

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	12795	169.5175	-7.3706015	484.88306	497.1606	5.2115048	0
2	12795	170.63915	-7.4992975	492.9199	511.02807	7.6864607	0
3	12795	171.8625	-7.61002	499.82169	557.08282	24.305906	0
4	12795	173.1875	-7.698048	505.31694	589.55904	35.75865	0
5	12795	174.5125	-7.751692	508.66766	617.26802	46.09812	0
6	12795	175.8375	-7.7710605	509.87093	640.35375	55.386672	0
7	12795	177.1625	-7.7561925	508.94607	658.92502	63.662287	0
8	12795	178.4875	-7.7070575	505.88057	673.07526	70.969933	0
9	12795	179.80625	-7.6241125	500.70122	685.56395	78.469572	0
10	12795	181.11875	-7.5075155	493.42786	694.30243	85.266195	0
11	12795	182.43125	-7.356801	484.02797	698.83494	91.180148	0
12	12795	183.74375	-7.171664	472.47065	699.21439	96.247009	0
13	12795	184.925	-6.9768815	460.31813	702.64265	102.86065	0
14	12795	185.975	-6.778423	447.93752	703.79509	108.60509	0

15	12795	187.0294	-6.5561395	434.06381	713.52766	118.62537	0
16	12795	188.0882	-6.3095295	418.67792	723.27272	129.29282	0
17	12795	188.8088	-6.130705	407.50413	738.78319	140.61962	0
18	12795	189.75	-5.8711835	390.76915	792.73468	170.62424	0
19	12795	191.0769	-5.482894	365.57072	824.6062	194.849	0
20	12795	192.23075	-5.1110975	341.52342	803.0591	195.91027	0
21	12795	193.3846	-4.708837	315.57176	778.22943	196.38653	0
22	12795	194.72115	-4.200826	282.88956	744.23026	195.82751	0
23	12795	196.2404	-3.573994	242.66373	699.7056	194.00276	0
24	12795	197.5	-3.0145385	206.82541	656.23089	190.76131	0
25	12795	198.5	-2.5376895	176.34017	615.42164	186.37902	0
26	12795	199.5	-2.033902	144.17082	564.73788	178.52012	0
27	12795	200.25	-1.64052	119.06877	577.82338	194.72978	0
28	12795	200.75	-1.3676245	101.67334	546.71387	188.9085	0
29	12795	201.61085	-0.87600755	70.365203	488.78698	177.60951	0
30	12795	202.8325	-0.1462807	23.933588	402.82132	160.8283	0
31	12795	204.20275	0.73193285	-31.872967	306.55218	130.12368	0
32	12795	205.72165	1.775819	-98.125587	200.52216	85.116609	0
33	12795	207.24055	2.903325	-169.59572	90.981852	38.619505	0
34	12795	208.1923	3.644399	-216.5336	17.928651	7.6102608	0



FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 228
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/21/2013
Time: 10:27:12 AM
File Name: Reach 26A_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/21/2013
Last Solved Time: 10:31:17 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. 0.5 TO -4 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -11 (protected)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -2.5 TO -11

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -11 TO -42

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -44 TO -70

Model: Mohr-Coulomb
Unit Weight: 109 pcf

Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -8.3705) ft
Left-Zone Right Coordinate: (167.4, -8.30059) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (206.4, 3.7) ft
Right-Zone Right Coordinate: (230, 1.8) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (100, -8.4) ft
Right Coordinate: (310, 1.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
100	0.4
189.6	0.4
310	0.4

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND SP, EL. -11 TO -42	20,24,14,17,47,41	825
Region 2	BEACH SAND SP, EL. -11 TO -42	17,14,24,38,8,10,16,11,42,9	5729.7
Region 3	MARSH, EL. -4 TO -11 (protected)	15,7,8,38	566.3
Region 4	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	25,30,4,31,12,23,27	9.23
Region 5	Fill, EL. 0.5 TO -4 (Protected Side)	15,35,6,7	469.22
Region 6	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	25,27,23,13,40,39,29	52.06
Region 7	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	23,26,5,34,35,15,13	151.06

Region 8	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	23,12,32,22,33,26	17.1
Region 9		12,36,37,22,32	7.1
Region 10	MARSH, MH, EL. -2.5 TO -11	13,40,39,41,20,24,45	132.6
Region 11	MARSH, MH, EL. -2.5 TO -11	13,15,38,24,45	225.525
Region 12	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	9,18,43,42	2363.2
Region 13	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	16,44,19,10	2265.2
Region 14	BAY SOUND CLAY CL, EL. -44 TO -70	42,43,44,16,11	1206.9
Region 15	MARSH, EL. -4 TO -11 (protected)	47,46,48,3,28,39,41	106.255
Region 16	Silted-in Layer	46,1,2,3,48	158.185

Points

	X (ft)	Y (ft)
Point 1	100	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	1.9
Point 6	310	1.8
Point 7	310	-4
Point 8	310	-11
Point 9	100	-42
Point 10	310	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42
Point 17	100	-19.2

Point 18	100	-70
Point 19	310	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11
Point 25	192.3	2
Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	199	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	1.9
Point 35	229.1	1.8
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8
Point 46	100	-10.6
Point 47	100	-11
Point 48	167.8	-10.6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
--	--------------	-----	-------------	-------------	------------	-----------

1	Optimized	1.00	(172.738, 43.724)	19.5023	(206.4, 3.7)	(168.067, -8.22912)
2	13236	1.07	(172.738, 43.724)	52.298	(206.4, 3.7)	(167.4, -8.30059)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	168.577	-8.174794	535.06386	547.03934	6.3674733	0
2	Optimized	169.59665	-8.0661445	528.28621	544.25026	8.488236	0
3	Optimized	170.7861	-7.94476	520.71275	542.07018	11.355947	0
4	Optimized	172.08285	-7.836495	513.9572	549.67067	15.159472	0
5	Optimized	173.4321	-7.74641	508.33737	559.06343	21.531939	0
6	Optimized	175.112	-7.654155	502.57861	569.73946	28.50809	0
7	Optimized	176.63315	-7.6047365	499.4925	585.09562	36.336368	0
8	Optimized	177.7799	-7.5926495	498.74259	596.71923	41.588615	0
9	Optimized	178.92665	-7.5805625	497.98396	608.33412	46.840862	0
10	Optimized	179.5109	-7.5744045	497.58374	626.65327	54.786768	0
11	Optimized	180.2636	-7.5146525	493.87685	627.45949	56.702469	0
12	Optimized	181.74715	-7.3953775	486.43245	646.68862	68.02471	0
13	Optimized	183.44445	-7.2103855	474.88774	655.73856	76.766617	0
14	Optimized	184.9826	-7.0086035	462.29686	659.49654	83.706301	0
15	Optimiz	186.1477	-6.855748	452.75768	671.24819	92.74372	0

	ed	5				
16	Optimized	187.66515	-6.593177	436.37499	668.34001	98.46331
17	Optimized	189.1	-6.307474	418.54316	673.34097	108.15525
18	Optimized	189.8286	-6.162397	409.49881	684.85775	116.88293
19	Optimized	190.7993	-5.840565	389.40834	679.46931	123.12358
20	Optimized	191.9207	-5.358576	359.33817	666.33417	130.31207
21	Optimized	192.65925	-4.958116	334.34823	674.41046	144.34785
22	Optimized	193.35925	-4.5032585	305.958	642.33567	142.78385
23	Optimized	194.271	-3.8073905	262.53839	606.63582	146.06069
24	Optimized	195.421	-2.929712	207.7727	537.39716	139.91728
25	Optimized	196.09965	-2.411785	175.45385	495.95711	136.04556
26	Optimized	196.7388	-1.93753	145.85929	458.6727	132.78142
27	Optimized	197.8178	-1.14111	96.168258	389.98216	124.7166
28	Optimized	198.67865	-0.5208839	57.463209	342.25748	120.88799
29	Optimized	199.42685	-0.0039839	25.208391	295.21266	114.61001
30	Optimized	199.92685	0.33427905	4.100974	274.15033	114.62914
31	Optimized	200.01885	0.38882905	0.69707553	268.8909	113.84153
32	Optimized	200.26885	0.5370626	-8.5526967	255.97251	108.65388
33	Optimized	200.75	0.8223588	-26.355384	231.33215	98.194671
34	Optimiz	201.5408	1.2912512	-55.613919	231.42312	98.233288

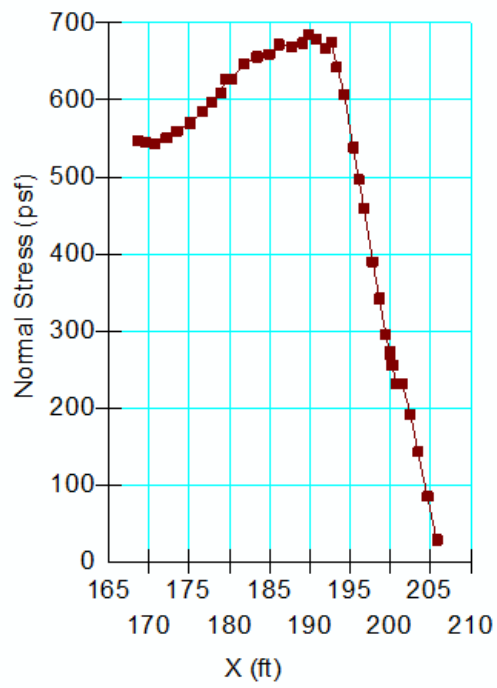
	ed						
35	Optimiz ed	202.4829	1.805955	-87.73147	191.39311	81.241555	0
36	Optimiz ed	203.4701 5	2.2833335	-117.51954	143.15444	60.765453	0
37	Optimiz ed	204.6421	2.8500005	-152.87987	85.892662	36.459272	0
38	Optimiz ed	205.8140 5	3.416667	-188.24021	28.630887	12.153091	0

23	13236	195.425	-3.3922705	236.63948	633.17747	168.32039	0
24	13236	196.60005	-2.807701	200.16357	581.16764	161.72663	0
25	13236	198.10005	-2.000815	149.80897	505.56579	151.00981	0
26	13236	199.5	-1.203797	100.08016	427.04819	138.7897	0
27	13236	200.25	-0.75131665	71.841715	380.12938	130.86035	0
28	13236	200.75	-0.43809445	52.296803	347.93039	125.48901	0
29	13236	201.5155	0.06024015	21.200764	337.35445	134.19928	0
30	13236	202.59035	0.788884	-24.266005	262.75633	111.53345	0
31	13236	203.709	1.588884	-74.18404	187.3509	79.525738	0
32	13236	204.8012	2.4136355	-125.64889	112.22647	47.637312	0
33	13236	205.86705	3.2636355	-178.69069	37.433143	15.889427	0

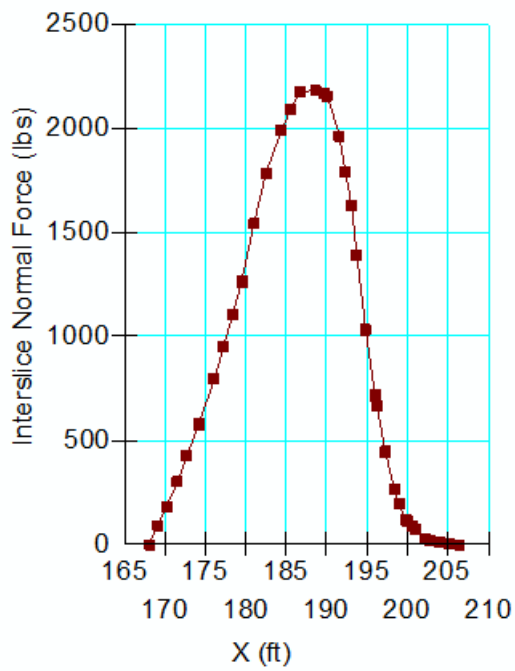
Slices of Slip Surface: 13236

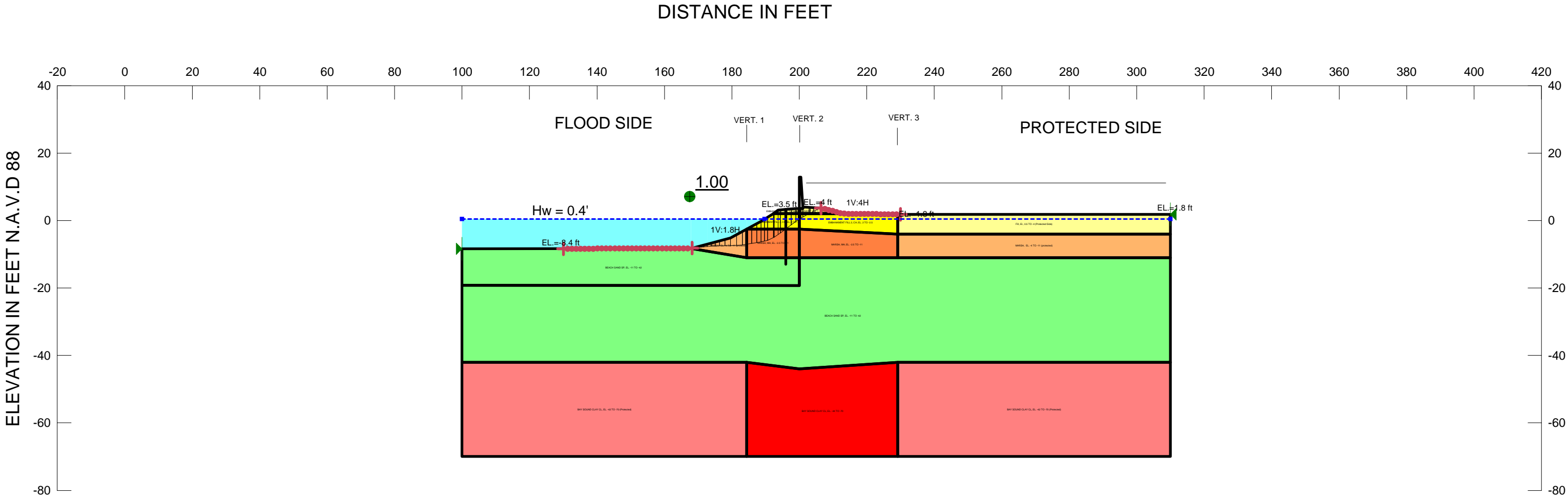
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	13236	167.6	-8.3203345	544.15473	551.17062	3.730417	0
2	13236	168.50415	-8.397276	548.95264	579.21605	16.091345	0
3	13236	169.91245	-8.4925755	554.89811	596.39139	22.062366	0
4	13236	171.13745	-8.546626	558.2715	613.95185	23.634904	0
5	13236	172.17915	-8.56814	559.61435	633.9973	31.573689	0
6	13236	173.38	-8.5653565	559.43557	648.67881	37.881508	0
7	13236	174.74	-8.530954	557.28958	657.34116	42.469376	0
8	13236	176.1	-8.4610915	552.93436	662.00966	46.299718	0
9	13236	177.46	-8.3556265	546.35433	662.72988	49.398488	0
10	13236	178.82	-8.2143425	537.53287	659.57396	51.803366	0
11	13236	180.1125	-8.047467	527.12013	669.58416	60.472391	0
12	13236	181.3375	-7.8581065	515.30429	672.54633	66.745289	0
13	13236	182.5625	-7.638836	501.62443	672.14931	72.383519	0
14	13236	183.7875	-7.38927	486.05398	668.40501	77.40342	0
15	13236	185.1	-7.0865535	467.15805	653.70895	79.186159	0
16	13236	186.5	-6.725294	444.61825	645.34802	85.204729	0
17	13236	187.9	-6.3222695	419.472	632.58499	90.461099	0
18	13236	189.1	-5.9454885	395.9592	619.3885	94.840113	0
19	13236	190.27725	-5.539651	370.63388	626.88043	108.77021	0
20	13236	191.62725	-5.0379225	339.32876	651.04603	132.31613	0
21	13236	193	-4.483105	304.70744	682.45407	160.34393	0
22	13236	194.275	-3.929013	270.12721	680.01693	173.98786	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: [Liljegren, James](#)
Revision Number: [214](#)
Last Edited By: [Serrano-Canals, Josinell M MVN](#)
Date: [6/21/2013](#)
Time: [10:28:20 AM](#)
File Name: [Reach 26B_S-Case.gsz](#)
Directory: [c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\](#)
Last Solved Date: [6/21/2013](#)
Last Solved Time: [10:34:23 AM](#)

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
 Apply Phreatic Correction: [No](#)
 PWP Conditions Source: [Piezometric Line](#)
 Use Staged Rapid Drawdown: [No](#)
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: [No](#)
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: [1](#)
 Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
 Tension Crack Option: [Search for Tension Crack](#)
 Percentage Wet: [0](#)
 Tension Crack Fluid Unit Weight: [62.4 pcf](#)

Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Fill, EL., 0.5 TO -4 (Protected Side)

Model: [Mohr-Coulomb](#)
Unit Weight: [105 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: [Mohr-Coulomb](#)
Unit Weight: [110 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

MARSH, EL. -4 TO -11 (protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [105 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [109 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(129.99996, -8.35575\) ft](#)
Left-Zone Right Coordinate: [\(168.17692, -8.2\) ft](#)

FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced
 Number of Slices: [30](#)
 Optimization Tolerance: [0.01](#)
 Minimum Slip Surface Depth: [5 ft](#)
 Optimization Maximum Iterations: [4000](#)
 Optimization Convergence Tolerance: [1e-007](#)
 Starting Optimization Points: [8](#)
 Ending Optimization Points: [16](#)
 Complete Passes per Insertion: [1](#)
 Driving Side Maximum Convex Angle: [5 °](#)
 Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: [Mohr-Coulomb](#)
Unit Weight: [110 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

MARSH, MH, EL. -2.5 TO -11

Model: [Mohr-Coulomb](#)
Unit Weight: [103 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BEACH SAND SP, EL. -11 TO -42

Model: [Mohr-Coulomb](#)
Unit Weight: [122 pcf](#)
Cohesion: [0 psf](#)
Phi: [30 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BAY SOUND CLAY CL, EL. -44 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: [110 pcf](#)

Left-Zone Increment: [30](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(206.4, 3.7\) ft](#)
Right-Zone Right Coordinate: [\(230, 1.8\) ft](#)
Right-Zone Increment: [20](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(100, -8.4\) ft](#)
Right Coordinate: [\(310, 1.8\) ft](#)

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	100	0.4
	189.6	0.4
	310	0.4

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND SP, EL. -11 TO -42	20,24,14,17,1,2,41	1027.08
Region 2	BEACH SAND SP, EL. -11 TO -42	17,14,24,38,8,10,16,11,42,9	5729.7
Region 3	MARSH, EL. -4 TO -11 (protected)	15,7,8,38	566.3
Region 4	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	25,30,4,31,12,23,27	9.23
Region 5	Fill, EL., 0.5 TO -4 (Protected Side)	15,35,6,7	469.22
Region 6	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	25,27,23,13,40,39,29	52.06
Region 7	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	23,26,5,34,35,15,13	151.06
Region 8	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	23,12,32,22,33,26	17.1
Region 9		12,36,37,22,32	7.1
Region 10	MARSH, MH, EL. -2.5 TO -11	13,40,39,41,20,24,45	132.6
Region 11	MARSH, MH, EL. -2.5 TO -11	13,15,38,24,45	225.525
Region	BAY SOUND CLAY CL, EL. -42 TO -70	9,18,43,42	2363.2

12	(Protected)		
Region 13	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	16,44,19,10	2265.2
Region 14	BAY SOUND CLAY CL, EL. -44 TO -70	42,43,44,16,11	1206.9
Region 15	MARSH, EL. -4 TO -11 (protected)	2,3,28,39,41	62.36

Points

	X (ft)	Y (ft)
Point 1	100	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	1.9
Point 6	310	1.8
Point 7	310	-4
Point 8	310	-11
Point 9	100	-42
Point 10	310	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42
Point 17	100	-19.2
Point 18	100	-70
Point 19	310	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11
Point 25	192.3	2

Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	199	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	1.9
Point 35	229.1	1.8
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.00	(173.192, 43.027)	19.6043	(206.4, 3.7)	(167.803, -8.29919)
2	13236	1.07	(173.192, 43.027)	51.472	(206.4, 3.7)	(168.177, -8.2)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	168.32895	-8.218124	537.77535	546.91758	3.8806455	0

2	Optimized	169.38085	-8.0559815	527.65594	541.26123	5.7751025	0
3	Optimized	170.78405	-7.87877	516.59363	540.93944	10.334186	0
4	Optimized	172.18065	-7.7436	508.16038	544.55355	15.447984	0
5	Optimized	173.28025	-7.660965	503.00658	547.81737	19.021055	0
6	Optimized	174.4699	-7.59248	498.72721	556.6974	24.606883	0
7	Optimized	175.68865	-7.54272	495.62826	564.91209	29.409244	0
8	Optimized	177.098	-7.51407	493.83804	581.42674	37.179199	0
9	Optimized	178.69795	-7.50653	493.36928	598.69573	44.708425	0
10	Optimized	179.49895	-7.5026885	493.12768	599.49328	45.149518	0
11	Optimized	180.4189	-7.4392335	489.16569	624.59389	57.485859	0
12	Optimized	182.211	-7.29002	479.85954	643.0837	69.284545	0
13	Optimized	183.7421	-7.108168	468.51229	649.23169	76.710835	0
14	Optimized	185.13185	-6.905327	455.85016	650.28548	82.532896	0
15	Optimized	186.5956	-6.691689	442.51915	662.66331	93.445649	0
16	Optimized	187.96375	-6.436379	426.58736	653.794	96.443494	0
17	Optimized	189.1	-6.1711955	410.04097	653.87833	103.50282	0
18	Optimized	190.0856	-5.9411715	395.68868	672.29574	117.41273	0
19	Optimized	191.4356	-5.4403685	364.43656	663.69638	127.02826	0
20	Optimized	192.41135	-5.0029885	337.14505	678.15849	144.75162	0

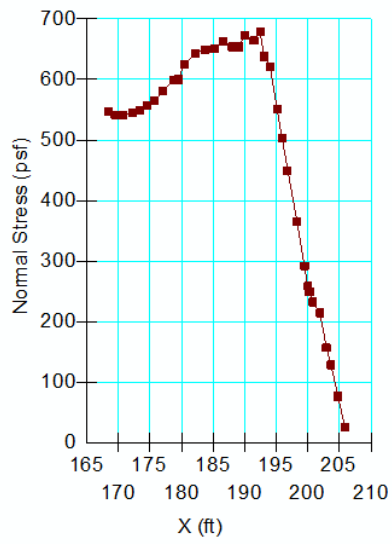
21	Optimized	193.11135	-4.536834	308.05518	638.14353	140.11419	0
22	Optimized	194.0306	-3.886804	267.49375	620.81813	149.9773	0
23	Optimized	195.137	-3.07651	216.93472	551.0923	141.84148	0
24	Optimized	195.9564	-2.467595	178.94022	502.95243	137.53502	0
25	Optimized	196.79445	-1.84479	140.07576	449.35375	131.28072	0
26	Optimized	198.29445	-0.77609795	73.38906	365.69585	124.07687	0
27	Optimized	199.5	0.0411511	22.392532	292.25428	114.54952	0
28	Optimized	200.01465	0.39005405	0.62062252	259.22788	109.77227	0
29	Optimized	200.17805	0.500815	-6.2908869	249.88499	106.06989	0
30	Optimized	200.4134	0.65057845	-15.63586	249.03696	105.70992	0
31	Optimized	200.75	0.8408086	-27.505629	232.41447	98.65409	0
32	Optimized	201.9006	1.4910451	-68.083403	214.90788	91.222982	0
33	Optimized	202.9723	2.0967	-105.87357	156.77012	66.544966	0
34	Optimized	203.6862	2.4445	-127.577	128.63046	54.600389	0
35	Optimized	204.77175	2.9466995	-158.91317	77.179946	32.760943	0
36	Optimized	205.85725	3.4488995	-190.24918	25.726906	10.920424	0

Slices of Slip Surface: 13236

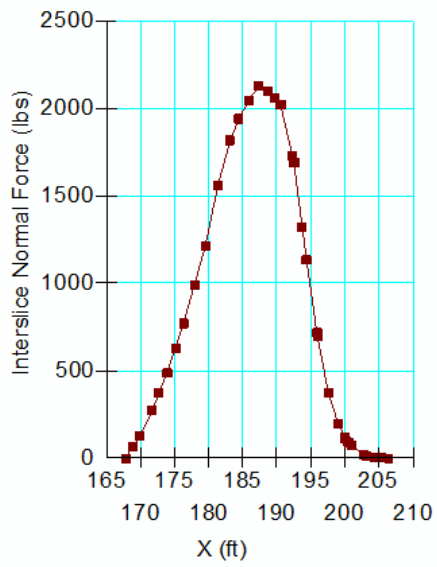
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	13236	168.7423	-8.249067	539.69974	570.66836	13.145398	0

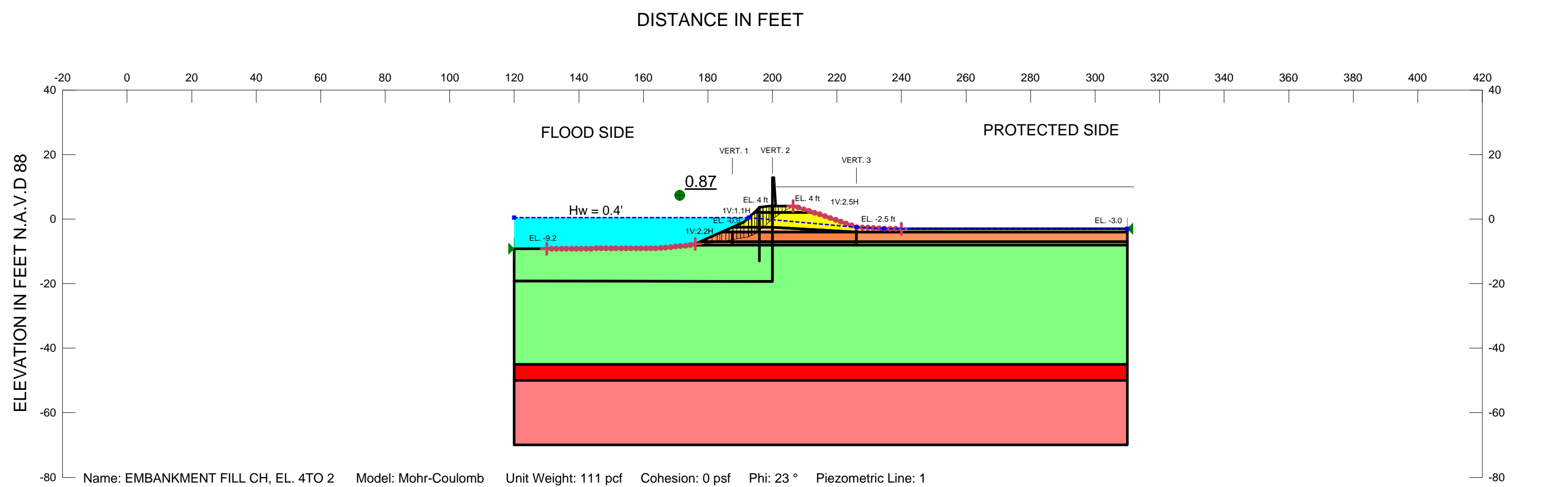
2	13236	169.8731	-8.3346695	545.03944	591.48605	19.715416	0
3	13236	171.00385	-8.395267	548.82828	609.21034	25.630667	0
4	13236	172.1346	-8.4309485	551.04778	623.92076	30.932746	0
5	13236	173.38	-8.4400885	551.62135	636.51049	36.033304	0
6	13236	174.74	-8.4171495	550.19238	646.44297	40.855953	0
7	13236	176.1	-8.3582115	546.51528	652.27988	44.894409	0
8	13236	177.46	-8.263151	540.58035	654.09247	48.183039	0
9	13236	178.82	-8.1317665	532.38406	651.94956	50.752545	0
10	13236	180.1125	-7.973854	522.52624	663.09127	59.666314	0
11	13236	181.3375	-7.7925755	511.21402	666.86012	66.06785	0
12	13236	182.5625	-7.5810005	498.01737	667.20714	71.816797	0
13	13236	183.7875	-7.3387465	482.89999	664.14925	76.935747	0
14	13236	185.1	-7.043425	464.46743	650.20159	78.839473	0
15	13236	186.5	-6.689583	442.39025	642.50258	84.942645	0
16	13236	187.9	-6.29347	417.67431	630.33438	90.268848	0
17	13236	189.1	-5.9222345	394.50984	617.60449	94.698057	0
18	13236	190.27725	-5.521401	369.49833	625.57539	108.69826	0
19	13236	191.62725	-5.0249705	338.51906	650.2733	132.33183	0
20	13236	193	-4.474993	304.1986	682.14272	160.42776	0
21	13236	194.275	-3.9249145	269.87643	680.0575	174.11153	0
22	13236	195.425	-3.3913225	236.57697	633.40765	168.44463	0
23	13236	196.60295	-2.80796	200.1796	581.41888	161.82647	0
24	13236	198.10295	-2.0037615	149.99603	505.96955	151.1018	0
25	13236	199.5	-1.2101766	100.47539	427.69511	138.89653	0
26	13236	200.25	-0.7583406	72.280539	380.79819	130.95797	0
27	13236	200.75	-0.4453738	52.751983	348.58302	125.57283	0
28	13236	201.52095	0.0565517	21.431502	337.59463	134.20329	0
29	13236	202.60025	0.788725	-24.256268	262.5827	111.45974	0
30	13236	203.7169	1.588725	-74.179772	187.17991	79.453157	0
31	13236	204.8064	2.4134845	-125.64008	112.0919	47.580189	0
32	13236	205.8688	3.2634845	-178.68051	37.386916	15.869804	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.70.

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN HE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27 STA. 48+50 TO STA. 58+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 265
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/21/2013
Time: 10:29:29 AM
File Name: Reach 27_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/21/2013
Last Solved Time: 10:35:11 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, El, -7 to -8 (Protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL CH, EL. 2 TO -2.5

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh1, El., -2.5 TO -4

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, EL. -45 to -50

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -50 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -8 TO -40

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected), El., -2.5 TO -4

Model: Mohr-Coulomb
Unit Weight: 105 pcf

Pore Water Pressure
Piezometric Line: 1

MARSH 1, El, -4 to -7 (Protected)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -7 TO -8

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -9.17753) ft
Left-Zone Right Coordinate: (176.063, -7.7) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (206.4, 4) ft
Right-Zone Right Coordinate: (240, -3) ft
Right-Zone Increment: 20
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -9.2) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)

	120	0.4
	192.6	0.4
	226.1	-2.5
	234.6	-3
	310	-3

Unit Weight Functions

Marsh2

Model: Spline Data Point Function

Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 99

Data Points: X (ft), Unit Weight (pcf)

Data Point: (187.56, 99)

Data Point: (200, 103)

Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function

Function: Unit Weight vs. Y

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 107

Data Points: Y (ft), Unit Weight (pcf)

Data Point: (191.1, 107)

Data Point: (200, 110)

Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function

Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 112

Data Points: X (ft), Unit Weight (pcf)

Data Point: (191.1, 112)

Data Point: (200, 110)

Data Point: (226.1, 112)

Regions

	Material	Points	Area (ft²)
--	----------	--------	------------

Region 1	Marsh1, El., -2.5 TO -4	5,26,16,20,27,50,4	21.15
Region 2	Marsh1, El., -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -8 TO -40	28,17,18,23,1,24,2,25,51	842.83
Region 4	BEACH SAND SP, EL. -8 TO -40	23,18,17,14,22,11,13,12	6130
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6		15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,46,5,26,16,38,39	38.211
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), El., -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, El, -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	950
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3800
Region 16	MARSH 1 , El, -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1 , El, -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, El, -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

	X (ft)	Y (ft)
Point 1	120	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7
Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	120	-45

Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	120	-19.2
Point 24	120	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8
Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7
Point 43	234.6	-3
Point 44	120	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	120	-50

Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.87	(176.003, 36.115)	17.70601	(206.4, 4)	(174.405, -8.10046)
2	18888	0.94	(176.003, 36.115)	44.219	(206.4, 4)	(174.592, -8.0815)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz ed	174.9023	-8.0911955	529.84918	538.48731	3.666671	0
2	Optimiz ed	175.41975	-8.081568	529.24583	566.46751	15.799668	0
3	Optimiz ed	175.83	-8.0406	526.69256	559.6395	13.985146	0
4	Optimiz ed	176.91525	-7.9277685	519.65055	563.76784	18.726678	0
5	Optimiz ed	178.3531	-7.7782785	510.32312	572.49137	26.388858	0
6	Optimiz ed	179.4581	-7.6511305	502.39173	575.63809	31.091234	0
7	Optimiz ed	180.554	-7.5000605	492.9644	579.83983	36.876431	0
8	Optimiz ed	182.08545	-7.27099	478.66973	581.1578	43.503604	0
9	Optimiz ed	183.3	-7.07155	466.22564	581.11012	48.765569	0

10	Optimiz ed	183.9785 5	-6.955146	458.95224	581.10704	51.851637	0
11	Optimiz ed	184.9054 5	-6.796136	449.03621	579.91901	55.556453	0
12	Optimiz ed	186.0681 5	-6.6014255	436.88631	580.00732	60.751265	0
13	Optimiz ed	187.0627	-6.440316	426.83211	579.52099	64.812584	0
14	Optimiz ed	187.7339	-6.3315905	420.04429	575.31877	65.910106	0
15	Optimiz ed	188.4592 5	-6.2180975	412.96796	579.23395	70.575728	0
16	Optimiz ed	189.5622	-6.0474525	402.32321	583.75887	77.014869	0
17	Optimiz ed	190.6068 5	-5.865694	390.98335	579.32599	79.946706	0
18	Optimiz ed	191.7832 5	-5.635659	376.62523	594.86231	92.636145	0
19	Optimiz ed	192.4951 5	-5.491985	367.66363	579.24008	89.808872	0
20	Optimiz ed	192.5619	-5.4685245	366.19899	581.28966	91.300574	0
21	Optimiz ed	193	-5.3145955	354.43345	604.92145	106.32585	0
22	Optimiz ed	193.5337 5	-5.127061	339.84303	631.8289	123.94065	0
23	Optimiz ed	194.0537 5	-4.8659155	320.73692	606.43516	121.27171	0
24	Optimiz ed	194.7261	-4.4931355	293.8531	624.87725	140.51142	0
25	Optimiz ed	195.2136	-4.167255	270.87895	590.34879	135.6069	0
26	Optimiz ed	195.7075	-3.75705	242.61603	595.7117	149.88022	0
27	Optimiz ed	196.4491	-3.141095	200.16975	569.81404	156.90469	0
28	Optimiz ed	197.0507	-2.634045	165.28197	522.08693	151.45472	0

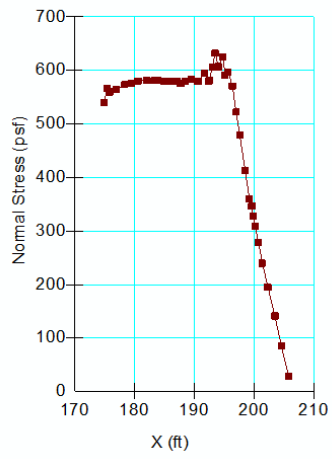
29	Optimiz ed	197.6524	-2.1051755	129.02789	478.77348	148.45819	0
30	Optimiz ed	198.5508	-1.3155267	74.903561	413.00964	143.51751	0
31	Optimiz ed	199.2445	-0.70580115	33.110564	360.39764	138.92512	0
32	Optimiz ed	199.6631	-0.3587014	9.1895338	345.51384	142.7612	0
33	Optimiz ed	199.9186	-0.16468835	-4.2969489	328.20838	139.31619	0
34	Optimiz ed	200.25	0.08695905	-21.790011	308.37326	130.89668	0
35	Optimiz ed	200.75	0.46662495	-48.181729	278.45978	118.19916	0
36	Optimiz ed	201.3967 5	0.95771895	-82.319698	239.75159	101.76851	0
37	Optimiz ed	202.378	1.64428	-130.45941	194.25353	82.455731	0
38	Optimiz ed	203.5354	2.357983	-181.24743	141.01228	59.856163	0
39	Optimiz ed	204.6812 5	3.0147895	-228.42567	84.604342	35.912412	0
40	Optimiz ed	205.8271	3.6715965	-275.59613	28.202435	11.971224	0

Slices of Slip Surface: **18888**

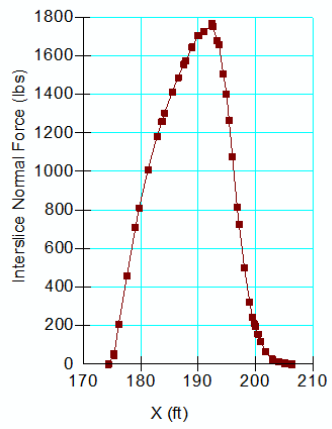
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	18888	174.9962	-8.090704	529.8259	541.32583	4.8814283	0
2	18888	175.9525	-8.100541	530.43391	575.48364	19.122477	0
3	18888	177.0575	-8.0880015	529.6504	588.91862	25.157869	0
4	18888	178.32235	-8.037413	526.49767	601.3231	31.761511	0
5	18888	179.42735	-7.9695035	522.25881	610.88678	37.620341	0
6	18888	180.3725	-7.8841445	516.93302	616.80388	42.392665	0
7	18888	181.4775	-7.7603495	509.20151	621.06726	47.484191	0
8	18888	182.5825	-7.608282	499.71408	622.26215	52.018572	0

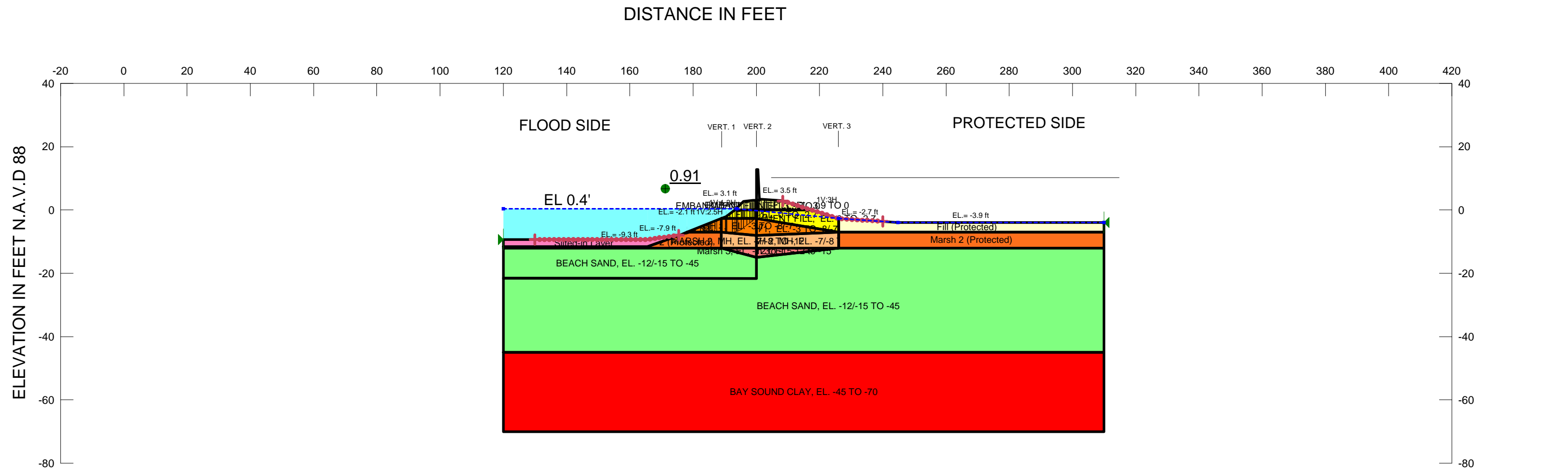
9	18888	183.6875	-7.427646	488.44372	620.43145	56.025467	0
10	18888	185.03135	-7.1650725	472.05825	613.08443	59.862062	0
11	18888	186.25705	-6.896462	455.29626	602.39938	62.441571	0
12	18888	187.1257	-6.6800465	441.79668	591.50236	63.546294	0
13	18888	188.15	-6.3986005	424.2363	573.60679	63.40401	0
14	18888	189.33	-6.0435295	402.07636	557.15684	65.827757	0
15	18888	190.51	-5.6521085	377.65001	537.10295	67.683757	0
16	18888	191.8119	-5.1746255	347.85563	525.21386	75.284101	0
17	18888	192.5619	-4.886676	329.89335	521.90011	81.502036	0
18	18888	193	-4.704739	316.37065	540.48191	95.129586	0
19	18888	193.92	-4.307708	286.62675	569.90428	120.24418	0
20	18888	194.5237	-4.0386145	266.57809	586.62907	135.85358	0
21	18888	195.3037	-3.662159	238.87683	624.14598	163.53705	0
22	18888	196.7744	-2.912159	184.12845	619.13805	184.65062	0
23	18888	198.2744	-2.0768905	123.90847	541.63747	177.31544	0
24	18888	199.5	-1.340119	71.310762	467.27563	168.07711	0
25	18888	200.25	-0.86253	37.457562	415.86992	160.62652	0
26	18888	200.75	-0.52977625	13.993449	380.47026	155.56018	0
27	18888	201.02185	-0.34594925	1.0540937	361.02043	152.79664	0
28	18888	201.55925	0.03419345	-25.569834	326.19406	138.46116	0
29	18888	202.5903	0.78730795	-78.130207	259.40593	110.11128	0
30	18888	203.62135	1.58764	-133.64235	191.03774	81.090712	0
31	18888	204.70265	2.482793	-195.34212	117.60324	49.919615	0
32	18888	205.8342	3.482793	-263.85496	39.143182	16.615295	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. 3.9 TO 0 Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -3 TO -8/-7 Model: Mohr-Coulomb Unit Weight: 86 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -12/-15 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: EMBANKMENT FILL, EL. 0 TO -2.7 Model: Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2, MH, EL. -7/-8 TO -12 Model: Mohr-Coulomb Unit Weight: 97 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 3, EL. -12 to -15 Model: Mohr-Coulomb Unit Weight: 89 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 2 (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.66.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 28 STA. 58+50 TO STA. 68+12
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 242
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 2:41:02 PM
File Name: Reach 28_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 2:46:00 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Fn: Clay
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL, EL. 0 TO -2.7

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -7/-8 TO -12

Model: Mohr-Coulomb
Unit Weight: 97 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 3, EL. -12 to -15

Model: Mohr-Coulomb
Unit Weight: 89 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 3.9 TO 0

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3 TO -8/-7

Model: Mohr-Coulomb
Unit Weight: 86 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12/-15 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -45 TO -70

Model: Spatial Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -9.3) ft
Left-Zone Right Coordinate: (175.4, -7.9549) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (208.4, 2.87403) ft
Right-Zone Right Coordinate: (240, -3.59198) ft
Right-Zone Increment: 20
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -9.3) ft
Right Coordinate: (310, -3.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
193.8	0.4
226.1	-2.7
244.8	-3.9
310	-3.9

Unit Weight Functions

Clay
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (123.4, 112)
Data Point: (188.9, 112)
Data Point: (200, 106)
Data Point: (226.1, 112)
Data Point: (310, 112)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -12/-15 TO -45	26,11,15,27,30	747.35
Region 2	BEACH SAND, EL. -12/-15 TO -45	9,15,11,26,31,28,10	5466.85
Region 3	BAY SOUND CLAY, EL. -45 TO -70	16,9,10,17	4750
Region 4		5,19,6,20,21	7.375
Region 5	Marsh 2 (Protected)	39,2,35,32,30,27,38	105.67052
Region 6	EMBANKMENT FILL, EL. 3.9 TO 0	5,19,6,18,29,22	40.13948
Region 7	EMBANKMENT FILL, EL. 0 TO -2.7	22,29,13,33,23	115.01053
Region 8	MARSH 1, EL. -3 TO -8/-7	24,23,33	69.165
Region 9	MARSH 1, EL. -3 TO -8/-7	32,37,35	23.294132
Region 10	MARSH 2, MH, EL. -7/-8 TO -12	24,33,31,25,36	117.45
Region 11	Marsh 3, EL. -12 to -15	26,31,25	39.15
Region 12	Fill (Protected)	7,8,34,33,13	271.31
Region 13	Marsh 2 (Protected)	31,33,34,28	419.5
Region 14	EMBANKMENT FILL, EL. 3.9 TO 0	5,40,12,4,22	15.445
Region 15	EMBANKMENT FILL, EL. 0 TO -2.7	22,4,3,37,23	23.328102
Region 16	Marsh 3, EL. -12 to -15	26,25,30	16.65
Region 17	MARSH 2, MH, EL. -7/-8 TO -12	25,36,24,32,30	49.95
Region 18	MARSH 1, EL. -3 TO -8/-7	24,23,37,32	53.302231
Region 19	Silted-in Layer	38,1,14,2,39	116.61

Points

	X (ft)	Y (ft)
Point 1	120	-9.3
Point 2	175.8	-7.9
Point 3	190.4	-2.1
Point 4	193.3	0
Point 5	200	3.1
Point 6	201	3.5
Point 7	244.8	-3.9
Point 8	310	-3.9
Point 9	120	-45
Point 10	310	-45
Point 11	200	-21.6
Point 12	196	2.7
Point 13	226.1	-2.7
Point 14	165.6	-9.3
Point 15	120	-21.5
Point 16	120	-70
Point 17	310	-70
Point 18	208	3
Point 19	201	3.1
Point 20	200.5	12.8
Point 21	200	12.8
Point 22	200	0
Point 23	200	-2.7
Point 24	200	-8
Point 25	200	-12
Point 26	200	-15
Point 27	120	-12
Point 28	310	-12
Point 29	217.52632	0
Point 30	188.9	-12
Point 31	226.1	-12
Point 32	188.9	-7
Point 33	226.1	-7

Point 34	310	-7
Point 35	178.06552	-7
Point 36	200	-11.9
Point 37	188.88966	-2.7
Point 38	120	-11.6
Point 39	165.6	-11.6
Point 40	199	3.1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.91	(179.58, 35.003)	18.50175	(208.4, 2.87404)	(172.439, -8.36136)
2	19539	1.04	(179.58, 35.003)	43.161	(208.4, 2.87403)	(175.4, -7.9549)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	172.99625	-8.285429	541.97518	542.03737	0.033071237	0
2	Optimiz ed	174.11135	-8.1335655	532.49443	532.60994	0.061418012	0
3	Optimiz ed	175.23445	-7.980619	522.9467	523.10439	0.083844314	0
4	Optimiz ed	175.8268	-7.899957	517.92297	529.7259	5.010047	0
5	Optimiz ed	176.40655	-7.8009985	511.74076	526.06864	6.0818267	0
6	Optimiz ed	177.5125	-7.6103755	499.8454	522.30846	9.5350032	0
7	Optimiz ed	178.44625	-7.449442	489.80351	517.12339	11.596598	0
8	Optimiz ed	179.6804	-7.289545	479.82679	515.16332	14.999468	0

9	Optimiz ed	181.4246	-7.145705	470.8527	519.17934	20.513442	0
10	Optimiz ed	182.93515	-7.0927985	467.54841	530.73478	26.821019	0
11	Optimiz ed	184.17465	-7.086115	467.13696	541.02111	31.361963	0
12	Optimiz ed	185.4141	-7.0794315	466.71744	551.30745	35.906331	0
13	Optimiz ed	186.74775	-7.083446	466.96536	565.06857	41.642339	0
14	Optimiz ed	188.1757	-7.0981575	467.88274	579.3124	47.299086	0
15	Optimiz ed	189.55675	-7.112386	468.77448	596.7706	54.331132	0
16	Optimiz ed	190.3119	-7.1201665	469.26103	608.9465	59.292965	0
17	Optimiz ed	190.54295	-7.122547	469.42347	619.21789	63.58396	0
18	Optimiz ed	191.58115	-7.0566	465.29217	630.44398	70.102788	0
19	Optimiz ed	192.8882	-6.91269	456.31597	637.27853	76.814048	0
20	Optimiz ed	193.5	-6.799051	449.21649	646.73803	83.84292	0
21	Optimiz ed	193.75	-6.752615	446.32604	656.20625	89.088863	0
22	Optimiz ed	193.9657	-6.712549	442.8344	675.3321	98.689419	0
23	Optimiz ed	194.70925	-6.40318	419.06922	676.77571	109.38991	0
24	Optimiz ed	195.64355	-5.8468145	378.76097	669.11635	123.24855	0
25	Optimiz ed	196.49195	-5.1856715	332.42447	651.1399	135.28667	0
26	Optimiz ed	197.4758	-4.4189365	278.68659	601.73921	137.1277	0
27	Optimiz ed	198.2782	-3.7935995	234.85676	561.4461	138.62895	0

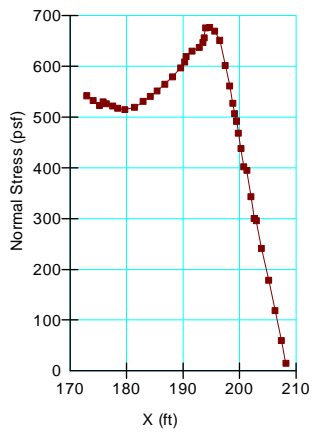
28	Optimized	198.79435	-3.381025	206.03127	527.61596	136.5046	0
29	Optimized	199.15245	-3.08394	185.34341	506.72346	136.41774	0
30	Optimized	199.4673	-2.82873	167.53223	491.97542	137.71796	0
31	Optimized	199.81485	-2.553223	148.25999	468.70735	136.02183	0
32	Optimized	200.25	-2.208268	124.12811	437.63549	133.07599	0
33	Optimized	200.75	-1.811912	96.401117	401.93254	129.69039	0
34	Optimized	201.2728	-1.397482	67.410011	394.76789	138.95518	0
35	Optimized	202.04	-0.8097594	26.141064	342.70731	134.3744	0
36	Optimized	202.6365	-0.3615844	-5.3976124	299.83472	127.27229	0
37	Optimized	202.96405	-0.14244	-21.033144	295.82898	125.57195	0
38	Optimized	203.90175	0.450005	-63.620669	240.82678	102.2249	0
39	Optimized	205.17835	1.1942545	-117.70187	178.39901	75.725888	0
40	Optimized	206.307	1.7827435	-161.18604	118.93529	50.485037	0
41	Optimized	207.43565	2.371233	-204.67021	59.46529	25.241518	0
42	Optimized	208.2	2.7697565	-234.11624	14.865639	6.3100892	0

Slices of Slip Surface: 19539

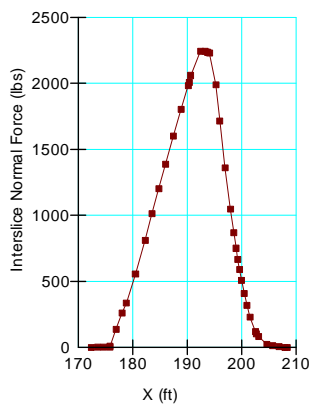
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	19539	175.4985	-7.9642615	521.94456	533.91831	6.3665583	0
2	19539	175.6985	-7.9827845	523.06486	536.46168	5.6866128	0
3	19539	176.3664	-8.034243	526.29865	561.97036	15.141744	0

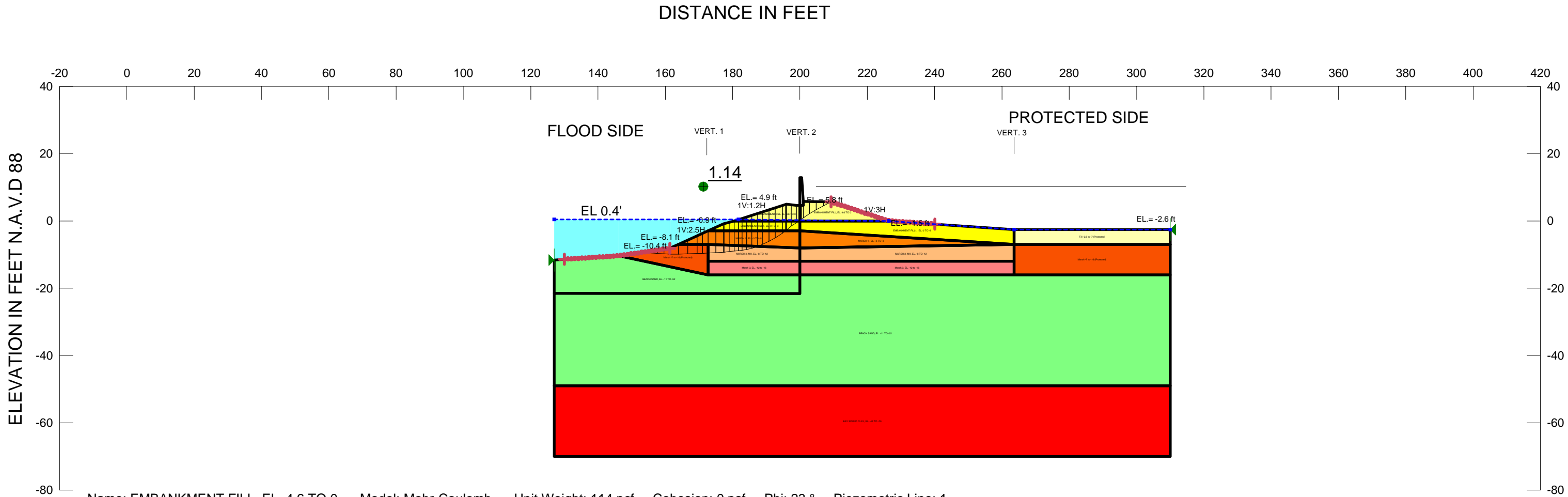
4	19539	177.49915	-8.1038815	530.64205	584.39491	22.816739	0
5	19539	178.6067	-8.143436	533.10785	599.76595	28.294688	0
6	19539	179.6891	-8.1542815	533.78689	608.46236	31.697857	0
7	19539	180.77155	-8.1379705	532.77209	614.22554	34.57494	0
8	19539	181.854	-8.0944715	530.05806	617.10331	36.948516	0
9	19539	182.9364	-8.023703	525.64147	617.13067	38.834858	0
10	19539	184.0188	-7.9255295	519.51692	614.34463	40.251976	0
11	19539	185.1012	-7.7997625	511.66366	608.76999	41.21919	0
12	19539	186.1836	-7.646158	502.07658	600.43221	41.749487	0
13	19539	187.266	-7.464413	490.73726	589.34653	41.857152	0
14	19539	188.34845	-7.2541645	477.61586	575.51087	41.553968	0
15	19539	189.1152	-7.090783	467.42815	565.29917	41.54378	0
16	19539	189.87035	-6.9096615	456.12314	558.70111	43.541766	0
17	19539	190.88335	-6.648457	439.82353	557.99103	50.15913	0
18	19539	191.85	-6.3739655	422.69306	556.50603	56.800234	0
19	19539	192.81665	-6.0748945	404.03185	552.67115	63.093637	0
20	19539	193.5	-5.8510055	390.05549	552.22562	68.837137	0
21	19539	193.75	-5.7654825	384.72437	557.09941	73.16886	0
22	19539	194.35	-5.547777	367.85018	595.51856	96.639491	0
23	19539	195.45	-5.129962	335.19067	662.35008	138.87093	0
24	19539	196.49195	-4.7029455	302.3012	680.43019	160.50623	0
25	19539	197.4758	-4.2692505	269.34763	651.83753	162.35733	0
26	19539	198.48385	-3.793598	233.6285	619.88581	163.9565	0
27	19539	199.5	-3.281959	195.61557	578.90712	162.69761	0
28	19539	200.2268	-2.898266	167.32259	544.2989	160.01695	0
29	19539	200.4768	-2.761879	157.31418	532.22592	159.14059	0
30	19539	200.75	-2.608317	146.09714	516.20698	157.10231	0
31	19539	201.50135	-2.171966	114.36784	503.23396	165.06388	0
32	19539	202.50405	-1.562014	70.301977	434.13161	154.43652	0
33	19539	203.50675	-0.91371175	23.843336	362.19428	143.62145	0
34	19539	204.41995	-0.28986275	-20.554188	298.25067	126.5999	0
35	19539	205.35985	0.39331875	-68.812906	232.95055	98.881642	0
36	19539	206.4159	1.2059128	-125.84353	156.1142	66.266547	0
37	19539	207.47195	2.07243	-186.23891	77.530302	32.909661	0
38	19539	208.2	2.6968525	-229.57034	19.025445	8.0758223	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. 4.6 TO 0 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -3 TO -8 Model: Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -11 TO -52 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Clay Gamma Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL1, EL. 0 TO -3 Model: Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, MH, EL. -8 TO -12 Model: Mohr-Coulomb Unit Weight: 97 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh 3, EL. -12 to -16 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill -2.6 to -7 (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh -7 to -16 (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 0.97.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 29 STA. 69+09 TO STA. 70+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 257
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 3:14:38 PM
File Name: Reach 29_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 3:18:04 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Spatial Fn: Clay Gamma
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL1, EL. 0 TO -3

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Mohr-Coulomb
Unit Weight: 97 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 3, EL. -12 to -16

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill -2.6 to -7 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh -7 to -16 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.6 TO 0

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3 TO -8

Model: Mohr-Coulomb
Unit Weight: 93 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -11 TO -52

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -45 TO -70

Model: Spatial Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -11.41152) ft
Left-Zone Right Coordinate: (161.3, -8.12987) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (209.2, 5.60241) ft
Right-Zone Right Coordinate: (240.10883, -0.95814) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (127, -11.6) ft
Right Coordinate: (310, -2.6) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
127	0.4
181.7	0.4
226.4	0
263.6	-2.6
310	-2.6

Spatial Functions

Clay Gamma

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (127.5, -49, 112)
Data Point: (127.5, -70, 112)

Data Point: (172.7, -49, 112)
Data Point: (172.7, -70, 112)
Data Point: (200, -49, 106)
Data Point: (200, -70, 106)
Data Point: (231, -49, 112)
Data Point: (231, -70, 112)
Data Point: (310, -49, 112)
Data Point: (310, -70, 112)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -11 TO -52	25,10,14,1,13,27	575.13
Region 2	BEACH SAND, EL. -11 TO -52	8,14,10,25,28,26,9	5633.85
Region 3	BAY SOUND CLAY, EL. -45 TO -70	15,8,9,16	3843
Region 4		4,18,5,19,20	6.45
Region 5	Marsh -7 to -16 (Protected)	13,2,38,29,37,27	128.94137
Region 6	EMBANKMENT FILL, EL. 4.6 TO 0	4,18,5,17,33,21	99.79
Region 7	EMBANKMENT FILL1, EL. 0 TO -3	21,33,6,30,22	269.64
Region 8	MARSH 1, EL. -3 TO -8	23,22,30	159
Region 9	MARSH 2, MH, EL. -8 TO -12	23,30,34,24,39	286.2
Region 10	Marsh 3, EL. -12 to -16	25,28,34,24	254.4
Region 11	Fill -2.6 to -7 (Protected)	6,7,31,30	204.16
Region 12	Marsh -7 to -16 (Protected)	28,34,30,31,26	417.6
Region 13	EMBANKMENT FILL, EL. 4.6 TO 0	4,32,11,36,21	56.9916
Region 14	EMBANKMENT FILL1, EL. 0 TO -3	21,36,3,35,22	71.5206
Region 15	Marsh 3, EL. -12 to -16	25,24,37,27	109.2
Region 16	MARSH 2, MH, EL. -8 TO -12	24,39,23,29,37	122.85
Region 17	MARSH 1, EL. -3 TO -8	23,22,35,38,29	140.41862

Points

	X (ft)	Y (ft)
Point 1	127	-11.6
Point 2	161.5	-8.1
Point 3	177.3	-0.9
Point 4	200	4.6
Point 5	201	5.8

Point 6	263.6	-2.6
Point 7	310	-2.6
Point 8	127	-49
Point 9	310	-49
Point 10	200	-21.6
Point 11	196	4.9
Point 12	231	-1.5
Point 13	146.1	-10.4
Point 14	127	-21.5
Point 15	127	-70
Point 16	310	-70
Point 17	209.3	5.6
Point 18	201	4.6
Point 19	200.5	12.8
Point 20	200	12.8
Point 21	200	0
Point 22	200	-3
Point 23	200	-8
Point 24	200	-12
Point 25	200	-16
Point 26	310	-16
Point 27	172.7	-16
Point 28	263.6	-16
Point 29	172.7	-7
Point 30	263.6	-7
Point 31	310	-7
Point 32	199	4.6
Point 33	226.4	0
Point 34	263.6	-12
Point 35	172.7	-3
Point 36	180.432	0
Point 37	172.7	-12
Point 38	163.91569	-7
Point 39	200	-8.3

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.14	(168.693, 49.439)	27.36597	(209.2, 5.60241)	(152.687, -9.41618)
2	16282	1.19	(168.693, 49.439)	59.687	(209.2, 5.60241)	(156.107, -8.90537)

Slides of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz ed	153.50625	-9.45321	614.84846	636.5002	9.1906189	0
2	Optimiz ed	155.1442	-9.527274	619.48376	653.69961	14.523767	0
3	Optimiz ed	156.78215	-9.601338	624.05807	670.89902	19.882804	0
4	Optimiz ed	158.5758	-9.699098	630.18369	693.36077	26.817079	0
5	Optimiz ed	160.52525	-9.820554	637.76085	717.42336	33.814729	0
6	Optimiz ed	161.5094	-9.881866	641.58285	750.81109	46.364638	0
7	Optimiz ed	162.71725	-9.866597	640.63575	758.48403	50.023626	0
8	Optimiz ed	165.30155	-9.832412	638.50082	792.25473	65.264663	0
9	Optimiz ed	168.089	-9.765435	634.3167	817.60257	77.800236	0
10	Optimiz ed	170.29295	-9.681308	629.10388	835.42256	87.577084	0
11	Optimiz ed	171.89765	-9.6103435	624.6214	848.62098	95.082181	0
12	Optimiz ed	173.86615	-9.5232905	619.21467	862.42863	103.2382	0
13	Optimiz	176.1661	-9.3859605	610.6358	881.94155	115.16246	0

	ed	5					
14	Optimiz ed	177.3808	-9.2940905	604.91294	891.50002	121.649	0
15	Optimiz ed	178.2042	-9.217264	600.11569	888.9163	122.58858	0
16	Optimiz ed	179.6894	-9.075832	591.29489	891.46333	127.41394	0
17	Optimiz ed	181.066	-8.9447425	583.11141	896.65362	133.09077	0
18	Optimiz ed	182.24445	-8.8325245	575.80733	914.98703	143.97324	0
19	Optimiz ed	183.50035	-8.6310625	562.53348	912.70532	148.63912	0
20	Optimiz ed	184.92325	-8.3318275	543.06345	932.71867	165.39883	0
21	Optimiz ed	186.5358	-7.861011	512.78888	907.61176	167.59237	0
22	Optimiz ed	188.1326	-7.291826	476.38035	907.34924	182.93544	0
23	Optimiz ed	189.7874	-6.5496275	429.1405	858.14197	182.10032	0
24	Optimiz ed	191.7056	-5.5612025	366.3902	831.40323	197.38632	0
25	Optimiz ed	193.7627	-4.331305	288.49755	754.4593	197.78903	0
26	Optimiz ed	195.2436	-3.29781	223.18083	689.06605	197.75654	0
27	Optimiz ed	195.81325	-2.854725	195.21329	667.34836	200.40945	0
28	Optimiz ed	196.7222	-2.147705	150.58969	603.64845	192.31204	0
29	Optimiz ed	198.2222	-1.0460199	81.00514	507.13759	180.88249	0
30	Optimiz ed	199.3645	-0.2530399	30.8865	429.105	169.03372	0
31	Optimiz ed	199.8645	0.09404785	8.9486211	397.15058	164.78196	0
32	Optimiz	200.0342	0.2118623	1.5021226	385.56599	163.02544	0

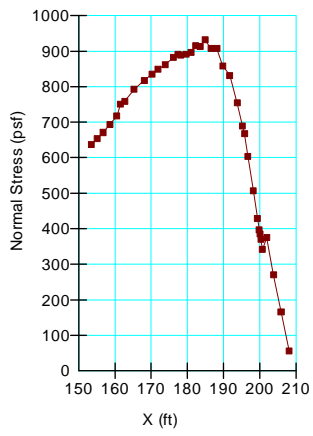
	ed	5					
33	Optimiz ed	200.2842 5	0.3854062	-9.4666547	370.06931	157.0851	0
34	Optimiz ed	200.75	0.70872735	-29.901633	341.68367	145.03611	0
35	Optimiz ed	201.9024	1.5087056	-80.461926	374.90032	159.13575	0
36	Optimiz ed	203.8068	2.751765	-159.0951	269.80635	114.526	0
37	Optimiz ed	205.9066	3.926895	-233.59594	165.78719	70.372487	0
38	Optimiz ed	208.1022	5.043905	-304.52233	55.261044	23.456921	0

Slices of Slip Surface: 16282

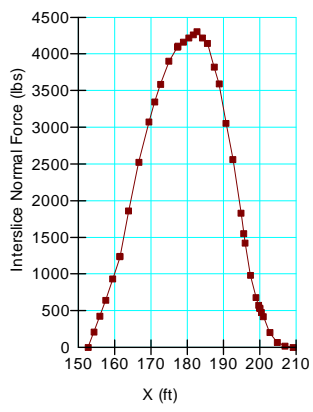
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	16282	157.00625	-9.0848375	591.879	632.14139	17.090372	0
2	16282	158.80375	-9.41532	612.50265	675.37689	26.688532	0
3	16282	160.60125	-9.6893245	629.57457	711.81282	34.908065	0
4	16282	162.70785	-9.934073	644.8286	779.264	57.06444	0
5	16282	164.79415	-10.11334	656.01778	824.76487	71.628888	0
6	16282	166.551	-10.202395	661.60598	852.33462	80.959506	0
7	16282	168.30785	-10.23961	663.89701	873.92616	89.152084	0
8	16282	170.0647	-10.22508	662.99594	889.76092	96.256024	0
9	16282	171.82155	-10.15877	658.8487	899.91309	102.32576	0
10	16282	173.46665	-10.051139	652.16459	898.80658	104.69331	0
11	16282	175	-9.908141	643.22995	905.92023	111.50541	0
12	16282	176.53335	-9.725067	631.80707	908.75119	117.55581	0
13	16282	178.083	-9.498721	617.68248	901.40312	120.43227	0
14	16282	179.649	-9.227748	600.76971	886.90223	121.45605	0
15	16282	181.066	-8.947168	583.26178	873.19534	123.0695	0
16	16282	182.5122	-8.6194965	562.36199	873.90694	132.24299	0
17	16282	184.13515	-8.208994	535.84353	883.51189	147.57646	0
18	16282	185.7567	-7.749888	506.28491	887.70491	161.90319	0

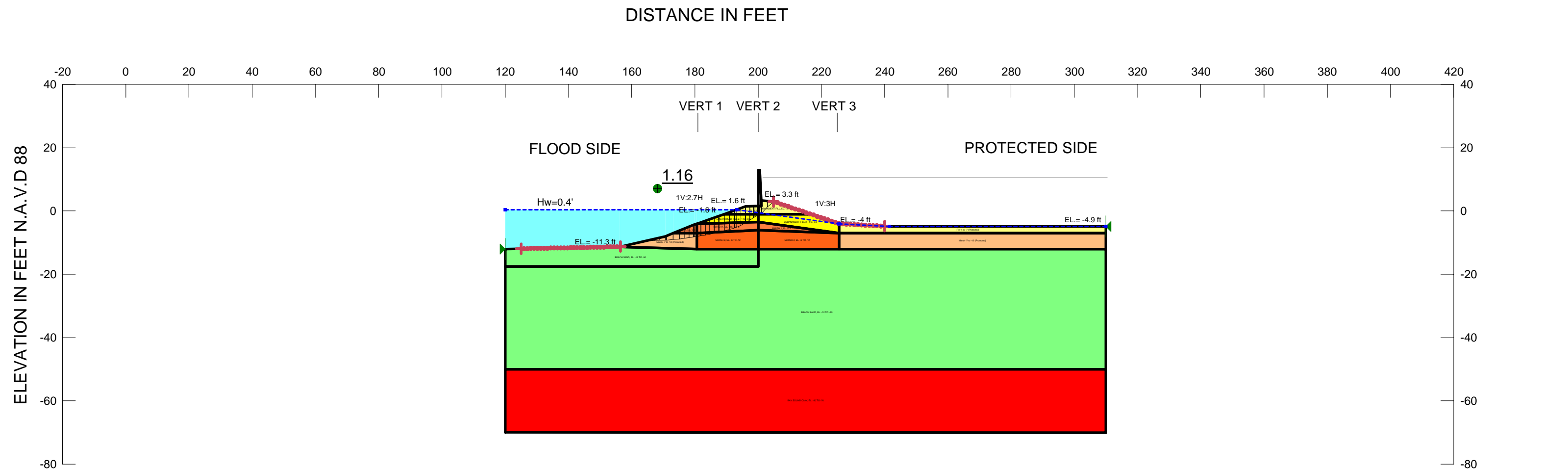
19	16282	187.51075	-7.194554	470.65606	887.16468	176.79742	0
20	16282	189.39725	-6.532226	428.27391	880.8192	192.09408	0
21	16282	191.28375	-5.7975425	381.37681	867.15128	206.19903	0
22	16282	193.17025	-4.9875685	329.78147	845.88234	219.07182	0
23	16282	195.05675	-4.098882	273.27178	816.8574	230.73841	0
24	16282	196.59965	-3.3172	223.63523	764.24549	229.47544	0
25	16282	198.09965	-2.4901515	171.18778	667.98269	210.87693	0
26	16282	199.5	-1.6789725	119.78807	577.89651	194.45549	0
27	16282	200.25	-1.221916	90.850184	532.3997	187.42665	0
28	16282	200.75	-0.90700765	70.919916	501.28797	182.6804	0
29	16282	201.5666	-0.37391265	37.199104	555.53019	220.01849	0
30	16282	202.29055	0.10716825	6.775208	505.42242	211.66319	0
31	16282	203.2919	0.81489775	-37.946254	434.29069	184.34546	0
32	16282	204.9799	2.061899	-116.70268	314.64197	133.55759	0
33	16282	206.66795	3.4045825	-201.43009	191.1205	81.125838	0
34	16282	208.356	4.851618	-292.66414	63.804501	27.083404	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. 1.6 TO -1 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -3.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -12 TO -50 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -50 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, -1 to -3.5 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill -4 to -7 (Protected) Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh -7 to -12 (Protected) Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, EL. -6 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 1.14.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 30 STA. 74+13 TO STA. 76+90
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: [Liljegren, James](#)
Revision Number: 281
Last Edited By: [Johnson, Andrew S MVN](#)
Date: 1/27/2012
Time: 6:28:05 AM
File Name: [Reach 30_S-Case.gsz](#)
Directory: [c:\documents and settings\b2edfjms\my documents\pw_working\cmvvn\d0443056\](#)
Last Solved Date: 1/27/2012
Last Solved Time: 6:32:30 AM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
 Apply Phreatic Correction: [No](#)
 PWP Conditions Source: [Piezometric Line](#)
 Use Staged Rapid Drawdown: [No](#)
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: [No](#)
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: [1](#)
 Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
 Tension Crack Option: [Search for Tension Crack](#)
 Percentage Wet: [0](#)
 Tension Crack Fluid Unit Weight: [62.4 pcf](#)

Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

EMBANKMENT FILL 2, -1 to -3.5

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill 2](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Fill -4 to -7 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [94 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Marsh -7 to -12 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [94 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

MARSH 2, EL. -6 TO -12

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 2](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(125, -11.90331\) ft](#)
Left-Zone Right Coordinate: [\(156.4, -11.25417\) ft](#)

FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced
 Number of Slices: [30](#)
 Optimization Tolerance: [0.01](#)
 Minimum Slip Surface Depth: [5 ft](#)
 Optimization Maximum Iterations: [4000](#)
 Optimization Convergence Tolerance: [1e-007](#)
 Starting Optimization Points: [8](#)
 Ending Optimization Points: [16](#)
 Complete Passes per Insertion: [1](#)
 Driving Side Maximum Convex Angle: [5 °](#)
 Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL, EL. 1.6 TO -1

Model: [Mohr-Coulomb](#)
Unit Weight: [112 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

MARSH 1, EL. -3.5 TO -6

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 1](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BEACH SAND, EL. -12 TO -50

Model: [Mohr-Coulomb](#)
Unit Weight: [122 pcf](#)
Cohesion: [0 psf](#)
Phi: [30 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
 Piezometric Line: [1](#)

BAY SOUND CLAY, EL. -50 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: [107 pcf](#)

Left-Zone Increment: [30](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(204.9, 2.96635\) ft](#)
Right-Zone Right Coordinate: [\(240, -4.81509\) ft](#)
Right-Zone Increment: [30](#)
Radius Increments: [30](#)

Slip Surface Limits

Left Coordinate: [\(120, -12\) ft](#)
Right Coordinate: [\(310, -4.9\) ft](#)

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
193.2	0.4
225.6	-4
241.5	-4.9
310	-4.9

Unit Weight Functions

Fill 2

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
 Curve Fit to Data: [100 %](#)
 Segment Curvature: [0 %](#)
Y-Intercept: [94](#)
Data Points: [X \(ft\), Unit Weight \(pcf\)](#)
 Data Point: [\(180.6, 94\)](#)
 Data Point: [\(200, 103\)](#)
 Data Point: [\(225.6, 94\)](#)

Marsh 2

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
 Curve Fit to Data: [100 %](#)
 Segment Curvature: [0 %](#)

Y-Intercept: 94
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.6, 94)
Data Point: (200, 96)
Data Point: (225.6, 94)

Marsh 1
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 94
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.6, 94)
Data Point: (200, 103)
Data Point: (225.6, 94)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -12 TO -50	14,12,11,34,8,10,9	6780
Region 2	BAY SOUND CLAY, EL. -50 TO -70	15,9,10,16	3790.5
Region 3	Marsh -7 to -12 (Protected)	1,13,32,31,35	74.070055
Region 4		21,18,24,23,22,4	8.9
Region 5	BEACH SAND, EL. -12 TO -50	20,1,35,11,12,14	461.21
Region 6	EMBANKMENT FILL 2, -1 to -3.5	28,17,27,26,25	40.414849
Region 7	EMBANKMENT FILL, EL. 1.6 TO -1	28,25,4,36,3	18.239396
Region 8	MARSH 1, EL. -3.5 TO -6	27,2,32,31	11.379148
Region 9	Fill -4 to -7 (Protected)	19,6,7,33,30	184.395
Region 10	Marsh -7 to -12 (Protected)	30,33,8,34	422
Region 11	MARSH 2, EL. -6 TO -12	30,34,11,37	140.8
Region 12	MARSH 2, EL. -6 TO -12	31,35,11,37	106.7
Region 13	EMBANKMENT FILL, EL. 1.6 TO -1	18,5,29,25,4,21	42.14142
Region 14	EMBANKMENT FILL 2, -1 to -3.5	29,25,26,30,19	95.428565
Region 15	MARSH 1, EL. -3.5 TO -6	26,37,30	32
Region 16	MARSH 1, EL. -3.5 TO -6	31,27,26,37	53.35

Points

	X (ft)	Y (ft)
--	--------	--------

Point 1	156.2	-11.3
Point 2	179.8	-4.3
Point 3	196	1.4
Point 4	200	1.6
Point 5	204.8	3
Point 6	241.5	-4.9
Point 7	310	-4.9
Point 8	310	-12
Point 9	120	-50
Point 10	310	-50
Point 11	200	-12
Point 12	200	-17.5
Point 13	170.6	-8
Point 14	120	-17.5
Point 15	120	-69.9
Point 16	310	-70
Point 17	187.5	-1.6
Point 18	201	3.3
Point 19	225.6	-4
Point 20	120	-12
Point 21	201	1.6
Point 22	200	12.9
Point 23	200.3	12.9
Point 24	200.5	12.9
Point 25	200	-1
Point 26	200	-3.5
Point 27	180.6	-4
Point 28	189.21717	-1
Point 29	216.68571	-1
Point 30	225.6	-7
Point 31	180.6	-7
Point 32	173.05989	-7
Point 33	310	-7
Point 34	225.6	-12
Point 35	180.6	-12
Point 36	199	1.6

Point 37	200	-6
----------	-----	----

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.16	(163.084, 55.767)	22.07338	(204.9, 2.96635)	(160.381, -10.3419)
2	28838	1.26	(163.084, 55.767)	67.353	(204.9, 2.96635)	(156.4, -11.2542)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	160.513	-10.316975	668.73684	670.92966	0.93079836	0
2	Optimized	161.3462	-10.15354	658.54143	661.03246	1.0573793	0
3	Optimized	162.7482	-9.876535	641.25817	644.98072	1.5801286	0
4	Optimized	164.31405	-9.612065	624.74219	633.7815	3.8369595	0
5	Optimized	166.12165	-9.398285	611.43493	629.07196	7.4864785	0
6	Optimized	167.9483	-9.282011	604.17563	634.53707	12.887665	0
7	Optimized	169.7161	-9.2250935	600.61367	641.66098	17.423548	0
8	Optimized	170.80395	-9.1900675	598.4299	654.58553	23.836652	0
9	Optimized	172.0339	-9.0930135	592.35454	656.19212	27.097447	0
10	Optimized	174.0798	-8.9125785	581.09722	663.33672	34.908594	0
11	Optimized	175.8444	-8.7185535	569.00012	661.59603	39.304635	0
12	Optimized	177.3338	-8.5104	556.0077	659.48826	43.924891	0

	ed	5					
13	Optimized	178.82335	-8.3022465	543.02193	657.38048	48.542325	0
14	Optimized	179.68405	-8.179138	535.33232	653.66625	50.229773	0
15	Optimized	180.2	-8.094454	530.05789	650.91583	51.30115	0
16	Optimized	181.2685	-7.919084	519.11358	646.18319	53.937847	0
17	Optimized	182.60545	-7.699648	505.41463	641.68084	57.841574	0
18	Optimized	183.97825	-7.441517	489.30764	629.96917	59.707278	0
19	Optimized	185.38695	-7.1446915	470.78894	619.98741	63.330994	0
20	Optimized	186.79565	-6.847866	452.2633	610.45716	67.149311	0
21	Optimized	187.67315	-6.6629655	440.73264	604.7748	69.631766	0
22	Optimized	188.53175	-6.482053	429.43931	599.1036	72.018218	0
23	Optimized	189.25605	-6.329444	419.91179	594.55277	74.130698	0
24	Optimized	190.10915	-6.0881425	404.85727	579.35423	74.069566	0
25	Optimized	191.73765	-5.6219075	375.76559	563.86386	79.842977	0
26	Optimized	192.87595	-5.255935	352.93298	536.53065	77.932589	0
27	Optimized	193.88175	-4.843565	321.42225	527.83223	87.615842	0
28	Optimized	195.28175	-4.10837	263.67997	484.6487	93.795657	0
29	Optimized	196.04075	-3.6268415	227.19913	463.70384	100.39029	0
30	Optimized	196.68895	-3.2156095	196.05186	429.84475	99.239198	0
31	Optimized	197.9038	-2.444843	137.66097	365.85874	96.864207	0

	ed						
32	Optimiz ed	198.7556	-1.9285865	98.224336	331.59889	99.061623	0
33	Optimiz ed	199.5	-1.529946	67.041618	295.17706	96.837749	0
34	Optimiz ed	200.15	-1.181849	39.813571	261.85746	94.252039	0
35	Optimiz ed	200.3948	-1.0507595	29.558087	249.27734	93.265288	0
36	Optimiz ed	200.7434	-0.864075	14.955173	230.34408	91.427167	0
37	Optimiz ed	200.9986	-0.7267092	4.2207763	183.72104	76.193342	0
38	Optimiz ed	201.0284	-0.6961235	2.0595139	314.11026	132.45768	0
39	Optimiz ed	202.0396 5	0.3408707	-71.217517	225.90988	95.893054	0
40	Optimiz ed	203.9112 5	2.114455	-197.74867	79.074749	33.56524	0
41	Optimiz ed	204.85	2.9232685	-256.17637	4.9566271	2.1039634	0

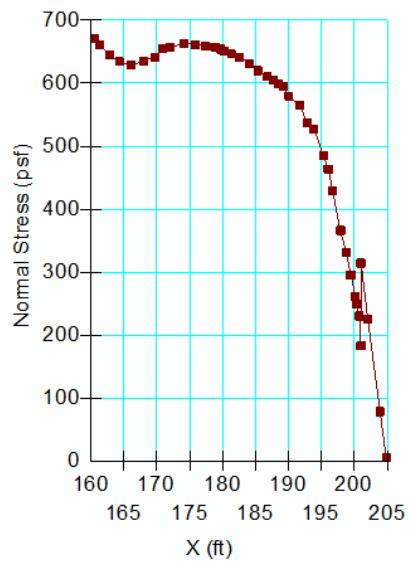
Slices of Slip Surface: **28838**

	Slip Surfa ce	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	2883 8	156.7962 5	-11.29132	729.53497	748.83245	8.1912917	0
2	2883 8	157.9851 5	-11.38865	735.60214	767.68055	18.520483	0
3	2883 8	159.5704 5	-11.49024	741.94323	789.3777	27.386307	0
4	2883 8	161.1557 5	-11.55435	745.92892	806.01939	34.693249	0
5	2883 8	162.741	-11.581085	747.61309	817.69393	40.461193	0
6	2883 8	164.3262 5	-11.570495	746.92759	824.50261	44.787957	0

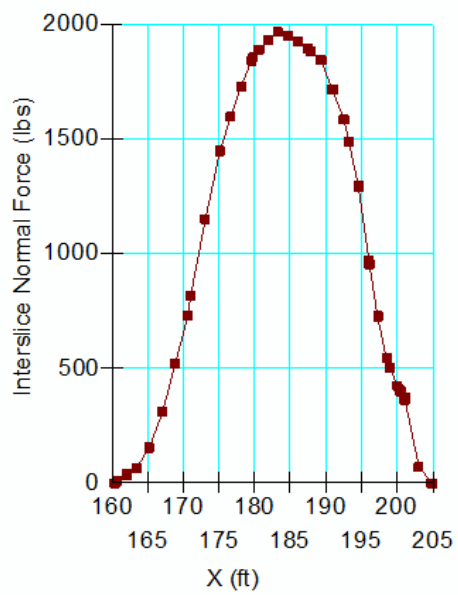
7	2883 8	166.0324 5	-11.515835	743.55866	828.04153	35.860853	0
8	2883 8	167.8595	-11.41086	736.99342	828.87874	39.003004	0
9	2883 8	169.6865	-11.255925	727.34146	824.8977	41.41017	0
10	2883 8	171.2149 5	-11.09114	717.04945	826.79046	46.582299	0
11	2883 8	172.4449	-10.930035	706.99678	824.87923	50.03813	0
12	2883 8	173.9024	-10.7066	693.06548	819.11998	53.506963	0
13	2883 8	175.5874	-10.410295	674.58149	808.93797	57.030942	0
14	2883 8	177.2724 5	-10.069537	653.29825	794.56291	59.963287	0
15	2883 8	178.9575	-9.68363	629.22572	775.94893	62.280308	0
16	2883 8	180.2	-9.3741925	609.9095	759.20429	63.371875	0
17	2883 8	181.4625	-9.024433	588.10177	739.18453	64.130827	0
18	2883 8	183.1875	-8.510014	555.99049	709.96816	65.359641	0
19	2883 8	184.9125	-7.944744	520.71417	676.79844	66.253844	0
20	2883 8	186.6375	-7.327255	482.18087	639.50078	66.778339	0
21	2883 8	188.0200 5	-6.7979945	449.15923	606.99728	66.998277	0
22	2883 8	188.8786 5	-6.450365	427.46179	584.99368	66.868317	0
23	2883 8	190.2063 5	-5.874779	391.54441	551.04092	67.702249	0
24	2883 8	192.1977 5	-4.95903	334.40352	496.3623	68.747424	0
25	2883 8	194.0174 5	-4.055819	271.11461	454.16859	77.701804	0

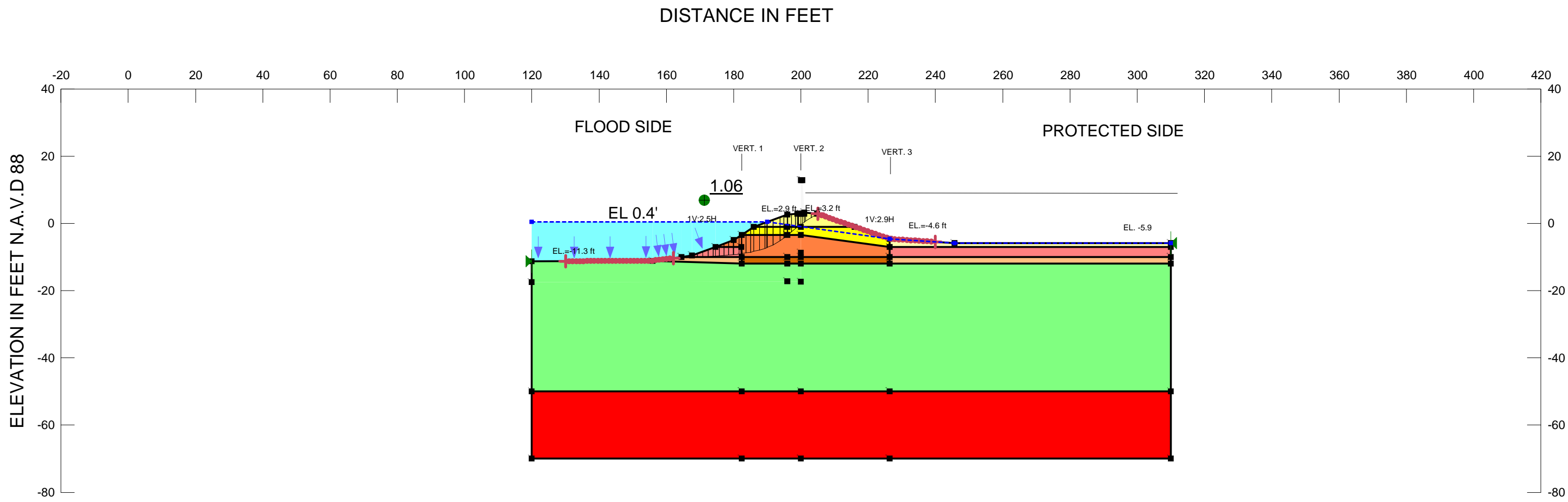
26	2883 8	195.4174 5	-3.314308	212.97934	429.48236	91.900079	0
27	2883 8	196.75	-2.562614	154.78207	380.46814	95.798055	0
28	2883 8	198.25	-1.6705425	86.410551	302.73827	91.825668	0
29	2883 8	199.1665 5	-1.105676	43.392575	252.06171	88.574793	0
30	2883 8	199.6665 5	-0.78429975	19.102363	219.01239	84.856772	0
31	2883 8	200.0285	-0.5498993	1.4084507	194.40005	81.920072	0
32	2883 8	200.1785	-0.45103225	-6.0318935	185.01013	78.532139	0
33	2883 8	200.4	-0.30431375	-17.064001	171.46418	72.782226	0
34	2883 8	200.75	- 0.069114975	-34.707202	149.85294	63.6088	0
35	2883 8	201.95	0.77090857	-97.292897	218.09667	92.576543	0
36	2883 8	203.85	2.1647945	-200.37159	79.541194	33.763234	0
37	2883 8	204.85	2.9268255	-256.39919	4.8789749	2.071002	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL 1, EL. 2.5 TO -1 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -3.5 TO -10 Model: Mohr-Coulomb Unit Weight: 92 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -12 TO -50 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -50 TO -70 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, -1 to -3.5 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill, EL -4 to -7 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1,-7 to -10 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2,-10 to -12 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -10 TO -12 Model: Mohr-Coulomb Unit Weight: 92 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 0.88.



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 31 STA. 76+90 TO STA. 83+73
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 287
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 6:35:13 AM
File Name: Reach 31_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 6:40:00 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, -1 to -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: Fill 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL -4 to -7 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1,-7 to -10 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2,-10 to -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -10 TO -12

Model: Mohr-Coulomb
Unit Weight: 92 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, EL. 2.5 TO -1

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -3.5 TO -10

Model: Mohr-Coulomb
Unit Weight: 92 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -50

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -50 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (129.9998, -11.24429) ft
Left-Zone Right Coordinate: (162.14, -10.3) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (205, 2.83036) ft
Right-Zone Right Coordinate: (240, -5.51606) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -11.3) ft
Right Coordinate: (310, -5.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
190	0.4
226.4	-4.6
245.7	-5.9
310	-5.9

Unit Weight Functions

Fill 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96

Data Points: X (ft), Unit Weight (pcf)
Data Point: (182.4, 96)
Data Point: (200, 103)
Data Point: (226.4, 96)

Regions

	Material	Points	Area (ft²)
Region 1	BAY SOUND CLAY, EL. -50 TO -70	5,3,46,9,49,4,6,50,48,47	3800
Region 2	MARSH 1,-7 to -10 (protected)	8,7,45,39	250.8
Region 3	Fill, EL -4 to -7 (protected)	1,11,12,7,8	104.505
Region 4	BEACH SAND, EL. -12 TO -50	3,13,14,15,10,2,4,49,9,46	6784
Region 5	BEACH SAND, EL. -12 TO -50	13,16,17,44,27,15,14	476.645
Region 6	MARSH, EL. -3.5 TO -10	20,26,21,37,51,52,41,40	114.725
Region 7	MARSH, EL. -3.5 TO -10	51,37,21,8,39	125.4
Region 8		23,34,29,30,25,24	7.675
Region 9	EMBANKMENT FILL 1, EL. 2.5 TO -1	23,24,25,31,32,33	41.03
Region 10	EMBANKMENT FILL 1, EL. 2.5 TO -1	23,34,38,22,35,36,33	33.15
Region 11	EMBANKMENT FILL 2, -1 to -3.5	20,35,36,33,21,26	39.5
Region 12	EMBANKMENT FILL 2, -1 to -3.5	21,33,32,1,8	93.48
Region 13	MARSH, EL. -3.5 TO -10	20,19,42,40	11.8163
Region 14	MARSH 1,-7 to -10 (protected)	40,42,18,43,41	35.76269
Region 15	MARSH 2,-10 to -12 (protected)	41,43,17,44	36.356
Region 16	MARSH 2,-10 to -12 (protected)	2,10,39,45	167.2
Region 17	MARSH, EL. -10 TO -12	15,51,39,10	52.8
Region 18	MARSH, EL. -10 TO -12	44,41,52,51,15,27	35.2

Points

	X (ft)	Y (ft)
Point 1	226.4	-4.6
Point 2	310	-12
Point 3	120	-50
Point 4	310	-50
Point 5	120	-70
Point 6	310	-70
Point 7	310	-7

Point 8	226.4	-7
Point 9	200	-50
Point 10	226.4	-12
Point 11	245.7	-5.9
Point 12	310	-5.9
Point 13	120	-17.5
Point 14	200	-17.4
Point 15	200	-12
Point 16	120	-11.3
Point 17	155.9	-11.1
Point 18	167.6	-9.6
Point 19	180	-5
Point 20	182.4	-3.5
Point 21	200	-3.5
Point 22	196	2.6
Point 23	200	2.8
Point 24	201	2.8
Point 25	201	3.2
Point 26	196	-3.5
Point 27	196	-12
Point 28	196	-17.2
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	204.8	2.9
Point 32	216	-1
Point 33	200	-1
Point 34	200	2.9
Point 35	186	-1
Point 36	196	-1
Point 37	200	-8.8
Point 38	199	2.9
Point 39	226.4	-10
Point 40	182.3	-7
Point 41	182.4	-10
Point 42	174.6087	-7
Point 43	164.48	-10

Point 44	182.4	-12
Point 45	310	-10
Point 46	182.4	-50
Point 47	182.4	-70
Point 48	200	-70
Point 49	226.4	-50
Point 50	226.4	-70
Point 51	200	-10
Point 52	196	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.06	(168.968, 43.93)	21.68003	(205, 2.83036)	(162.14, -10.3)
2	28839	1.11	(168.968, 43.93)	54.658	(205, 2.83036)	(162.14, -10.3)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	162.9019	-10.250805	664.63741	669.94194	2.2516375	0
2	Optimized	164.0719	-10.20026	661.45998	674.00601	5.3254734	0
3	Optimized	165.26	-10.196335	661.21413	678.77814	7.4554762	0
4	Optimized	166.82	-10.191185	660.89362	685.12425	10.285292	0
5	Optimized	167.63015	-10.18851	660.71659	702.40239	17.694572	0
6	Optimized	168.43915	-10.142615	657.83571	703.14403	19.232238	0
7	Optimized	169.99685	-10.051025	652.13212	712.69274	25.706457	0

8	Optimized	171.58015	-9.9476525	645.70927	720.23088	31.632546	0
9	Optimized	173.15245	-9.8351125	638.66987	727.93401	37.89038	0
10	Optimized	174.2645	-9.752904	633.54841	732.2851	41.911241	0
11	Optimized	175.182	-9.680274	629.01174	735.2004	45.074411	0
12	Optimized	176.44295	-9.5857765	623.11103	739.88542	49.567786	0
13	Optimized	177.8182	-9.48755	616.98219	744.52738	54.139722	0
14	Optimized	179.1934	-9.3893235	610.85335	749.24187	58.742445	0
15	Optimized	179.9405	-9.333453	607.36493	746.404	59.018583	0
16	Optimized	180.78985	-9.236998	601.34827	757.91216	66.457431	0
17	Optimized	181.93985	-9.088659	592.09618	755.89284	69.527553	0
18	Optimized	182.33365	-9.0245385	588.09157	752.18116	69.651898	0
19	Optimized	182.38365	-9.0163965	587.5872	748.35415	68.241521	0
20	Optimized	183.0643	-8.9055655	580.66472	753.29959	73.279155	0
21	Optimized	184.3929	-8.6892285	567.16624	761.10003	82.320007	0
22	Optimized	185.5286	-8.4569845	552.67489	750.29543	83.884939	0
23	Optimized	186.82745	-8.115122	531.34118	741.24458	89.098708	0
24	Optimized	188.4824	-7.6795475	504.16318	730.31728	95.99672	0
25	Optimized	189.5994	-7.342835	483.14558	699.10888	91.67098	0
26	Optimized	189.94445	-7.201088	474.30429	693.40799	93.004005	0

27	Optimiz ed	190.8713 5	-6.820318	443.0795	692.72971	105.97023	0
28	Optimiz ed	192.7703 5	-5.848455	366.15811	647.49304	119.41959	0
29	Optimiz ed	194.3364 5	-4.8309	289.24115	590.92071	128.05537	0
30	Optimiz ed	195.4133	-4.02362	229.6349	556.63708	138.80419	0
31	Optimiz ed	195.9758 5	-3.599564	198.3495	525.7969	138.99317	0
32	Optimiz ed	196.0468 5	-3.539574	193.99764	521.96449	139.21367	0
33	Optimiz ed	196.6768	-3.0072425	155.38252	480.03212	137.80558	0
34	Optimiz ed	197.843	-2.0217275	83.890189	401.38793	134.7698	0
35	Optimiz ed	198.7130 5	-1.318863	32.573029	358.44672	138.32518	0
36	Optimiz ed	199.0742 5	-1.054378	12.973566	336.5674	137.35743	0
37	Optimiz ed	199.2309	-0.93965285	4.4720316	325.58176	136.30299	0
38	Optimiz ed	199.6566 5	-0.62790095	-18.630768	298.34373	126.6394	0
39	Optimiz ed	200.25	-0.19343137	-50.826311	253.14724	107.45463	0
40	Optimiz ed	200.75	0.17269828	-77.959602	222.18156	94.310476	0
41	Optimiz ed	201.1911	0.49570155	-101.89452	227.41032	96.529954	0
42	Optimiz ed	202.2366 5	1.153987	-151.9339	172.8168	73.35638	0
43	Optimiz ed	203.9455 5	2.190681	-231.27293	68.897579	29.245287	0
44	Optimiz ed	204.9	2.7696925	-275.58512	8.4694138	3.5950529	0

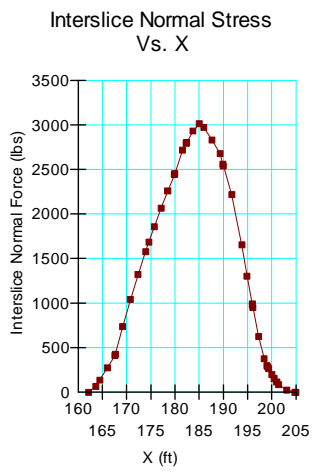
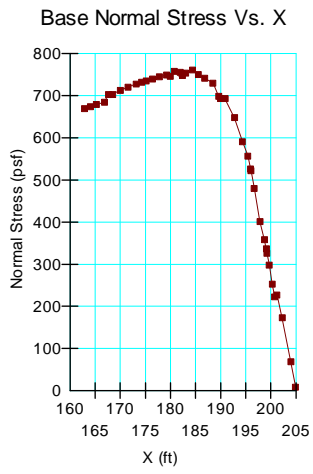
Slices of Slip Surface: **28839**

	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictional	Cohesi
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	Surfa ce				Normal Stress (psf)	Strength (psf)	ve Strengt h (psf)
1	2883 9	162.725	-10.36726	671.87282	689.44085	7.4571829	0
2	2883 9	163.895	-10.48905	679.47326	705.53124	11.060955	0
3	2883 9	165.26	-10.59662	686.17206	720.64374	14.632363	0
4	2883 9	166.82	-10.680335	691.38858	733.85575	18.026244	0
5	2883 9	168.3008 5	-10.719565	693.86465	758.78628	27.557598	0
6	2883 9	169.7026	-10.718695	693.80334	773.61119	33.876425	0
7	2883 9	171.1043 5	-10.68185	691.51105	784.63828	39.530165	0
8	2883 9	172.5061	-10.60896	686.95731	791.92019	44.554101	0
9	2883 9	173.9078 5	-10.499875	680.15534	795.52285	48.970602	0
10	2883 9	175.4214 5	-10.33961	670.16103	793.93006	52.536836	0
11	2883 9	177.0469	-10.12148	656.51572	786.54112	55.192509	0
12	2883 9	178.9298	-9.8015825	636.56434	771.57644	57.309234	0
13	2883 9	180.575	-9.478199	616.40181	763.3964	62.395503	0
14	2883 9	181.725	-9.215206	599.99036	754.60674	65.63076	0
15	2883 9	182.3343 5	-9.0685205	590.83064	745.43684	65.626435	0
16	2883 9	182.3843 5	-9.0558945	590.03383	741.17702	64.15648	0
17	2883 9	183	-8.892537	579.85535	738.53514	67.355574	0
18	2883	184.2	-8.5590265	559.04404	730.4475	72.756454	0

	g						
19	2883 9	185.4	-8.1957595	536.37892	720.21077	78.031994	0
20	2883 9	186.6481 5	-7.785022	510.74447	702.43605	81.368252	0
21	2883 9	187.9444 5	-7.3234515	481.94418	680.03475	84.084458	0
22	2883 9	189.2407 5	-6.82458	450.81207	654.28213	86.367919	0
23	2883 9	189.9444 5	-6.5425985	433.21765	640.39786	87.942781	0
24	2883 9	190.75	-6.193579	405.00905	636.00606	98.052414	0
25	2883 9	192.25	-5.51449	349.77587	624.37574	116.56073	0
26	2883 9	193.75	-4.779748	291.07298	606.84025	134.03525	0
27	2883 9	195.25	-3.9867895	228.73773	583.19851	150.45967	0
28	2883 9	196.0660 5	-3.537707	193.71897	566.81224	158.36869	0
29	2883 9	196.8491	-3.074717	158.11808	527.84401	156.93934	0
30	2883 9	198.2830 5	-2.193737	90.84954	452.4938	153.50888	0
31	2883 9	199.5	-1.40127	30.970981	379.62074	147.99304	0
32	2883 9	200.0466 5	-1.03225	3.2582393	334.10176	140.43474	0
33	2883 9	200.1014 5	-0.99434325	0.42294253	330.29232	140.02124	0
34	2883 9	200.3048	-0.85210425	-10.195682	317.07632	134.59091	0
35	2883 9	200.75	-0.5368358	-33.684508	288.19438	122.33126	0
36	2883 9	201.6333 5	0.11401425	-81.870405	259.4219	110.11806	0
37	2883	202.9	1.0877991	-153.49292	165.01634	70.04528	0

	g						
38	2883 9	204.1666 5	2.1226465	-228.9187	68.418942	29.042118	0
39	2883 9	204.9	2.743115	-273.92342	9.992329	4.241492	0



FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 281
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/21/2013
Time: 12:52:01 PM
File Name: Reach 32_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/21/2013
Last Solved Time: 12:55:07 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. 0 TO -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: FILL 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh EL. -7 to -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 95 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected) -4.5 to -7

Model: Mohr-Coulomb
Unit Weight: 85 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (125, -14.8187) ft
Left-Zone Right Coordinate: (144.6, -14.5) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (205.7, 2.612) ft
Right-Zone Right Coordinate: (240, -4.5) ft
Right-Zone Increment: 20
Radius Increments: 20

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.9 TO 0

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -3.5 TO -14

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -70

Model: Mohr-Coulomb
Unit Weight: 106 pcf

Slip Surface Limits

Left Coordinate: (120, -14.9) ft
Right Coordinate: (310, -4.5) ft

Piezometric Lines

Piezometric Line 1

Coordinates		
	X (ft)	Y (ft)
	120	0.4
	181.5	0.4
	230.4	-4.5
	310	-4.5

Unit Weight Functions

FILL 2

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 85
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (174, 85)
Data Point: (200, 105)
Data Point: (230.4, 85)

Marsh

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 95
Data Points: X (ft), Unit Weight (pcf)
Data Point: (174, 95)
Data Point: (200, 98)
Data Point: (230.4, 95)

Regions

	Material	Points	Area (ft²)
Region 1	Fill (Protected) -4.5 to -7	5,6,7,17	199
Region 2	BEACH SAND, EL. -12 TO -48	14,13,12,18,8,10,9	5368.1
Region 3	BAY SOUND CLAY, EL. -48 TO -70	15,9,10,16	4199
Region 4	Marsh EL. -7 to -12 (protected)	17,7,8,18	398
Region 5	EMBANKMENT FILL, EL. +2.9 TO 0	33,20,3,37,36,28,22	41.597439
Region 6	EMBANKMENT FILL, EL. +2.9 TO 0	28,25,4,21,22	24.8
Region 7	EMBANKMENT FILL 2, EL. 0 TO -3.5	32,33,22,11	87.807785
Region 8	EMBANKMENT FILL 2, EL. 0 TO -3.5	22,21,35,5,17,11	117.55
Region 9		23,24,25,28	7.6
Region 10	BEACH SAND, EL. -12 TO -48	1,26,29,30,12,13,14	1331.08
Region 11	MARSH, EL. -3.5 TO -14	32,11,19,12,30,34	236.65446
Region 12	Marsh EL. -7 to -12 (protected)	29,2,31,34,30	77.659999
Region 13	MARSH, EL. -3.5 TO -14	18,12,19,11,17	235.6
Region 14	MARSH, EL. -3.5 TO -14	31,34,32,27	9.7192665

Points

	X (ft)	Y (ft)
Point 1	120	-14.9
Point 2	163.8	-7.6
Point 3	185.9	2.1
Point 4	206	2.6
Point 5	230.4	-4.5
Point 6	310	-4.5
Point 7	310	-7
Point 8	310	-12
Point 9	120	-47.9
Point 10	310	-48
Point 11	200	-3.5
Point 12	200	-14
Point 13	200	-29.9
Point 14	120	-29.9
Point 15	120	-70.1
Point 16	310	-70

Point 17	230.4	-7
Point 18	230.4	-12
Point 19	200	-7
Point 20	180.5	0.1
Point 21	212.5	0
Point 22	200	0
Point 23	200	13
Point 24	200.5	13
Point 25	201	2.8
Point 26	144.6	-14.5
Point 27	173.1	-4.9
Point 28	200	2.9
Point 29	151.4	-12
Point 30	174	-12
Point 31	165.86667	-7
Point 32	173.96613	-4.30037
Point 33	180.35122	0
Point 34	174	-7
Point 35	213.7	-0.5
Point 36	199	2.9
Point 37	192.45	2.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.34	(116.082, 204.963)	27.3948	(205.7, 2.612)	(148.271, -13.1506)
2	13232	1.53	(116.082, 204.963)	221.308	(205.7, 2.612)	(144.6, -14.5)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimiz	149.1957	-12.891545	829.38339	836.82531	4.2965926	0

	ed						
2	Optimized	150.76045	-12.505705	805.34586	826.20418	12.042557	0
3	Optimized	152.03855	-12.252265	789.5226	815.48414	14.9889	0
4	Optimized	153.22335	-12.062825	777.68432	809.73663	18.505405	0
5	Optimized	154.05775	-11.966865	771.69481	808.41673	15.587531	0
6	Optimized	155.4618	-11.902045	767.63938	822.46117	23.270468	0
7	Optimized	157.69355	-11.83868	763.69794	841.5413	33.042543	0
8	Optimized	159.9253	-11.775315	759.75651	860.62143	42.814619	0
9	Optimized	162.4206	-11.64017	751.30516	872.0345	51.246562	0
10	Optimized	164.83335	-11.459205	740.03305	878.0323	58.577207	0
11	Optimized	167.2725	-11.276255	728.6023	882.95547	65.519034	0
12	Optimized	169.7837	-11.112205	718.34921	892.4712	73.910401	0
13	Optimized	171.99455	-10.995	711.03202	901.64027	80.908403	0
14	Optimized	173.45855	-10.91739	706.19821	918.44479	90.093328	0
15	Optimized	173.8916	-10.88645	704.26735	912.80417	88.51863	0
16	Optimized	175.15815	-10.683625	691.63122	912.13811	93.599623	0
17	Optimized	177.5253	-10.304545	667.94531	910.49457	102.95606	0
18	Optimized	179.5258	-9.918801	643.90097	893.50832	105.95204	0
19	Optimized	180.4256	-9.703437	630.45284	887.22798	108.99458	0
20	Optimiz	180.905	-9.588698	623.29694	885.7485	111.40408	0

	ed						
21	Optimized	181.405	-9.4690265	615.81757	885.51608	114.48023	0
22	Optimized	181.8494	-9.3626645	607.00093	893.10443	121.44373	0
23	Optimized	183.09525	-8.85422	567.47848	864.75071	126.18458	0
24	Optimized	184.74175	-7.9272975	499.35382	816.29352	134.53292	0
25	Optimized	185.6959	-7.288582	453.52757	791.7391	143.56228	0
26	Optimized	185.9223	-7.1370445	442.6527	785.26499	145.43029	0
27	Optimized	186.69525	-6.55397	401.44252	727.74205	138.50593	0
28	Optimized	188.1965	-5.41767	321.15296	635.3801	133.38151	0
29	Optimized	189.77005	-4.319362	242.77714	557.65395	133.65728	0
30	Optimized	191.1216	-3.448677	179.99327	490.00157	131.59071	0
31	Optimized	192.0501	-2.897263	139.78562	462.55327	137.00674	0
32	Optimized	193.7433	-2.004398	73.480228	399.39293	138.34173	0
33	Optimized	195.38715	-1.17455	11.418932	352.27473	144.6847	0
34	Optimized	196.95465	-0.51334	-39.643271	311.15349	132.07682	0
35	Optimized	198.5858	0.174729	-92.776918	265.45823	112.68033	0
36	Optimized	199.4693	0.547414	-121.55339	231.30682	98.183921	0
37	Optimized	199.9693	0.75532285	-137.65609	217.71599	92.414955	0
38	Optimized	200.25	0.8462723	-145.08727	205.96015	87.424898	0
39	Optimiz	200.75	1.0082654	-158.322	184.42995	78.285867	0

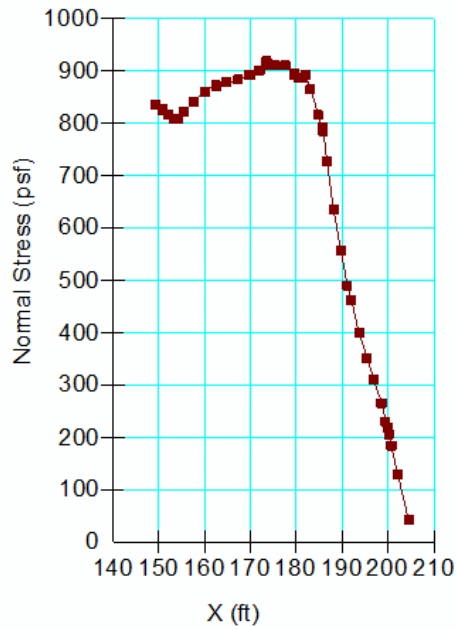
	ed						
40	Optimiz ed	202.175	1.4699465	-196.03993	130.25339	55.289284	0
41	Optimiz ed	204.525	2.2313155	-258.24386	43.416447	18.429188	0

Slices of Slip Surface: **13232**

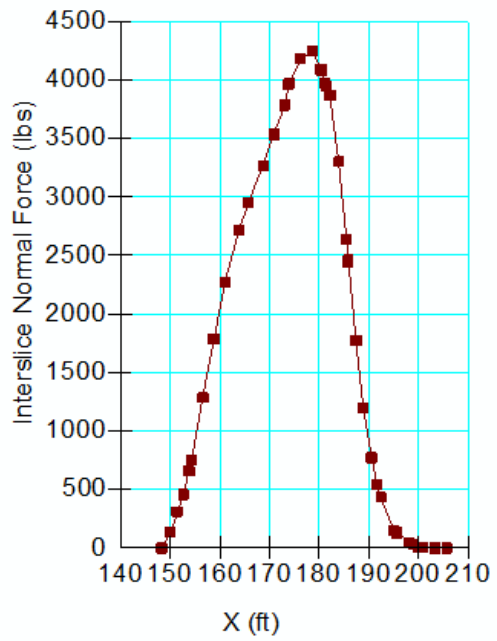
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	13232	145.73335	-14.34677	920.21563	942.73135	12.999462	0
2	13232	148	-14.02836	900.3259	951.14194	29.338659	0
3	13232	150.26665	-13.68599	878.95486	956.54175	44.794812	0
4	13232	152.4401	-13.33557	857.09774	948.33182	52.674023	0
5	13232	154.5203	-12.978895	834.81986	927.65652	53.599273	0
6	13232	156.6005	-12.601745	811.30486	904.54798	53.833936	0
7	13232	158.6807	-12.20402	786.47111	879.02487	53.435939	0
8	13232	160.7406	-11.78989	760.65055	858.22895	41.419575	0
9	13232	162.7802	-11.359635	733.78834	839.51214	44.87709	0
10	13232	164.83335	-10.906125	705.52131	815.63512	46.740539	0
11	13232	166.77085	-10.46001	677.65973	790.70171	47.983472	0
12	13232	168.57915	-10.026477	650.61693	765.84882	48.913032	0
13	13232	170.3875	-9.5768275	622.55912	739.47994	49.629942	0
14	13232	172.19585	-9.1109585	593.49832	711.66306	50.157956	0
15	13232	173.53305	-8.7575425	571.42685	699.78326	54.484063	0
16	13232	175.0416	-8.343862	545.61798	684.62151	59.003498	0
17	13232	177.1756	-7.7425615	508.11107	658.02018	63.632642	0
18	13232	179.29265	-7.1230405	469.42151	629.21495	67.82829	0
19	13232	180.4256	-6.784948	448.34248	614.32617	70.455899	0
20	13232	180.905	-6.638274	439.18727	609.62819	72.34788	0
21	13232	181.405	-6.4848565	429.61358	605.90335	74.830565	0
22	13232	182.49795	-6.1415395	401.95167	615.57108	90.676062	0
23	13232	184.49385	-5.503186	349.63825	631.62549	119.69648	0
24	13232	185.6959	-5.1111735	317.65855	640.31722	136.96048	0
25	13232	186.79175	-4.7428555	287.82353	618.7988	140.49067	0
26	13232	188.5753	-4.1329915	238.62032	572.12935	141.56619	0

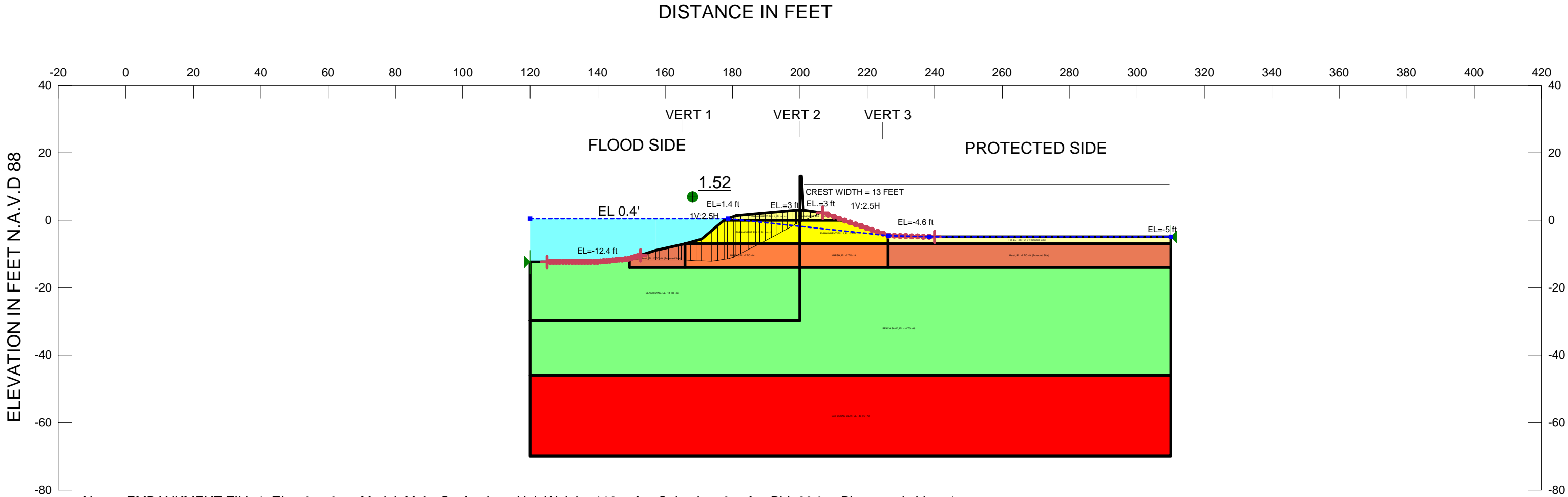
27	13232	190.95855	-3.2875635	170.96231	511.97522	144.75139	0
28	13232	193.5206	-2.3514075	96.526355	448.22214	149.286	0
29	13232	195.6618	-1.53893	32.438804	392.47131	152.82473	0
30	13232	197.8662	-0.6754324	-35.22677	335.97912	142.61467	0
31	13232	199.2767	-0.1122554	-79.189254	299.31642	127.05228	0
32	13232	199.7767	0.0912183	-95.011315	281.40215	119.44812	0
33	13232	200.25	0.28524175	-110.07811	259.2554	110.04739	0
34	13232	200.75	0.49156715	-126.07852	233.41988	99.080861	0
35	13232	202.175	1.0912767	-172.41068	165.84057	70.395144	0
36	13232	204.525	2.099733	-250.03277	55.600977	23.601215	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL 1, EL. +3 to 0 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -7 TO -14 Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -14 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, EL. 0 to -7 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill, EL. -4.6 TO -7 (Protected Side) Model: Mohr-Coulomb Unit Weight: 84 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh, EL. -7 TO -14 (Protected Side) Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.75.



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 33 STA. 90+00 TO STA. 93+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 277
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 6:56:15 AM
File Name: Reach 33_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 7:00:24 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. 0 to -7

Model: Spatial Mohr-Coulomb
Weight Fn: FILL 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. -4.6 TO -7 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 84 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh, EL. -7 TO -14 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (125, -12.4) ft
Left-Zone Right Coordinate: (152.7, -10.42405) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (206.8, 2.2) ft
Right-Zone Right Coordinate: (240, -5) ft
Right-Zone Increment: 20
Radius Increments: 20

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, EL. +3 to 0

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -7 TO -14

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -14 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (120, -12.4) ft
Right Coordinate: (310, -5) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
120	0.4
178.6	0.4
226.2	-4.6
238.5	-5
310	-5

Unit Weight Functions

FILL 2

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 84
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (165.9, 84)
Data Point: (200, 105)
Data Point: (226.2, 84)

Marsh

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 94
Data Points: X (ft), Unit Weight (pcf)
Data Point: (165.9, 94)
Data Point: (200, 104)
Data Point: (226.2, 94)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -14 TO -46	12,13,14,22,36,1,2,35,33	1315.065
Region 2	Fill, EL. -4.6 TO -7 (Protected Side)	6,29,7,8,17	170.06
Region 3	BEACH SAND, EL. -14 TO -46	14,13,12,31,9,11,32,10	4816
Region 4	BAY SOUND CLAY, EL. -46 TO -70	15,10,32,11,16	4560
Region 5	Marsh, EL. -7 TO -14 (Protected Side)	17,8,9,31	586.6
Region 6	EMBANKMENT FILL 1, EL. +3 to 0	19,3,28,4,21	45.05
Region 7	EMBANKMENT FILL 1, EL. +3 to 0	4,25,5,20,21	24.9
Region 8	EMBANKMENT FILL 2, EL. 0 to -7	26,30,19,21,18	189.07
Region 9	EMBANKMENT FILL 2, EL. 0 to -7	18,21,20,6,17	153.04
Region 10		4,23,24,25	7.575
Region 11	Marsh, EL. -7 TO -14 (Protected Side)	35,33,26,27,2	81.825
Region 12	MARSH, EL. -7 TO -14	18,17,31,12,34	183.4
Region 13	MARSH, EL. -7 TO -14	33,26,18,34,12	238.7

Points

	X (ft)	Y (ft)
Point 1	140	-12.4
Point 2	149.3	-11.5
Point 3	181	1.4
Point 4	200	3
Point 5	206.8	2.2
Point 6	226.2	-4.6
Point 7	310	-5
Point 8	310	-7
Point 9	310	-14
Point 10	120	-46
Point 11	310	-46
Point 12	200	-14
Point 13	200	-29.8
Point 14	120	-29.8
Point 15	120	-70
Point 16	310	-70
Point 17	226.2	-7

Point 18	200	-7
Point 19	177.5	0
Point 20	213	0
Point 21	200	0
Point 22	120	-14
Point 23	200	13.1
Point 24	200.5	13.1
Point 25	201	3
Point 26	165.9	-7
Point 27	157.2	-9
Point 28	199	3
Point 29	238.5	-5
Point 30	170.8	-5.6
Point 31	226.2	-14
Point 32	200	-46
Point 33	165.9	-14
Point 34	200	-8.3
Point 35	149.3	-14
Point 36	120	-12.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.52	(159.186, 73.054)	26.91408	(206.8, 2.2)	(148.53, -11.5745)
2	11030	1.61	(159.186, 73.054)	85.366	(206.8, 2.2)	(148.22, -11.6046)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	148.915	-11.602765	748.96966	759.68143	6.1844484	0
2	Optimiz	150.1538	-11.693675	754.62905	784.47313	12.668063	0

	ed						
3	Optimized	151.86145	-11.818985	762.45509	813.67478	21.74147	0
4	Optimized	153.83645	-11.87375	765.87038	833.7882	28.829403	0
5	Optimized	156.0788	-11.85797	764.8893	854.25719	37.934421	0
6	Optimized	157.7024	-11.846545	764.1846	865.2519	42.900522	0
7	Optimized	159.6532	-11.829955	763.14507	877.54606	48.560341	0
8	Optimized	162.52415	-11.82731	762.9947	899.25757	57.840153	0
9	Optimized	164.3685	-11.846385	764.17299	915.56173	64.260707	0
10	Optimized	165.34515	-11.875525	765.995	926.94239	68.318112	0
11	Optimized	166.71665	-11.92614	769.12958	943.25597	73.912265	0
12	Optimized	168.35	-11.986425	772.92292	961.36609	79.989381	0
13	Optimized	169.98335	-12.04671	776.65507	979.5374	86.118437	0
14	Optimized	172.23885	-12.12995	781.87427	1029.9279	105.29253	0
15	Optimized	174.63325	-12.051385	776.94371	1042.5424	112.73998	0
16	Optimized	176.5444	-11.78805	760.51225	1049.5401	122.68503	0
17	Optimized	178	-11.58749	748.02268	1055.8246	130.65415	0
18	Optimized	178.55	-11.51171	743.28742	1060.8768	134.80871	0
19	Optimized	178.6346	-11.50005	742.33659	1063.4936	136.32305	0
20	Optimized	179.42425	-11.24372	721.18813	1046.9448	138.27549	0
21	Optimiz	180.58965	-10.78185	684.71137	1027.8478	145.65277	0

	ed						
22	Optimized	181.704	-10.21073	641.78451	997.31315	150.91296	0
23	Optimized	183.64005	-9.218485	567.17036	921.97688	150.60643	0
24	Optimized	185.90655	-8.06809	480.49631	834.88502	150.42908	0
25	Optimized	187.47495	-7.274565	420.72259	771.68423	148.97438	0
26	Optimized	188.88795	-6.5479725	366.11934	721.00927	150.64184	0
27	Optimized	190.6461	-5.6439175	298.18139	662.7883	154.76645	0
28	Optimized	192.34535	-4.7427	230.81135	600.50089	156.9239	0
29	Optimized	193.9857	-3.84432	163.99754	541.79285	160.3646	0
30	Optimized	195.578	-2.9530275	97.945554	480.52834	162.39676	0
31	Optimized	197.12225	-2.0688225	32.648143	422.24655	165.37471	0
32	Optimized	198.2999	-1.394535	-17.14636	379.93996	161.27494	0
33	Optimized	198.8527	-1.0909725	-39.711849	372.0714	157.93494	0
34	Optimized	199.5	-0.7773254	-63.526475	350.35808	148.71818	0
35	Optimized	200.16505	-0.4550729	-87.994254	326.72443	138.68629	0
36	Optimized	200.41505	-0.34128675	-96.734652	326.48013	138.58259	0
37	Optimized	200.75	-0.2079802	-107.24739	316.45552	134.3274	0
38	Optimized	201.13625	-0.05423845	-119.37326	303.00975	128.62001	0
39	Optimized	202.19375	0.3666666	-152.56724	247.53664	105.07307	0
40	Optimiz	204.03625	1.0999996	-210.40715	148.52299	63.044269	0

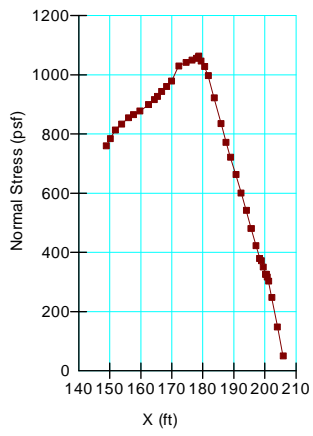
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41	Optimized	205.87875	1.833333	-268.24201	49.507327	21.014614	0

Slices of Slip Surface: 11030

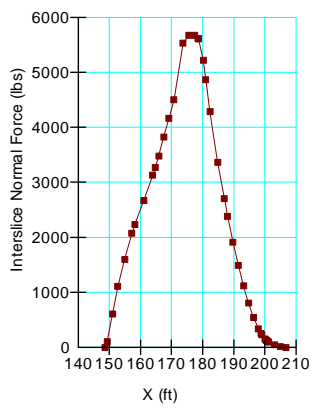
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	11030	148.7598	-11.67103	753.23098	768.93114	9.0644911	0
2	11030	150.2875	-11.84102	763.81507	800.3239	15.497079	0
3	11030	152.2625	-12.024895	775.31038	836.67713	26.048641	0
4	11030	154.2375	-12.16261	783.89428	868.25845	35.810466	0
5	11030	156.2125	-12.25438	789.6468	895.10171	44.762955	0
6	11030	158.2875	-12.300255	792.50764	912.9607	51.129294	0
7	11030	160.4625	-12.29545	792.18736	926.19537	56.883028	0
8	11030	162.6375	-12.235185	788.45818	934.04019	61.795895	0
9	11030	164.8125	-12.119345	781.19409	936.44196	65.898813	0
10	11030	166.71665	-11.975185	772.20218	935.88807	69.480536	0
11	11030	168.35	-11.814685	762.22268	931.01708	71.648972	0
12	11030	169.98335	-11.622375	750.17142	923.01694	73.36857	0
13	11030	171.91665	-11.34982	733.19983	929.02971	83.124853	0
14	11030	174.15	-10.982565	710.26096	928.95539	92.830277	0
15	11030	176.38335	-10.55405	683.52685	922.24592	101.33023	0
16	11030	178	-10.211395	662.14856	914.89727	107.28546	0
17	11030	178.55	-10.086775	654.37691	914.08631	110.2401	0
18	11030	179.8	-9.776493	627.16218	936.15407	131.15928	0
19	11030	181.704	-9.285331	584.01686	943.82343	152.72882	0
20	11030	183.4782	-8.7751045	540.54756	908.75052	156.29288	0
21	11030	185.6186	-8.1088705	484.92689	860.88293	159.58387	0
22	11030	187.759	-7.380169	425.45052	806.09267	161.57301	0
23	11030	189.8463	-6.6085565	363.62076	752.01665	164.86427	0
24	11030	191.88045	-5.795394	299.54407	699.74751	169.87628	0
25	11030	193.9146	-4.920693	231.63053	642.3628	174.34551	0
26	11030	195.94875	-3.982355	159.74554	579.75143	178.28192	0
27	11030	197.9829	-2.9780215	83.742617	511.72151	181.66626	0
28	11030	199.5	-2.191163	24.696821	453.60069	182.05889	0

29	11030	200.05795	-1.891678	2.3519306	428.19529	180.75978	0
30	11030	200.30795	-1.7545075	-7.846224	417.47661	177.20831	0
31	11030	200.75	-1.509585	-26.027473	398.89343	169.32021	0
32	11030	202.1752	-0.6851145	-86.814738	321.36413	136.41098	0
33	11030	204.2128	0.5354625	-176.33409	191.884	81.449926	0
34	11030	205.9376	1.6354625	-256.27916	64.312331	27.298965	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 370
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/21/2013
Time: 12:55:03 PM
File Name: Reach 34_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/21/2013
Last Solved Time: 1:01:35 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL -4.8 to -7 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 84 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill 2 EL. 0 to -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: Fill2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh EL. -7 to -14 (Protected)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

PLEISTOCENE CLAY, EL. -63 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.7 TO 0

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -3.5 to -14

Model: Spatial Mohr-Coulomb
Weight Spatial Fn: Marsh Gamma
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -10 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -63

Model: Spatial Mohr-Coulomb
Unit Weight: 107 pcf

Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (125, -12) ft
Left-Zone Right Coordinate: (160.9, -10.2297) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (203.52607, 2.4) ft
Right-Zone Right Coordinate: (240, -5.52626) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (120, -12) ft
Right Coordinate: (310, -5.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
190	0.4
227	-4.8
244.9	-5.8
310	-5.8

Unit Weight Functions

Fill2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 84
Data Points: X (ft), Unit Weight (pcf)

Data Point: (180.4, 84)
Data Point: (200, 98)
Data Point: (227, 84)

Spatial Functions

Marsh Gamma

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (180.4, -3.5, 94)
Data Point: (180.4, -14, 94)
Data Point: (200, -3.5, 102)
Data Point: (200, -14, 102)
Data Point: (227, -7, 94)
Data Point: (227, -14, 94)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -10 TO -46	21,17,42,35,12,6,38,5,36	4999.75
Region 2	BAY SOUND CLAY, EL. -46 TO -63	5,38,6,44,43	3230
Region 3		19,20,11,18	7.7
Region 4	EMBANKMENT FILL, EL. +2.7 TO 0	23,18,37,1,13	20.85
Region 5	EMBANKMENT FILL, EL. +2.7 TO 0	18,11,9,26,23	18.289813
Region 6	Fill 2 EL. 0 to -3.5	23,22,24,13	53.9
Region 7	Fill 2 EL. 0 to -3.5	23,26,25,2,30,22	104.20037
Region 8	MARSH, EL. -3.5 to -14	22,24,27,34,28,29,17	220.58209
Region 9	MARSH, EL. -3.5 to -14	22,17,42,31,30	236.25
Region 10	Fill, EL. -4.8 to -7 (Protected Side)	2,3,4,32,30	108.55
Region 11	Marsh EL. -7 to -14 (Protected)	30,32,33,31	581
Region 12	BEACH SAND, EL. -10 TO -46	31,33,12,35,42	480.25
Region 13	BEACH SAND, EL. -10 TO -46	17,29,41,39,10,45,36,21	557.08778
Region 14	Silted-in Layer	10,45,46,16,15,14,34,40,41,39	175.0014
Region 15	Marsh EL. -7 to -14 (Protected)	41,40,34,28,29	80.694834
Region 16	PLEISTOCENE CLAY, EL. -63 TO -70	7,43,44,8	1330

Points

	X (ft)	Y (ft)
Point 1	195	2.5
Point 2	227	-4.8
Point 3	244.9	-5.8
Point 4	310	-5.8
Point 5	120	-46
Point 6	310	-46
Point 7	120	-70
Point 8	310	-70
Point 9	203.2	2.5
Point 10	140	-15.4
Point 11	201	2.5
Point 12	310	-19
Point 13	188.8	0
Point 14	168.6	-8.4
Point 15	158.5	-10.8
Point 16	140	-12
Point 17	200	-14
Point 18	200	2.7
Point 19	200	12.9
Point 20	200.5	12.9
Point 21	200	-21.5
Point 22	200	-3.5
Point 23	200	0
Point 24	180.4	-3.5
Point 25	222.76443	-3.5
Point 26	211.35185	0
Point 27	177.25465	-4.8
Point 28	180.4	-7
Point 29	180.4	-14
Point 30	227	-7
Point 31	227	-14
Point 32	310	-7
Point 33	310	-14

Point 34	171.9657	-7
Point 35	227	-19
Point 36	120	-21.5
Point 37	199	2.7
Point 38	200	-46
Point 39	158.5	-14.2
Point 40	168.6	-12.4
Point 41	159.62222	-14
Point 42	200.9	-14
Point 43	120	-63
Point 44	310	-63
Point 45	120	-15.4
Point 46	120	-12

6	Optimized	167.8559	-9.764315	634.2548	676.33694	22.375472	0
7	Optimized	168.9063	-9.736222	632.49724	689.21964	30.159837	0
8	Optimized	169.7498	-9.7107105	630.91081	695.65873	34.42708	0
9	Optimized	170.91075	-9.6732805	628.57376	708.5796	33.960461	0
10	Optimized	171.7501	-9.6319635	625.9856	713.56912	37.176998	0
11	Optimized	172.9852	-9.5104835	618.39599	718.30574	42.409175	0
12	Optimized	174.8172	-9.3036165	605.50554	718.28885	47.873674	0
13	Optimized	176.4422	-9.0904295	592.20389	718.04478	53.416287	0
14	Optimized	177.35605	-8.970538	584.71895	717.85195	56.511605	0
15	Optimized	178.4542	-8.800095	574.10811	712.49457	58.741568	0
16	Optimized	179.9255	-8.5616005	559.20225	706.4963	62.522615	0
17	Optimized	181.42655	-8.3042505	543.13127	698.76425	66.062282	0
18	Optimized	183.33175	-7.9784025	522.8114	689.17195	70.615866	0
19	Optimized	185.08895	-7.6787075	504.11371	681.71083	75.385503	0
20	Optimized	186.67565	-7.3854285	485.81094	670.46324	78.380255	0
21	Optimized	188.0919	-7.0985655	467.90765	662.0341	82.401788	0
22	Optimized	189.296	-6.8546665	452.69161	659.40092	87.742896	0
23	Optimized	189.896	-6.7331335	445.10967	663.44963	92.679811	0
24	Optimized	190.1726	-6.677104	440.09654	670.81932	97.93601	0

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.15	(167.485, 45.795)	21.79699	(203.526, 2.4)	(160.473, -10.3313)
2	13236	1.20	(167.485, 45.795)	56.41	(203.526, 2.4)	(160.9, -10.2297)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimized	161.1324	-10.219615	662.66338	666.92914	2.2681409	0
2	Optimized	162.37805	-10.04691	651.88803	662.48341	5.6336676	0
3	Optimized	163.54955	-9.92485	644.27259	658.84974	7.7508071	0
4	Optimized	164.87945	-9.843919	639.21868	664.41423	13.396711	0
5	Optimized	166.3677	-9.804117	636.74009	670.37894	17.886092	0

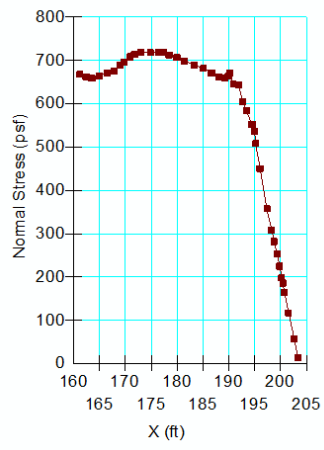
25	Optimized	190.88645	-6.393365	416.12876	644.62814	96.992234	0
26	Optimized	191.96895	-5.895815	375.5945	642.90739	113.46759	0
27	Optimized	192.6782	-5.5236995	346.16404	604.78546	109.77828	0
28	Optimized	193.38465	-5.005029	307.5889	584.25723	117.43874	0
29	Optimized	194.46155	-4.214369	248.80914	552.51332	128.91478	0
30	Optimized	195.0095	-3.8120645	218.90109	535.87217	134.54624	0
31	Optimized	195.19575	-3.652545	207.31307	507.88555	127.58545	0
32	Optimized	196.04275	-2.921545	154.27154	449.62216	125.3689	0
33	Optimized	197.38325	-1.764635	70.322114	357.06036	121.71317	0
34	Optimized	198.3163	-0.9959444	14.17519	308.20723	124.8092	0
35	Optimized	198.78955	-0.6533478	-11.353013	282.13666	119.75991	0
36	Optimized	199.346	-0.2504934	-41.371524	252.85264	107.32958	0
37	Optimized	199.846	0.11147965	-68.34345	224.29592	95.207969	0
38	Optimized	200.2084	0.37382965	-87.891001	197.95638	84.027499	0
39	Optimized	200.4584	0.54979025	-101.06386	186.05137	78.974119	0
40	Optimized	200.75	0.72566335	-114.59623	164.88204	69.988272	0
41	Optimized	201.55	1.2081686	-151.72215	116.75366	49.558988	0
42	Optimized	202.65	1.871613	-202.76587	56.792661	24.107054	0
43	Optimized	203.36305	2.3016675	-235.85459	13.406087	5.6905465	0

32	13236	200.46145	0.027776759	-68.517261	226.41539	96.10763	0
33	13236	200.75	0.23808529	-84.170717	202.25782	85.85335	0
34	13236	201.55	0.8373862	-128.58321	144.17608	61.199114	0
35	13236	202.65	1.6926885	-191.60141	69.131745	29.344685	0
36	13236	203.36305	2.2656205	-233.6041	15.655883	6.6455282	0

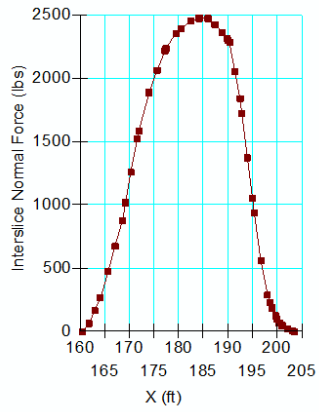
Slices of Slip Surface: 13236

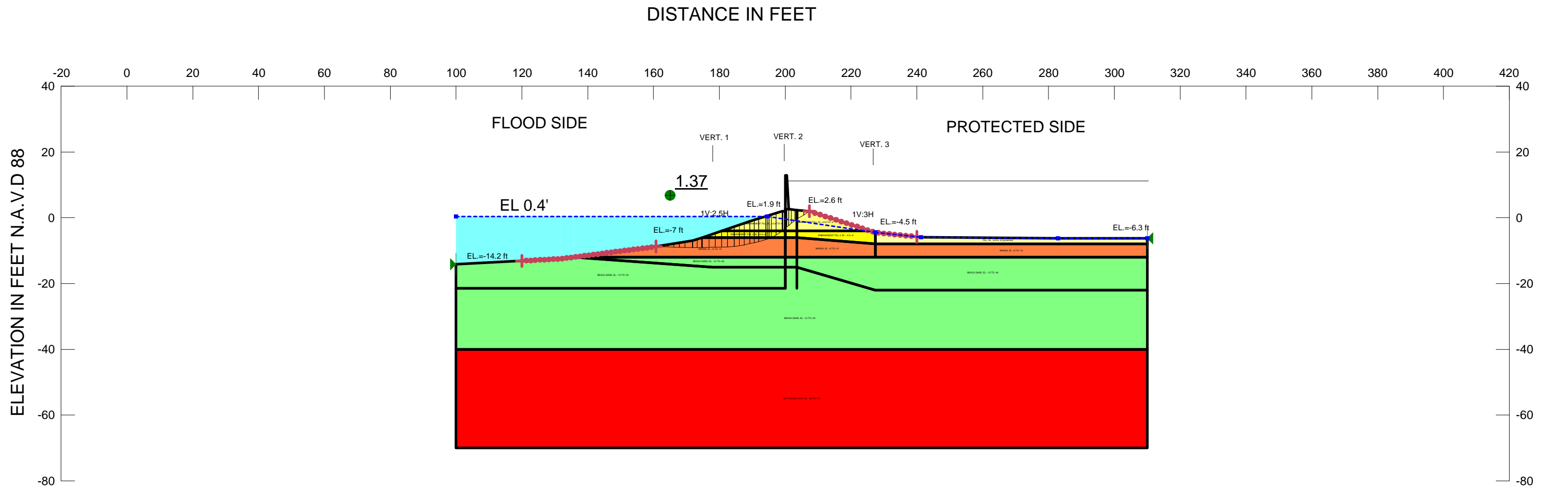
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	13236	161.67	-10.309505	668.30379	690.97457	12.054271	0
2	13236	163.21	-10.44783	676.87921	712.62029	19.003873	0
3	13236	164.75	-10.543725	682.89734	729.98476	25.036827	0
4	13236	166.29	-10.59741	686.20991	743.21013	30.307553	0
5	13236	167.83	-10.609005	686.93512	752.25856	34.733092	0
6	13236	169.17025	-10.58724	685.60816	765.74054	42.60714	0
7	13236	170.2968	-10.542425	682.81153	775.65739	39.410726	0
8	13236	171.4094	-10.475855	678.65193	786.90844	45.952162	0
9	13236	172.6268	-10.37653	672.45232	793.36209	51.323152	0
10	13236	173.94905	-10.239735	663.91837	794.66149	55.497159	0
11	13236	175.2713	-10.071314	653.41343	792.87202	59.196657	0
12	13236	176.59355	-9.8709845	640.91302	787.9399	62.409209	0
13	13236	178.041	-9.612986	624.81105	778.78078	65.356274	0
14	13236	179.61365	-9.2900275	604.65812	764.74153	67.951376	0
15	13236	181.1	-8.9427655	582.9856	746.53765	69.423726	0
16	13236	182.5	-8.5753275	560.06301	725.07174	70.04205	0
17	13236	183.9	-8.169072	534.7079	700.72526	70.470186	0
18	13236	185.3	-7.7231145	506.88124	673.38379	70.676137	0
19	13236	186.7	-7.2364535	476.51187	642.89077	70.623654	0
20	13236	188.1	-6.707955	443.53343	609.13209	70.292464	0
21	13236	189.296	-6.225128	413.40707	581.44172	71.326477	0
22	13236	189.896	-5.972135	397.62018	571.39454	73.762837	0
23	13236	190.71155	-5.605577	368.50646	569.55306	85.339219	0
24	13236	192.13465	-4.938323	314.39239	562.29984	105.23047	0
25	13236	193.9231	-4.0210505	241.471	543.63785	128.26221	0
26	13236	195.66665	-3.064968	166.51811	497.09855	140.32307	0
27	13236	197	-2.271061	105.28866	429.64853	137.6826	0
28	13236	198.33335	-1.42616	40.871107	356.66544	134.04674	0
29	13236	199.077	-0.9385733	3.9240523	313.73055	131.50506	0
30	13236	199.577	-0.59388105	-21.969668	285.07103	121.00547	0
31	13236	200.21145	-0.15062525	-55.193333	245.45135	104.18792	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +2.6 TO -6 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -12 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: FILL, EL. -6.8 to -8 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, EL. -4 to -6 Model: Mohr-Coulomb Unit Weight: 88 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.19.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35A STA. 102+42 TO STA. 103+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Lijegren, James
Revision Number: 375
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 5:53:23 PM
File Name: Reach 35A_S-Case.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/24/2013
Last Solved Time: 5:58:42 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 9.807 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. -6.8 to -8 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. -4 to -6

Model: Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (120, -13.13082) ft
Left-Zone Right Coordinate: (160.7, -8.8) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (207.4, 1.91077) ft
Right-Zone Right Coordinate: (240, -5.77826) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (100, -14.2) ft
Right Coordinate: (310, -6.3) ft

FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.6 TO -6

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -6 TO -12

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -40

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -40 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	0.4
194.5	0.4
227.4	-4.5
241.2	-5.9
282.9	-6.3
310	-6.3

Unit Weight Functions

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (103, 107)
Data Point: (174.8, 107)
Data Point: (200, 108)
Data Point: (227.4, 107)
Data Point: (310, 107)

Regions

	Material	Points	Area (ft ²)
Region 1	EMBANKMENT FILL, EL. +2.6 TO -6	2,35,31,36,41	61.349915
Region 2	EMBANKMENT FILL 2, EL. -4 to -6	40,4,25,11,14,36,37	78.311328
Region 3	BEACH SAND, EL. -12 TO -40	1,28,29,44,45,18,9,12	776.65176
Region 4	BEACH SAND, EL. -12 TO -40	12,9,18,22,16,20,6,5	3938.15
Region 5	BAY SOUND CLAY, EL. -40 TO -70	5,6,8,7	6300
Region 6	BEACH SAND, EL. -12 TO -40	18,17,21,15,19,20,16,22	991.85
Region 7	MARSH, EL. -6 TO -12	44,43,30,42,14,24,34,17	253.04524
Region 8	MARSH, EL. -6 TO -12	17,34,24,14,11,25,15,21	140.5

Region 9	BEACH SAND, EL. -12 TO -40	44,17,18,45	129.44189
Region 10	MARSH, EL. -6 TO -12	15,25,26,19	330.4
Region 11	FILL, EL. -6.8 to -8 (protected)	4,25,26,27,38,39	163.94
Region 12		13,32,33,23	7.725
Region 13	EMBANKMENT FILL 2, EL. -4 to -6	42,41,36,14	44.47119
Region 14	EMBANKMENT FILL, EL. +2.6 TO -6	36,31,13,23,46,3,40,37	101.34367

Points

	X (ft)	Y (ft)
Point 1	100	-15
Point 2	189.2	-1.1
Point 3	207.5	1.9
Point 4	227.4	-4.5
Point 5	100	-40
Point 6	310	-40
Point 7	100	-70
Point 8	310	-70
Point 9	200	-21.5
Point 10	203.5	-21.5
Point 11	203.5	-6
Point 12	100	-21.5
Point 13	200	2.6
Point 14	200	-6
Point 15	227.4	-12
Point 16	227.4	-22
Point 17	200	-12
Point 18	200	-15
Point 19	310	-12
Point 20	310	-22
Point 21	203.5	-12
Point 22	203.5	-15
Point 23	201	2.6
Point 24	200	-7
Point 25	227.4	-8
Point 26	310	-8

2	Optimiz ed	161.60685	-8.822217	575.48183	588.4908	5.5219828	0
3	Optimiz ed	163.4205	-8.8634305	578.01748	602.38175	10.342019	0
4	Optimiz ed	165.23415	-8.9046435	580.60825	616.27269	15.138656	0
5	Optimiz ed	166.98785	-8.9528325	583.61433	631.07157	20.144405	0
6	Optimiz ed	168.6815	-9.0079975	587.06061	645.70648	24.893695	0
7	Optimiz ed	170.63955	-9.056875	590.09883	660.27907	29.789743	0
8	Optimiz ed	171.8254	-9.078299	591.4475	667.575	32.314208	0
9	Optimiz ed	172.57345	-9.079591	591.5251	681.37307	38.138199	0
10	Optimiz ed	173.9204	-9.081917	591.67358	696.70409	44.582805	0
11	Optimiz ed	174.71305	-9.07945	591.53481	702.67826	47.177596	0
12	Optimiz ed	175.83435	-9.04529	589.37352	709.01365	50.784223	0
13	Optimiz ed	177.8015	-8.997085	586.35394	721.86962	57.522991	0
14	Optimiz ed	179.73155	-8.9617355	584.17823	734.61307	63.855797	0
15	Optimiz ed	181.59095	-8.9276805	582.04725	753.64863	72.84046	0
16	Optimiz ed	183.5178	-8.816235	575.11146	765.44895	80.793472	0
17	Optimiz ed	185.29965	-8.6090975	562.17042	766.88098	86.89448	0
18	Optimiz ed	186.79835	-8.3849525	548.18033	768.53076	93.533206	0
19	Optimiz ed	188.37385	-8.080348	529.17444	754.09421	95.472776	0
20	Optimiz ed	189.8775	-7.729927	507.30669	742.528	99.845524	0

Point 27	310	-6.3
Point 28	100	-14.2
Point 29	131.8	-12.5
Point 30	171.9	-7
Point 31	200	1.9
Point 32	200	12.9
Point 33	200.5	12.9
Point 34	200	-10
Point 35	199	1.9
Point 36	200	-4
Point 37	203.5	-4
Point 38	282.9	-6.3
Point 39	241.2	-5.9
Point 40	225.84531	-4
Point 41	180.69661	-4
Point 42	174.8322	-6
Point 43	160.7	-8.8
Point 44	135.70541	-12
Point 45	178	-15
Point 46	203.5	2.33077

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.37	(172.413, 47.292)	21.81086	(207.4, 1.91077)	(160.689, - 8.80137)
2	3152	1.43	(172.413, 47.292)	57.302	(207.4, 1.91077)	(160.7, -8.8)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz ed	160.69465	-8.801489	574.16841	580.19574	2.5584485	0

21	Optimiz ed	191.2325	-7.414149	487.60609	731.17195	103.38757	0
22	Optimiz ed	193.005	-6.926509	457.17104	701.54068	103.72876	0
23	Optimiz ed	194.3	-6.536528	432.84831	686.01741	107.46391	0
24	Optimiz ed	194.80025	-6.385874	420.65136	687.38916	113.22348	0
25	Optimiz ed	195.40525	-6.147725	400.15981	662.61197	111.40433	0
26	Optimiz ed	196.4422	-5.645055	359.15858	649.01588	123.03712	0
27	Optimiz ed	198.0872	-4.673479	283.24689	592.3842	131.221	0
28	Optimiz ed	199.0421	-4.028424	234.12106	563.78706	139.93492	0
29	Optimiz ed	199.16865	-3.942935	227.60892	555.70597	139.26893	0
30	Optimiz ed	199.62655	-3.565704	199.8147	499.20132	127.08208	0
31	Optimiz ed	200.25	-3.031208	160.67501	505.81805	146.50453	0
32	Optimiz ed	200.75	-2.602548	129.27339	463.71337	141.96135	0
33	Optimiz ed	201.42525	-2.023634	86.874129	402.9817	134.1797	0
34	Optimiz ed	202.40365	-1.2592879	30.085753	330.77771	127.63616	0
35	Optimiz ed	203.2284	-0.66324495	-14.771944	265.71593	112.78972	0
36	Optimiz ed	203.6877	-0.3313271	-39.751687	232.18354	98.556064	0
37	Optimiz ed	204.75655	0.3309247	-91.010314	170.28695	72.28252	0
38	Optimiz ed	206.51885	1.3841542	-173.11199	56.763939	24.094863	0

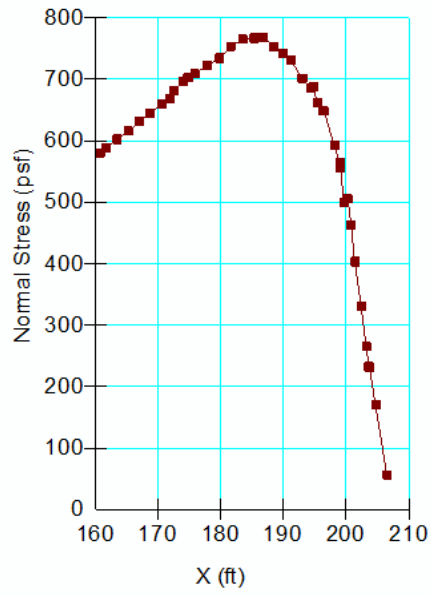
Slices of Slip Surface: 3152

	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictional	Cohesi
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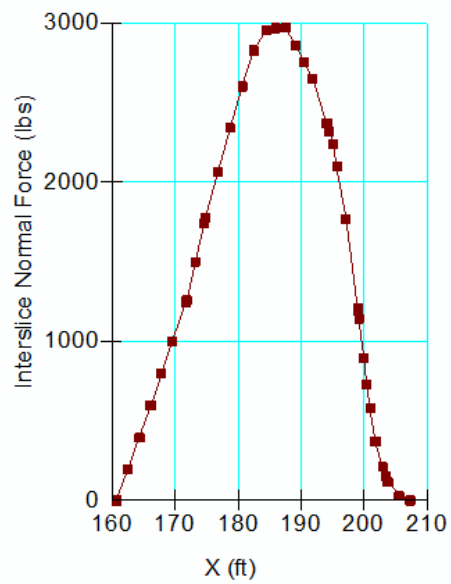
	Surfac e				Normal Stress (psf)	Strength (psf)	ve Strengt h (psf)
1	3152	161.5	-8.955223	583.76318	606.86976	9.8081599	0
2	3152	163.1	-9.242239	601.67727	643.26667	17.653653	0
3	3152	164.7	-9.482722	616.6846	674.6149	24.589954	0
4	3152	166.3	-9.677262	628.82725	701.03767	30.651506	0
5	3152	167.9	-9.8263285	638.13561	722.74684	35.915334	0
6	3152	169.5	-9.930278	644.60234	739.72909	40.37891	0
7	3152	171.1	-9.9893555	648.26692	752.1146	44.080723	0
8	3152	172.63305	-10.00489	649.26189	768.97315	50.814417	0
9	3152	174.09915	-9.9805055	647.74482	780.91816	56.528729	0
10	3152	175.56525	-9.9185465	643.87609	786.95058	60.73152	0
11	3152	177.03135	-9.818889	637.65605	787.34804	63.540479	0
12	3152	178.49745	-9.681336	629.07359	783.95972	65.745263	0
13	3152	179.96355	-9.5056115	618.10725	776.87679	67.393674	0
14	3152	181.54695	-9.270858	603.46884	771.05393	71.135648	0
15	3152	183.24765	-8.9698015	584.66803	765.68069	76.835318	0
16	3152	184.9483	-8.6154015	562.5624	755.0634	81.711828	0
17	3152	186.64895	-8.2066345	537.05174	739.17803	85.79752	0
18	3152	188.34965	-7.7422875	508.08113	717.91495	89.06917	0
19	3152	189.91205	-7.2676745	478.46221	692.69673	90.937157	0
20	3152	191.3362	-6.7901455	448.66544	664.56434	91.643649	0
21	3152	192.76035	-6.2704985	416.24137	632.52777	91.808129	0
22	3152	193.7862	-5.873861	391.49119	608.34233	92.047847	0
23	3152	194.3	-5.665064	378.45208	599.7934	93.953818	0
24	3152	195.3651	-5.204173	341.66191	589.93051	105.38377	0
25	3152	197.0953	-4.41297	276.20869	569.25402	124.39037	0
26	3152	198.4802	-3.734469	221.0037	543.15907	136.74684	0
27	3152	199.5	-3.2007145	178.21611	500.06962	136.61871	0
28	3152	200.25	-2.7935455	145.83908	521.27966	159.36507	0
29	3152	200.75	-2.51236	123.6458	490.74842	155.82582	0
30	3152	201.5948	-2.018106	84.956346	431.4732	147.08768	0
31	3152	202.78445	-1.2942698	28.729504	342.24362	133.07885	0
32	3152	203.43965	-0.88357765	-2.986424	292.63166	124.21477	0
33	3152	204.15	-0.41227541	-38.99752	241.36564	102.45364	0

34	3152	205.45	0.47887174	-106.68559	146.53792	62.201656	0
35	3152	206.75	1.4241778	-177.75616	49.071685	20.829694	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 336
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 7:37:27 AM
File Name: Reach 35B_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 7:41:40 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Fn: Clay
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. -6.8 to -8 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. -4 to -6

Model: Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -8 TO -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (130, -13.04431) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.4 TO -4

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -6 TO -12

Model: Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -40

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -40 TO -70

Model: Spatial Mohr-Coulomb

Left-Zone Right Coordinate: (168.2, -11.64592) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (207.3, 1.42462) ft
Right-Zone Right Coordinate: (240, -6) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (111.2, -13.2) ft
Right Coordinate: (310, -6) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	112	0.4
	188	0.4
	235.8	-6
	310	-6

Unit Weight Functions

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)
Data Point: (235.5, 107)
Data Point: (310, 107)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.4 TO -4	44,4,40,35,15,41	86.9756
Region 2	EMBANKMENT FILL 2, EL. -4 to -6	43,38,6,29,13,17,41,46	90.397883
Region 3	BEACH SAND, EL. -12 TO -40	1,2,28,16,21,11,14	278.58
Region 4	BEACH SAND, EL. -12 TO -40	14,11,21,25,19,23,8,7	3760.7
Region 5	BAY SOUND CLAY, EL. -40 TO -70	7,8,10,9	5964
Region 6	BEACH SAND, EL. -12 TO -40	21,20,24,18,22,23,19,25	962.1
Region 7	MARSH, EL. -6 TO -12	3,34,45,17,27,39,20	158.45
Region 8	MARSH, EL. -6 TO -12	20,39,27,17,13,29,18,24	182.5
Region 9	BEACH SAND, EL. -12 TO -40	16,3,20,21	79.2
Region 10	MARSH, EL. -8 TO -12 (protected)	18,29,30,22	296.8
Region 11	FILL, EL. -6.8 to -8 (protected)	6,29,30,31	148.4
Region 12	Silted-in Layer	1,32,33,34,3,16,28,2	437.325
Region 13		15,35,36,37,26	8.025
Region 14	EMBANKMENT FILL 2, EL. -4 to -6	45,42,44,41,17	40.5744
Region 15	EMBANKMENT FILL, EL. +2.4 TO -4	41,15,26,48,47,5,43,46	87.887136

Points

	X (ft)	Y (ft)
Point 1	111.2	-20.9
Point 2	147.6	-20.3
Point 3	174.4	-12
Point 4	190.2	1.9
Point 5	207.5	1.4
Point 6	235.8	-6
Point 7	111.2	-40
Point 8	310	-40
Point 9	111.2	-70
Point 10	310	-70
Point 11	200	-21.5
Point 12	203.5	-21.5
Point 13	203.5	-6
Point 14	111.2	-21.5
Point 15	200	2.2

Point 16	172.8	-15
Point 17	200	-6
Point 18	235.8	-12
Point 19	235.9	-22
Point 20	200	-12
Point 21	200	-15
Point 22	310	-12
Point 23	310	-22
Point 24	203.5	-12
Point 25	203.5	-15
Point 26	201	2.2
Point 27	200	-7
Point 28	167.2	-18.4
Point 29	235.8	-8
Point 30	310	-8
Point 31	310	-6
Point 32	111.2	-13.2
Point 33	159.5	-12.8
Point 34	169.3	-11.5
Point 35	200	2.4
Point 36	200	12.9
Point 37	200.5	12.9
Point 38	225.3	-4.5
Point 39	200	-10
Point 40	199	2.4
Point 41	200	-4
Point 42	178.8	-5.6
Point 43	223.79153	-4
Point 44	181.232	-4
Point 45	178.2	-6
Point 46	203.5	-4
Point 47	203.5	1.89231
Point 48	201.9	2.08923

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.08	(168.679, 48.908)	20.98398	(207.3, 1.42462)	(166.362, -11.8897)
2	25955	1.22	(168.679, 48.908)	61.207	(207.3, 1.42462)	(164.405, -12.1493)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	167.0964	-11.87619	766.00321	772.4688	3.4378194	0
2	Optimized	168.56545	-11.84907	764.36979	775.39534	5.8623868	0
3	Optimized	169.3116	-11.835295	763.46302	794.09114	16.285261	0
4	Optimized	170.2287	-11.76213	758.90508	797.37873	20.456801	0
5	Optimized	172.19135	-11.685525	754.12784	823.8888	29.611772	0
6	Optimized	173.86745	-11.690515	754.44813	850.81394	40.904858	0
7	Optimized	175.10535	-11.707805	755.53053	871.00795	49.017254	0
8	Optimized	176.3432	-11.725095	756.60485	891.20196	57.13308	0
9	Optimized	177.58105	-11.742385	757.68725	911.39596	65.245477	0
10	Optimized	178.5	-11.74967	758.14217	925.07377	70.858264	0
11	Optimized	179.408	-11.745555	757.87903	938.971	76.868978	0
12	Optimized	180.624	-11.74004	757.54187	957.80305	85.005828	0
13	Optimized	181.5027	-11.736055	757.28358	975.31269	92.547866	0

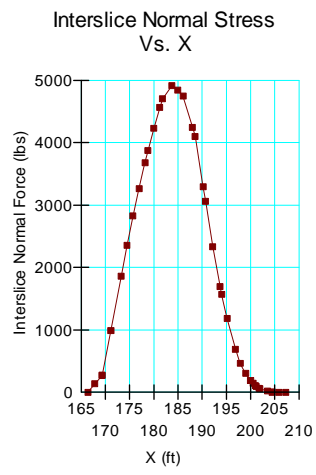
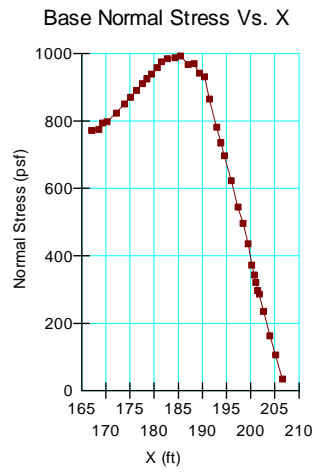
	ed						
14	Optimized	182.7763	-11.60714	749.25371	985.35518	100.21913	0
15	Optimized	184.3545	-11.32873	731.87363	987.74816	108.61229	0
16	Optimized	185.50505	-11.027295	713.06538	993.54954	119.05846	0
17	Optimized	187.04015	-10.482755	679.07976	967.70431	122.51386	0
18	Optimized	188.27335	-9.97677	645.23291	969.91384	137.81888	0
19	Optimized	189.37335	-9.3163945	594.81563	942.48032	147.57491	0
20	Optimized	190.45045	-8.6020745	541.2615	931.04498	165.45327	0
21	Optimized	191.44605	-7.885815	488.24293	865.13951	159.9831	0
22	Optimized	192.9363	-6.785505	407.13273	781.24916	158.803	0
23	Optimized	193.8486	-6.117675	357.83539	735.25977	160.20715	0
24	Optimized	194.57265	-5.60804	319.99195	696.45221	159.7979	0
25	Optimized	196.0118	-4.60804	245.56639	622.39705	159.95513	0
26	Optimized	197.39075	-3.65772	174.74228	544.26252	156.85204	0
27	Optimized	198.4437	-2.9886465	124.19694	495.68728	157.6883	0
28	Optimized	199.5	-2.3681325	76.65081	435.32432	152.24787	0
29	Optimized	200.25	-1.927552	42.892662	372.77798	140.02801	0
30	Optimized	200.75	-1.6338315	20.386646	342.87573	136.88849	0
31	Optimized	201.10145	-1.427364	4.5674187	320.76026	134.2159	0
32	Optimized	201.4576	-1.2181235	-11.465362	297.55916	126.30637	0

	ed	5					
33	Optimized	201.8062	-1.0219126	-26.620576	285.69274	121.26937	0
34	Optimized	202.7	-0.5781289	-61.779157	235.03062	99.764578	0
35	Optimized	203.97785	0.0563337	-112.0507	162.59347	69.016835	0
36	Optimized	205.16675	0.5763465	-154.43059	105.48456	44.775538	0
37	Optimized	206.5889	1.1418595	-201.59939	35.161301	14.925087	0

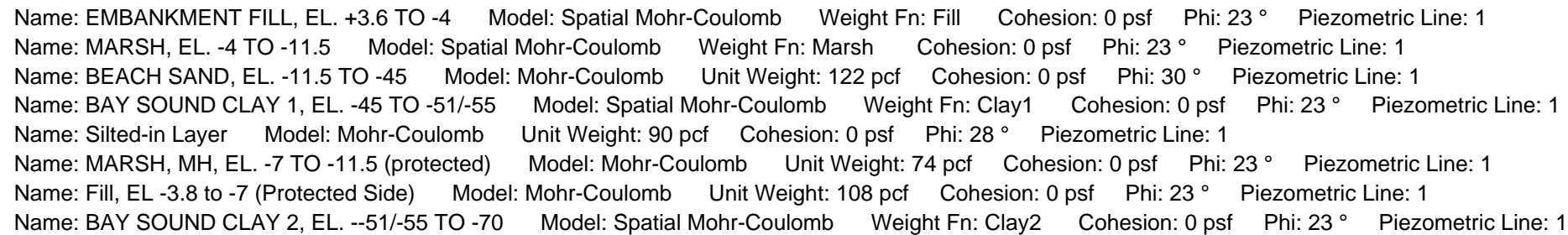
Slices of Slip Surface: 25955

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	25955	165.22125	-12.19543	785.93529	796.52213	5.6291235	0
2	25955	166.85275	-12.265945	790.33415	808.04009	9.414413	0
3	25955	168.48425	-12.292895	792.03042	815.44441	12.449441	0
4	25955	169.93535	-12.282445	791.36968	840.23035	25.979677	0
5	25955	171.20605	-12.243145	788.89555	854.23714	34.742741	0
6	25955	172.47675	-12.17739	784.82689	865.49314	42.891008	0
7	25955	173.75605	-12.08429	779.03085	874.04971	50.522424	0
8	25955	174.55895	-12.015345	774.70746	878.70722	60.044292	0
9	25955	175.58845	-11.90109	767.5933	882.64668	68.837266	0
10	25955	177.3295	-11.677885	753.63169	886.11712	56.236727	0
11	25955	178.5	-11.50482	742.86471	887.25259	61.289019	0
12	25955	179.408	-11.347795	733.05881	885.98248	64.912246	0
13	25955	180.624	-11.11855	718.76094	882.53181	69.516609	0
14	25955	181.9008	-10.84958	701.97452	885.36078	77.842847	0
15	25955	183.2384	-10.5378	682.51891	893.95803	89.750581	0
16	25955	184.576	-10.19411	661.07349	899.33083	101.13424	0
17	25955	185.9136	-9.817944	637.59853	901.4987	112.01898	0
18	25955	187.2512	-9.4086745	612.06274	900.34578	122.36889	0
19	25955	187.96	-9.1824045	597.9365	900.30366	128.34725	0
20	25955	188.55	-8.9803325	580.73847	919.51691	143.80291	0

21	25955	189.65	-8.590941	547.24745	953.38712	172.39606	0
22	25955	190.89035	-8.1214755	507.59493	947.75439	186.83661	0
23	25955	192.27105	-7.5642045	461.28101	902.53974	187.30322	0
24	25955	193.65175	-6.9672615	412.49977	853.92206	187.37265	0
25	25955	195.03245	-6.32936	361.15698	801.81569	187.04852	0
26	25955	196.5421	-5.581045	301.84909	740.64495	186.25779	0
27	25955	198.1807	-4.711301	233.88614	669.42242	184.87418	0
28	25955	199.22615	-4.130256	188.89497	620.62015	183.25646	0
29	25955	199.72615	-3.838816	166.52754	591.24121	180.28026	0
30	25955	200.25	-3.5271075	142.70556	539.37793	168.37743	0
31	25955	200.75	-3.2227825	119.53823	506.53931	164.27221	0
32	25955	201.45	-2.783695	86.290286	454.45673	156.27738	0
33	25955	202.54965	-2.066732	32.364536	366.07458	141.65151	0
34	25955	203.34965	-1.53172	-7.7042177	302.23206	128.2899	0
35	25955	204.13335	-0.97827175	-48.787048	243.42043	103.32584	0
36	25955	205.4	-0.05315755	-117.09454	147.41028	62.571951	0
37	25955	206.66665	0.9232302	-188.60473	49.271207	20.914387	0



ELEVATION IN FEET N.A.V.D 88



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

HW=CANAL WATER LEVEL

FS Slope Stability (Entry/Exit)_Global

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File Information

Created By: [Liljegren, James](#)
Revision Number: [243](#)
Last Edited By: [Serrano-Canals, Josinell M MVN](#)
Date: [6/21/2013](#)
Time: [12:56:04 PM](#)
File Name: [Reach 36_S-Case.gsz](#)
Directory: [c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443056\](#)
Last Solved Date: [6/21/2013](#)
Last Solved Time: [1:01:29 PM](#)

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

FS Slope Stability (Entry/Exit)_Global

Kind: [SLOPE/W](#)
Method: [Spencer](#)
Settings
Apply Phreatic Correction: [No](#)
PWP Conditions Source: [Piezometric Line](#)
Use Staged Rapid Drawdown: [No](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Entry and Exit](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Search for Tension Crack](#)
Percentage Wet: [0](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)

Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

Silted-in Layer

Model: [Mohr-Coulomb](#)
Unit Weight: [90 pcf](#)
Cohesion: [0 psf](#)
Phi: [28 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

MARSH, MH, EL. -7 TO -11.5 (protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [74 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

Fill, EL -3.8 to -7 (Protected Side)

Model: [Mohr-Coulomb](#)
Unit Weight: [108 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

BAY SOUND CLAY 2, EL. --51/-55 TO -70

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay2](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(119.9, -12.87659\) ft](#)
Left-Zone Right Coordinate: [\(149.60667, -9.7\) ft](#)

FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced
Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [5 ft](#)
Optimization Maximum Iterations: [2000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL, EL. +3.6 TO -4

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Fill](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

MARSH, EL. -4 TO -11.5

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

BEACH SAND, EL. -11.5 TO -45

Model: [Mohr-Coulomb](#)
Unit Weight: [122 pcf](#)
Cohesion: [0 psf](#)
Phi: [30 °](#)
Phi-B: [0 °](#)
Pore Water Pressure
Piezometric Line: [1](#)

BAY SOUND CLAY 1, EL. -45 TO -51/-55

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Clay1](#)

Left-Zone Increment: [30](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(208, 3.12473\) ft](#)
Right-Zone Right Coordinate: [\(240, -4.68503\) ft](#)
Right-Zone Increment: [20](#)
Radius Increments: [30](#)

Slip Surface Limits

Left Coordinate: [\(90, -14\) ft](#)
Right Coordinate: [\(310, -6.8\) ft](#)

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
90	0.4
181.7	0.4
226.4	-3.8
272.5	-6.8
310	-6.8

Unit Weight Functions

Marsh

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [74](#)
Data Points: [X \(ft\), Unit Weight \(pcf\)](#)
Data Point: [\(165.2, 74\)](#)
Data Point: [\(200, 90\)](#)
Data Point: [\(226.4, 74\)](#)

Clay1

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)

Y-Intercept: 103
Data Points: X (ft), Unit Weight (pcf)
Data Point: (96, 103)
Data Point: (165.6, 103)
Data Point: (200, 107)
Data Point: (226.4, 103)
Data Point: (310, 103)

Clay2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 118
Data Points: X (ft), Unit Weight (pcf)
Data Point: (96, 118)
Data Point: (165.2, 118)
Data Point: (200, 120)
Data Point: (226.4, 118)
Data Point: (310, 118)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 108
Data Points: X (ft), Unit Weight (pcf)
Data Point: (165.2, 108)
Data Point: (200, 118)
Data Point: (226.4, 108)

Regions

	Material	Points	Area (ft ²)
Region 1	EMBANKMENT FILL, EL. +3.6 TO -4	3,34,35,4,5,14	155.595
Region 2		5,17,18,19	7
Region 3	EMBANKMENT FILL, EL. +3.6 TO -4	5,19,6,36,12,14	165.95
Region 4	MARSH, EL. -4 TO -11.5	27,28,3	11.7
Region 5	Fill, EL -3.8 to -7 (Protected Side)	37,7,8,12,36	85.87
Region 6	MARSH, MH, EL. -7 TO -11.5 (protected)	12,8,9,13	376.2
Region 7	BAY SOUND CLAY 1, EL. -45 TO -51/-55	29,10,11,30,45,44,46	1442.4

Point 15	200	-11.5
Point 16	200	-15.5
Point 17	200	12.9
Point 18	200.5	12.9
Point 19	201	3.5
Point 20	90	-70
Point 21	310	-70
Point 22	90	-14
Point 23	151.5	-13.4
Point 24	151.5	-9.3
Point 25	124.6	-12.7
Point 26	144.4	-10.8
Point 27	165.2	-7
Point 28	157.4	-7
Point 29	90	-51
Point 30	310	-51
Point 31	200	-20
Point 32	90	-20
Point 33	310	-20
Point 34	170.7	-1.7
Point 35	196.8	3.3
Point 36	226.4	-3.8
Point 37	272.5	-6.8
Point 38	165.2	-11.5
Point 39	144.4	-14.9
Point 40	90	-15.5
Point 41	156.2	-11.4
Point 42	138.11579	-15.5
Point 43	200	-6.9
Point 44	200	-55
Point 45	226.4	-51
Point 46	165.2	-51

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
--	------	-----	-------------	-------------	------------	-----------

Region 8	Silted-in Layer	22,25,26,24,28,41,23,39,42,40	197.09974
Region 9	MARSH, MH, EL. -7 TO -11.5 (protected)	41,28,27,38	37.41
Region 10	BEACH SAND, EL. -11.5 TO -45	31,16,15,13,9,33	935
Region 11	BEACH SAND, EL. -11.5 TO -45	10,32,31,33,11	5500
Region 12	MARSH, EL. -4 TO -11.5	3,27,38,15,43,14	261
Region 13	MARSH, EL. -4 TO -11.5	14,12,13,15,43	158.4
Region 14	BEACH SAND, EL. -11.5 TO -45	42,39,23,41,38,15,16	201.69026
Region 15	BEACH SAND, EL. -11.5 TO -45	16,31,32,1,2,42	418.87474
Region 16	Silted-in Layer	1,2,42,40	76.125264
Region 17	BAY SOUND CLAY 2, EL. --51/-55 TO -70	20,29,46,44,45,30,21	4057.6

Points

	X (ft)	Y (ft)
Point 1	90	-18.1
Point 2	124.5	-16.8
Point 3	165.2	-4
Point 4	199	3.6
Point 5	200	3.6
Point 6	207.8	3.2
Point 7	310	-6.8
Point 8	310	-7
Point 9	310	-11.5
Point 10	90	-45
Point 11	310	-45
Point 12	226.4	-7
Point 13	226.4	-11.5
Point 14	200	-4

	Surface					
1	Optimized	1.34	(163.419, 64.48)	27.9885	(208, 3.12473)	(147.729, -10.0968)
2	18887	1.43	(163.419, 64.48)	75.841	(208, 3.12473)	(148.631, -9.90612)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimized	148.67145	-10.14378	657.92993	676.94433	10.110134	0
2	Optimized	150.55715	-10.2378	663.80903	696.80616	17.544885	0
3	Optimized	152.6033	-10.339815	670.15155	731.11968	32.41733	0
4	Optimized	155.0655	-10.486065	679.28862	772.39114	49.503488	0
5	Optimized	156.9122	-10.61007	687.03282	771.72051	35.94779	0
6	Optimized	158.41175	-10.710765	693.33055	758.3195	27.586174	0
7	Optimized	160.5329	-10.872025	703.38787	780.31951	32.655546	0
8	Optimized	162.7517	-11.058675	715.01968	803.31367	37.478577	0
9	Optimized	164.53055	-11.215605	724.81688	823.32096	41.812498	0
10	Optimized	166.372	-11.39056	735.73195	867.0535	55.74269	0
11	Optimized	169.122	-11.481795	741.40937	925.54984	78.162994	0
12	Optimized	171.5966	-11.45025	739.44626	969.73908	97.753501	0
13	Optimized	173.3898	-11.42739	738.05224	991.98771	107.78921	0
14	Optimized	175.18305	-11.40453	736.60245	1014.5151	117.96694	0

15	Optimiz ed	176.8426 5	-11.35319	733.41313	1026.726	124.50394	0
16	Optimiz ed	178.3686	-11.273365	728.43951	1041.2542	132.78198	0
17	Optimiz ed	180.4158	-11.01777	712.4613	1029.3539	134.51295	0
18	Optimiz ed	182.1124 5	-10.73282	692.26942	1034.3093	145.18732	0
19	Optimiz ed	184.0239 5	-10.24898	650.86494	1023.1046	158.00638	0
20	Optimiz ed	186.6655 5	-9.396695	582.19315	997.12888	176.12977	0
21	Optimiz ed	188.4295	-8.65438	525.53623	957.83904	183.50166	0
22	Optimiz ed	189.8744 5	-7.885935	469.11434	914.41352	189.01829	0
23	Optimiz ed	191.5215 5	-6.958245	401.56751	874.05152	200.55756	0
24	Optimiz ed	193.2588	-5.898025	325.22773	808.26911	205.0389	0
25	Optimiz ed	195.0648	-4.650825	236.81136	729.95972	209.32906	0
26	Optimiz ed	196.3785 5	-3.692622	169.31947	670.27084	212.64124	0
27	Optimiz ed	197.7929 5	-2.661037	96.653833	584.34946	207.01451	0
28	Optimiz ed	198.8929 5	-1.8710525	40.910292	534.35637	209.45543	0
29	Optimiz ed	199.4093	-1.5538455	18.089086	502.40983	205.58196	0
30	Optimiz ed	199.9093	-1.246689	-4.0092275	470.6268	199.76922	0
31	Optimiz ed	200.25	-1.0373835	-19.067523	447.59004	189.9907	0
32	Optimiz ed	200.75	-0.7302267	-41.164992	412.2634	174.99543	0
33	Optimiz ed	201.8558 5	-0.0508792	-90.038518	339.16267	143.96601	0

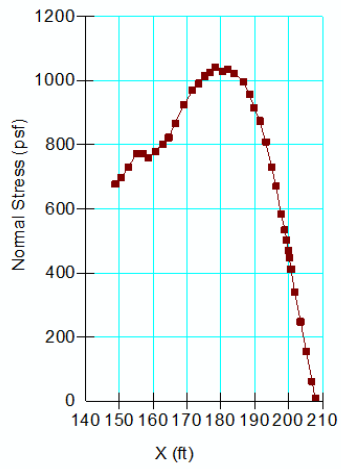
34	Optimiz ed	203.5597 5	0.8998265	-159.35333	247.67738	105.13281	0
35	Optimiz ed	205.2558 5	1.7496995	-222.3335	154.74104	65.683674	0
36	Optimiz ed	206.9519 5	2.5995725	-285.3084	62.816766	26.664135	0
37	Optimiz ed	207.9	3.074619	-320.50698	8.6146782	3.6567139	0

Slices of Slip Surface: **18887**

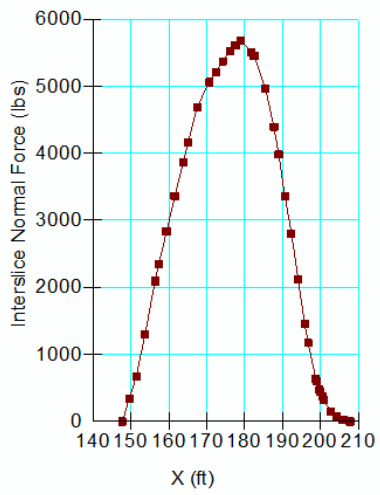
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	18887	150.0655	-10.162748	659.10983	691.46489	17.203487	0
2	18887	152.70045	-10.590765	685.84063	757.99965	38.367635	0
3	18887	155.1013	-10.894625	704.80379	810.08552	55.979285	0
4	18887	156.85085	-11.074825	716.03055	807.53674	38.842076	0
5	18887	158.375	-11.18755	723.06221	790.60464	28.670062	0
6	18887	160.325	-11.29235	729.59713	804.71402	31.885228	0
7	18887	162.275	-11.346865	732.99347	814.88159	34.759442	0
8	18887	164.225	-11.351205	733.29197	821.18445	37.308143	0
9	18887	166.11665	-11.308205	730.60979	840.77634	46.76293	0
10	18887	167.95	-11.2207	725.13837	872.96467	62.748542	0
11	18887	169.78335	-11.088625	716.9164	901.77104	78.466139	0
12	18887	171.6135	-10.91213	705.85892	916.27801	89.317605	0
13	18887	173.4405	-10.69105	692.07043	919.55956	96.563406	0
14	18887	175.2675	-10.424755	675.45468	919.05951	103.40412	0
15	18887	177.0945	-10.112771	656.00618	914.64006	109.78356	0
16	18887	178.9215	-9.7545195	633.62114	906.17574	115.69257	0
17	18887	180.7675	-9.3446085	608.04695	893.35768	121.10722	0
18	18887	182.72245	-8.856342	571.61963	886.49044	133.65473	0
19	18887	184.7673	-8.287249	524.10734	883.64808	152.61599	0
20	18887	186.81215	-7.65571	472.7158	874.35212	170.4845	0
21	18887	188.85705	-6.960067	417.30665	858.36673	187.2189	0
22	18887	190.9019	-6.198425	357.79056	835.40677	202.73605	0
23	18887	192.94675	-5.368623	294.02094	805.24125	217.00015	0

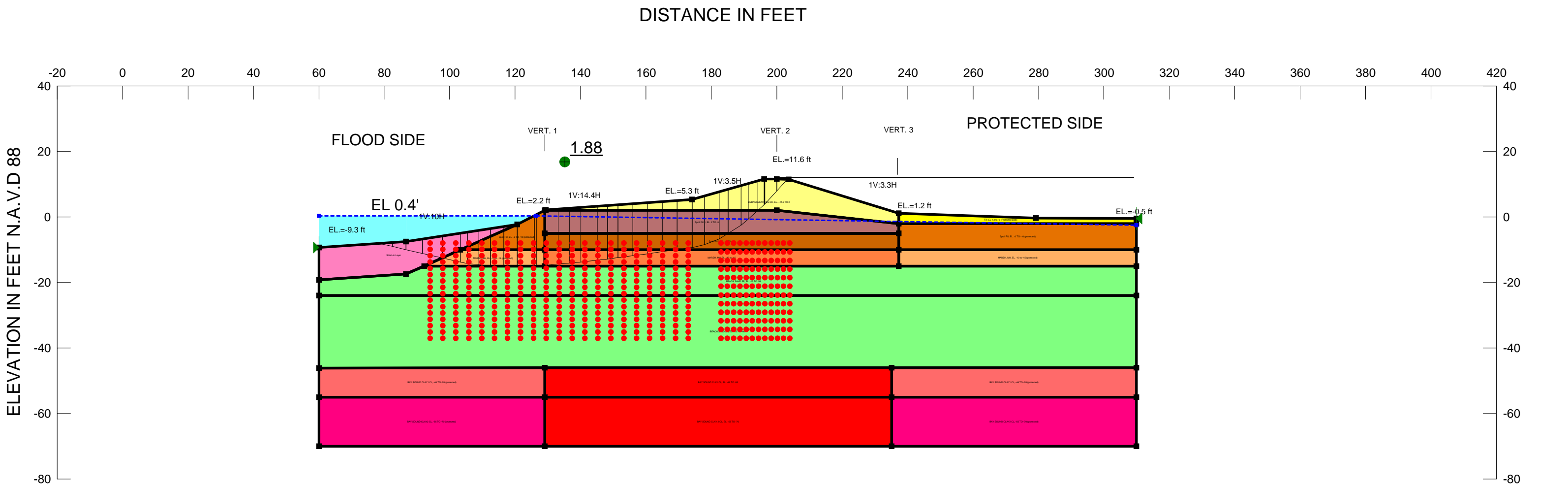
24	18887	194.9916	-4.468197	225.84476	767.4738	229.90789	0
25	18887	196.407	-3.8101675	176.49077	732.72596	236.10783	0
26	18887	197.9	-3.0587365	120.84355	670.89423	233.48266	0
27	18887	199.5	-2.226689	59.542815	592.27927	226.13321	0
28	18887	200.25	-1.817352	29.602527	542.95776	217.90637	0
29	18887	200.7367	-1.5446915	9.7349877	506.07885	210.68547	0
30	18887	200.9867	-1.403321	-0.55223639	487.17153	206.79205	0
31	18887	202.13335	-0.72279397	-49.739826	410.07285	174.0656	0
32	18887	204.4	0.67810353	-150.44655	256.96924	109.07697	0
33	18887	206.66665	2.1929885	-258.26243	99.402786	42.193979	0
34	18887	207.9	3.052318	-319.11787	10.219871	4.338078	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +11.6 TO 2 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH, MH, EL. -10 to -15 Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -46 TO -55 Model: Spatial Mohr-Coulomb Weight Fn: Clay 1 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: Fill ,EL 1.2 to -2 (Protected Side) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Spoil Fill 1, EL. 2 TO -5 Model: Spatial Mohr-Coulomb Weight Fn: Spoil Fill 1 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY2 CL, -55 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Spoil Fill 2, EL. -5 TO -10 Model: Mohr-Coulomb Unit Weight: 85 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH, MH, EL. -10 to -15 (protected) Model: Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Spoil Fill, EL. -2 TO -10 (protected) Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY1 CL, -46 TO -55 (protected) Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY 2 CL, EL. -55 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 1.14.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 37 STA. 129+03 TO STA. 137+60
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

FS Slope Stability (Block)_Global

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Created By: Liljegren, James
Revision Number: 194
Last Edited By: Johnson, Andrew S MVN
Date: 2/7/2012
Time: 2:10:32 PM
File Name: Reach 37_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 2/7/2012
Last Solved Time: 2:12:50 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Block)_Global

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Pheatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
SlipSurface
 Direction of movement: Right to Left
 Use Passive Mode: No
 Slip Surface Option: Block
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 1

BAY SOUND CLAY CL, EL. -46 TO -55

Model: Spatial Mohr-Coulomb
Weight Fn: Clay 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill ,EL 1.2 to -2 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 1, EL. 2 TO -5

Model: Spatial Mohr-Coulomb
Weight Fn: Spoil Fill 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY2 CL, -55 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 2, EL. -5 TO -10

Model: Mohr-Coulomb

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 5 ft
 Optimization Maximum Iterations: 3000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +11.6 TO 2

Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -10 to -15

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -15 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Unit Weight: 85 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -10 to -15 (protected)

Model: Mohr-Coulomb
Unit Weight: 93 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill, EL. -2 TO -10 (protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY1 CL, -46 TO -55 (protected)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2 CL, EL. -55 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (60, -9.3) ft
Right Coordinate: (310, -0.5) ft

Slip Surface Block

Left Grid
Upper Left: (94, -8) ft
Lower Left: (94, -37) ft
Lower Right: (173, -37) ft
X Increments: 20
Y Increments: 15
Starting Angle: 145 °
Ending Angle: 180 °
Angle Increments: 4

Right Grid
Upper Left: (183, -8) ft
Lower Left: (183, -37) ft
Lower Right: (204, -37) ft
X Increments: 11
Y Increments: 11
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
60	0.4
126.5	0.4
310	-2.5

Unit Weight Functions

Spoil Fill 1
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 109)
Data Point: (200, 110)
Data Point: (237.3, 109)

Marsh

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 93
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 93)
Data Point: (200, 98)
Data Point: (237.3, 93)

Clay 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 108
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 108)
Data Point: (200, 119)
Data Point: (237.3, 108)

Clay 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 120
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 120)
Data Point: (200, 119)
Data Point: (237.3, 120)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 112)
Data Point: (200, 113)
Data Point: (237.3, 112)

Regions

	Material	Points	Area (ft²)
--	----------	--------	------------

Region 1	Fill ,EL 1.2 to -2 (Protected Side)	18,3,4,2,13	151.935
Region 2	Spoil Fill, EL. -2 TO -10 (protected)	37,11,30,33,31	150.27899
Region 3	MARSH, MH, EL. -10 to -15 (protected)	31,32,36,37	156.71688
Region 4	EMBANKMENT FILL CH, EL. +11.6 TO 2	14,15,16,9,17,18,3,10,30	513.69
Region 5	BEACH SAND SP, EL. -15 TO -46	35,36,32,28,6,19,20,34	2155.29
Region 6	BEACH SAND SP, EL. -15 TO -46	20,19,8,21,40,7	5503.455
Region 7	Spoil Fill, EL. -2 TO -10 (protected)	3,4,5,27,29	581.6
Region 8	MARSH, MH, EL. -10 to -15 (protected)	27,5,6,28	363.5
Region 9	Spoil Fill 1, EL. 2 TO -5	33,30,10,3,29	682.8
Region 10	Spoil Fill 2, EL. -5 TO -10	33,29,27,31	541
Region 11	MARSH, MH, EL. -10 to -15	31,27,28,32	541
Region 12	Silted-in Layer	34,1,12,11,37,36,35	432.54914
Region 13	BAY SOUND CLAY1 CL, -46 TO -55 (protected)	7,40,39,38	618.445
Region 14	BAY SOUND CLAY2 CL, -55 TO -70 (protected)	38,24,41,39	1036.5
Region 15	BAY SOUND CLAY1 CL, -46 TO -55 (protected)	21,8,25,22	674.1
Region 16	BAY SOUND CLAY2 CL, -55 TO -70 (protected)	22,25,26,23	1123.5
Region 17	BAY SOUND CLAY CL, EL. -46 TO -55	40,21,22,39	954
Region 18	BAY SOUND CLAY 2 CL, EL. -55 TO -70	39,22,23,41	1590

Points

	X (ft)	Y (ft)
Point 1	60	-9.3
Point 2	310	-0.5
Point 3	237.3	-2
Point 4	310	-2
Point 5	310	-10
Point 6	310	-15

Point 7	60	-46.1
Point 8	310	-46
Point 9	200	11.6
Point 10	200	2
Point 11	120.6	-2.3
Point 12	86.7	-7.5
Point 13	279.2	-0.3
Point 14	129.4	2.2
Point 15	174.1	5.3
Point 16	196.1	11.6
Point 17	203.7	11.5
Point 18	237.3	1.2
Point 19	310	-24
Point 20	60	-24
Point 21	235.1	-46
Point 22	235.1	-55
Point 23	235.1	-70
Point 24	60	-70
Point 25	310	-55
Point 26	310	-70
Point 27	237.3	-10
Point 28	237.3	-15
Point 29	237.3	-5
Point 30	129.1	2
Point 31	129.1	-10
Point 32	129.1	-15
Point 33	129.1	-5
Point 34	60	-19.2
Point 35	86.7	-17.4
Point 36	92.2	-15
Point 37	103.31325	-10
Point 38	60	-55
Point 39	129.1	-55
Point 40	129.1	-46
Point 41	129.1	-70

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.88	(140.159, 15.21)	53.38007	(203.188, 11.5138)	(78.3482, -8.06304)
2	13385	2.10	(140.159, 15.21)	53.852	(206.817, 10.5444)	(77.541, -8.11746)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimized	80.436165	-8.534174	557.50246	596.58322	20.779613	0
2	Optimized	84.612055	-9.4764395	616.29881	695.20785	41.956684	0
3	Optimized	89.20664	-10.513181	680.98477	815.36047	71.448828	0
4	Optimized	94.76886	-11.77414	759.66147	961.83471	107.49742	0
5	Optimized	100.56887	-13.09403	842.02826	1115.1425	115.93012	0
6	Optimized	104.3883	-13.96321	896.27305	1231.9616	142.49134	0
7	Optimized	107.2067	-14.40374	923.74988	1286.0735	153.79724	0
8	Optimized	110.6935	-14.795525	948.20309	1370.2347	179.14179	0
9	Optimized	114.4777	-14.990945	960.39495	1408.9745	190.41074	0
10	Optimized	118.55925	-14.989995	960.34595	1461.3566	212.6664	0
11	Optimized	123.2686	-14.9889	960.25844	1553.8458	251.9629	0
12	Optimized	126.2186	-14.988215	960.23264	1629.4157	284.05135	0
13	Optimiz	126.58265	-14.98813	960.14033	1649.9728	292.81651	0

	ed						
14	Optimiz ed	127.88265	-14.871965	951.61927	1678.7653	308.65519	0
15	Optimiz ed	129.25	-14.74151	942.12182	1625.4522	290.05652	0
16	Optimiz ed	131.26295	-14.54946	928.14324	1634.0761	299.65071	0
17	Optimiz ed	134.873	-14.21085	903.46192	1633.282	309.79025	0
18	Optimiz ed	138.3672	-13.889105	879.95059	1631.8286	319.15327	0
19	Optimiz ed	142.6192	-13.452935	848.5309	1619.5222	327.26639	0
20	Optimiz ed	146.7028	-12.990995	815.68721	1606.4327	335.65152	0
21	Optimiz ed	149.8602	-12.6177	789.26717	1596.9026	342.82088	0
22	Optimiz ed	153.72705	-12.133085	755.20449	1578.211	349.34552	0
23	Optimiz ed	158.30335	-11.53715	713.51353	1558.6873	358.75498	0
24	Optimiz ed	162.81745	-10.929385	671.13123	1534.0397	366.2829	0
25	Optimiz ed	167.2693	-10.309795	628.08148	1510.5904	374.60279	0
26	Optimiz ed	171.7976	-9.679568	584.30262	1489.8695	384.39034	0
27	Optimiz ed	174.18785	-9.346908	561.1802	1482.7499	391.18313	0
28	Optimiz ed	176.10385	-8.89067	530.82791	1467.7034	397.68006	0
29	Optimiz ed	180.18775	-7.56098	443.82062	1430.0428	418.62648	0
30	Optimiz ed	183.7978	-5.83765	332.73403	1322.2386	420.01979	0
31	Optimiz ed	187.149	-3.764915	200.08045	1226.5139	435.69514	0
32	Optimiz	190.20895	-1.5767373	60.521249	1017.0105	406.00561	0

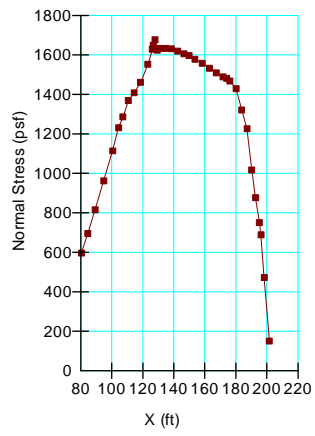
	ed						
33	Optimiz ed	192.7352	0.6881777	-83.301466	877.74403	372.58024	0
34	Optimiz ed	195.1492	2.852442	-220.73078	750.63499	318.62565	0
35	Optimiz ed	196.2357	3.826532	-282.57888	688.57167	292.28134	0
36	Optimiz ed	198.1857	5.9617755	-417.74169	473.10238	200.82005	0
37	Optimiz ed	201.59415	9.7446005	-657.15506	152.04847	64.540745	0

Slices of Slip Surface: 13385

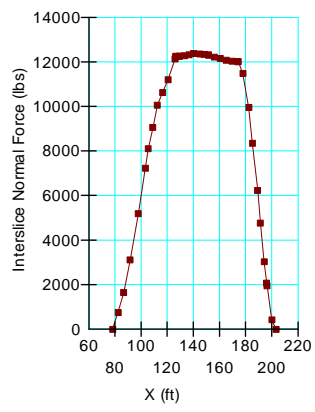
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	13385	79.83076	-8.4698855	553.47886	584.0826	16.272299	0
2	13385	84.410255	-9.174737	597.46364	659.38335	32.923291	0
3	13385	88.893605	-9.8647915	640.52323	743.86032	54.945304	0
4	13385	93.280815	-10.54005	682.65106	826.71923	76.602402	0
5	13385	97.668025	-11.215305	724.80142	909.60066	98.2595	0
6	13385	100.88082	-11.7098	755.63367	969.07691	90.60128	0
7	13385	102.60665	-11.87892	766.20383	972.71805	87.660085	0
8	13385	105.4741	-11.928635	769.30605	1009.1994	101.8287	0
9	13385	109.79575	-12.00356	773.97945	1072.0127	126.50759	0
10	13385	114.11745	-12.078485	778.65284	1134.8259	151.18649	0
11	13385	118.43915	-12.153415	783.32624	1197.616	175.85557	0
12	13385	123.2686	-12.237145	788.55214	1300.1847	217.17512	0
13	13385	126.2186	-12.28829	791.75618	1380.6788	249.98282	0
14	13385	127.8	-12.315705	792.18856	1473.1246	289.04021	0
15	13385	129.25	-12.34084	792.31422	1437.3173	273.78754	0
16	13385	131.635	-12.38219	792.54304	1471.3672	288.14374	0
17	13385	136.105	-12.45969	792.96804	1515.8571	306.84821	0
18	13385	140.575	-12.53719	793.39303	1560.4366	325.59066	0
19	13385	145.045	-12.61469	793.81802	1605.1278	344.38058	0
20	13385	149.515	-12.692185	794.26538	1649.8862	363.18949	0

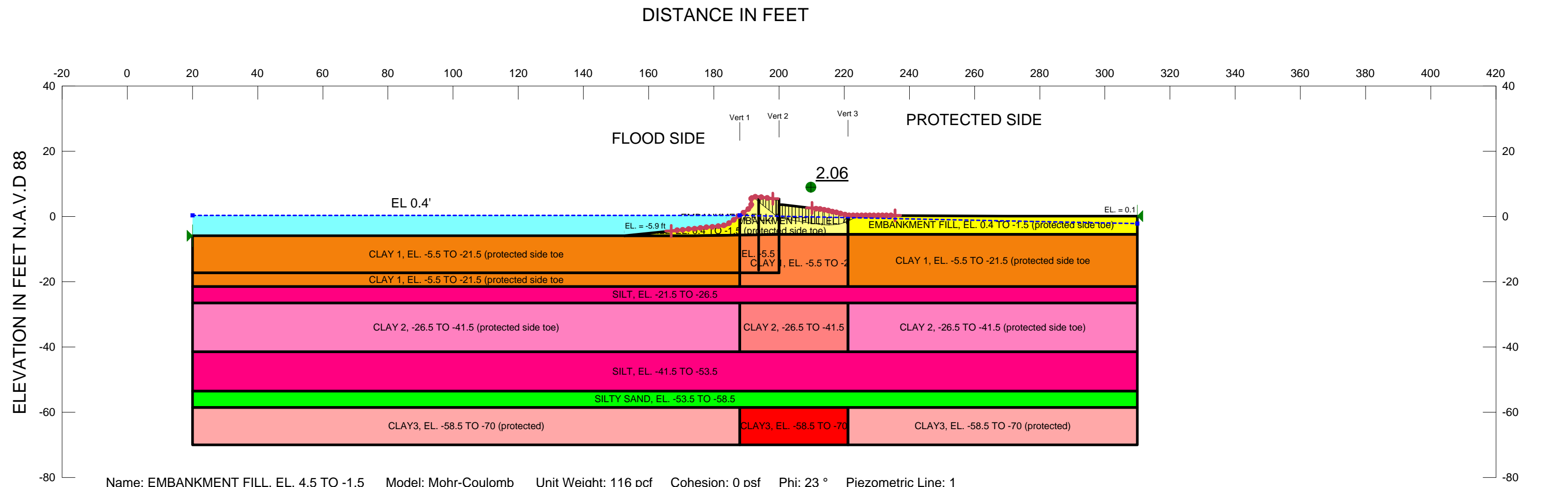
21	13385	153.985	-12.76968	794.69037	1694.7564	382.05536	0
22	13385	158.455	-12.84718	795.11537	1739.6937	400.94972	0
23	13385	162.925	-12.92468	795.54036	1784.7429	419.89156	0
24	13385	167.395	-13.00218	795.96535	1829.8591	438.86187	0
25	13385	171.865	-13.079675	796.39034	1875.0872	457.87967	0
26	13385	176.325	-13.157	796.82403	1976.3321	500.67147	0
27	13385	180.775	-13.234155	797.25093	2133.6792	567.28016	0
28	13385	184.63635	-11.636365	693.72679	1690.4783	423.09592	0
29	13385	188.7727	-7.5	431.54726	1471.4892	441.42915	0
30	13385	193.42685	-2.8458716	136.5416	1200.7954	451.74892	0
31	13385	195.8405	-0.4322352	16.449609	1037.6442	440.45382	0
32	13385	197.18635	0.91363635	101.75741	929.99642	394.76006	0
33	13385	199.13635	2.8636365	225.36233	762.54752	323.68222	0
34	13385	201.85	5.577273	397.37491	521.13772	221.20984	0
35	13385	205.2586	8.9858565	613.42818	177.53622	75.359652	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.45.

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 1 STA. 2+44 TO STA. 10+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 205
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 10:29:50 AM
File Name: Reach 1_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 10:32:00 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -21.5 TO -26.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, -26.5 TO -41.5

Model: Spatial Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY3, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -41.5 TO -53.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL, EL. 0.4 TO -1.5 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 4 ft
Optimization Maximum Iterations: 6000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.5 TO -1.5

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILTY SAND, EL. -53.5 TO -58.5

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY3, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5 (protected side toe)

Model: Spatial Mohr-Coulomb
Weight Fn: clay1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, -26.5 TO -41.5 (protected side toe)

Model: Spatial Mohr-Coulomb
Weight Fn: clay2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (166.9, -4.4278) ft
Left-Zone Right Coordinate: (198.13333, 5.5) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (210.1, 2.57258) ft
Right-Zone Right Coordinate: (235.6, 0.3122) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (20, -5.9) ft
Right Coordinate: (310, 0.1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	20	0.4
	188	0.4
	310	-2.1

Unit Weight Functions

clay1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 111
Data Points: X (ft), Unit Weight (pcf)
Data Point: (188, 111)
Data Point: (200, 112)
Data Point: (221.6, 111)

clay2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (188, 101)
Data Point: (200, 102)
Data Point: (221.6, 101)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. 4.5 TO -1.5	27,43,14,4,44,3,46,47,28,21,13,25	121.83862
Region 2	EMBANKMENT FILL, EL. 4.5 TO -1.5	25,17,5,22,52,28,21,13	166.3
Region	CLAY 1, EL. -5.5 TO -21.5	47,28,35,45,34,18,57	140.50074

3			
Region 4	CLAY 1, EL. -5.5 TO -21.5	28,52,53,48,57,18,34,45,35	389.6
Region 5	SILT, EL. -21.5 TO -26.5	7,48,53,8,31,54,49,30	1450
Region 6	CLAY 2, -26.5 TO -41.5	49,54,55,50	498
Region 7	SILTY SAND, EL. -53.5 TO -58.5	42,10,37,38,9,41,51,56	1450
Region 8	CLAY3, EL. -58.5 TO -70	38,37,40,39	381.8
Region 9	CLAY3, EL. -58.5 TO -70 (protected)	11,9,38,39	1932
Region 10	CLAY3, EL. -58.5 TO -70 (protected)	37,10,12,40	1021.2
Region 11	SILT, EL. -41.5 TO -53.5	41,32,50,55,33,42,56,51	3480
Region 12	EMBANKMENT FILL, EL. 0.4 TO -1.5 (protected side toe)	46,24,1,2,47	68.501441
Region 13	EMBANKMENT FILL, EL. 0.4 TO -1.5 (protected side toe)	22,36,6,29,52	504.66
Region 14	CLAY 1, EL. -5.5 TO -21.5 (protected side toe)	52,29,8,53	1420.8
Region 15	CLAY 1, EL. -5.5 TO -21.5 (protected side toe)	1,2,47,57,20,58	1916.7392
Region 16	CLAY 1, EL. -5.5 TO -21.5 (protected side toe)	20,57,48,7	705.6
Region 17	CLAY 2, -26.5 TO -41.5 (protected side toe)	54,31,33,55	1332
Region 18	CLAY 2, -26.5 TO -41.5 (protected side toe)	30,49,50,32	2520

Points

	X (ft)	Y (ft)
Point 1	152.5	-5.9
Point 2	173.8	-5.9
Point 3	189.5	1.5

Point 4	191.5	6
Point 5	213.4	2.2
Point 6	310	0.1
Point 7	20	-21.5
Point 8	310	-21.5
Point 9	20	-58.5
Point 10	310	-58.5
Point 11	20	-70
Point 12	310	-70
Point 13	200	1.5
Point 14	193.8	6
Point 15	193.8	1.5
Point 16	200.5	12.8
Point 17	201	3.6
Point 18	200	-17.3
Point 19	193.8	-16.5
Point 20	20	-17.3
Point 21	200	-4.9
Point 22	221.2	0.4
Point 23	201	6
Point 24	183.8	-2.7
Point 25	200	3.6
Point 26	200	12.8
Point 27	200	5.4
Point 28	200	-5.5
Point 29	310	-5.5
Point 30	20	-26.5
Point 31	310	-26.5
Point 32	20	-41.5
Point 33	310	-41.5
Point 34	200	-12.5
Point 35	200	-7.2
Point 36	270.4	0.1
Point 37	221.2	-58.5
Point 38	188	-58.5
Point 39	188	-70

Point 40	221.2	-70
Point 41	20	-53.5
Point 42	310	-53.5
Point 43	199	5.4
Point 44	191.5	3
Point 45	200	-10.9
Point 46	188.00714	0.4
Point 47	188	-5.68321
Point 48	188	-21.5
Point 49	188	-26.5
Point 50	188	-41.5
Point 51	188	-53.5
Point 52	221.2	-5.5
Point 53	221.2	-21.5
Point 54	221.2	-26.5
Point 55	221.2	-41.5
Point 56	221.2	-53.5
Point 57	188	-17.3
Point 58	20	-5.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.06	(212.606, 23.966)	14.51509	(192.166, 6)	(224.722, 0.378524)
2	4064	2.13	(212.606, 23.966)	26.794	(192.727, 6)	(225.31, 0.374941)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	192.5747	5.6285095	-332.11254	33.020167	14.016229	0
2	Optimiz	193.39155	4.885529	-286.79483	99.057783	42.047534	0

	ed						
3	Optimized	194.02185	4.3122745	-251.81861	147.74125	62.712441	0
4	Optimized	194.6589	3.7643425	-218.44813	194.12267	82.400186	0
5	Optimized	195.4893	3.0720075	-176.30867	248.32312	105.40691	0
6	Optimized	196.4092	2.33341	-131.39392	310.88739	131.96387	0
7	Optimized	197.41855	1.54855	-83.716696	372.62689	158.17073	0
8	Optimized	198.4616	0.7526258	-35.380796	438.70581	186.21957	0
9	Optimized	199.1197	0.2594076	-5.4457985	478.87602	203.27081	0
10	Optimized	199.6197	-0.1153154	17.298193	515.43165	211.44511	0
11	Optimized	200.0017	-0.4015772	34.67272	376.1	144.92728	0
12	Optimized	200.5017	-0.49577665	39.910635	459.12716	177.94686	0
13	Optimized	201.4826	-0.67871995	50.071655	473.56381	179.76175	0
14	Optimized	202.4478	-0.8587333	60.071117	481.5589	178.91095	0
15	Optimized	203.46165	-1.041155	70.157447	491.26532	178.74969	0
16	Optimized	204.52415	-1.225985	80.33214	498.58131	177.53624	0
17	Optimized	205.58665	-1.410815	90.506834	505.88803	176.31886	0
18	Optimized	206.637	-1.5832675	99.928792	515.26587	176.30013	0
19	Optimized	207.6752	-1.7433425	108.58224	520.1019	174.67973	0
20	Optimized	208.6578	-1.8865635	116.26148	526.75206	174.24291	0
21	Optimized	209.5848	-2.01293	122.96333	529.18909	172.43261	0

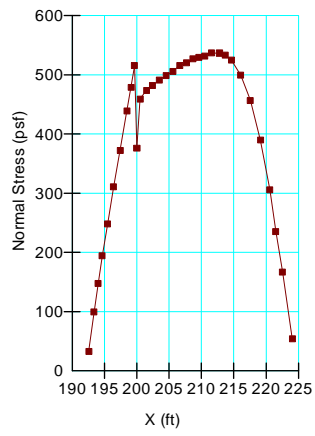
	ed						
22	Optimized	210.5118	-2.1392965	129.66517	531.62613	170.6223	0
23	Optimized	211.58145	-2.2702215	136.4683	536.90538	169.97546	0
24	Optimized	212.7938	-2.4057045	143.37041	536.66766	166.94478	0
25	Optimized	213.6383	-2.500078	148.18069	533.26033	163.45661	0
26	Optimized	214.6232	-2.560375	150.6834	524.92311	158.85533	0
27	Optimized	216.07	-2.570975	149.49256	499.13642	148.41501	0
28	Optimized	217.56245	-2.443465	139.62859	456.84628	134.65092	0
29	Optimized	219.14505	-2.137895	118.54189	389.54207	115.03275	0
30	Optimized	220.5677	-1.6631455	87.099834	305.3429	92.638686	0
31	Optimized	221.48055	-1.2681105	61.279134	235.15931	73.807756	0
32	Optimized	222.55915	-0.7356161	26.672118	167.18671	59.644906	0
33	Optimized	224.0396	0.02699615	-22.807923	54.278244	23.039748	0

Slices of Slip Surface: 4064

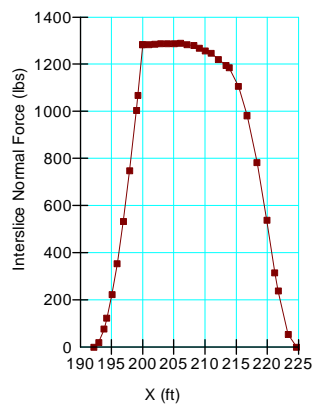
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4064	193.26375	5.440131	-321.2329	47.911796	20.337351	0
2	4064	194.32	4.3944215	-257.33282	136.39497	57.896228	0
3	4064	195.36	3.4710175	-201.0434	212.92531	90.381433	0
4	4064	196.4	2.6383305	-150.41641	284.30362	120.67973	0
5	4064	197.44	1.886039	-104.80338	350.67877	148.85431	0
6	4064	198.48	1.2061339	-63.703764	412.18112	174.96051	0
7	4064	199.5	0.6029142	-27.367094	473.63675	201.04687	0

8	4064	200.1671	0.23484065	-5.2519216	336.1887	142.70364	0
9	4064	200.6671	-0.01845355	9.9141727	365.14576	150.78686	0
10	4064	201.56365	-0.43917655	35.020921	408.26355	158.4321	0
11	4064	202.6909	-0.9187687	63.506217	453.14375	165.39132	0
12	4064	203.81815	-1.339075	88.292155	492.28575	171.48511	0
13	4064	204.94545	-1.703015	109.56307	525.81605	176.68891	0
14	4064	206.07275	-2.012963	127.46361	553.81629	180.97598	0
15	4064	207.2	-2.270837	142.10845	576.34897	184.32417	0
16	4064	208.32725	-2.4781635	153.6081	593.43288	186.69455	0
17	4064	209.45455	-2.636127	162.02193	605.06274	188.05967	0
18	4064	210.58185	-2.745605	167.41206	611.19642	188.37529	0
19	4064	211.7091	-2.8071925	169.8104	611.76252	187.59754	0
20	4064	212.83635	-2.821221	169.243	606.64553	185.66636	0
21	4064	213.95715	-2.788231	165.75155	587.73548	179.12155	0
22	4064	215.07145	-2.7085935	159.36038	554.53086	167.73992	0
23	4064	216.18575	-2.5819675	150.03055	514.62551	154.76138	0
24	4064	217.3	-2.4076755	137.73659	467.6983	140.06043	0
25	4064	218.41425	-2.1847625	122.39792	413.31965	123.48895	0
26	4064	219.52855	-1.9119695	103.9474	350.98503	104.86125	0
27	4064	220.64285	-1.587696	82.291826	280.05332	83.944773	0
28	4064	221.87285	-1.164346	54.302204	215.32635	68.350695	0
29	4064	223.21855	-0.6258529	18.97969	145.84436	53.850859	0
30	4064	224.60055	0.01973055	-23.071851	54.497933	23.133	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 214
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 10:38:38 AM
File Name: Reach 2_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 10:43:06 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 4 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 5.8 TO -5.5

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL.-41.5 TO -58.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70

Model: Mohr-Coulomb

Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. 0.9 TO -1.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. -1.5 TO -5.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -41.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (163.8, -6.51474) ft

Left-Zone Right Coordinate: (199.8, 5.8) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (206.3, 3.5) ft
Right-Zone Right Coordinate: (241.1, 1.4) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (20, -6.7) ft
Right Coordinate: (310, 1.4) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	20	0.4
	190.8	0.4
	310	-0.6

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. 5.8 TO -5.5	3,4,14,21,15,41,23	115.235
Region 2	EMBANKMENT FILL, EL. 5.8 TO -5.5	15,21,19,5,24,31,32	107.48
Region 3	CLAY 1, EL. -5.5 TO -41.5	41,15,16,17,35	227.74
Region 4	CLAY 1, EL. -5.5 TO -41.5	35,17,16,15,32,34,28,36	927.86
Region 5	CLAY 2, EL. -58.5 TO -70	37,29,39,40,30,38	369.15
Region 6	SILT, EL.-41.5 TO -58.5	10,8,36,28,34,9,11,39,29,37	4930
Region 7	FILL, EL. 0.9 TO -1.5 (Protected)	26,6,31,24,25	279.18
Region 8	FILL, EL. -1.5 TO -5.5 (Protected)	32,31,6,33	388.8
Region 9	CLAY 1, EL. -5.5 TO -41.5 (protected)	20,7,1,2,41,35	1710.4
Region 10	CLAY 1, EL. -5.5 TO -41.5 (protected)	8,36,35,20	3888.94
Region 11	CLAY 1, EL. -5.5 TO -41.5 (protected)	32,33,9,34	3499.2
Region 12	CLAY 2, EL. -58.5 TO -70 (protected)	12,38,37,10	1848.05
Region 13	CLAY 2, EL. -58.5 TO -70 (protected)	40,13,11,39	1117.8

Points

	X (ft)	Y (ft)
Point 1	150.6	-6.7
Point 2	179.1	-6.3
Point 3	194.8	3
Point 4	195.4	5.8
Point 5	206.3	3.5
Point 6	310	-1.5
Point 7	20	-6.7
Point 8	20	-41.5
Point 9	310	-41.5
Point 10	20	-58.5
Point 11	310	-58.5
Point 12	20	-70
Point 13	310	-70
Point 14	200	5.8
Point 15	200	-5.5
Point 16	200	-9.5
Point 17	200	-17.3
Point 18	200.5	12.8
Point 19	201	3.7
Point 20	20	-17.3
Point 21	200	3.7
Point 22	201	6
Point 23	184.3	-3.7
Point 24	212.8	0.9
Point 25	223.6	1.4
Point 26	310	1.4
Point 27	200	12.8
Point 28	200	-41.5
Point 29	200	-58.5
Point 30	200	-70
Point 31	212.8	-1.5
Point 32	212.8	-5.5
Point 33	310	-5.5

Point 34	212.8	-41.5
Point 35	180.7	-17.3
Point 36	180.7	-41.5
Point 37	180.7	-58.5
Point 38	180.7	-70
Point 39	212.8	-58.5
Point 40	212.8	-70
Point 41	180.7	-5.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.62	(208.551, 14.345)	9.546475	(195.397, 5.78388)	(215.313, 1.01634)
2	4230	1.74	(208.551, 14.345)	15.419	(195.717, 5.8)	(216.389, 1.06616)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	195.39825	5.78222	-338.25041	0.79423671	0.33713348	0
2	Optimized	195.76815	5.4275065	-316.31437	30.442403	12.922033	0
3	Optimized	196.4678	4.7622875	-275.17906	85.336144	36.223044	0
4	Optimized	197.13085	4.1379625	-236.5611	136.67267	58.014106	0
5	Optimized	197.7733	3.531945	-199.08098	186.27097	79.067338	0
6	Optimized	198.39505	2.944235	-162.73143	234.54224	99.557273	0
7	Optimized	199.02945	2.3508685	-126.04531	285.25209	121.08233	0

8	Optimized	199.6765	1.751845	-89.001781	334.79014	142.10998	0
9	Optimized	200.0012	1.4512315	-70.414458	185.97643	78.942311	0
10	Optimized	200.2518	1.4031095	-67.541704	258.2558	109.62308	0
11	Optimized	200.7506	1.309068	-61.934899	268.83505	114.11371	0
12	Optimized	201.14695	1.2343385	-57.478931	276.61297	117.41524	0
13	Optimized	201.6436	1.1107235	-50.025564	276.83662	117.51017	0
14	Optimized	202.343	0.91891015	-38.422336	294.69304	125.08978	0
15	Optimized	203.0424	0.72709665	-26.819108	312.54947	132.66938	0
16	Optimized	203.6416	0.5642625	-16.972445	328.60446	139.48432	0
17	Optimized	204.14055	0.4304075	-8.8811284	341.05175	144.76788	0
18	Optimized	204.50065	0.32380665	-2.4176997	336.85387	142.98599	0
19	Optimized	204.89275	0.18321684	6.1497982	350.09116	145.99445	0
20	Optimized	205.45565	0.018616055	18.450231	369.17184	148.87249	0
21	Optimized	206.01855	-0.22044895	30.749827	388.26925	151.75799	0
22	Optimized	206.44535	-0.3734877	40.073938	397.27496	151.62284	0
23	Optimized	207.0276	-0.557495	51.252541	402.08104	148.91786	0
24	Optimized	207.7575	-0.7443375	62.530062	411.03642	147.93217	0
25	Optimized	208.34355	-0.8542525	69.08075	396.93214	139.16466	0
26	Optimized	208.9791	-0.932695	73.642927	397.95928	137.66412	0

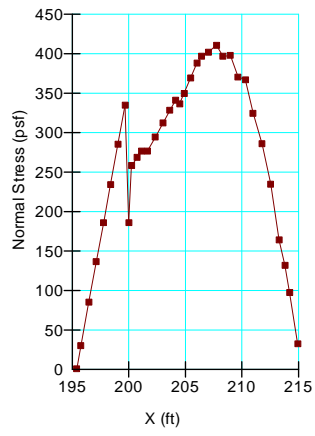
	ed						
27	Optimized	209.66415	-0.979665	76.216184	370.72673	125.01231	0
28	Optimized	210.3311	-0.9687525	75.1854	367.24404	123.97154	0
29	Optimized	210.9799	-0.8999575	70.553466	324.61859	107.84425	0
30	Optimized	211.7989	-0.72323	59.09702	285.94549	96.291463	0
31	Optimized	212.54675	-0.45261495	41.818357	235.07194	82.031278	0
32	Optimized	213.29695	-0.07256995	17.711458	164.10966	62.142351	0
33	Optimized	213.81885	0.1929347	0.87073073	132.22754	55.757656	0
34	Optimized	214.2111	0.40909565	-12.823443	97.717353	41.478556	0
35	Optimized	214.9457	0.81392795	-38.469137	32.572451	13.826185	0

Slices of Slip Surface: 4230

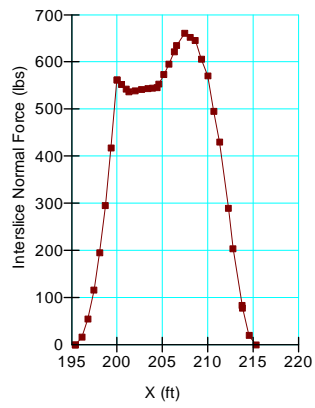
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4230	196.07355	5.307156	-308.96485	35.407341	15.029525	0
2	4230	196.78745	4.392374	-252.25608	107.62251	45.683044	0
3	4230	197.50135	3.6032215	-203.39182	176.69859	75.004103	0
4	4230	198.21525	2.913249	-160.71115	242.42781	102.9045	0
5	4230	198.92915	2.3052005	-123.14171	304.79051	129.3759	0
6	4230	199.64305	1.767086	-89.935498	363.85018	154.44524	0
7	4230	200.5	1.207814	-55.485737	233.28087	99.021854	0
8	4230	201.2945	0.7442354	-26.974532	284.50065	120.76336	0
9	4230	201.88345	0.44582625	-8.6615793	318.12704	135.03692	0
10	4230	202.5214	0.15853322	8.9314886	352.45582	145.81743	0
11	4230	203.2084	-0.11441773	25.604134	386.88142	153.35311	0
12	4230	203.89545	-0.35019425	39.956952	418.10768	160.51546	0
13	4230	204.5825	-0.55056655	52.100878	446.19719	167.28396	0

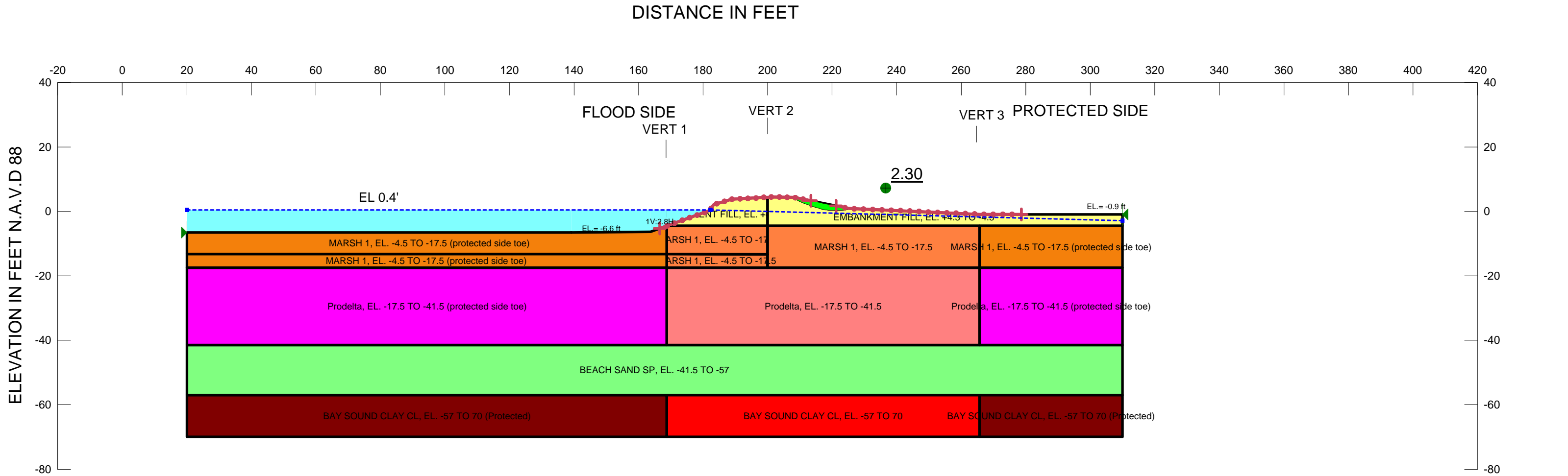
14	4230	205.2695	-0.7169512	62.123117	471.17485	173.63216	0
15	4230	205.9565	-0.85046735	70.09433	493.06934	179.54224	0
16	4230	206.6611	-0.9537526	76.171293	497.13136	178.68695	0
17	4230	207.3833	-1.0258186	80.289381	482.08973	170.55413	0
18	4230	208.10555	-1.063714	82.276783	462.08807	161.22033	0
19	4230	208.8278	-1.0676915	82.147105	436.92824	150.59566	0
20	4230	209.55	-1.037777	79.901379	406.3878	138.58526	0
21	4230	210.2722	-0.97377195	75.52927	370.16112	125.0638	0
22	4230	210.99445	-0.87524545	69.003825	327.83447	109.86709	0
23	4230	211.7167	-0.74151915	60.28076	278.92251	92.807916	0
24	4230	212.4389	-0.57164415	49.302864	222.76528	73.630428	0
25	4230	213.11475	-0.3799836	36.989777	183.66678	62.260694	0
26	4230	213.7443	-0.16981987	23.545769	163.86168	59.56057	0
27	4230	214.37385	0.071193335	8.1768256	139.04163	55.548813	0
28	4230	215.11375	0.399651	-12.706184	98.89221	41.977253	0
29	4230	215.964	0.8329364	-40.188516	36.708433	15.581805	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +4.3 TO -4.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -4.5 TO -17.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -41.5 TO -57 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -57 TO 70 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Prodelta, EL. -17.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -57 TO 70 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -4.5 TO -17.5 (protected side toe) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Prodelta, EL. -17.5 TO -41.5 (protected side toe) Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.62.

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 3 STA. 21+00 TO STA. 33+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 175
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 10:16:03 AM
File Name: Reach 3_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 10:19:50 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -4.5 TO -17.5 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, EL. -17.5 TO -41.5 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (166.53333, -5.3) ft

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (213.4, 3.28596) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (221.2, 1.73509) ft
Right-Zone Right Coordinate: (278.6, -0.9) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (20, -6.6) ft
Right Coordinate: (310, -0.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	20	0.4
	182.3	0.4
	310	-2.9

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +4.3 TO -4.5	31,27,28,7,26,1,17	175.48
Region 2	EMBANKMENT FILL, EL. +4.3 TO -4.5	1,29,23,2,3,30,4,8,24,17	536.01
Region 3	MARSH 1, EL. -4.5 TO -17.5	31,17,18,36	273.76081
Region 4	MARSH 1, EL. -4.5 TO -17.5	18,17,24,25,19	854.1
Region 5	MARSH 1, EL. -4.5 TO -17.5	36,18,19,37	131.83919
Region 6	Prodelta, EL. -17.5 TO -41.5	37,19,25,39,38	2325.6
Region 7	BEACH SAND SP, EL. -41.5 TO -57	13,11,38,39,12,14,33,32	4495
Region 8	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	13,15,34,32	1934.4
Region 9	BAY SOUND CLAY CL, EL. -57 TO 70	32,34,35,33	1259.7
Region 10	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	33,35,16,14	575.9
Region	MARSH 1, EL. -4.5 TO -17.5 (protected side	25,24,8,10	575.9

11	toe)		
Region 12	MARSH 1, EL. -4.5 TO -17.5 (protected side toe)	5,6,31,36,9,40	995.51849
Region 13	MARSH 1, EL. -4.5 TO -17.5 (protected side toe)	9,36,37,20	636.21151
Region 14	Prodelta, EL. -17.5 TO -41.5 (protected side toe)	20,37,38,11	3571.2
Region 15	Prodelta, EL. -17.5 TO -41.5 (protected side toe)	25,39,12,10	1063.2

Points

	X (ft)	Y (ft)
Point 1	200	4.3
Point 2	208.3	4.3
Point 3	225.4	0.9
Point 4	310	-0.9
Point 5	139.1	-6.6
Point 6	163.7	-6.3
Point 7	188.9	3.8
Point 8	310	-4.5
Point 9	20	-13.2
Point 10	310	-17.5
Point 11	20	-41.5
Point 12	310	-41.5
Point 13	20	-57
Point 14	310	-57
Point 15	20	-70
Point 16	310	-70
Point 17	200	-4.5
Point 18	200	-13.3
Point 19	200	-17.5
Point 20	20	-17.5
Point 21	200	12.8
Point 22	200.5	12.8
Point 23	201	4.5
Point 24	265.7	-4.5

Point 25	265.7	-17.5
Point 26	199	4.3
Point 27	182.2	0.3
Point 28	183.2	2.1
Point 29	201	4.3
Point 30	265.7	-0.9
Point 31	168.8	-4.5
Point 32	168.8	-57
Point 33	265.7	-57
Point 34	168.8	-70
Point 35	265.7	-70
Point 36	168.8	-13.24877
Point 37	168.8	-17.5
Point 38	168.8	-41.5
Point 39	265.7	-41.5
Point 40	20	-6.6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.30	(221.252, 21.543)	7.834672	(207.884, 4.3114)	(225.846, 0.880057)
2	7986	2.34	(221.252, 21.543)	21.457	(208.549, 4.25049)	(226.869, 0.834407)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	208.0919	4.1533015	-	275.79151	14.271101	6.057723
2	Optimized	208.47965	3.858725	-	258.03932	37.977856	16.120644
3	Optimized	208.91145	3.58487	-	59.409089	25.217662	0

	ed			241.64107			
4	Optimized	209.4158	3.31011	225.30879	76.873132	32.630709	0
5	Optimized	209.92065	3.0630935	210.71301	94.921611	40.291833	0
6	Optimized	210.42595	2.84382	197.84186	107.24997	45.524909	0
7	Optimized	210.93125	2.6245465	184.98885	119.57832	50.757985	0
8	Optimized	211.4393	2.41928	172.9909	133.02493	56.465734	0
9	Optimized	211.9501	2.22802	161.88058	142.52187	60.496944	0
10	Optimized	212.4609	2.03676	150.76844	152.01697	64.527376	0
11	Optimized	213.06575	1.824595	138.50511	164.0235	69.623845	0
12	Optimized	213.76465	1.591525	125.08896	174.12227	73.910517	0
13	Optimized	214.36625	1.3969375	113.91597	183.68691	77.970469	0
14	Optimized	214.8706	1.2408325	104.98885	189.73682	80.538503	0
15	Optimized	215.4352	1.0716275	95.340718	197.10089	83.664364	0
16	Optimized	216.05995	0.8893225	-	203.43123	86.351433	0

	ed			84.972486			
17	Optimized	216.7246	0.7023175	74.375321	210.85356	89.502027	0
18	Optimized	217.4292	0.5106125	63.549149	216.50974	91.902932	0
19	Optimized	218.03705	0.40043	57.654255	233.01594	98.9094	0
20	Optimized	218.5481	0.37177	56.689216	224.36185	95.235954	0
21	Optimized	219.05915	0.34311	55.72613	215.68822	91.554216	0
22	Optimized	219.6834	0.3183975	55.189725	206.09045	87.480204	0
23	Optimized	220.42075	0.2976325	55.082627	190.98817	81.069669	0
24	Optimized	221.1078	0.28853	55.623774	177.90059	75.514322	0
25	Optimized	221.74455	0.29109	56.809464	162.2118	68.854823	0
26	Optimized	222.3563	0.3052525	58.680066	148.01461	62.828474	0
27	Optimized	222.94305	0.3310175	61.234039	130.44669	55.371333	0
28	Optimized	223.6727	0.384625	65.755014	108.04696	45.863214	0
29	Optimized	224.55745	0.502745	-	73.396568	31.154995	0

	ed			74.552385			
30	Optimized	225.20295	0.65044585	84.80968	40.636378	17.249119	0
31	Optimized	225.62325	0.8004043	94.844203	12.61369	5.354194	0

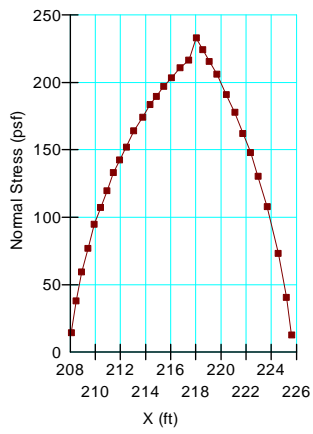
Slices of Slip Surface: 7986

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	7986	208.8499	4.03731	269.78623	14.610596	6.2018302	0
2	7986	209.4517	3.625948	245.08127	43.05193	18.27446	0
3	7986	210.05355	3.243625	222.19029	69.452003	29.480626	0
4	7986	210.6554	2.888552	201.01427	93.832186	39.8294	0
5	7986	211.2572	2.5591965	181.43462	116.2152	49.330425	0
6	7986	211.859	2.2542395	163.37399	136.61657	57.990293	0
7	7986	212.4608	1.972539	146.76134	155.05841	65.818388	0
8	7986	213.06265	1.713102	131.54377	171.53475	72.812183	0
9	7986	213.6645	1.475064	-	186.05844	78.977122	0

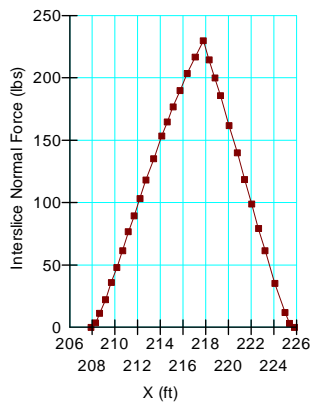
				117.66086			
10	7986	214.2663	1.2576705	105.06571	198.64686	84.320591	0
11	7986	214.8681	1.0602639	93.717499	209.27286	88.831057	0
12	7986	215.46995	0.8822708	83.581942	217.97167	92.523484	0
13	7986	216.0718	0.7231924	74.624748	224.6966	95.378048	0
14	7986	216.6736	0.58259775	66.821913	229.44414	97.39326	0
15	7986	217.2754	0.46011675	60.150302	232.20518	98.565252	0
16	7986	217.8772	0.35543495	54.589106	232.94765	98.880412	0
17	7986	218.47905	0.2682894	50.120981	231.66475	98.335852	0
18	7986	219.0809	0.1984651	46.734603	228.2922	96.904289	0
19	7986	219.6827	0.14579235	44.418836	222.82333	94.582894	0
20	7986	220.2845	0.11014461	43.16488	215.17703	91.337229	0
21	7986	220.8863	0.09143694	42.966635	205.33008	87.157446	0
22	7986	221.48815	0.089624965	-	193.20169	82.00925	0

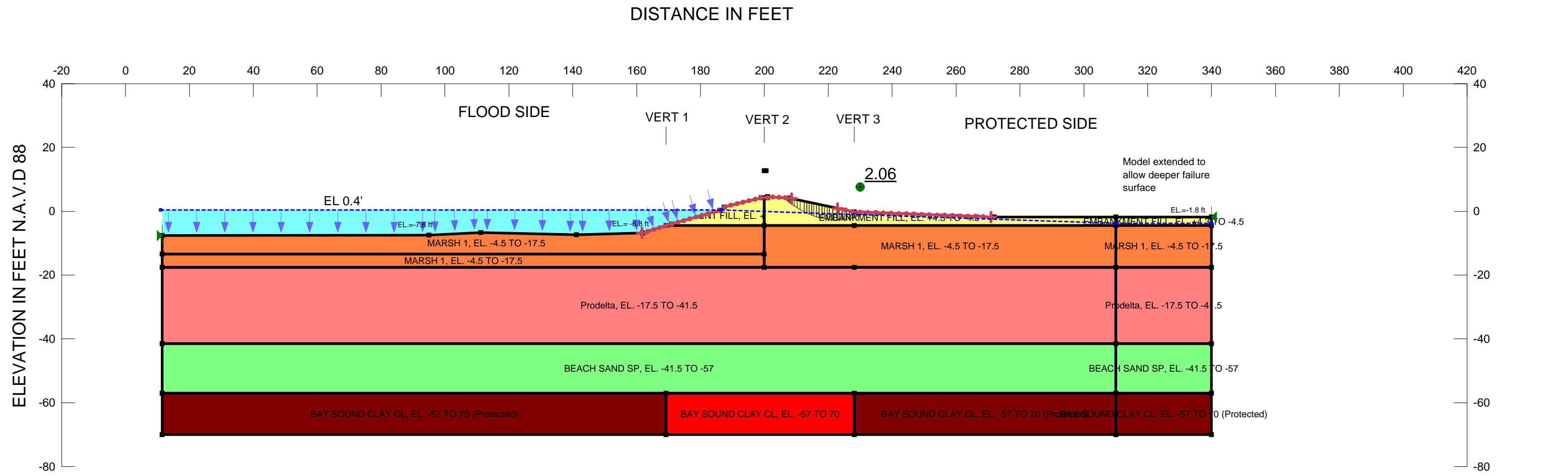
				43.824283			
23	7986	222.09	0.10470439	45.736096	178.75365	75.876424	0
24	7986	222.6918	0.136711	48.703401	161.86996	68.709723	0
25	7986	223.2936	0.1857209	52.732077	142.48247	60.48022	0
26	7986	223.89545	0.2518516	57.829013	120.48948	51.144749	0
27	7986	224.4973	0.33526345	64.004962	95.770922	40.652345	0
28	7986	225.0991	0.43616145	71.270754	68.20081	28.949526	0
29	7986	225.76715	0.57005335	80.703849	41.397718	17.572289	0
30	7986	226.50145	0.7417515	92.60109	14.624283	6.2076397	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +4.3 TO -4.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -4.5 TO -17.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -41.5 TO -57 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO 70 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Prodelta, EL. -17.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO 70 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.07.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 4 STA.33+00 TO STA. 37+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 166
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
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Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 10:59:12 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70

Model: Mohr-Coulomb

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (161.7, -6.80483) ft
Left-Zone Right Coordinate: (208.5, 3.99303) ft
Left-Zone Increment: 25
Right Projection: Range
Right-Zone Left Coordinate: (222.95814, 0.9) ft
Right-Zone Right Coordinate: (270.9, -1.75991) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (11.5, -7.6) ft
Right Coordinate: (340, -1.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
11	0.4
186.5	0.4
310	-3.8
340	-3.8

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +4.3 TO -4.5	7,28,25,26,24,1,15	141.75
Region 2	EMBANKMENT FILL, EL. +4.3 TO -4.5	1,29,21,2,3,43,4,8,22,15	456.645
Region 3	MARSH 1, EL. -4.5 TO -17.5	5,44,27,30,6,7,15,16,9	1250.8564
Region 4	MARSH 1, EL. -4.5 TO -17.5	16,15,22,8,10,17	1430
Region 5	MARSH 1, EL. -4.5 TO -17.5	9,16,17,18	772.85
Region 6	Prodelta, EL. -17.5 TO -41.5	18,17,10,12,11	7164
Region 7	BEACH SAND SP, EL. -41.5 TO -57	36,11,12,38,40,39	4626.75
Region 8	BEACH SAND SP, EL. -41.5 TO -57	38,12,32,37	465
Region 9	Prodelta, EL. -17.5 TO -41.5	10,33,32,12	720
Region 10	MARSH 1, EL. -4.5 TO -17.5	8,34,33,10	390
Region 11	EMBANKMENT FILL, EL. +4.3 TO -4.5	4,35,34,8	81
Region 12	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	36,13,41,39	2050.1
Region 13	BAY SOUND CLAY CL, EL. -57 TO 70	39,41,42,40	765.7
Region 14	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	40,42,14,38	1064.7
Region 15	BAY SOUND CLAY CL, EL. -57 TO 70 (Protected)	38,14,31,37	390

Points

	X (ft)	Y (ft)
Point 1	200	4.3
Point 2	208	4.1
Point 3	228.1	-0.2
Point 4	310	-1.8
Point 5	11.5	-7.6
Point 6	161.9	-6.8
Point 7	169.2	-4.5
Point 8	310	-4.5
Point 9	11.5	-13.4
Point 10	310	-17.5
Point 11	11.5	-41.5
Point 12	310	-41.5
Point 13	11.5	-70
Point 14	310	-70
Point 15	200	-4.5
Point 16	200	-13.4
Point 17	200	-17.5
Point 18	11.5	-17.5
Point 19	200	12.7
Point 20	200.5	12.7
Point 21	201	4.6
Point 22	228.1	-4.5
Point 23	228.1	-17.5
Point 24	199	4.3
Point 25	186	0.3
Point 26	187.4	1.4
Point 27	111.2	-6.6
Point 28	171	-4
Point 29	201	4.3
Point 30	141.2	-7.3
Point 31	340	-70
Point 32	340	-41.5
Point 33	340	-17.5

Point 34	340	-4.5
Point 35	340	-1.8
Point 36	11.5	-57
Point 37	340	-57
Point 38	310	-57
Point 39	169.2	-57
Point 40	228.1	-57
Point 41	169.2	-70
Point 42	228.1	-70
Point 43	272	-1.8
Point 44	95	-7.42234

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.06	(222.43, 18.51)	11.88665	(205.981, 4.24425)	(232.449, -0.358494)
2	5593	2.06	(222.43, 18.51)	21.367	(206.559, 4.20291)	(232.456, -0.358769)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	206.3641	3.93108	-262.4977	26.305304	11.165939	0
2	Optimized	207.13125	3.30474	-225.03697	78.915913	33.497818	0
3	Optimized	207.7574	2.811982	-195.62029	122.9166	52.174999	0
4	Optimized	208.6551	2.147422	-156.05543	170.66722	72.443938	0
5	Optimized	209.78195	1.3840775	-110.8122	230.26006	97.739599	0
6	Optimized	210.7254	0.8273325	-78.074265	265.26829	112.59971	0

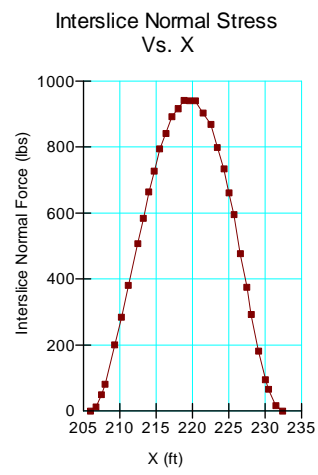
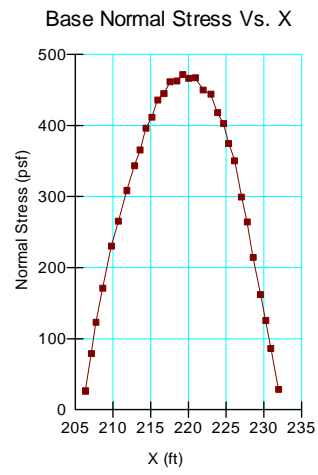
7	Optimized	211.8356	0.212145	-42.042882	308.61692	131.00011	0
8	Optimized	212.8658	-0.3173207	-11.190149	343.66292	145.87626	0
9	Optimized	213.6315	-0.6939257	10.685004	365.94335	150.79822	0
10	Optimized	214.3838	-1.0292725	30.014391	396.15461	155.4173	0
11	Optimized	215.1404	-1.3320575	47.302208	411.67782	154.66827	0
12	Optimized	215.93425	-1.6111675	63.034529	436.34689	158.4617	0
13	Optimized	216.76535	-1.8666025	77.209478	445.13363	156.17454	0
14	Optimized	217.60635	-2.0909475	89.4237	461.73059	158.0349	0
15	Optimized	218.45725	-2.2842025	99.677377	463.10585	154.26623	0
16	Optimized	219.26395	-2.439845	107.67786	471.94523	154.62233	0
17	Optimized	220.02645	-2.557875	113.42472	466.77383	149.9878	0
18	Optimized	220.94025	-2.6595825	117.82795	467.02577	148.22568	0
19	Optimized	222.0054	-2.7449675	120.89741	450.21861	139.78856	0
20	Optimized	222.98835	-2.77652	120.78221	444.10382	137.24188	0
21	Optimized	223.88905	-2.75424	117.48573	417.94285	127.53648	0
22	Optimized	224.68335	-2.70474	112.70688	402.86923	123.16661	0
23	Optimized	225.37125	-2.62802	106.45999	374.89983	113.94595	0
24	Optimized	226.16045	-2.4877925	96.034717	350.54281	108.03228	0
25	Optimized	227.0509	-2.2840575	81.431686	299.47216	92.55269	0

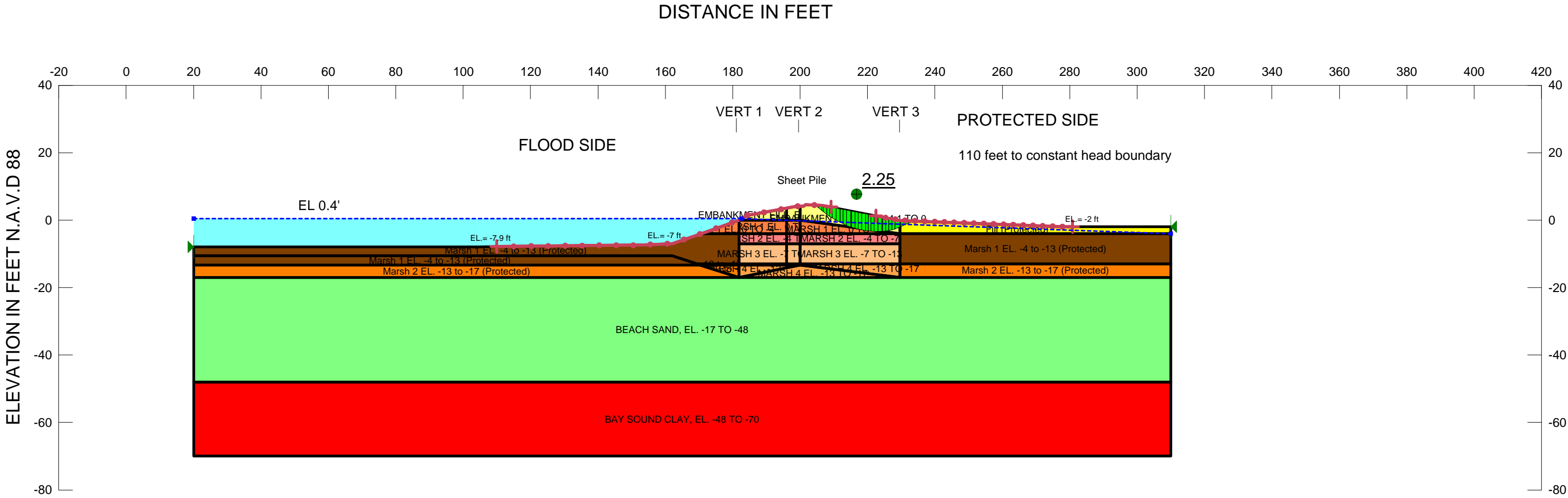
26	Optimized	227.79805	-2.0723025	66.633285	264.52277	83.999101	0
27	Optimized	228.5926	-1.7831485	46.903913	214.67542	71.214778	0
28	Optimized	229.5778	-1.424616	22.440434	162.25368	59.347201	0
29	Optimized	230.27145	-1.170385	5.1043213	125.60037	51.14754	0
30	Optimized	230.96655	-0.9111886	-12.544533	85.972104	36.492993	0
31	Optimized	231.95465	-0.5427256	-37.633598	28.657368	12.164331	0

Slices of Slip Surface: 5593

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	5593	206.91945	3.8225465	-256.90194	30.455981	12.927797	0
2	5593	207.6398	3.0965705	-213.13024	90.80522	38.544529	0
3	5593	208.4653	2.3489125	-168.22445	149.7831	63.579155	0
4	5593	209.39585	1.5884785	-122.74618	206.33925	87.585814	0
5	5593	210.3264	0.9101153	-82.393286	257.40763	109.26306	0
6	5593	211.257	0.30459361	-46.583877	303.16796	128.68717	0
7	5593	212.18755	-0.2351814	-14.876223	343.77985	145.92589	0
8	5593	213.0819	-0.69822675	12.119616	378.88599	155.68309	0
9	5593	213.9401	-1.0928746	34.924151	408.53376	158.58787	0
10	5593	214.7983	-1.442819	54.93993	433.55298	160.71171	0
11	5593	215.65645	-1.750382	72.310498	454.09149	162.05642	0
12	5593	216.5146	-2.0174735	87.156637	470.24208	162.61012	0
13	5593	217.3728	-2.245659	99.573317	482.04485	162.34954	0
14	5593	218.231	-2.4362125	109.64339	489.56488	161.26711	0
15	5593	219.08915	-2.5901555	117.42925	492.80462	159.33739	0
16	5593	219.9473	-2.708286	122.9821	491.75478	156.53472	0
17	5593	220.8055	-2.7912015	126.33235	486.37898	152.83073	0
18	5593	221.6637	-2.8393125	127.51426	476.62384	148.18823	0
19	5593	222.52185	-2.8528545	126.53472	462.38368	142.55942	0

20	5593	223.38	-2.8318935	123.40722	443.56055	135.89702	0
21	5593	224.2382	-2.7763275	118.11661	419.99727	128.14074	0
22	5593	225.0964	-2.6858835	110.65378	391.50643	119.21488	0
23	5593	225.95455	-2.560112	100.98471	357.8546	109.0348	0
24	5593	226.8127	-2.398375	89.070868	318.73913	97.488394	0
25	5593	227.6709	-2.1998275	74.860542	273.8376	84.460751	0
26	5593	228.5655	-1.951636	57.474179	231.60868	73.91571	0
27	5593	229.4965	-1.648848	36.605387	191.59191	65.787876	0
28	5593	230.42755	-1.29769	12.717405	143.87629	55.673645	0
29	5593	231.28385	-0.93174755	-11.935031	90.745822	38.519316	0
30	5593	232.0654	-0.5562701	-37.023144	31.963322	13.567625	0





Name: EMBANKMENT FILL, EL. +4.1 TO 0 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1 EL. 0 TO -4 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -17 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2 EL. -4 TO -7 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 3 EL. -7 TO -13 Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 1 EL. -4 to -13 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 2 EL. -13 to -17 (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 4 EL. -13 TO -17 Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.00.

GENERAL NOTES

CLASSIFICATION STRATIFICATION

SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



US Army Corps
of Engineers®
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 5 STA.37+00 TO STA. 40+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 358
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 11:11:24 AM
File Name: Reach 5_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 11:16:32 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2 EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 3 EL. -7 TO -13

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1 EL. -4 to -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 EL. -13 to -17 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.1 TO 0

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 EL. 0 TO -4

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -17 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 4 EL. -13 TO -17

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (110, -7.83313) ft
Left-Zone Right Coordinate: (209.2, 3.8569) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (222.5, 1.27716) ft
Right-Zone Right Coordinate: (280.8, -2) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (20, -7.9) ft
Right Coordinate: (310, -2) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
20	0.4
182.5	0.4
310	-4

Regions

	Material	Points	Area (ft²)
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Region 1	Marsh 1 EL. -4 to -13 (Protected)	5,6,17,16,53	723.6
Region 2	Fill (Protected)	33,34,35,6,5	206.4
Region 3	Marsh 2 EL. -13 to -17 (Protected)	16,17,22,18	321.6
Region 4	BAY SOUND CLAY, EL. -48 TO -70	7,39,20,41,23,10,42,21,40,9	6380
Region 5	EMBANKMENT FILL, EL. +4.1 TO 0	29,30,3,13,31,4,8,14	46.405
Region 6	MARSH 1 EL. 0 TO -4	36,29,14,8,26,28	72.8
Region 7	MARSH 2 EL. -4 TO -7	37,36,28,26,27,56	54.6
Region 8	MARSH 4 EL. -13 TO -17	38,55,54,19,15,48	5.46
Region 9	EMBANKMENT FILL, EL. +4.1 TO 0	8,4,43,59,32,33,5	137.33001
Region 10	MARSH 2 EL. -4 TO -7	26,5,53,27	88.8
Region 11	MARSH 1 EL. 0 TO -4	8,5,26	59.2
Region 12	MARSH 1 EL. 0 TO -4	29,2,1,36	21.95
Region 13	Marsh 1 EL. -4 to -13 (Protected)	46,50,52,38,37,36,1,25,11,58,12	558.8919
Region 14	MARSH 4 EL. -13 TO -17	19,54,16,18	63.64
Region 15	Marsh 2 EL. -13 to -17 (Protected)	48,38,52,51	3.58125
Region 16	Marsh 2 EL. -13 to -17 (Protected)	47,51,48	21.275
Region 17	BEACH SAND, EL. -17 TO -48	47,57,7,39,20,41,23,22,18	8990
Region 18	Marsh 1 EL. -4 to -13 (Protected)	51,52,50,46,49	394.66875
Region 19	MARSH 3 EL. -7 TO -13	27,54,55,38,37,56	109.2
Region 20	MARSH 3 EL. -7 TO -13	54,27,53,16	177.6
Region 21	MARSH 4 EL. -13 TO -17	47,48,15,19	33.67
Region 22	Marsh 2 EL. -13 to -17 (Protected)	49,51,47,57	577.385
Region 23	MARSH 4 EL. -13 TO -17	19,18,47	88.43

Points

	X (ft)	Y (ft)
Point 1	170.7	-4
Point 2	173.6	-3
Point 3	193.6	3.1
Point 4	200	4.1
Point 5	229.6	-4
Point 6	310	-4
Point 7	20	-48
Point 8	200	0
Point 9	20	-70

Point 10	310	-70
Point 11	153.4	-7.4
Point 12	20	-7.9
Point 13	196	3.5
Point 14	196	0
Point 15	196	-13.3
Point 16	229.6	-13
Point 17	310	-13
Point 18	229.6	-17
Point 19	200	-13.3
Point 20	200.05	-48
Point 21	200	-70
Point 22	310	-17
Point 23	310	-48
Point 24	201	4.6
Point 25	162	-7
Point 26	200	-4
Point 27	200	-7
Point 28	196	-4
Point 29	181.8	0
Point 30	184.1	1.4
Point 31	199	4.1
Point 32	206.4	4.4
Point 33	229.6	-0.1
Point 34	277.6	-2
Point 35	310	-2
Point 36	181.8	-4
Point 37	181.8	-7
Point 38	181.8	-13
Point 39	181.8	-48
Point 40	181.8	-70
Point 41	229.6	-48
Point 42	229.6	-70
Point 43	201	4.1
Point 44	200	12.8
Point 45	200.5	12.8

Point 46	20	-10.6
Point 47	181.8	-17
Point 48	181.8	-13.3
Point 49	20	-13.3
Point 50	162	-10.6
Point 51	170.3	-13.3
Point 52	169.425	-13
Point 53	229.6	-7
Point 54	200	-13
Point 55	196	-13
Point 56	196	-7
Point 57	20	-17
Point 58	105	-7.88303
Point 59	201.6	4.57778

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.25	(222.108, 20.834)	13.00573	(204.476, 4.47125)	(233.474, -0.253329)
2	4438	2.26	(222.108, 20.834)	24.258	(204.19, 4.48185)	(234.058, -0.276469)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	204.95715	4.061112	-276.81228	32.686853	13.874746	0
2	Optimized	205.91905	3.240828	-227.69737	98.063722	41.62558	0
3	Optimized	206.62165	2.641693	-191.81762	142.9122	60.662629	0
4	Optimized	207.3678	2.072965	-157.94541	184.62225	78.367496	0
5	Optimized	208.2925	1.437505	-120.27761	229.39501	97.372405	0

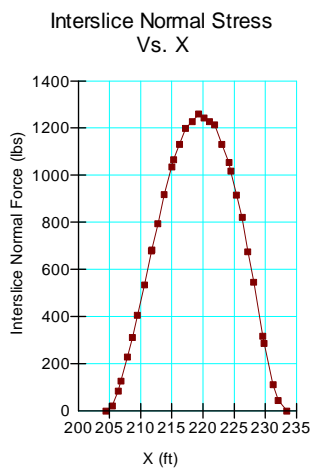
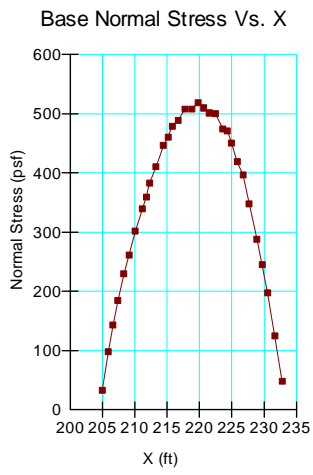
6	Optimized	209.09285	0.926055	-90.091342	260.88576	110.73944	0
7	Optimized	210.05975	0.35030902	-56.246586	301.57973	128.013	0
8	Optimized	211.1932	-0.28973293	-18.748862	339.52303	144.11898	0
9	Optimized	211.77025	-0.61559695	0.34232333	358.86347	152.1832	0
10	Optimized	212.28305	-0.85863	14.402907	382.87165	156.4057	0
11	Optimized	213.28795	-1.33301	41.840872	410.29162	156.39806	0
12	Optimized	214.3962	-1.7987485	68.516085	446.57543	160.47667	0
13	Optimized	215.1467	-2.0818835	84.568319	460.41171	159.53605	0
14	Optimized	215.7706	-2.2767625	95.384839	479.15726	162.90173	0
15	Optimized	216.729	-2.5573475	110.83203	489.11091	160.56986	0
16	Optimized	217.7433	-2.80272	123.95417	507.77292	162.92139	0
17	Optimized	218.8135	-3.01288	134.76429	508.24971	158.53515	0
18	Optimized	219.77205	-3.1601465	141.88877	518.27705	159.76735	0
19	Optimized	220.61895	-3.24452	145.33142	509.8408	154.72505	0
20	Optimized	221.46585	-3.3288935	148.77407	501.40455	149.68276	0
21	Optimized	222.4632	-3.3647475	148.86574	500.27877	149.16599	0
22	Optimized	223.611	-3.3520825	145.59884	474.51824	139.618	0
23	Optimized	224.33695	-3.3275375	142.50485	471.30493	139.56735	0
24	Optimized	224.9385	-3.255486	136.71396	450.25702	133.09113	0

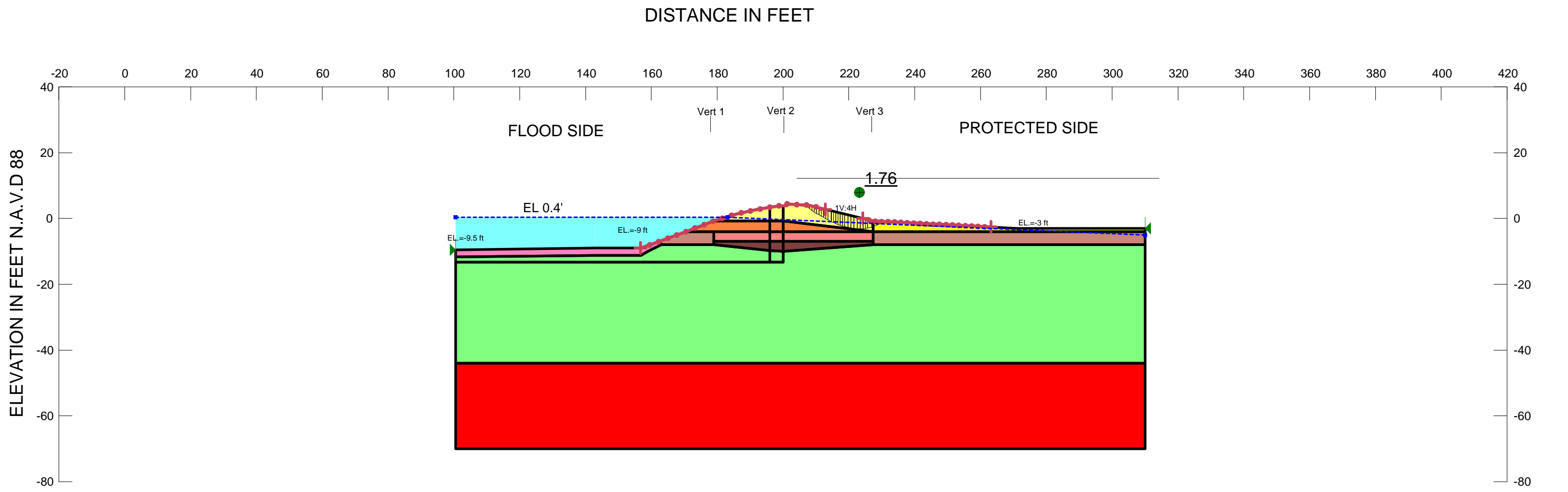
	ed						
25	Optimiz ed	225.8374 5	-3.1478085	128.05475	418.93364	123.47076	0
26	Optimiz ed	226.7532	-2.9725	115.14603	396.84702	119.57497	0
27	Optimiz ed	227.6857 5	-2.72956	97.981011	347.9909	106.1229	0
28	Optimiz ed	228.876	-2.31213	69.371508	287.58619	92.626639	0
29	Optimiz ed	229.7127 5	-1.97007	46.2229	244.83814	84.307168	0
30	Optimiz ed	230.5317 5	-1.6029545	21.552413	197.72223	74.779652	0
31	Optimiz ed	231.6604 5	-1.0899245	-12.891733	124.37009	52.791973	0
32	Optimiz ed	232.7782 5	-0.5756195	-47.391086	48.073479	20.405981	0

Slices of Slip Surface: 4438

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	4438	204.7426	3.9147885	-267.2173	43.511623	18.469588	0
2	4438	205.84755	2.848236	-203.04957	129.21031	54.846523	0
3	4438	206.93725	1.917844	-147.3395	200.85943	85.259768	0
4	4438	208.0118	1.1030972	-98.811521	258.23208	109.61302	0
5	4438	209.08635	0.37724495	-55.831159	309.73434	131.47443	0
6	4438	210.16085	-0.26893614	-17.823259	355.59054	150.93923	0
7	4438	211.15085	-0.8024024	13.332939	394.01776	161.59112	0
8	4438	212.05635	-1.2378855	38.557295	425.46293	164.2317	0
9	4438	212.96185	-1.6284335	60.977156	452.71834	166.28426	0
10	4438	213.91755	-1.9932465	81.683815	477.17437	167.87578	0
11	4438	214.9234	-2.329701	100.50991	498.45698	168.91851	0
12	4438	215.92925	-2.6182055	116.34525	514.89165	169.17291	0
13	4438	216.93515	-2.8605155	129.29946	526.57088	168.63171	0
14	4438	217.941	-3.058039	139.46564	533.52464	167.26812	0
15	4438	218.94685	-3.2118815	146.8985	535.78575	165.07284	0

16	4438	219.9527	-3.3228795	151.65619	533.34654	162.01794	0
17	4438	220.95855	-3.3916235	153.77572	526.15429	158.06532	0
18	4438	221.9644	-3.4184725	153.28988	514.15091	153.17642	0
19	4438	222.97025	-3.403566	150.19523	497.24289	147.31299	0
20	4438	223.9761	-3.3468275	144.49111	475.29318	140.41715	0
21	4438	224.9911	-3.246668	136.05337	448.12105	132.46487	0
22	4438	226.0153	-3.101766	124.8086	415.46655	123.37698	0
23	4438	227.0395	-2.9118235	110.75039	377.02931	113.0287	0
24	4438	228.0637	-2.675747	93.809451	332.46068	101.30144	0
25	4438	229.0879	-2.392127	73.9059	281.34324	88.051928	0
26	4438	230.20385	-2.024369	48.554556	244.38846	83.126558	0
27	4438	231.41155	-1.559635	16.954842	184.79577	71.244249	0
28	4438	232.5261	-1.0658208	-16.259753	117.37506	49.822759	0
29	4438	233.5475	-0.54967225	-50.666416	41.54318	17.634034	0





Name: EMBANKMENT FIL, EL. +4 TO -0.8 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -0.8 TO -4 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -8/-10 TO -44 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -44 TO 70 Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
Name: MARSH, EL. -4 TO -8 (Protected Side) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, EL. -4 TO -7 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 3, EL. -7 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 (protected) Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill, EL. -0.8 to -4 (Protected) Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 1.13.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 6A STA.40+00 TO STA. 47+00
PROTECTED SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 277
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
Time: 8:50:32 AM
File Name: Reach 6A_5-case.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/21/2013
Last Solved Time: 8:59:36 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 1
 Tension Crack Fluid Unit Weight: 9.807 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -8 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 3, EL. -7 TO -10

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3 (protected)
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. -0.8 to -4 (Protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FOS Distribution
FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 2 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FIL, EL. +4 TO -0.8

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -0.8 TO -4

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -8/-10 TO -44

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -44 TO 70

Model: Mohr-Coulomb
Unit Weight: 109 pcf

Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (156.7, -9) ft
Left-Zone Right Coordinate: (212.9, 2.78763) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (224.2, -0.00825) ft
Right-Zone Right Coordinate: (263.2, -2.60229) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (100.5, -9.5) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
100.5	0.4
183.1	0.4
310	-5

Unit Weight Functions

Marsh 3 (protected)

Model: Spline Data Point Function
Function: Unit Weight vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (179, 101)
 Data Point: (200, 103)
 Data Point: (227.4, 101)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH, EL. -4 TO -8 (Protected Side)	29,35,28,40,41,42,55	53.85
Region 2	Fill, EL. -0.8 to -4 (Protected)	4,37,5,22,21	130.67
Region 3	MARSH 1, EL. -0.8 TO -4	9,21,25	43.84
Region 4	BAY SOUND CLAY, EL. -44 TO 70	13,7,8,14	5447
Region 5	MARSH, EL. -4 TO -8 (Protected Side)	39,21,22,6,23	330.4
Region 6	BEACH SAND, EL. -8/-10 TO -44	11,10,23,6,8,7,12,20	6997.2
Region 7	EMBANKMENT FIL, EL. +4 TO -0.8	2,24,38,3,4,21,9	130.1
Region 8	EMBANKMENT FIL, EL. +4 TO -0.8	49,56,36,1,17,33,2,9,18	58.44
Region 9	BEACH SAND, EL. -8/-10 TO -44	42,55,54,53,15,16,12,20,11,10,19	293.97
Region 10	Silted-in Layer	16,27,26,34,29,55,54,53,15	133.855
Region 11	MARSH 2, EL. -4 TO -7	32,25,21,39	82.2
Region 12	MARSH 3, EL. -7 TO -10	10,52,32,39,23	54.8
Region 13	MARSH 1, EL. -0.8 TO -4	18,9,25,30,40,28,49	80.8
Region 14	MARSH 2, EL. -4 TO -7	40,30,25,32,31,41	63
Region 15	MARSH 3, EL. -7 TO -10	41,31,32,52,10,19,42	43.9

Points

	X (ft)	Y (ft)
Point 1	192	2.7
Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	310	-3
Point 6	310	-8
Point 7	100.5	-44
Point 8	310	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2
Point 13	100.5	-70
Point 14	310	-70
Point 15	143.1	-11.2

Point 16	100.5	-11.7
Point 17	196	3.4
Point 18	196	-0.8
Point 19	196	-9.8
Point 20	196	-13.2
Point 21	227.4	-4
Point 22	310	-4
Point 23	227.4	-8
Point 24	201	3.9
Point 25	200	-4
Point 26	143	-9
Point 27	100.5	-9.5
Point 28	170.5	-4
Point 29	162.5	-7
Point 30	196	-4
Point 31	196	-7
Point 32	200	-7
Point 33	199	3.9
Point 34	156.8	-9
Point 35	164.3	-6.3
Point 36	186	1.4
Point 37	271.1	-3
Point 38	201	4.4
Point 39	227.4	-7
Point 40	179	-4
Point 41	179	-7
Point 42	179	-8
Point 43	179	-44
Point 44	200	-44
Point 45	227.4	-44
Point 46	227.4	-70
Point 47	200	-70
Point 48	179	-70
Point 49	179	-0.8
Point 50	200	12.9
Point 51	200.5	12.9

Point 52	200	-9
Point 53	156.8	-11.2
Point 54	159	-10
Point 55	163	-8
Point 56	180.1	-0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.76	(222.912, 17.95)	11.21979	(206.786, 4.0694)	(230.975, -0.979963)
2	4207	1.77	(222.912, 17.95)	21.01	(207.159, 4.04809)	(231.926, -1.02786)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.0891	3.8288395	-277.65211	18.566073	7.8808304	0
2	Optimized	207.69635	3.3477185	-249.24282	55.696928	23.641943	0
3	Optimized	208.4242	2.771059	-215.19999	93.483673	39.681465	0
4	Optimized	209.18675	2.2136975	-182.4388	130.20564	55.269017	0
5	Optimized	209.8634	1.7711725	-156.62526	154.20098	65.454434	0
6	Optimized	210.55585	1.3449435	-131.86293	181.24279	76.932999	0
7	Optimized	211.2641	0.93501015	-108.1689	202.27292	85.859759	0
8	Optimized	211.97235	0.52507665	-84.469991	223.30304	94.786518	0
9	Optimized	212.65205	0.1430225	-62.434749	245.55644	104.23252	0

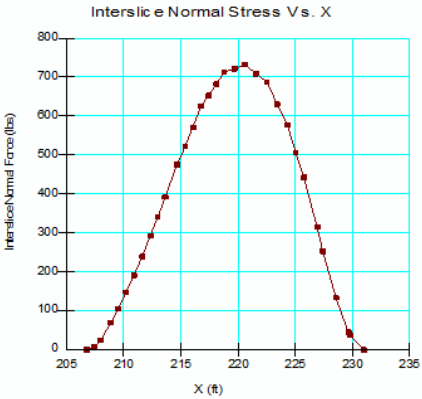
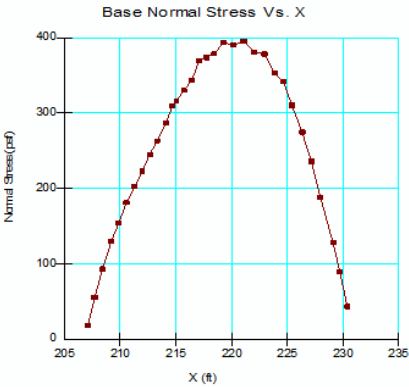
10	Optimized	213.3031	-0.2111525	-42.063009	263.08269	111.67198	0
11	Optimized	214.13915	-0.655835	-16.535249	286.74283	121.71511	0
12	Optimized	214.67365	-0.93400375	-0.59625205	309.50459	131.3769	0
13	Optimized	215.0384	-1.0951312	8.4895973	316.6254	130.79589	0
14	Optimized	215.72	-1.396239	25.469329	329.99146	129.26198	0
15	Optimized	216.4016	-1.6973465	42.447986	343.35752	127.72852	0
16	Optimized	217.08105	-1.95414	56.667078	368.91858	132.5429	0
17	Optimized	217.7583	-2.16662	68.128421	373.66655	129.69324	0
18	Optimized	218.4355	-2.3791	79.588355	378.41452	126.84418	0
19	Optimized	219.2283	-2.58044	90.047311	393.56572	128.83592	0
20	Optimized	220.1367	-2.77064	99.503404	390.02076	123.3173	0
21	Optimized	221.06815	-2.9206525	106.39134	394.96561	122.49251	0
22	Optimized	222.02265	-3.0304775	110.71069	381.279	114.84943	0
23	Optimized	222.95075	-3.08617	111.71904	378.11917	113.08014	0
24	Optimized	223.85245	-3.08773	109.42345	353.14485	103.4536	0
25	Optimized	224.6649	-3.0454975	104.63084	341.47857	100.53589	0
26	Optimized	225.3881	-2.9594725	97.342673	310.3377	90.411024	0
27	Optimized	226.3326	-2.78072	83.677045	274.64049	81.059174	0
28	Optimized	227.15775	-2.555898	67.461384	235.90078	71.498281	0

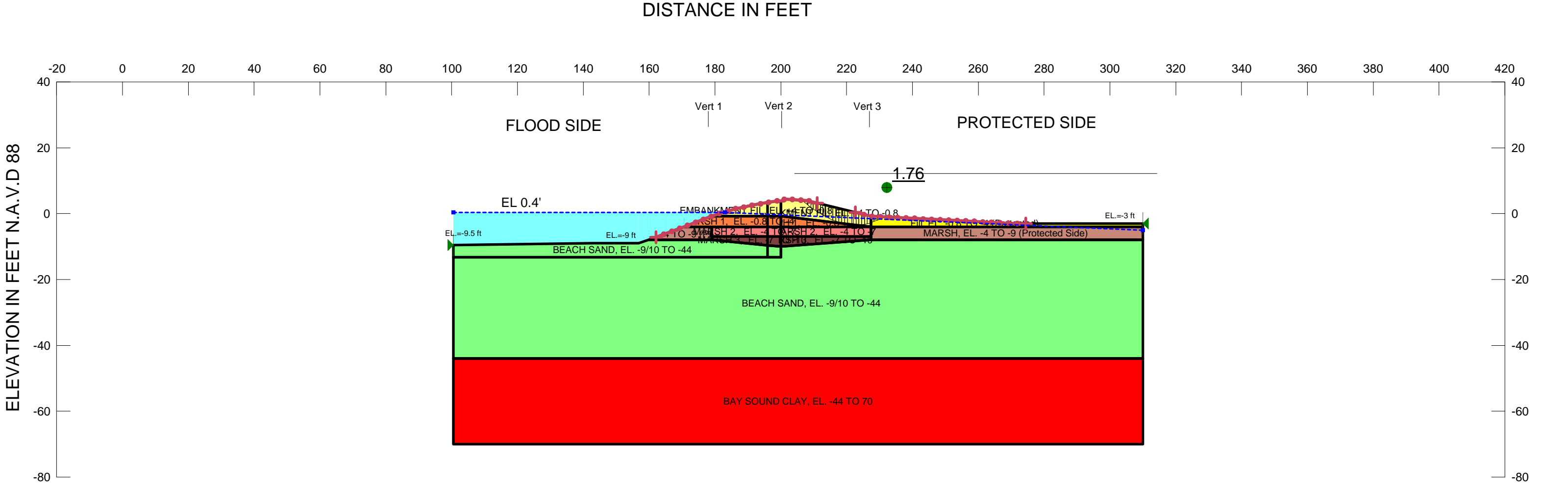
29	Optimized	227.97775	-2.254353	46.46718	188.07158	60.107502	0
30	Optimized	229.1041	-1.811429	15.837446	128.03385	47.624548	0
31	Optimized	229.72125	-1.552189	-1.9777125	89.980433	38.194428	0
32	Optimized	230.38225	-1.2516863	-22.484347	43.660796	18.532909	0

Slices of Slip Surface: 4207

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4207	207.57925	3.5985605	-264.58709	32.316767	13.717654	0
2	4207	208.4022	2.7647295	-214.74314	89.387328	37.94267	0
3	4207	209.2066	2.0340945	-171.28824	135.32176	57.440678	0
4	4207	210.01105	1.374726	-132.28141	177.54591	75.363766	0
5	4207	210.8155	0.77836685	-97.203049	216.11631	91.735931	0
6	4207	211.6199	0.23862229	-65.659935	251.13439	106.60022	0
7	4207	212.4243	-0.24956486	-37.332475	282.65401	119.97951	0
8	4207	213.2287	-0.69025975	-11.969441	310.74213	131.90221	0
9	4207	214.0359	-1.0879885	10.705774	336.10876	138.12537	0
10	4207	214.84585	-1.4451985	30.845152	358.39519	139.03674	0
11	4207	215.6558	-1.762668	48.504914	376.81886	139.361	0
12	4207	216.46575	-2.042295	68.802525	391.49199	139.09593	0
13	4207	217.2757	-2.2856515	76.837825	402.44024	138.21002	0
14	4207	218.08565	-2.4940355	87.689995	409.71905	136.69323	0
15	4207	218.8956	-2.668509	96.426764	413.32335	134.51462	0
16	4207	219.70555	-2.809928	103.09974	413.27749	131.66265	0
17	4207	220.51545	-2.9189655	107.75381	409.53515	128.09858	0
18	4207	221.3254	-2.9961285	110.41736	402.0616	123.79564	0
19	4207	222.13535	-3.0417695	111.11561	390.78433	118.71233	0
20	4207	222.9453	-3.0560935	109.85797	375.60538	112.80308	0
21	4207	223.75525	-3.0391645	106.65079	356.40319	106.01361	0
22	4207	224.5652	-2.990907	101.48979	333.04778	98.290538	0
23	4207	225.37515	-2.9111035	94.359437	305.33138	89.552277	0

24	4207	226.1851	-2.7993895	85.236856	273.04917	79.721598	0
25	4207	226.99505	-2.6552445	74.091424	235.92215	68.693068	0
26	4207	227.79465	-2.4806615	61.074583	206.07096	61.547311	0
27	4207	228.584	-2.2756475	46.18632	179.75375	56.696009	0
28	4207	229.37335	-2.0373695	29.221607	148.56115	50.65663	0
29	4207	230.16265	-1.7646195	10.105827	112.05432	43.274568	0
30	4207	230.8995	-1.478769	-9.6878258	70.984685	30.131211	0
31	4207	231.5839	-1.182969	-29.962978	24.937875	10.5855	0





Name: EMBANKMENT FIL, EL. +4 TO -0.8 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -0.8 TO -4 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -9/10 TO -44 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -44 TO 70 Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH, EL. -4 TO -9 (Protected Side) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2, EL. -4 TO -7 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 3, EL. -7 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill, EL. -0.8 TO -4 (Protected) Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 1.15.



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 6B STA.47+00 TO STA. 59+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)___Global

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File Information

Created By: Liljegren, James
Revision Number: 304
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 11:46:14 AM
File Name: Reach 6B_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 11:47:52 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)___Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -9 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 3, EL. -7 TO -10

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. -0.8 TO -4 (Protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (162.1, -7.13111) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FIL, EL. +4 TO -0.8

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -0.8 TO -4

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -9/10 TO -44

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -44 TO 70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (211.1, 3.23299) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (222.7, 0.36289) ft
Right-Zone Right Coordinate: (274.4, -3) ft
Right-Zone Increment: 20
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (100.5, -9.5) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
100.5	0.4
183	0.4
310	-5

Unit Weight Functions

Marsh 3

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (179, 101)
Data Point: (200, 103)
Data Point: (227.4, 101)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH, EL. -4 TO -9 (Protected Side)	32,26,37,38,39,49	55.495
Region 2	Fill, EL. -0.8 TO -4 (Protected)	4,34,5,20,19	130.67

Region 3	MARSH 1, EL. -0.8 TO -4	9,19,23	43.84
Region 4	BAY SOUND CLAY, EL. -44 TO 70	13,7,8,14	5447
Region 5	MARSH, EL. -4 TO -9 (Protected Side)	36,19,20,6,21	330.4
Region 6	BEACH SAND, EL. -9/10 TO -44	11,10,21,6,8,7,12,18	6997.2
Region 7	EMBANKMENT FIL, EL. +4 TO -0.8	2,22,35,3,4,19,9	130.1
Region 8	EMBANKMENT FIL, EL. +4 TO -0.8	46,50,33,1,15,30,2,9,16	58.44
Region 9	BEACH SAND, EL. -9/10 TO -44	39,49,31,24,25,12,18,11,10,17	428.175
Region 10	MARSH 2, EL. -4 TO -7	29,23,19,36	82.2
Region 11	MARSH 3, EL. -7 TO -10	10,29,36,21	54.8
Region 12	MARSH 1, EL. -0.8 TO -4	16,9,23,27,37,26,46	80.8
Region 13	MARSH 2, EL. -4 TO -7	37,27,23,29,28,38	63
Region 14	MARSH 3, EL. -7 TO -10	38,28,29,10,17,39	41.8

Points

	X (ft)	Y (ft)
Point 1	192	2.7
Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	310	-3
Point 6	310	-8
Point 7	100.5	-44
Point 8	310	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2
Point 13	100.5	-70
Point 14	310	-70
Point 15	196	3.4
Point 16	196	-0.8
Point 17	196	-9.6
Point 18	196	-13.2
Point 19	227.4	-4
Point 20	310	-4

Point 21	227.4	-8
Point 22	201	3.9
Point 23	200	-4
Point 24	143	-9
Point 25	100.5	-9.5
Point 26	170.5	-4
Point 27	196	-4
Point 28	196	-7
Point 29	200	-7
Point 30	199	3.9
Point 31	156.8	-9
Point 32	164.3	-6.3
Point 33	186	1.4
Point 34	271.1	-3
Point 35	201	4.4
Point 36	227.4	-7
Point 37	179	-4
Point 38	179	-7
Point 39	179	-8
Point 40	179	-44
Point 41	200	-44
Point 42	227.4	-44
Point 43	227.4	-70
Point 44	200	-70
Point 45	179	-70
Point 46	179	-0.8
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	159.8	-8
Point 50	180.1	-0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.76	(222.892,	11.68591	(206.57,	(231.553, -

			19.093)		4.08174)	1.00909)
2	4207	1.77	(222.892, -19.093)	22.531	(206.063, 4.11066)	(232.931, -1.07843)

Slices of Slip Surface: **Optimized**

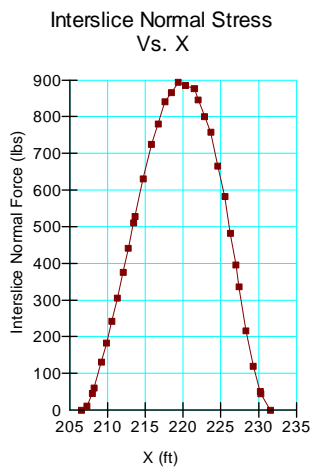
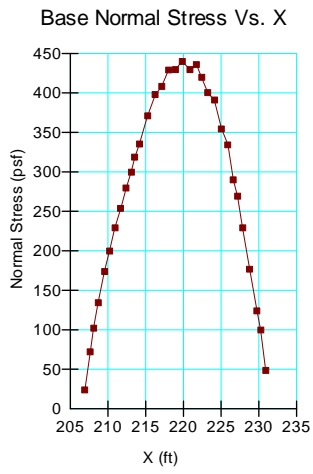
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	206.9272	3.762118	-273.27984	24.140032	10.246836	0
2	Optimized	207.6424	3.12288	-235.2913	72.421139	30.74095	0
3	Optimized	208.11235	2.7028305	-210.32708	102.42144	43.475322	0
4	Optimized	208.71235	2.22123	-181.86709	134.13021	56.934898	0
5	Optimized	209.54035	1.6094475	-145.88508	174.2327	73.957394	0
6	Optimized	210.2211	1.1482225	-118.91288	199.62517	84.735857	0
7	Optimized	210.93695	0.6880225	-92.09604	229.39652	97.373046	0
8	Optimized	211.68785	0.2288475	-65.435553	253.65295	107.66929	0
9	Optimized	212.41305	-0.2017425	-40.490301	279.56999	118.67042	0
10	Optimized	213.11255	-0.6037475	-17.261798	300.15722	127.40918	0
11	Optimized	213.5566	-0.8540078	-2.8236009	318.71873	135.28807	0
12	Optimized	214.17915	-1.1793128	15.823616	335.48951	135.69012	0
13	Optimized	215.2634	-1.70008	45.442872	371.01514	138.19723	0
14	Optimized	216.26255	-2.1033225	67.954425	398.09784	140.13757	0
15	Optimized	217.1489	-2.4203675	85.385746	408.26408	137.05372	0

16	Optimized	218.03995	-2.691525	99.942756	429.09793	139.71808	0
17	Optimized	218.93565	-2.916795	111.61895	429.6393	134.99163	0
18	Optimized	219.84895	-3.10096	120.69049	440.25274	135.64613	0
19	Optimized	220.90465	-3.263185	128.01029	429.56462	128.00222	0
20	Optimized	221.7593	-3.362995	131.97323	435.87906	129.00037	0
21	Optimized	222.4364	-3.3863375	131.63605	419.97129	122.39105	0
22	Optimized	223.2618	-3.4147925	131.22438	400.40508	114.26043	0
23	Optimized	224.13825	-3.3860375	127.10082	391.23304	112.11748	0
24	Optimized	225.06575	-3.3000725	119.27444	354.55964	99.872642	0
25	Optimized	225.8998	-3.16774	108.80411	334.42547	95.770584	0
26	Optimized	226.64045	-2.98904	95.687764	290.07429	82.512184	0
27	Optimized	227.2054	-2.824021	83.89097	269.38017	78.735493	0
28	Optimized	227.8706	-2.56539	65.988174	229.43452	69.37886	0
29	Optimized	228.81175	-2.199466	40.658079	176.70063	57.746637	0
30	Optimized	229.7529	-1.833542	15.326995	123.96674	46.114835	0
31	Optimized	230.2641	-1.630981	1.3307571	99.903214	41.841525	0
32	Optimized	230.929	-1.310236	-20.448045	48.516676	20.594107	0

Slices of Slip Surface: **4207**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength
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							h (psf)
1	4207	206.54755	3.5999045	-262.15089	37.088902	15.743305	0
2	4207	207.51585	2.636772	-204.61755	110.8584	47.056601	0
3	4207	208.4407	1.815774	-155.8452	170.68304	72.450651	0
4	4207	209.3221	1.1145134	-114.42595	216.18318	91.764314	0
5	4207	210.2035	0.48142445	-77.257882	257.55752	109.32668	0
6	4207	211.0849	-0.0902745	-43.922715	294.9051	125.17979	0
7	4207	211.9663	-0.60594985	-14.082802	328.30768	139.35834	0
8	4207	212.87395	-1.0822398	13.229244	359.4261	146.95185	0
9	4207	213.80785	-1.519885	38.060365	387.60958	148.37484	0
10	4207	214.74175	-1.9068925	59.731633	410.91515	149.06856	0
11	4207	215.67565	-2.246025	78.415549	429.47693	149.01671	0
12	4207	216.60955	-2.539539	94.253847	443.39206	148.20038	0
13	4207	217.54345	-2.789275	107.35538	452.7212	146.59909	0
14	4207	218.46665	-2.994815	117.73259	457.23052	144.10832	0
15	4207	219.3792	-3.1582515	125.50938	457.15941	140.77708	0
16	4207	220.29175	-3.2832945	130.89508	452.97862	136.71635	0
17	4207	221.20425	-3.3705865	133.91888	444.63692	131.89198	0
18	4207	222.1168	-3.420567	134.62195	432.07818	126.26268	0
19	4207	223.0558	-3.4327565	132.88653	414.14524	119.38724	0
20	4207	224.02115	-3.405009	128.59504	390.24403	111.06341	0
21	4207	224.9865	-3.335693	121.71172	360.8034	101.4884	0
22	4207	225.9519	-3.22442	112.20026	325.54804	90.560759	0
23	4207	226.9173	-3.0705575	100.03976	284.1273	78.140527	0
24	4207	227.82455	-2.8876005	86.216515	252.26871	70.484976	0
25	4207	228.6737	-2.679564	70.981996	226.01374	65.807072	0
26	4207	229.52285	-2.436037	53.533486	194.74191	59.939421	0
27	4207	230.372	-2.155797	33.792734	158.00528	52.725096	0
28	4207	231.22115	-1.8373655	11.669593	115.27348	43.97724	0
29	4207	232.2882	-1.3734165	-20.111886	47.032406	19.964072	0



PS Slope Stability (Entry/Exit)_Global

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File Information

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Last Solved Date: 1/25/2012
Last Solved Time: 12:42:46 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 Protected Toe MH, EL. -6 TO -10

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill ,EL -1 to -6 (Protected Side toe) El. -1 to -6

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill 2, EL. -1 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2 Protected Toe MH, EL. -10 to -12

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +3.5 TO -1

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -45 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -45 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (170, -4.4117) ft
Left-Zone Right Coordinate: (211.8, 2.57363) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (225.00477, -0.64544) ft
Right-Zone Right Coordinate: (275, -3) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, -9.7) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
0	0.4
184.5	0.4
310	-5

Unit Weight Functions

Marsh 3

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.7, 96)
Data Point: (200, 98)
Data Point: (228, 96)

fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.7, 96)
Data Point: (200, 105)
Data Point: (228.1, 96)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +3.5 TO -1	4,38,5,18,39,40,6,13,19	57.67
Region 2	Fill 2, EL. -1 TO -4	3,4,19,13,14,20,55	71.37
Region 3	Fill 2, EL. -1 TO -4	13,8,27,25,14	106.55
Region 4	Fill ,EL. -1 to -6 (Protected Side toe) El.	8,41,9,10,28,25,27	258.75

	-1 to -6		
Region 5	EMBANKMENT FILL CH, EL. +3.5 TO -1	6,32,61,7,8,13	83.523015
Region 6	BEACH SAND SP, EL. -12 TO -45	11,24,17,16,26,29,12,52,33,53	9190
Region 7	BAY SOUND CLAY CL, EL. -45 TO -70	53,33,52,59,35,58	1285
Region 8	MARSH 1, MH, EL. -4 TO -8	2,3,55,20,14,15,21,56	136.07
Region 9	BEACH SAND SP, EL. -12 TO -45	16,17,24,50,51,49,57,23	1102.375
Region 10	MARSH 2, MH, EL. -8 TO -12	15,44,16,23,57,49,37,2,56,21	155.01
Region 11	MARSH 2 Protected Toe MH, EL. -10 to -12	45,46,29,26	164
Region 12	MARSH 1 Protected Toe MH, EL. -6 TO -10	25,28,46,45,54	328
Region 13	MARSH 2, MH, EL. -8 TO -12	45,26,16,44,15	84
Region 14	Silted-in Layer	50,60,1,36,2,37,49,51	327.65
Region 15	MARSH 1, MH, EL. -4 TO -8	15,14,25,54,45	112
Region 16	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	31,11,53,58	4408.665
Region 17	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	59,52,12,30	2047.5

Points

	X (ft)	Y (ft)
Point 1	102.6	-9.7
Point 2	161.5	-8.3
Point 3	170.9	-4
Point 4	176.7	-1.6
Point 5	186.2	1.4
Point 6	200	3.5
Point 7	208	3.5
Point 8	228.1	-1.4
Point 9	310	-3
Point 10	310	-4
Point 11	0	-45

Point 12	310	-45
Point 13	200	-1
Point 14	200	-4
Point 15	200	-8
Point 16	200	-12
Point 17	200	-17.2
Point 18	195.1	2.4
Point 19	195	-1
Point 20	195	-4
Point 21	195	-8
Point 22	195	-15
Point 23	195	-12
Point 24	0	-17.2
Point 25	228	-6
Point 26	228	-12
Point 27	228	-4
Point 28	310	-6
Point 29	310	-12
Point 30	310	-70
Point 31	0	-69.9
Point 32	201	3.53
Point 33	200	-45
Point 34	200	-53
Point 35	200	-70
Point 36	151.3	-9.2
Point 37	160.5	-9
Point 38	183.4	-0.2
Point 39	195.9	3.3
Point 40	199	3.5
Point 41	244	-3
Point 42	201	3.7
Point 43	0	-12
Point 44	200	-9.9
Point 45	228	-10
Point 46	310	-10
Point 47	200	12.9

Point 48	200.5	12.9
Point 49	157.3	-11.4
Point 50	0	-11.9
Point 51	151.3	-11.4
Point 52	228.1	-45
Point 53	176.7	-45
Point 54	228	-8
Point 55	176.7	-4
Point 56	176.7	-8
Point 57	176.7	-12
Point 58	176.7	-70
Point 59	228.1	-70
Point 60	0	-9.7
Point 61	201.2	3.69429

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.36	(225.726, 11.998)	12.60768	(209.923, 3.03124)	(237.148, -2.31048)
2	2123	1.38	(225.726, 11.998)	16.815	(211.8, 2.57363)	(234.913, -2.08558)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	210.3581	2.7276625	-214.67708	16.165794	6.8619726	0
2	Optimized	211.22855	2.120501	-179.12684	48.496441	20.585518	0
3	Optimized	212.1043	1.502135	-142.89026	81.119221	34.433066	0
4	Optimized	212.98525	0.872565	-105.96709	114.86079	48.755513	0
5	Optimized	213.933	0.18535335	-65.631924	150.86548	64.038595	0

	ed						
6	Optimiz ed	214.9476 5	-0.55949995	-21.877043	191.04277	81.092847	0
7	Optimiz ed	215.4928	-0.9596833	1.6304616	212.85013	89.657429	0
8	Optimiz ed	215.7092	-1.1068	10.22966	226.99758	92.012523	0
9	Optimiz ed	216.3425	-1.53009	34.942482	251.08053	91.745157	0
10	Optimiz ed	217.1923	-2.0515875	65.202233	289.57214	95.239377	0
11	Optimiz ed	217.9825	-2.4867225	90.232857	310.86796	93.654046	0
12	Optimiz ed	218.8340 5	-2.9046525	114.02665	340.95664	96.326065	0
13	Optimiz ed	219.747	-3.3053775	136.58325	356.23174	93.235253	0
14	Optimiz ed	220.595	-3.636215	154.94157	378.70297	94.981082	0
15	Optimiz ed	221.378	-3.897165	169.1296	383.93716	91.180399	0
16	Optimiz ed	222.2451 5	-4.1320225	181.45744	398.50201	92.129956	0
17	Optimiz ed	223.1964 5	-4.3407875	191.93028	394.15886	85.840939	0
18	Optimiz ed	224.1190 5	-4.488695	198.68231	399.81419	85.375417	0
19	Optimiz ed	225.0129 5	-4.5757445	201.71087	384.42644	77.55816	0
20	Optimiz ed	225.5505 5	-4.6280945	203.53621	375.14668	72.844323	0
21	Optimiz ed	226.0531	-4.6186475	201.59577	377.73893	74.768337	0
22	Optimiz ed	226.8769 5	-4.5821025	197.10912	350.67356	65.184236	0
23	Optimiz ed	227.6444 5	-4.5022025	190.06175	335.06403	61.549815	0
24	Optimiz	228.05	-4.4319085	184.57794	315.4861	55.567217	0

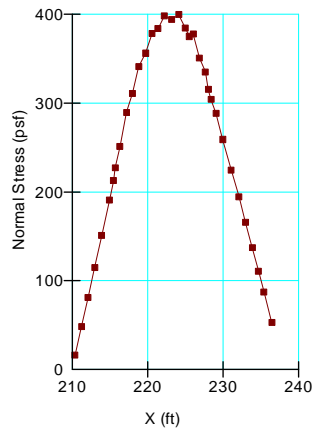
	ed						
25	Optimiz ed	228.4075	-4.369946	179.75154	304.259	52.850282	0
26	Optimiz ed	229.0673 5	-4.2370775	169.69488	288.56434	50.457093	0
27	Optimiz ed	229.9805 5	-4.0308515	154.37233	259.15107	44.475937	0
28	Optimiz ed	231.1022 5	-3.777544	135.55407	224.89732	37.923959	0
29	Optimiz ed	232.106	-3.5439985	118.28653	194.57636	32.383108	0
30	Optimiz ed	232.9918 5	-3.330215	102.56767	165.9128	26.888414	0
31	Optimiz ed	233.8777	-3.1164315	86.848807	137.26023	21.398378	0
32	Optimiz ed	234.6935 5	-2.921615	72.501646	110.87673	16.289259	0
33	Optimiz ed	235.4395	-2.745765	59.526404	87.235801	11.761941	0
34	Optimiz ed	236.4802	-2.484162	40.407854	52.907265	5.3056853	0

Slices of Slip Surface: **2123**

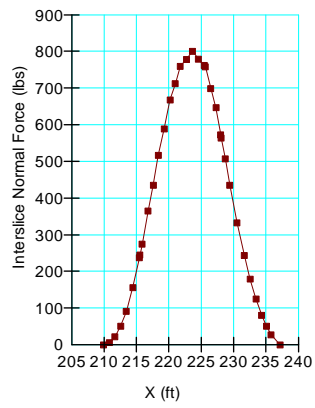
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	2123	212.1937	2.0386895	-176.61163	28.934918	12.282144	0
2	2123	212.9811	1.0456138	-116.7529	86.780393	36.836091	0
3	2123	213.7685	0.1888372	-65.407708	139.993	59.423504	0
4	2123	214.55585	-0.559993	-20.794189	188.62141	80.06504	0
5	2123	215.13955	-1.0641974	9.1005254	223.78274	91.127194	0
6	2123	215.71925	-1.506918	35.169923	256.09808	93.778438	0
7	2123	216.4985	-2.051522	67.061269	294.56288	96.568704	0
8	2123	217.27775	-2.533935	95.070889	327.59041	98.698679	0
9	2123	218.057	-2.960206	119.57291	355.57839	100.17838	0
10	2123	218.83625	-3.3350385	140.87455	378.81031	100.99774	0
11	2123	219.6155	-3.6621405	159.19228	397.51447	101.16176	0

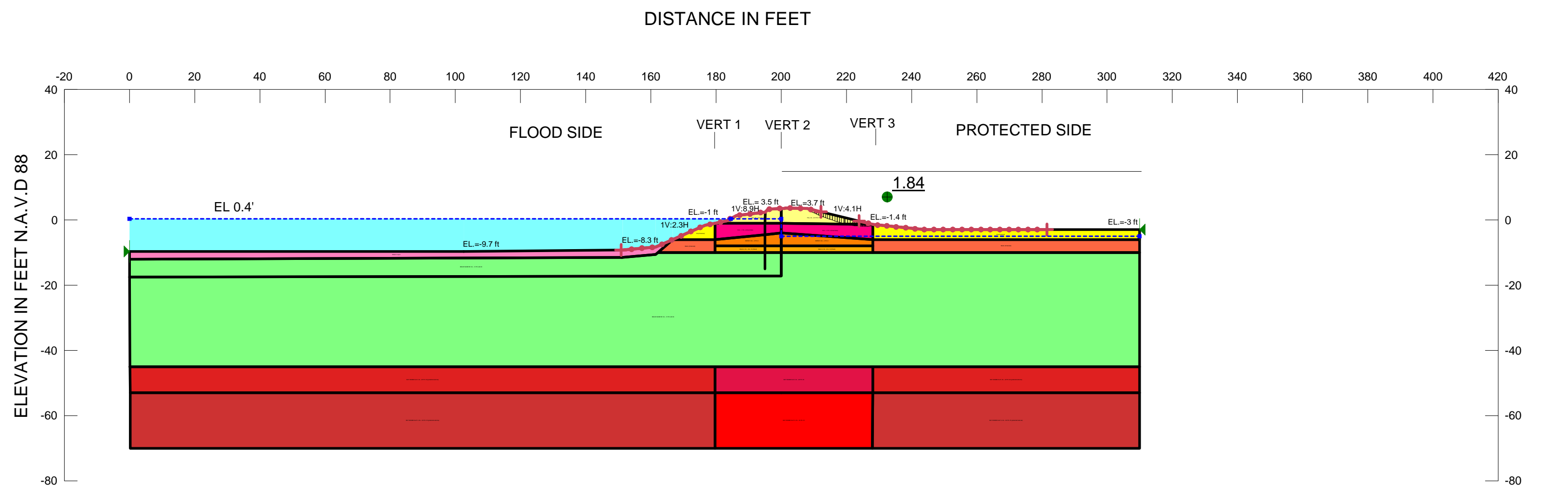
12	2123	220.39475	-3.9444605	174.71764	411.88138	100.67004	0
13	2123	221.174	-4.184349	187.59844	422.0409	99.514921	0
14	2123	221.95325	-4.383675	197.9364	428.08686	97.693074	0
15	2123	222.73255	-4.5439095	205.84433	430.07461	95.180107	0
16	2123	223.5118	-4.666183	211.38489	428.049	91.968456	0
17	2123	224.29105	-4.751328	214.61241	422.00076	88.031129	0
18	2123	225.0703	-4.799911	215.54236	411.87582	83.338609	0
19	2123	225.88325	-4.811152	214.05844	396.83186	77.582717	0
20	2123	226.72995	-4.7818535	209.96007	376.33418	70.621619	0
21	2123	227.57665	-4.709622	203.18742	350.60366	62.57448	0
22	2123	228.05	-4.655746	198.5457	334.34948	57.645289	0
23	2123	228.4299	-4.595001	193.73169	325.68822	56.012224	0
24	2123	229.08975	-4.473855	184.40355	310.39309	53.479387	0
25	2123	229.81205	-4.3081475	172.12255	291.48976	50.668359	0
26	2123	230.5968	-4.0910245	156.47717	268.08455	47.37452	0
27	2123	231.38155	-3.8320405	138.20386	239.43575	42.97039	0
28	2123	232.1663	-3.529095	117.19395	204.92404	37.239213	0
29	2123	232.9511	-3.1795465	93.275283	163.72563	29.904397	0
30	2123	233.73585	-2.780076	66.241325	114.6743	20.558578	0
31	2123	234.5206	-2.326489	35.83066	56.151895	8.6258524	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: FILL, EL. +3.5 TO -1.0 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill 2. -1 TO -4 (Flood Side) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -12 TO -48/-53 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -48 TO -53 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: Fill (Protected) Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY 2, EL. -53 TO -70 Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 2, EL. -8 to -10 (Flood) Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -48 TO -53 (protected side toe) Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe) Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 1.03.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District
LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 8 STA. 66+00 TO STA. 69+06
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 320
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 1:15:24 PM
File Name: Reach 8_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave_West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:16:24 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1,EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -53 TO -70

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2, EL. -8 to -10 (Flood)

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL, EL. +3.5 TO-1.0

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill 2, -1 TO -4 (Flood Side)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -48/-53

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -53

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -53 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (150.86238, -9.20449) ft
Left-Zone Right Coordinate: (212.2, 2.47612) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (223.9, -0.37612) ft
Right-Zone Right Coordinate: (281.49996, -3) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, -9.7) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
0	0.4
184.5	0.4
200	0.4
200	-5
310	-5

Regions

	Material	Points	Area (ft²)
Region 1	FILL, EL. +3.5 TO-1.0	26,14,31,4,10,52,34,30	52.9145
Region 2	FILL (Protected)	6,44,7,8,19,37	258.42
Region 3	BEACH SAND SP, EL. -12 TO -48/-53	46,47,48,36,49,32,13,22,45	1194.4515
Region 4	BEACH SAND SP, EL. -12 TO -48/-53	22,13,32,33,27,23,57,53,55,9	9378.625
Region 5	BAY SOUND CLAY 2, EL. -53 TO -70	54,58,28,59,41,56	821.95
Region 6	FILL, EL. +3.5 TO-1.0	4,40,24,5,6,10	83.525
Region 7	Marsh (Protected)	18,37,19,27,33	327.6
Region 8	Marsh 2, EL. -8 to -10 (Flood)	32,12,18,33	56.2
Region 9	Marsh 2, EL. -8 to -10 (Flood)	32,12,50,35,36,49	40.6
Region 10	FILL (Protected)	38,34,29,3,39	36.2
Region 11	Fill 2. -1 TO -4 (Flood Side)	10,11,37,6	106.78
Region 12	MARSH 1,EL. -4 TO -8	11,12,18,37	84.3
Region 13	Fill 2. -1 TO -4 (Flood Side)	10,52,34,38,51,11	81.199992
Region 14	MARSH 1,EL. -4 TO -8	11,12,50,35,38,51	60.900009
Region 15	Marsh (Protected)	39,38,35,36,48	61.04348
Region	Silted-in Layer	1,2,25,39,48,47,46,45,60	351.64

16			
Region 17	BAY SOUND CLAY, EL. -48 TO -53 (protected side toe)	9,55,56,16	1436.4
Region 18	BAY SOUND CLAY, EL. -48 TO -53	55,53,57,58,54,56	387.2
Region 19	BAY SOUND CLAY, EL. -48 TO -53 (protected side toe)	57,23,17,58	655.2
Region 20	BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe)	16,56,41,21	3051.5
Region 21	BAY SOUND CLAY 2, EL. -53 TO -70 (protected side toe)	58,17,20,28	1393.15

Points

	X (ft)	Y (ft)
Point 1	102.6	-9.7
Point 2	151.3	-9.2
Point 3	171.2	-4
Point 4	200	3.5
Point 5	208	3.5
Point 6	228.1	-1.4
Point 7	310	-3
Point 8	310	-5.2
Point 9	0.1	-45
Point 10	200	-1
Point 11	200	-4
Point 12	200	-8
Point 13	200	-17.2
Point 14	195.1	2.4
Point 15	195	-15
Point 16	0.2	-53
Point 17	310	-53
Point 18	228.1	-8
Point 19	310	-6
Point 20	310	-70
Point 21	0.2	-70
Point 22	0	-17.5

Point 23	310	-45
Point 24	201.2	3.7
Point 25	161.5	-8.3
Point 26	186.2	1.4
Point 27	310	-10
Point 28	228	-70
Point 29	176.7	-1.6
Point 30	183.4	-0.2
Point 31	195.9	3.31
Point 32	200	-10
Point 33	228.1	-10
Point 34	179.7	-1
Point 35	179.7	-8
Point 36	179.7	-10
Point 37	228.1	-6
Point 38	179.7	-6
Point 39	166.7	-6
Point 40	201	3.5
Point 41	179.7	-70
Point 42	200	12.9
Point 43	200.7	12.9
Point 44	244	-3
Point 45	0	-12
Point 46	151.1	-11.5
Point 47	161.5	-10.6
Point 48	162.17826	-10
Point 49	195	-10
Point 50	195	-8
Point 51	195	-4.49261
Point 52	195	-1
Point 53	200	-45
Point 54	200	-53
Point 55	179.7	-45
Point 56	179.7	-53
Point 57	228.1	-45
Point 58	228.1	-53

Point 59	200	-70
Point 60	0	-9.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.84	(224.537, 23.176)	9.542254	(207.665, 3.50985)	(228.675, -1.4579)
2	2007	1.88	(224.537, 23.176)	25.225	(209.089, 3.23449)	(229.55, -1.54591)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.8326	3.3970035	523.97104	9.1007583	3.8630427	0
2	Optimized	208.3782	3.0291955	501.02559	31.927994	13.552629	0
3	Optimized	209.0947	2.612665	475.03122	56.380365	23.932045	0
4	Optimized	209.77125	2.289535	454.86537	70.755205	30.033802	0
5	Optimized	210.4478	1.966405	434.69951	85.12871	36.134994	0
6	Optimized	211.15365	1.6580065	415.46486	100.61655	42.70919	0
7	Optimized	211.8888	1.36434	397.13534	111.34645	47.263765	0
8	Optimized	212.62395	1.0706735	-	122.07762	51.818875	0

	ed			378.805 82			
9	Optimiz ed	213.31105	0.80868665	362.460 13	133.05269	56.477517	0
10	Optimiz ed	213.9501	0.57838	348.092 45	140.15115	59.490635	0
11	Optimiz ed	214.58915	0.34807335	333.724 76	147.25403	62.505627	0
12	Optimiz ed	215.3018	0.101355	318.318 56	155.86017	66.158718	0
13	Optimiz ed	216.08795	-0.161775	301.901 43	162.74789	69.082379	0
14	Optimiz ed	216.8144	-0.40101835	286.970 77	169.55352	71.971201	0
15	Optimiz ed	217.48115	-0.616375	273.540 64	174.66297	74.14003	0
16	Optimiz ed	218.14785	-0.83173165	260.096 25	179.77241	76.30886	0
17	Optimiz ed	218.8463	-1.053755	246.250 02	185.55339	78.762743	0
18	Optimiz ed	219.396	-1.223414	235.657 78	190.10359	80.694187	0
19	Optimiz ed	219.98795	-1.400774	224.592 3	192.79828	81.838014	0
20	Optimiz ed	220.78975	-1.56843	214.127 4	205.38802	87.182041	0
21	Optimiz	221.5786	-1.65965	-	194.2686	82.46213	0

	ed			208.435 47			
22	Optimiz ed	222.27385	-1.7331875	-203.857	185.73527	78.839946	0
23	Optimiz ed	222.8755	-1.7890425	200.365 05	175.77246	74.610983	0
24	Optimiz ed	223.44185	-1.8331875	197.611 04	168.00415	71.313533	0
25	Optimiz ed	223.9729	-1.8656225	195.580 98	157.32756	66.781586	0
26	Optimiz ed	224.59555	-1.8889075	194.126 84	146.13052	62.028727	0
27	Optimiz ed	225.30985	-1.9030425	193.245 02	128.36811	54.489028	0
28	Optimiz ed	226.14505	-1.896765	193.643 01	107.66309	45.700269	0
29	Optimiz ed	227.12205	-1.821325	198.353 58	76.169129	32.331877	0
30	Optimiz ed	227.8605	-1.6907805	206.496 16	43.591403	18.503453	0
31	Optimiz ed	228.3877	-1.5401155	215.904 18	14.452379	6.1346708	0

Slices of Slip Surface: 2007

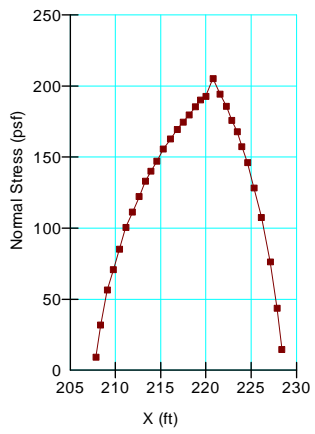
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	2007	209.44255	2.9704655	497.361	14.602802	6.1985219	0

				2			
2	2007	210.1494	2.4609755	465.569 18	43.094228	18.292414	0
3	2007	210.85625	1.987316	436.003 44	69.543762	29.519575	0
4	2007	211.5631	1.5471275	408.540 8	93.956862	39.882322	0
5	2007	212.2699	1.1384003	383.031 55	116.33598	49.381692	0
6	2007	212.97675	0.759411	359.389 24	136.67907	58.016821	0
7	2007	213.6836	0.4086717	-337.503	154.9975	65.792534	0
8	2007	214.3904	0.084893345	317.303 78	171.28032	72.704181	0
9	2007	215.09725	-0.21304525	298.700 53	185.53333	78.754227	0
10	2007	215.8041	-0.4861214	281.667 97	197.73299	83.932673	0
11	2007	216.5109	-0.7351879	266.123 42	207.88797	88.243207	0
12	2007	217.21775	-0.96098905	252.037 45	215.95667	91.668167	0
13	2007	217.9246	-1.1641725	239.359 12	221.93828	94.207209	0
14	2007	218.6288	-1.344707	228.088 98	225.41454	95.682797	0
15	2007	219.3304	-1.5032355	-	226.41136	96.105919	0

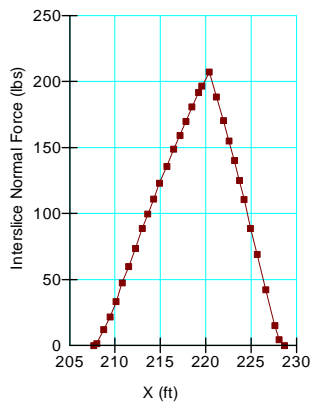
				218.196 73			
16	2007	220.03195	-1.6409215	209.610 65	225.34617	95.653775	0
17	2007	220.7335	-1.7581115	202.300 82	222.16877	94.305048	0
18	2007	221.4351	-1.855093	196.241 08	216.82284	92.035834	0
19	2007	222.13665	-1.9321	191.438 67	209.28849	88.837695	0
20	2007	222.8382	-1.989316	187.864 41	199.48328	84.675629	0
21	2007	223.5398	-2.0268765	185.524 11	187.33292	79.518105	0
22	2007	224.2414	-2.0448695	184.402 29	172.78628	73.343425	0
23	2007	224.94295	-2.0433365	184.490 85	155.73052	66.103683	0
24	2007	225.6445	-2.022274	185.803 52	136.08598	57.765072	0
25	2007	226.3461	-1.9816325	188.347 32	113.73062	48.275782	0
26	2007	227.04765	-1.9213175	192.108 18	88.53712	37.581778	0
27	2007	227.7492	-1.8411865	197.107 57	60.363664	25.622855	0
28	2007	228.4625	-1.7390325	-	36.671695	15.566211	0

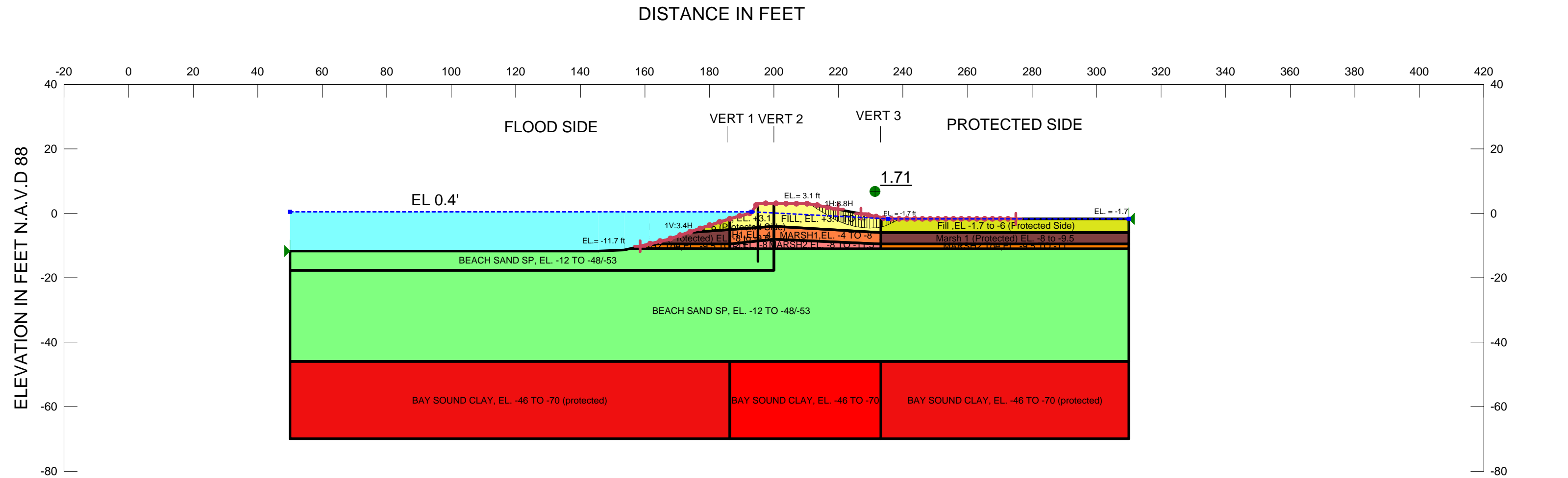
				203.489 42			
29	2007	229.1875	-1.6139155	- 211.293 11	12.867379	5.4618782	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: FILL, EL. +3.1 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH1,EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -12 TO -48/-53 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill ,EL -1.7 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH2,EL. -8 TO -11.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH2 Toe,EL. -9.5 TO -11 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh 1 (Protected) EL. -8 to -9.5 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.67.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 9 STA. 70+18 TO STA. 74+00
PROTECTED SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 347
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
Time: 11:17:38 AM
File Name: Reach 9_S-case.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443056\
Last Solved Date: 6/21/2013
Last Solved Time: 11:20:21 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 9.807 pcf

FOS Distribution
FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 3 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL, EL. +3.1 TO -4
Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH1,EL. -4 TO -8
Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -48/-53
Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -70
Model: Mohr-Coulomb
Unit Weight: 108 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill ,EL -1.7 to -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 102 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH2,EL. -8 TO -11.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH2 Toe,EL. -9.5 TO -11

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1 (Protected) EL. -8 to -9.5

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (158.5, -10.21186) ft
Left-Zone Right Coordinate: (219.8, 1.26089) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (226.92093, -0.1) ft
Right-Zone Right Coordinate: (275, -1.7) ft
Right-Zone Increment: 20
Radius Increments: 6

Slip Surface Limits

Left Coordinate: (50, -11.7) ft
Right Coordinate: (310, -1.7) ft

Piezometric Lines

Piezometric Line 1

Coordinates		
	X (ft)	Y (ft)
	50	0.4
	193.1	0.4
	235.3	-1.7
	310	-1.7

Unit Weight Functions

Fill
Model: Spline Data Point Function
Function: Unit Weight vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 102
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (186.3, 102)
 Data Point: (200, 106)

Data Point: (233.2, 102)

Regions

	Material	Points	Area (ft²)
Region 1	FILL, EL. +3.1 TO -4	35,3,38,51,4,15,36,5,11,12,56	75.381047
Region 2	FILL, EL. +3.1 TO -4	11,5,30,6,54,50,7,22,12	217.32501
Region 3	FILL ,EL -1.7 to -6 (Protected Side)	7,44,8,18,9,23,22	330.66
Region 4	BEACH SAND SP, EL. -12 TO -48/-53	1,43,31,48,16,13,14,26,57	934.91
Region 5	BEACH SAND SP, EL. -12 TO -48/-53	26,14,13,32,33,29,28,27,52,10	8095
Region 6	MARSH2,EL. -8 TO -11.5	47,45,13,16,48	30.825
Region 7	MARSH2,EL. -8 TO -11.5	13,45,40,32	74.7
Region 8	BAY SOUND CLAY, EL. -46 TO -70 (protected)	34,28,29,20,24	1843.2
Region 9	Marsh 1 (Protected) EL. -8 to -9.5	21,22,23,39,40	268.8
Region 10	MARSH2 Toe,EL. -9.5 TO -11	32,40,39,33	115.2
Region 11	MARSH1,EL. -4 TO -8	47,45,12,56	58.018952
Region 12	MARSH2 Toe,EL. -9.5 TO -11	47,48,31,49	40.382415
Region 13	MARSH1,EL. -4 TO -8	45,12,22,21,40	124.5
Region 14	Marsh 1 (Protected) EL. -8 to -9.5	46,56,47,49,37	70.733572
Region 15	BAY SOUND CLAY, EL. -46 TO -70 (protected)	10,52,53,25,19	3271.2
Region 16	BAY SOUND CLAY, EL. -46 TO -70	52,27,28,34,55,53	1125.6
Region 17	Fill ,EL -1.7 to -6 (Protected Side)	46,2,35,56	21.694016

Points

	X (ft)	Y (ft)
Point 1	145.5	-11.7
Point 2	178.1	-4.4
Point 3	187	-1.5

Point 4	194.8	3
Point 5	200	3.1
Point 6	201	3
Point 7	233.2	-1.3
Point 8	310	-1.7
Point 9	310	-4
Point 10	50	-46
Point 11	200	0.5
Point 12	200	-4
Point 13	200	-11
Point 14	200	-17.7
Point 15	195	3
Point 16	195	-11
Point 17	195	-15
Point 18	310	-3
Point 19	50	-53
Point 20	310	-53
Point 21	233.2	-8
Point 22	233.2	-6
Point 23	310	-6
Point 24	310	-70
Point 25	50	-70
Point 26	50	-17.7
Point 27	200	-46
Point 28	233.2	-46
Point 29	310	-46
Point 30	201	3.1
Point 31	155.7	-10.9
Point 32	233.2	-11
Point 33	310	-11
Point 34	233.2	-70
Point 35	186.3	-1.7
Point 36	195.4	3
Point 37	167.5	-8
Point 38	192.9	0.1
Point 39	310	-9.5

Point 40	233.2	-9.5
Point 41	200	12.7
Point 42	200.5	12.7
Point 43	153.6	-11.4
Point 44	235.3	-1.7
Point 45	200	-8
Point 46	173.4	-6
Point 47	186.3	-9.5
Point 48	186.3	-11
Point 49	161.39655	-9.5
Point 50	223.7814	0.5
Point 51	193.16207	0.5
Point 52	186.3	-46
Point 53	186.3	-70
Point 54	210.7	3
Point 55	200	-70
Point 56	186.3	-5.03008
Point 57	50	-11.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.71	(229.303, 24.055)	12.64623	(210.746, 2.99117)	(239.259, -1.7)
2	2544	1.73	(229.303, 24.055)	28.386	(210.264, 3)	(241.239, -1.7)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	211.1569	2.743464	-202.29865	14.731678	6.2532264	0
2	Optimized	211.9783	2.2480585	-173.94243	44.152292	18.741536	0

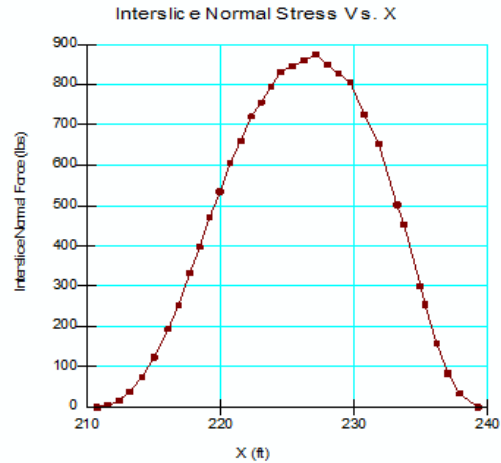
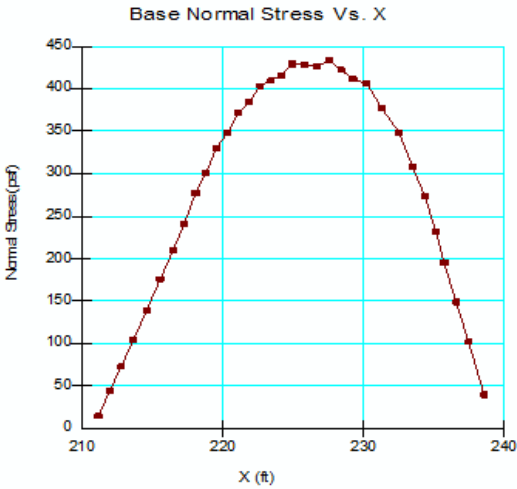
3	Optimized	212.7997	1.752653	-145.57579	73.517653	31.206392	0
4	Optimized	213.66485	1.216705	-114.8241	104.53926	44.374285	0
5	Optimized	214.5738	0.640215	-81.670138	139.00786	59.005337	0
6	Optimized	215.55045	0.025645	-46.353325	176.07524	74.739504	0
7	Optimized	216.46235	-0.5413272	-13.806116	210.13199	89.195737	0
8	Optimized	217.2764	-1.0439922	15.032201	241.24913	96.023389	0
9	Optimized	218.0691	-1.5014375	41.11584	277.01515	100.13332	0
10	Optimized	218.8059	-1.8922925	63.216862	300.67127	100.79342	0
11	Optimized	219.56015	-2.25638	83.594154	330.24939	104.69894	0
12	Optimized	220.33185	-2.5937	102.24623	348.43959	104.50288	0
13	Optimized	221.10785	-2.9031375	119.14568	371.76895	107.23222	0
14	Optimized	221.88815	-3.1846925	134.29008	384.53494	106.22264	0
15	Optimized	222.65405	-3.429565	147.19263	403.34038	108.72827	0
16	Optimized	223.4056	-3.6377545	157.84836	409.52096	106.82868	0
17	Optimized	224.1378	-3.8405795	168.2363	415.53447	104.97184	0
18	Optimized	224.93275	-4.0180315	176.83908	429.31565	107.16994	0
19	Optimized	225.80985	-4.175475	183.94272	427.9241	103.56395	0
20	Optimized	226.68695	-4.3329185	191.03514	426.52133	99.957957	0
21	Optimized	227.55365	-4.441565	195.12466	433.53786	101.2004	0

22	Optimiz ed	228.40995	-4.501415	196.20803	422.3313	95.983632	0
23	Optimiz ed	229.2663	-4.561265	197.27976	411.14804	90.781696	0
24	Optimiz ed	230.2213	-4.56149	194.32453	406.26409	89.963009	0
25	Optimiz ed	231.27495	-4.50209	187.35052	377.79007	80.836794	0
26	Optimiz ed	232.5009	-4.3424675	173.58469	348.29446	74.159896	0
27	Optimiz ed	233.4606	-4.1641175	159.47299	307.83829	62.977335	0
28	Optimiz ed	234.33605	-3.91105	140.96211	273.56017	56.284536	0
29	Optimiz ed	235.12545	-3.62643	120.75076	232.45556	47.415875	0
30	Optimiz ed	235.7296	-3.34963	102.93648	195.42503	39.259062	0
31	Optimiz ed	236.5888	-2.95599	78.37423	148.79348	29.891198	0
32	Optimiz ed	237.448	-2.56235	53.810926	102.16087	20.523334	0
33	Optimiz ed	238.56815	-2.032765	20.764724	39.743557	8.0560369	0

Slices of Slip Surface: 2544

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	2544	210.48215	2.807026	-204.16725	15.373877	6.5258234	0
2	2544	211.17315	2.221164	-169.76105	55.733917	23.657644	0
3	2544	212.11945	1.4683075	-125.72306	104.15948	44.213077	0
4	2544	213.06575	0.7782783	-85.602631	149.03693	63.262423	0
5	2544	214.0121	0.1456176	-49.06302	190.42278	80.829673	0
6	2544	214.95845	-0.4341347	-15.824646	228.3837	96.943128	0
7	2544	215.95345	-0.989457	15.737133	265.80562	106.14777	0
8	2544	216.99715	-1.5187415	45.523731	301.85405	108.80576	0

9	2544	218.0409	-1.9954665	72.030548	333.15832	110.84216	0
10	2544	219.08465	-2.422477	95.43636	359.86399	112.24287	0
11	2544	220.12835	-2.802149	115.88952	382.11265	113.00501	0
12	2544	221.17205	-3.1364695	133.50578	399.99413	113.11759	0
13	2544	222.2158	-3.427097	148.40311	413.58228	112.56188	0
14	2544	223.25955	-3.6754075	160.64953	422.93485	111.33351	0
15	2544	224.30465	-3.882753	170.34653	428.0862	109.404	0
16	2544	225.35115	-4.04994	177.52566	429.03847	106.76086	0
17	2544	226.39765	-4.1773585	182.22743	425.774	103.37938	0
18	2544	227.44415	-4.265546	184.48401	418.26418	99.233798	0
19	2544	228.4907	-4.314868	184.30856	406.47028	94.302059	0
20	2544	229.53725	-4.325528	181.73097	390.30259	88.533399	0
21	2544	230.58375	-4.29757	176.73147	369.69085	81.906397	0
22	2544	231.63025	-4.230879	169.32559	344.49854	74.356503	0
23	2544	232.67675	-4.1251795	159.48045	314.57753	65.834806	0
24	2544	233.725	-3.9797215	147.14266	279.89185	56.348688	0
25	2544	234.775	-3.7937505	132.28008	240.11334	45.772504	0
26	2544	235.7949	-3.5743075	116.95279	207.09428	38.262789	0
27	2544	236.7847	-3.322781	101.25985	181.38086	34.009349	0
28	2544	237.77445	-3.0327635	83.164345	150.78275	28.702308	0
29	2544	238.7642	-2.7030015	62.587216	114.95184	22.227462	0
30	2544	239.754	-2.3320025	39.43689	73.436929	14.43216	0
31	2544	240.7438	-1.9179955	13.6027	25.708474	5.1385962	0



PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 405
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 1:34:24 PM
File Name: Reach 10_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:35:26 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL -53 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1 (Protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 EL. -8 to -11.5 (Flood)

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 (Protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +3.3 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -12 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -53

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1, EL. -4 TO -8

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (160.40474, -10.76116) ft
Left-Zone Right Coordinate: (215.4, 1.18414) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (228.55696, -2.4) ft
Right-Zone Right Coordinate: (291.5, -5.2) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, -11.8) ft
Right Coordinate: (310, -5.2) ft

Piezometric Lines

Piezometric Line 1

Coordinates		
X (ft)	Y (ft)	
	0	0.4
	190.2	0.4
	200	0.4
	200	-7.2
	310	-7.2

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96

Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.5, 96)
Data Point: (200, 98)
Data Point: (237, 96)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.5, 99)
Data Point: (200, 101)
Data Point: (237, 99)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +3.3 TO -4	2,47,27,3,7,43,25	99.529999
Region 2	Fill (Protected)	26,10,5,13,28,38	63.575
Region 3	EMBANKMENT FILL CH, EL. +3.3 TO -4	3,46,23,4,38,28,7	189.1
Region 4	BEACH SAND SP, EL. -12 TO -48	18,9,17,48,1,39,41,33	1154.0873
Region 5	Marsh 2 EL. -8 to -11.5 (Flood)	18,8,29,30	92.5
Region 6	Marsh 1, EL. -4 TO -8	7,8,29,28	148
Region 7	Marsh 1 (Protected)	28,29,14,13	292
Region 8	Marsh 2 (Protected)	29,30,31,14	109.5
Region 9	Marsh 2 EL. -8 to -11.5 (Flood)	8,18,33,32	58.75
Region 10	Marsh 1, EL. -4 TO -8	7,8,32,43	94
Region 11	BEACH SAND SP, EL. -12 TO -48	6,17,9,18,30,31,22,21,19,34	10115
Region 12	Marsh 2 (Protected)	41,42,32,33	24.066968
Region 13	Marsh 1 (Protected)	42,40,43,32	21.985716
Region 14	BAY SOUND CLAY CL, EL. -48 TO -53	45,35,34,19,21,20,24	1331
Region 15	BAY SOUND CLAY, EL. -53 TO -70 (Protected)	6,34,35,45,16,11	3883
Region	BAY SOUND CLAY, EL. -53 TO -70	21,22,12,15,24,20	1606

16	(Protected)		
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Points

	X (ft)	Y (ft)
Point 1	145.7	-11.8
Point 2	192	2.8
Point 3	200	3.1
Point 4	208	3.2
Point 5	310	-5.6
Point 6	0	-48
Point 7	200	-4
Point 8	200	-8
Point 9	200	-17.5
Point 10	310	-5.2
Point 11	0	-53
Point 12	310	-53
Point 13	310	-6
Point 14	310	-10
Point 15	310	-70
Point 16	0	-70
Point 17	0	-17.5
Point 18	200	-11.5
Point 19	200	-48
Point 20	237	-53
Point 21	237	-48
Point 22	310	-48
Point 23	201	3.3
Point 24	237	-70
Point 25	188.8	-1.2
Point 26	257.7	-5.2
Point 27	199	3.1
Point 28	237	-6
Point 29	237	-10
Point 30	237	-11.5
Point 31	310	-11.5

Point 32	176.5	-10
Point 33	176.5	-11.5
Point 34	176.5	-48
Point 35	176.5	-53
Point 36	200	12.9
Point 37	200.5	12.9
Point 38	237	-4.7
Point 39	156.6	-11.6
Point 40	169.3	-8.8
Point 41	157.05357	-11.5
Point 42	163.85714	-10
Point 43	176.5	-6
Point 44	200	3.5
Point 45	176.5	-70
Point 46	201	3.1
Point 47	196.66667	3
Point 48	0	-11.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.65	(232.14, 30.674)	14.04573	(207.446, 3.20791)	(237.283, -4.70683)
2	1907	1.67	(232.14, 30.674)	35.832	(209.704, 2.73584)	(237.738, -4.71782)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.72325	2.9866215	635.64141	16.26427	6.9037729	0
2	Optimized	208.44445	2.409933	599.65805	50.042963	21.241978	0

3	Optimized	209.32145	1.8089235	562.15518	84.5766	35.900637	0
4	Optimized	210.1865	1.31771	531.50515	105.4908	44.778188	0
5	Optimized	211.05155	0.8264965	500.85511	126.38992	53.649338	0
6	Optimized	211.92295	0.36676	472.16128	149.54061	63.476222	0
7	Optimized	212.8007	-0.0615	445.43749	165.49297	70.247598	0
8	Optimized	213.7755	-0.5164775	417.04925	184.52317	78.325437	0
9	Optimized	214.84735	-0.9981725	386.99318	200.74255	85.210158	0
10	Optimized	215.92505	-1.46578	357.81118	218.56211	92.774113	0
11	Optimized	217.00855	-1.9193	329.51185	232.23502	98.577916	0
12	Optimized	218.04755	-2.3459375	302.8977	246.43094	104.60373	0
13	Optimized	219.042	-2.7456925	277.94857	257.59927	109.3444	0
14	Optimized	220.0009	-3.038405	259.67981	286.08523	121.43597	0
15	Optimized	220.92425	-3.224075	248.09625	279.59801	118.68231	0

16	Optimiz ed	221.91975	-3.417365	236.036 02	273.70163	116.17945	0
17	Optimiz ed	222.98745	-3.618275	223.499 22	264.83751	112.41685	0
18	Optimiz ed	224.0551	-3.819185	210.962 42	255.98259	108.65816	0
19	Optimiz ed	225.04895	-3.996045	199.924 31	249.51137	105.91129	0
20	Optimiz ed	225.96905	-4.148855	190.392 87	239.81911	101.79717	0
21	Optimiz ed	226.9005	-4.295755	181.226 2	231.19033	98.134474	0
22	Optimiz ed	227.85235	-4.42816	172.959 15	220.89268	93.763382	0
23	Optimiz ed	228.81325	-4.55198	165.238 59	207.06173	87.892491	0
24	Optimiz ed	229.77415	-4.6758	157.507 7	193.2411	82.025982	0
25	Optimiz ed	230.6819	-4.7780415	151.130 89	181.95586	77.23568	0
26	Optimiz ed	231.5365	-4.858705	146.098 24	166.49678	70.673688	0
27	Optimiz ed	232.3911	-4.9393685	141.065 59	151.03769	64.111697	0
28	Optimiz ed	233.3503	-4.9976425	137.425 31	134.72885	57.189004	0

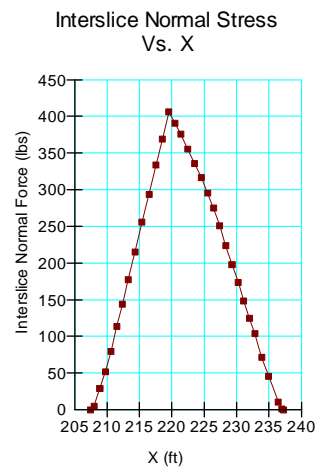
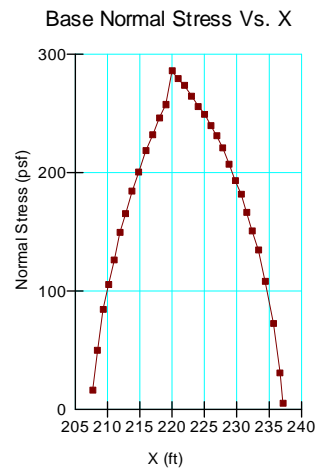
29	Optimiz ed	234.41405	-5.0335275	135.189 22	108.18708	45.922691	0
30	Optimiz ed	235.6782	-5.00002	137.280 94	72.842811	30.919939	0
31	Optimiz ed	236.70525	-4.866876	145.586 35	30.912965	13.121775	0
32	Optimiz ed	237.14135	-4.746005	153.129 42	5.3258999	2.2607104	0

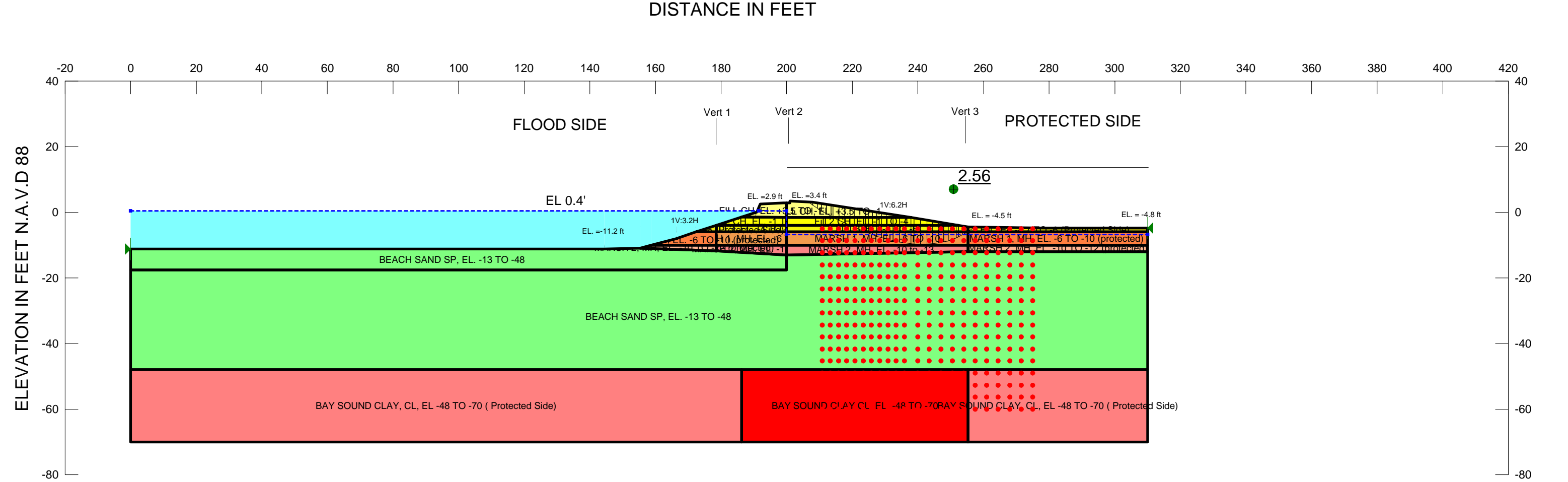
Slices of Slip Surface: 1907

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	1907	210.1745	2.370602	597.209 1	17.841406	7.5732274	0
2	1907	211.11575	1.664291	553.129 15	52.730418	22.382735	0
3	1907	212.057	1.0046559	511.972 96	85.253162	36.18782	0
4	1907	212.99825	0.38864015	473.529 17	115.40292	48.985634	0
5	1907	213.9395	-0.1863724	437.649 34	143.18044	60.776492	0
6	1907	214.88075	-0.72263865	404.185 14	168.57107	71.554176	0
7	1907	215.822	-1.222116	373.016 95	191.58759	81.324106	0

8	1907	216.7632	-1.68651	344.045 02	212.20571	90.075982	0
9	1907	217.70445	-2.117313	317.158 57	230.43272	97.812884	0
10	1907	218.6457	-2.515835	292.293 72	246.2436	104.52421	0
11	1907	219.58695	-2.8832275	269.367 98	259.6361	110.20899	0
12	1907	220.5282	-3.2205035	248.324 71	270.5872	114.85745	0
13	1907	221.46945	-3.528555	229.100 2	279.07039	118.45835	0
14	1907	222.4107	-3.808166	211.647 52	285.05287	120.99777	0
15	1907	223.35195	-4.0600235	195.930 82	288.51465	122.4672	0
16	1907	224.2932	-4.284728	181.907 84	289.41674	122.85012	0
17	1907	225.23445	-4.482801	169.552 61	287.69942	122.12116	0
18	1907	226.1757	-4.6546905	158.826 42	283.32304	120.26349	0
19	1907	227.1169	-4.8007775	149.710 65	276.22624	117.25108	0
20	1907	228.05815	-4.9213795	142.187 12	266.34622	113.05726	0

21	1907	228.9994	-5.0167555	136.239 22	253.60836	107.65036	0
22	1907	229.94065	-5.0871075	131.841 88	237.90497	100.98467	0
23	1907	230.8819	-5.132583	129.004 71	219.16997	93.032134	0
24	1907	231.82315	-5.153277	127.719 4	197.28409	83.742127	0
25	1907	232.7644	-5.149232	127.970 55	172.10748	73.05529	0
26	1907	233.70565	-5.1204395	129.767 63	143.53408	60.926601	0
27	1907	234.6469	-5.06684	133.113 15	111.37628	47.276425	0
28	1907	235.58815	-4.988322	138.013 04	75.483646	32.040907	0
29	1907	236.5294	-4.88472	144.476 43	35.640401	15.128453	0
30	1907	237.3688	-4.77222	151.494 93	7.3136039	3.1044407	0





Name: FILL CH, EL. +3.5 TO -1 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: FILL3, EL. -4 TO -6 Model: Mohr-Coulomb Unit Weight: 82 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -13 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, MH, EL. -6 TO -10 Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill, EL -4.7 TO -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill 2 CH, EL. -1 TO -4 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY, CL, EL -48 TO -70 (Protected Side) Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, MH, EL. -6 TO -10 (protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2, MH, EL. -10 TO -12 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2, MH, EL. -10 to -13 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED
FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE.
A FAILURE SURFACE EXISTS FOR THIS SECTION
THAT IS CONSIDERED FOR LOCAL STABILITY AND
THAT FACTOR OF SAFETY IS 0.49.

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 11 STA. 79+50 TO STA. 84+81
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012
LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Block)_Global

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File Information

Created By: Liljegren, James
Revision Number: 332
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File Name: Reach 11_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:47:36 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Block)_Global

Kind: SLOPE/W
Method: Spencer
Settings
 Apply Phreatic Correction: No
 PWP Conditions Source: Piezometric Line
 Use Staged Rapid Drawdown: No
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Block
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +3.5 TO -1

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

FILL3, EL. -4 TO -6

Model: Mohr-Coulomb
Unit Weight: 82 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BEACH SAND SP, EL. -13 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb
Unit Weight: 106 pcf

Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

MARSH 1, MH, EL. -6 TO -10

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Fill, EL -4.7 TO -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Fill 2 CH, EL. -1 TO -4

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

BAY SOUND CLAY, CL, EL -48 TO -70 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

MARSH 1, MH, EL. -6 TO -10 (protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

Pore Water Pressure
 Piezometric Line: 1

MARSH 2, MH, EL. -10 TO -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

MARSH 2, MH, EL. -10 to -13

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
 Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (0, -11.2) ft
Right Coordinate: (310, -4.8) ft

Slip Surface Block

Left Grid
 Upper Left: (210.818, -5) ft
 Lower Left: (210.818, -60) ft
 Lower Right: (235.886, -60) ft
 X Increments: 10
 Y Increments: 15
 Starting Angle: 125 °
 Ending Angle: 145 °
 Angle Increments: 4
Right Grid
 Upper Left: (240, -5) ft
 Lower Left: (240, -60) ft
 Lower Right: (275, -60) ft
 X Increments: 10
 Y Increments: 15
 Starting Angle: 25 °
 Ending Angle: 0 °
 Angle Increments: 4

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
0	0.4
191.5	0.4
200	0.4
200	-6.8
310	-6.8

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (186.3, 96)
Data Point: (200, 100)
Data Point: (255.3, 96)

Regions

	Material	Points	Area (ft²)
Region 1	Fill 2 CH, EL -1 TO -4	3,4,10,11	45.075
Region 2	FILL3, EL -4 TO -6	11,12,46,3	43
Region 3	BAY SOUND CLAY CL, EL -48 TO -70	41,20,21,29,45,42	1518
Region 4	FILL CH, EL +3.5 TO -1	5,23,30,6,7,10	106.42
Region 5	BEACH SAND SP, EL -13 TO -48	8,1,26,47,19,25,18	1234.0708
Region 6	BEACH SAND SP, EL -13 TO -48	18,25,19,13,15,22,21,20,41,9	10032.35
Region 7	MARSH 1, MH, EL -6 TO -10	46,12,44,48	86
Region 8	MARSH 1, MH, EL -6 TO -10	12,32,27,44	221.2
Region 9	BAY SOUND CLAY, CL, EL -48 TO -70 (Protected Side)	29,21,22,16	1203.4
Region	Fill 2 CH, EL -1 TO -4	7,24,11,10	112.875

10			
Region 11	Fill, EL -4.7 TO -6 (Protected Side)	31,39,33,14,32	69.045
Region 12	FILL3, EL -4 TO -6	11,24,31,32,12	109.875
Region 13	MARSH 1, MH, EL -6 TO -10 (protected)	32,14,28,27	218.8
Region 14	FILL CH, EL +3.5 TO -1	4,34,35,36,5,10	40.105
Region 15	BAY SOUND CLAY, CL, EL -48 TO -70 (Protected Side)	9,17,42,41	4098.6
Region 16	MARSH 2, MH, EL -10 TO -12 (protected)	13,27,28,15	109.4
Region 17	MARSH 2, MH, EL -10 to -13	44,19,47,48	50.774722
Region 18	MARSH 2, MH, EL -10 to -13	44,19,13,27	138.25
Region 19	Fill, EL -4.7 TO -6 (Protected Side)	40,3,46	6.1
Region 20	MARSH 1, MH, EL -6 TO -10 (protected)	43,2,40,46,48	50.28621
Region 21	MARSH 2, MH, EL -10 TO -12 (protected)	26,43,48,47	28.893262

Points

	X (ft)	Y (ft)
Point 1	144.4	-11.2
Point 2	166.3	-8
Point 3	178.5	-4
Point 4	186.3	-1.4
Point 5	200	2.9
Point 6	208	3.1
Point 7	237.9	-1.5
Point 8	0	-11.2
Point 9	0	-48
Point 10	200	-1.5

Point 11	200	-4
Point 12	200	-6
Point 13	255.3	-12
Point 14	310	-6
Point 15	310	-12
Point 16	310	-70
Point 17	0	-70
Point 18	0	-17.5
Point 19	200	-13
Point 20	200	-48
Point 21	255.3	-48
Point 22	310	-48
Point 23	201	2.9
Point 24	252.4	-4
Point 25	200	-17.5
Point 26	155.3	-10.9
Point 27	255.3	-10
Point 28	310	-10
Point 29	255.3	-70
Point 30	201	3.4
Point 31	255.3	-4.5
Point 32	255.3	-6
Point 33	310	-4.8
Point 34	190.9	0.1
Point 35	192	2.5
Point 36	199	2.9
Point 37	200	12.9
Point 38	200.5	12.9
Point 39	278	-4.8
Point 40	172.4	-6
Point 41	186.3	-48
Point 42	186.3	-70
Point 43	158.71379	-10
Point 44	200	-10
Point 45	200	-70
Point 46	178.5	-6

Point 47	178.5	-11.72323
Point 48	178.5	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.56	(233.637, 5.096)	22.11394	(206.511, 3.16383)	(257.213, -4.52528)
2	4632	2.79	(233.637, 5.096)	22.761	(206.453, 3.16631)	(259.126, -4.55056)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz ed	207.25535	2.6542405	-589.93748	42.603394	18.084068	0
2	Optimiz ed	208.66195	1.691647	-529.88133	116.52826	49.463313	0
3	Optimiz ed	209.98585	0.785629	-473.34386	179.16828	76.052424	0
4	Optimiz ed	211.3632	-0.05509	-420.88083	244.34218	103.7171	0
5	Optimiz ed	212.79395	-0.83051	-372.49539	295.78167	125.55187	0
6	Optimiz ed	213.79315	-1.35911	-339.5076	334.64825	142.04975	0
7	Optimiz ed	215.01265	-1.964355	-301.74436	373.00744	158.33226	0
8	Optimiz ed	216.80185	-2.8215325	-248.25514	430.33978	182.6684	0
9	Optimiz ed	218.50895	-3.6071775	-199.2299	478.48168	203.10342	0
10	Optimiz ed	219.99055	-4.28904	-156.68075	514.584	218.42795	0
11	Optimiz ed	221.48555	-4.93356	-116.46348	547.65851	232.46725	0

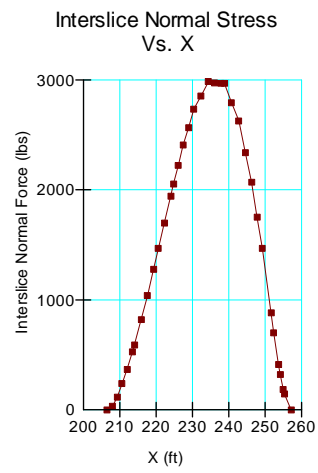
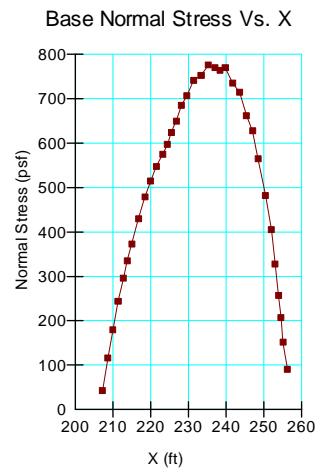
12	Optimized	223.21945	-5.64452	-72.103301	574.87334	244.01926	0
13	Optimized	224.4684	-6.156645	-40.144939	597.0214	253.42055	0
14	Optimized	225.49865	-6.556645	-15.185532	624.1312	264.92797	0
15	Optimized	226.8055	-7.047255	15.428593	650.06489	269.38713	0
16	Optimized	228.1968	-7.523575	45.150995	685.72247	271.90646	0
17	Optimized	229.6622	-7.981705	73.737311	706.89077	268.7577	0
18	Optimized	231.40085	-8.4352025	102.03611	741.28262	271.34404	0
19	Optimized	233.4128	-8.8840675	130.04584	753.16759	264.49949	0
20	Optimized	235.2891	-9.2191805	150.95542	776.00671	265.31853	0
21	Optimized	237.0297	-9.440542	164.77034	769.85155	256.84173	0
22	Optimized	238.3582	-9.6094965	175.31721	764.37696	250.04103	0
23	Optimized	239.79805	-9.6781775	179.59662	769.73617	250.49938	0
24	Optimized	241.76135	-9.6989925	180.89539	735.86635	235.5712	0
25	Optimized	243.6456	-9.620335	175.98873	714.96971	228.78385	0
26	Optimized	245.45075	-9.442205	164.87469	662.32139	211.15359	0
27	Optimized	247.0786	-9.1916225	149.23867	627.95438	203.20276	0
28	Optimized	248.5292	-8.8685875	129.0791	565.00619	185.04007	0
29	Optimized	250.49075	-8.267945	91.599271	482.1596	165.78302	0
30	Optimized	252.0635	-7.6514225	53.129264	405.30451	149.48952	0

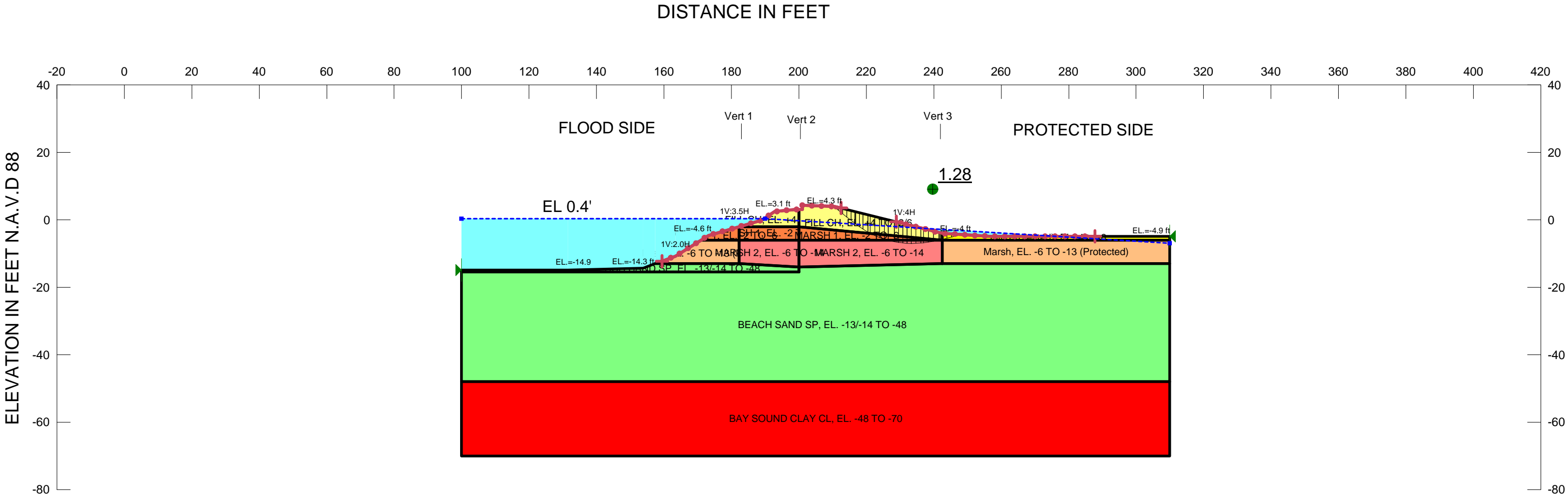
31	Optimized	253.03925	-7.1370125	21.029442	327.83346	130.23058	0
32	Optimized	253.93195	-6.66639	-8.3371946	257.24326	109.19328	0
33	Optimized	254.58715	-6.26639	-33.296882	207.37168	88.024055	0
34	Optimized	255.14445	-5.8968695	-56.354043	151.57775	64.340936	0
35	Optimized	256.25655	-5.159511	-102.36609	90.707937	38.503235	0

Slices of Slip Surface: 4632

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	4632	207.2264	2.6246145	-588.08768	45.329553	19.241253	0
2	4632	208.8528	1.485766	-517.04679	132.19128	56.111868	0
3	4632	210.55845	0.29145975	-442.5058	215.25687	91.371119	0
4	4632	212.2641	-0.90284675	-367.98402	298.32246	126.63037	0
5	4632	214.0095	-2.125	-291.72104	382.27731	162.26709	0
6	4632	215.7947	-3.375	-213.71922	467.12076	198.281	0
7	4632	217.4014	-4.5	-143.52028	534.21756	226.7619	0
8	4632	218.82955	-5.5	-81.120906	583.61396	247.72943	0
9	4632	220.11485	-6.4	-24.959903	634.07461	269.1487	0
10	4632	221.3526	-7.2666665	29.120271	692.04046	281.39293	0
11	4632	222.68555	-8.2	87.35774	756.32199	283.95848	0
12	4632	224.26125	-8.666667	116.48062	931.81193	346.08761	0
13	4632	226.07975	-8.666667	116.48062	901.45724	333.20281	0
14	4632	227.89825	-8.666667	116.48062	871.10256	320.31801	0
15	4632	229.71675	-8.666667	116.48062	840.74787	307.43321	0
16	4632	231.53525	-8.666667	116.48062	810.39318	294.54841	0
17	4632	233.35375	-8.666667	116.48062	780.03849	281.66361	0
18	4632	235.17225	-8.666667	116.48062	749.68381	268.77881	0
19	4632	236.99075	-8.666667	116.48062	719.32912	255.89401	0
20	4632	238.81	-8.666667	116.47802	687.47253	242.37279	0
21	4632	240.63	-8.666667	116.47802	654.06593	228.19253	0

22	4632	242.45	-8.666667	116.47802	620.65934	214.01227	0
23	4632	244.27	-8.666667	116.47802	587.25275	199.83201	0
24	4632	246.09	-8.666667	116.47802	553.84615	185.65176	0
25	4632	247.9	-8.361158	97.418089	541.69676	188.58511	0
26	4632	249.7	-7.75014	59.288361	438.12363	160.80603	0
27	4632	251.5	-7.1391225	21.161263	334.56101	133.0303	0
28	4632	252.4495	-6.816807	1.0487481	280.14111	118.46768	0
29	4632	253.67735	-6.4	-24.960172	212.69645	90.284289	0
30	4632	255.07785	-5.924598	-54.624193	137.22018	58.246512	0
31	4632	256.2564	-5.524537	-79.587809	125.01281	53.064789	0
32	4632	258.16925	-4.8752185	-120.10695	41.670606	17.688123	0





Name: FILL CH, EL. +4 TO -2/6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, EL. -6 TO -14 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill (Protected), EL -4 to -6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh, EL. -6 TO -13 (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.84.

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A STA. 85+90 TO STA. 89+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Name: PS Slope Stability (Entry/Exit)_Global
File Name: Reach 12A_S-case.gsz Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Edited By: Johnson, Andrew S MVN

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 296
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 1:56:43 PM
File Name: Reach 12A_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 1:59:14 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected), EL -4 to -6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (159.37055, -12.28453) ft
Left-Zone Right Coordinate: (212.5, 3.5) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (228.9, -0.6) ft
Right-Zone Right Coordinate: (287.8, -4.9) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (100, -14.9) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	0.4
190	0.4
310	-6.9

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,37,32,33,36	143.13643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	7078.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	4620
Region 9	Fill (Protected), EL -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11

Points

	X (ft)	Y (ft)
Point 1	100	-15.5
Point 2	192.9	2.5
Point 3	199	3.1

Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	100	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	100	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13
Point 37	100	-14.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.28	(233.476, 17.463)	17.9168	(210.318, 4.00574)	(248.286, -4.36933)
2	2133	1.31	(233.476, 17.463)	25.198	(212.5, 3.5)	(246.278, -4.24114)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	210.40915	3.929836	-297.73349	5.7207542	2.4283161	0
2	Optimized	211.11825	3.337354	-263.45334	39.798824	16.893599	0
3	Optimized	212.35475	2.3041915	-203.6828	96.510396	40.966233	0
4	Optimized	213.5865	1.311985	-146.44116	153.55839	65.18167	0
5	Optimized	214.81355	0.360735	-91.744715	205.20183	87.103009	0
6	Optimized	216.0406	-0.590515	-37.041832	256.84527	109.02435	0
7	Optimized	216.77145	-1.1509365	-4.8457795	292.96761	124.35737	0
8	Optimized	217.40535	-1.6090645	21.335065	320.41038	126.94994	0
9	Optimized	218.43845	-2.355728	64.005196	366.23261	128.28792	0
10	Optimized	219.7181	-3.185225	110.90827	431.81672	136.21756	0
11	Optimized	220.8285	-3.8172025	146.13431	480.62349	141.98224	0
12	Optimized	221.836	-4.3272275	174.12668	500.0821	138.35987	0
13	Optimized	223.2070	-4.928085	206.41715	537.8516	140.68557	0

	ed	5					
14	Optimized	224.62875	-5.461375	234.30122	546.74894	132.62619	0
15	Optimized	225.89205	-5.86401	254.62896	572.93713	135.1138	0
16	Optimized	227.3701	-6.22784	271.72097	571.53618	127.264	0
17	Optimized	228.9392	-6.5525925	286.02624	585.1298	126.96193	0
18	Optimized	230.22615	-6.7464175	293.24105	573.68906	119.04312	0
19	Optimized	231.492	-6.8809875	296.82621	574.02973	117.66591	0
20	Optimized	232.73675	-6.9563025	296.80215	550.85459	107.83886	0
21	Optimized	234.04805	-6.979345	293.26358	535.45255	102.80312	0
22	Optimized	235.43015	-6.899546	283.03784	504.27875	93.911194	0
23	Optimized	236.52635	-6.796461	272.43931	469.54961	83.668359	0
24	Optimized	237.6772	-6.6477025	258.79591	447.39653	80.056216	0
25	Optimized	239.1728	-6.4259875	239.28436	403.44594	69.682457	0
26	Optimized	240.7002	-6.157565	216.73261	360.93394	61.209834	0
27	Optimized	241.6419	-5.9672455	201.28472	327.80361	53.704082	0
28	Optimized	242.01695	-5.8914455	195.129	314.13928	50.516867	0
29	Optimized	242.36495	-5.814836	189.02687	304.40434	48.97483	0
30	Optimized	243.1794	-5.6123965	173.30435	269.57343	40.863801	0
31	Optimized	244.5382	-5.274646	147.07122	218.69987	30.40456	0
32	Optimized	245.897	-4.9368955	120.83809	167.81917	19.942287	0

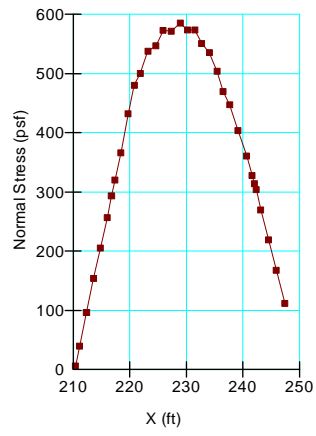
	ed						
33	Optimized	247.4313	-4.568675	92.033503	111.46773	8.2493418	0

Slices of Slip Surface: 2133

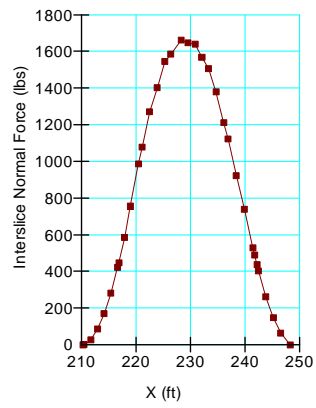
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	2133	213.00785	2.7915015	-236.56458	38.099384	16.172229	0
2	2133	214.02355	1.4654761	-157.68083	114.53654	48.617877	0
3	2133	215.0392	0.3023361	-88.954209	185.91772	78.91739	0
4	2133	216.05485	-0.72958795	-28.418359	252.21258	107.05789	0
5	2133	217.15215	-1.7175345	29.064629	322.55918	124.58105	0
6	2133	218.331	-2.6627215	83.567857	394.44788	131.96074	0
7	2133	219.5098	-3.498982	131.27966	457.2974	138.38632	0
8	2133	220.6226	-4.202209	170.93266	503.53039	141.17936	0
9	2133	221.6694	-4.790416	203.66382	534.72091	140.5254	0
10	2133	222.7162	-5.3153425	232.44404	561.0185	139.47159	0
11	2133	223.763	-5.78129	257.5489	582.66924	138.0054	0
12	2133	224.82445	-6.1967465	279.44356	603.73877	137.65515	0
13	2133	225.9005	-6.5631405	298.22399	623.98466	138.2772	0
14	2133	226.97655	-6.876464	313.6843	639.10325	138.13215	0
15	2133	228.05265	-7.1387495	325.96563	649.1543	137.18545	0
16	2133	229.12875	-7.351618	335.16464	654.18251	135.41505	0
17	2133	230.20485	-7.516336	341.35986	654.16479	132.77782	0
18	2133	231.28095	-7.633854	344.61307	649.06679	129.23294	0
19	2133	232.35705	-7.704834	344.95596	638.80492	124.73149	0
20	2133	233.43315	-7.72967	342.41528	623.25584	119.20975	0
21	2133	234.50925	-7.7084985	337.01147	602.2585	112.59069	0
22	2133	235.5853	-7.6412035	328.73067	575.60972	104.79394	0
23	2133	236.6547	-7.5284045	317.63085	550.65722	98.913824	0
24	2133	237.7175	-7.370051	303.71918	527.71973	95.082592	0
25	2133	238.7803	-7.164837	286.87933	499.04015	90.056925	0
26	2133	239.84305	-6.911576	267.03398	464.20505	83.694154	0
27	2133	240.9058	-6.6087485	244.10901	422.67514	75.796825	0
28	2133	241.9686	-6.254452	217.96403	373.7855	66.142289	0

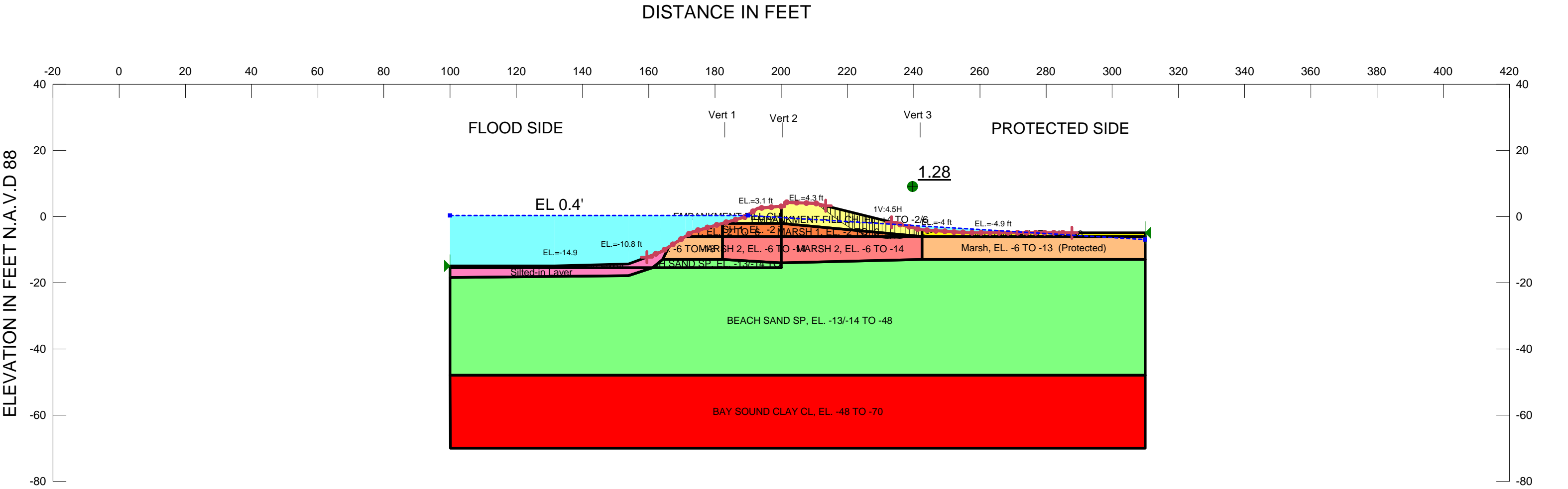
29	2133	242.5828	-6.0320865	201.7596	340.05997	58.705022	0
30	2133	243.26765	-5.745993	181.30677	302.69316	51.525467	0
31	2133	244.47175	-5.1998695	142.65839	228.29976	36.352601	0
32	2133	245.67585	-4.5744485	99.060689	138.78233	16.860834	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +4 TO -2/6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: MARSH 2, EL. -6 TO -14 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill (Protected), EL -4 to -6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh, EL. -6 TO -13 (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

THE FAILURE SURFACE SHOWN IS CONSIDERED FOR THE GLOBAL STABILITY OF THE I-WALL LEVEE. A FAILURE SURFACE EXISTS FOR THIS SECTION THAT IS CONSIDERED FOR LOCAL STABILITY AND THAT FACTOR OF SAFETY IS 0.84.



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12B STA. 89+50 TO STA. 93+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 280
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 2:04:25 PM
File Name: Reach 12B_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 2:06:20 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected), EL -4 to -6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (159.37055, -12.28453) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (213.4, 3.275) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (233.3, -1.7) ft
Right-Zone Right Coordinate: (287.8, -4.9) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (100, -14.9) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	100	0.4
	190	0.4
	310	-6.9

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +4 TO -2/6	35,21,2,3,24,9	53.225
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	EMBANKMENT FILL CH, EL. +4 TO -2/6	24,19,23,4,30,14,9	212.525
Region 4	MARSH 1, EL. -2 TO -6	9,14,10	85
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,38,40,34	109.57536
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	38,27,12,13,39	84.467862
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,37,36,39	6930.475
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	4618.9
Region 9	Fill (Protected), EL -4 to -6	31,18,5,14,30	80.595
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13	Silted-in Layer	1,41,32,33,20,40,38,39	69.721793

Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11
Region 15	Silted-in Layer	1,39,36,37	148.275

Points

	X (ft)	Y (ft)
Point 1	100	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	100	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	100.1	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4

Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	153.8	-17.8
Point 37	100	-18.4
Point 38	164.24571	-13
Point 39	161.1	-15.5
Point 40	166	-9.15789
Point 41	100	-14.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.28	(232.641, 15.991)	17.38005	(210.636, 3.96604)	(247.395, -4.31244)
2	2123	1.31	(232.641, 15.991)	23.063	(213.4, 3.275)	(243.976, -4.09423)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	211.1738 5	3.5590165	-277.49797	21.967694	9.3247329	0
2	Optimiz ed	212.2497 5	2.744979	-230.78753	65.903082	27.974199	0
3	Optimiz ed	213.3298 5	1.9294025	-183.9954	110.00245	46.693271	0
4	Optimiz ed	214.4141	1.1122875	-137.12191	154.06972	65.398717	0
5	Optimiz ed	215.6153 5	0.2081575	-85.266528	202.9347	86.14067	0
6	Optimiz ed	216.9336 5	-0.7829875	-28.421772	256.3574	108.81726	0

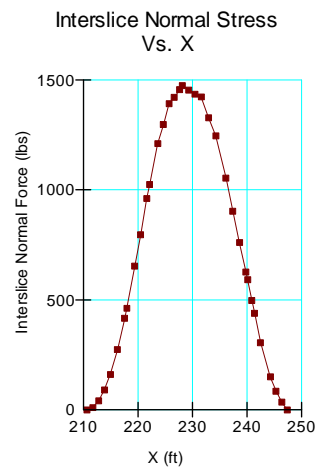
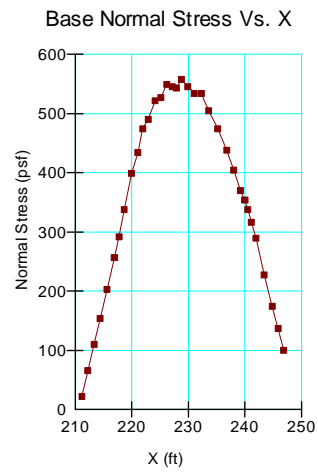
7	Optimiz ed	217.7739	-1.414745	7.8103333	291.52782	120.43093	0
8	Optimiz ed	218.6829 5	-2.046125	43.757536	337.86904	124.84292	0
9	Optimiz ed	219.9708	-2.8637825	89.888127	399.11071	131.2572	0
10	Optimiz ed	221.0906	-3.5087075	125.88671	434.56762	131.02727	0
11	Optimiz ed	221.9224	-3.9600205	150.88816	474.21374	137.24357	0
12	Optimiz ed	222.9122	-4.4291355	176.40184	490.14147	133.17457	0
13	Optimiz ed	224.1503 5	-4.957855	204.6944	521.69332	134.55806	0
14	Optimiz ed	225.1909	-5.334765	224.26569	527.15088	128.56713	0
15	Optimiz ed	226.2003 5	-5.642415	239.6311	549.35985	131.47206	0
16	Optimiz ed	227.1786	-5.880805	250.79428	545.24815	124.98825	0
17	Optimiz ed	227.9254 5	-6.06281	259.32106	543.35104	120.56357	0
18	Optimiz ed	228.7576	-6.2055635	265.06687	557.44653	124.1078	0
19	Optimiz ed	229.9064	-6.36545	270.67944	545.84204	116.79959	0
20	Optimiz ed	231.0552 5	-6.5253365	276.29201	534.23755	109.49139	0
21	Optimiz ed	232.2957	-6.623805	277.73171	534.30841	108.91035	0
22	Optimiz ed	233.6277	-6.660855	274.98508	504.59834	97.465046	0
23	Optimiz ed	235.2431 5	-6.616615	266.09388	474.52016	88.471707	0
24	Optimiz ed	236.8018 5	-6.4699035	251.02065	438.37971	79.529201	0
25	Optimiz ed	238.0204	-6.30201	235.91616	404.08163	71.382004	0

26	Optimiz ed	239.239	-6.1341165	220.8198	369.78355	63.231357	0
27	Optimiz ed	239.9858	-6.025085	211.18015	353.7916	60.534969	0
28	Optimiz ed	240.5277	-5.9262145	202.94866	337.40443	57.073088	0
29	Optimiz ed	241.1807 5	-5.8070595	193.03951	316.21337	52.284202	0
30	Optimiz ed	241.9647	-5.629858	179.0087	289.1365	46.746479	0
31	Optimiz ed	243.4057	-5.274988	151.39356	227.34765	32.240598	0
32	Optimiz ed	244.8253	-4.9286985	124.39037	174.57982	21.304158	0
33	Optimiz ed	245.8531	-4.6821955	105.1093	137.25704	13.645906	0
34	Optimiz ed	246.8809 5	-4.435692	85.827274	99.934248	5.9880548	0

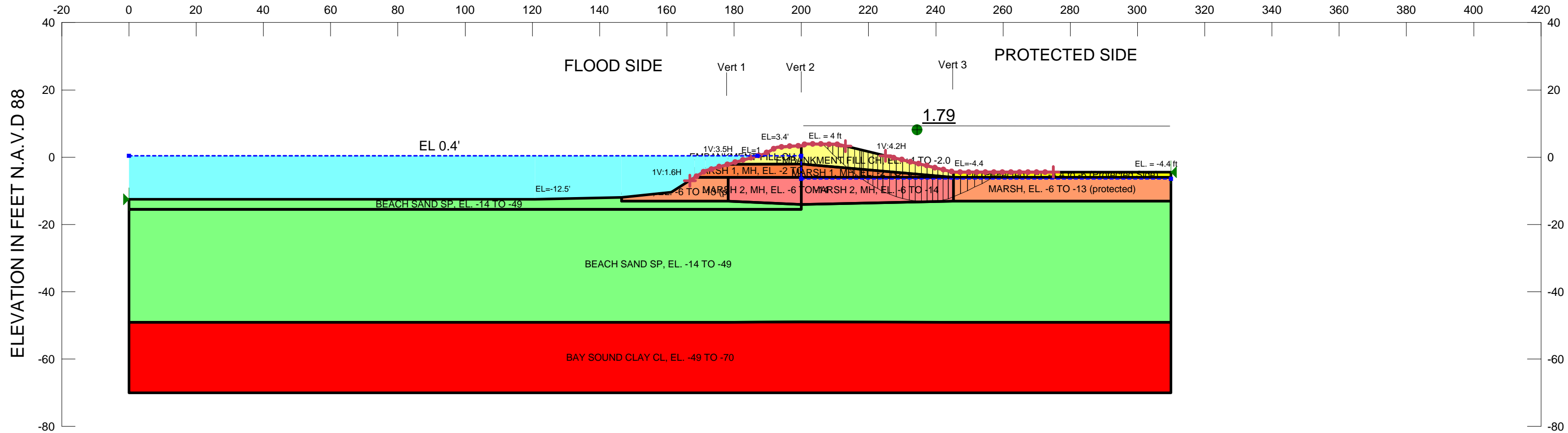
Slices of Slip Surface: 2123

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	2123	213.8921	2.586654	-227.14179	36.737407	15.594104	0
2	2123	214.87635	1.3030955	-150.78211	110.56491	46.932021	0
3	2123	215.8606	0.1854074	-84.779236	179.30425	76.11014	0
4	2123	216.8448	-0.80003255	-27.021027	242.89619	103.10332	0
5	2123	217.8096	-1.660172	22.989316	304.03526	119.29692	0
6	2123	218.755	-2.4139745	66.437774	361.51964	125.25482	0
7	2123	219.70035	-3.0911555	105.10834	412.69424	130.56247	0
8	2123	220.6457	-3.6996615	139.48875	458.02465	135.21047	0
9	2123	221.6899	-4.2961135	172.74617	495.73485	137.10056	0
10	2123	222.8329	-4.873269	204.4187	525.41734	136.25584	0
11	2123	223.9759	-5.373712	231.30563	549.09347	134.89293	0
12	2123	225.1189	-5.8027495	253.73666	567.04326	132.99076	0
13	2123	226.21205	-6.1514545	271.35147	582.10916	131.90881	0
14	2123	227.25535	-6.4282175	284.65768	594.56296	131.54699	0

15	2123	228.29865	-6.653554	294.75638	601.8539	130.35516	0
16	2123	229.34195	-6.8289915	301.74417	604.00061	128.30025	0
17	2123	230.38525	-6.9556765	305.68852	600.95085	125.33142	0
18	2123	231.42855	-7.0344155	306.64147	592.62705	121.39368	0
19	2123	232.47185	-7.0657005	304.6327	578.91044	116.42399	0
20	2123	233.51515	-7.049726	299.68057	559.62147	110.33837	0
21	2123	234.55845	-6.986393	291.76987	534.52935	103.04529	0
22	2123	235.6017	-6.8753065	280.87346	503.32508	94.425113	0
23	2123	236.7013	-6.70435	266.03069	471.61496	87.265345	0
24	2123	237.85725	-6.466693	246.81423	438.76118	81.47665	0
25	2123	239.01315	-6.1662215	223.67665	397.63445	73.840703	0
26	2123	239.91215	-5.8933255	203.23335	362.89663	67.773044	0
27	2123	240.7999	-5.572214	179.83323	317.86243	58.589921	0
28	2123	241.9333	-5.10818	146.57495	244.26736	41.467968	0
29	2123	243.2381	-4.476405	102.19759	145.45516	18.361749	0



DISTANCE IN FEET



Name: EMBANKMENT FILL CH, EL. +4 TO -2.0 Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, MH, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -14 TO -49 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -49 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, MH, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill (Protected) ,EL -4.4 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -6 TO -13 (protected) Model: Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

H_w=CANAL WATER LEVELS

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 13 STA. 93+00 TO STA. 96+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 310
Last Edited By: Johnson, Andrew S MVN
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File Name: Reach 13_S-case.gsz
Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 2:20:58 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -6 TO -14

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected) ,EL -4.4 to -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -6 TO -13 (protected)

Model: Mohr-Coulomb
Unit Weight: 75 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (166.8, -6.94902) ft
Left-Zone Right Coordinate: (213.08537, 3.3) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (225.01936, 0.43863) ft
Right-Zone Right Coordinate: (275, -4.4) ft
Right-Zone Increment: 20
Radius Increments: 4

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +4 TO -2.0

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 75 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -14 TO -49

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -49 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (0, -12.5) ft
Right Coordinate: (310, -4.4) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
0	0.4
187	0.4
200	0.4
200	-6.4
310	-6.4

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 75
Data Points: X (ft), Unit Weight (pcf)
Data Point: (178.2, 75)
Data Point: (200, 105)
Data Point: (245.2, 75)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1, MH, EL. -2 TO -6	23,2,11,12,42,39	109.0625
Region 2	MARSH 1, MH, EL. -2 TO -6	11,15,12	90.4
Region 3	BEACH SAND SP, EL. -14 TO -49	7,1,34,35,31,40,30,14,41,32,33	568.775
Region 4	BAY SOUND CLAY CL, EL. -49 TO -70	9,38,37,36,10,17,18	6513.35
Region 5	Fill (Protected) ,EL -4.4 to -6 (Protected Side)	24,19,6,15	103.68
Region 6	BEACH SAND SP, EL. -14 TO -49	14,16,8,10,36,37,38,9,7,33,32,41	10634.05

Region 7	EMBANKMENT FILL CH, EL. +4 TO -2.0	2,22,3,27,4,11	69.71
Region 8	EMBANKMENT FILL CH, EL. +4 TO -2.0	4,20,25,5,24,15,11	212.94
Region 9	MARSH 2, MH, EL. -6 TO -14	12,15,16,14,21,13	339
Region 10	MARSH, EL. -6 TO -13 (protected)	30,40,31,35,26,39,42	129.5125
Region 11	MARSH 2, MH, EL. -6 TO -14	30,42,12,13,21,14	163.5
Region 12	MARSH, EL. -6 TO -13 (protected)	16,15,6,8	453.6

Points

	X (ft)	Y (ft)
Point 1	0	-12.5
Point 2	178.2	-2.1
Point 3	192.7	3
Point 4	200	3.4
Point 5	211	3.8
Point 6	310	-6
Point 7	0	-15.5
Point 8	310	-13
Point 9	0	-49
Point 10	310	-49
Point 11	200	-2
Point 12	200	-6
Point 13	200	-7.9
Point 14	200	-14
Point 15	245.2	-6
Point 16	245.2	-13
Point 17	310	-70
Point 18	0	-70
Point 19	310	-4.4
Point 20	201	3.4
Point 21	200	-10.7
Point 22	189	1

Point 23	171.5	-4
Point 24	245.2	-4.4
Point 25	201	4
Point 26	161.3	-10.4
Point 27	199	3.4
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	178.2	-13
Point 31	146.5	-13
Point 32	151.7	-15.5
Point 33	138.6	-15.5
Point 34	120.8	-12.5
Point 35	146.5	-12
Point 36	245.2	-49
Point 37	199.9	-48.9
Point 38	178.2	-49
Point 39	168.3125	-6
Point 40	154.61111	-13
Point 41	200	-15.5
Point 42	178.2	-6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.79	(237.987, 26.383)	24.73578	(206.391, 3.89218)	(259.671, -4.4)
2	1863	1.82	(237.987, 26.383)	39.265	(205.793, 3.90413)	(262.362, -4.4)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	207.14025	3.1471695	-595.7618	59.273282	25.160016	0

2	Optimiz ed	208.63835	1.6571565	-502.76276	177.81985	75.480047	0
3	Optimiz ed	210.1937	0.1459915	-408.47024	301.76737	128.09265	0
4	Optimiz ed	211.78495	-1.3660285	-314.1214	409.2883	173.73257	0
5	Optimiz ed	213.2446	-2.6718425	-232.63439	505.21496	214.45103	0
6	Optimiz ed	214.9232	-4.0649325	-145.70657	569.80286	241.86697	0
7	Optimiz ed	216.68885	-5.449035	-59.338264	639.12156	271.29101	0
8	Optimiz ed	217.7271	-6.2	-12.479982	668.1074	283.59476	0
9	Optimiz ed	218.2772	-6.597905	12.349278	688.96488	287.20628	0
10	Optimiz ed	219.22275	-7.229345	51.750873	739.25353	291.82756	0
11	Optimiz ed	220.56665	-8.096415	105.85775	783.45993	287.62506	0
12	Optimiz ed	221.99875	-8.9348875	158.17828	848.56753	293.05285	0
13	Optimiz ed	223.519	-9.7447625	208.71383	881.89022	285.74643	0
14	Optimiz ed	225.27555	-10.55536	259.29307	940.25166	289.04977	0
15	Optimiz ed	227.2684	-11.36668	309.91914	959.53911	275.74732	0
16	Optimiz ed	229.2139	-12.02216	350.82312	1003.5454	277.06416	0
17	Optimiz ed	231.1121	-12.5218	382.00241	995.64865	260.47738	0
18	Optimiz ed	232.9712	-12.88095	404.41263	1014.9457	259.15591	0
19	Optimiz ed	234.7912	-13.09961	418.05616	982.75983	239.70249	0
20	Optimiz ed	236.5276	-13.18826	423.58457	980.75506	236.50484	0

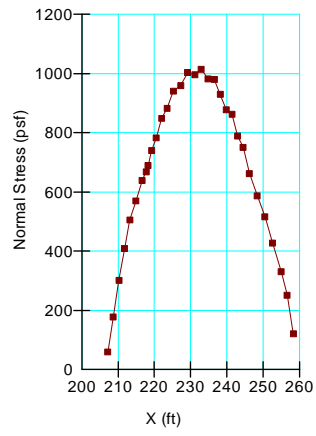
21	Optimiz ed	238.1804	-13.146895	421.00794	929.28281	215.74988	0
22	Optimiz ed	239.8332	-13.10553	418.42525	877.87104	195.02317	0
23	Optimiz ed	241.4254	-12.91877	406.71282	863.12045	193.73355	0
24	Optimiz ed	242.957	-12.583905	385.878	788.22737	170.78718	0
25	Optimiz ed	244.4614	-12.097075	355.49622	751.2216	167.97546	0
26	Optimiz ed	246.2502	-11.32246	307.1613	662.085	150.65617	0
27	Optimiz ed	248.35055	-10.412925	250.40741	586.80636	142.79288	0
28	Optimiz ed	250.47975	-9.4239375	188.69335	516.50958	139.14973	0
29	Optimiz ed	252.63785	-8.3554925	122.02217	426.64572	129.30502	0
30	Optimiz ed	255.00755	-7.110635	44.344145	330.0308	121.26679	0
31	Optimiz ed	256.6252	-6.219955	-11.234756	251.57516	106.78732	0
32	Optimiz ed	258.31135	-5.219955	-73.635675	120.95692	51.343167	0

Slices of Slip Surface: 1863

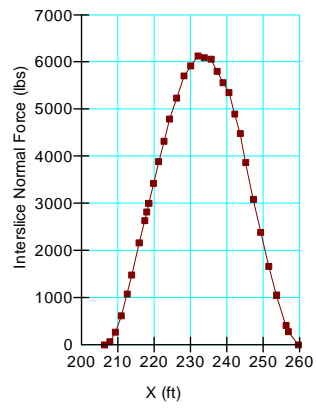
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	1863	206.66115	2.7537055	-571.19877	84.881761	36.03017	0
2	1863	208.3967	0.6070902	-437.23652	254.50398	108.03053	0
3	1863	210.13225	-1.2634113	-320.52393	413.81102	175.65236	0
4	1863	211.5064	-2.600402	-237.09765	524.92853	222.81894	0
5	1863	212.95505	-3.843398	-159.53108	595.96305	252.9713	0
6	1863	214.8395	-5.311858	-67.901303	667.09977	283.16705	0
7	1863	216.0792	-6.2	-12.479951	713.14804	302.71338	0
8	1863	217.33745	-6.9944085	37.091095	766.03003	309.41622	0

9	1863	219.259	-8.1104695	106.73129	838.36454	310.55989	0
10	1863	221.18055	-9.087358	167.69159	896.18613	309.22759	0
11	1863	223.1021	-9.936357	220.67017	940.54243	305.56764	0
12	1863	225.02365	-10.66629	266.21646	972.40035	299.75728	0
13	1863	226.9452	-11.284105	304.76669	992.45062	291.90451	0
14	1863	228.86675	-11.79527	336.66325	1001.3039	282.12321	0
15	1863	230.7883	-12.20403	362.17156	999.53497	270.54472	0
16	1863	232.7099	-12.51362	381.48992	987.541	257.25342	0
17	1863	234.63145	-12.7264	394.76495	965.71842	242.35537	0
18	1863	236.553	-12.843955	402.10314	934.39912	225.94624	0
19	1863	238.47455	-12.86714	403.54789	893.73759	208.07318	0
20	1863	240.3961	-12.796125	399.11988	843.9704	188.82784	0
21	1863	242.31765	-12.630395	388.77415	785.21371	168.27861	0
22	1863	244.2392	-12.368725	372.45056	717.47621	146.4547	0
23	1863	246.09985	-12.02363	350.91363	670.77315	135.77231	0
24	1863	247.8995	-11.59871	324.39826	646.42009	136.69016	0
25	1863	249.69915	-11.08257	292.19138	614.72943	136.90928	0
26	1863	251.4988	-10.471365	254.05403	575.33479	136.37559	0
27	1863	253.29845	-9.76026	209.68162	527.45298	134.88594	0
28	1863	255.0981	-8.9432005	158.69666	470.38402	132.30344	0
29	1863	256.89775	-8.012608	100.62666	403.00819	128.35334	0
30	1863	258.6974	-6.9589375	34.877508	323.93776	122.6988	0
31	1863	259.8947	-6.2	-12.479951	262.05303	111.23491	0
32	1863	261.277	-5.2	-74.878276	124.7588	52.956967	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
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Last Solved Date: 1/25/2012
Last Solved Time: 2:37:20 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -6 TO -11.5

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL -4.4 to -6 (Protected)

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL -6 to -11.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (162.6, -6.76268) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.8 TO -2

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -13 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (218.9, 1.27816) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (232.2, -1.86552) ft
Right-Zone Right Coordinate: (270, -4.4) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (50, -11.9) ft
Right Coordinate: (310, -4.4) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
50	0.4
185.8	0.4
310	-6.4

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %

Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (169.2, 80)
Data Point: (200, 109)
Data Point: (242.9, 80)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1, EL. -2 TO -6	3,28,34	3.76
Region 2	MARSH 1, EL. -2 TO -6	12,32,13	85.8

Region 3	BEACH SAND SP, EL. -13 TO -47	8,1,29,35,14,15	203.73
Region 4	BAY SOUND CLAY CL, EL. -47 TO -70	10,11,17,18	5980
Region 5	FILL, EL -4.4 to -6 (Protected)	27,25,19,7,32	107.34186
Region 6	BEACH SAND SP, EL. -13 TO -47	36,11,10,37	7020
Region 7	EMBANKMENT FILL, EL. +3.8 TO -2	24,23,4,26,5,31,12,28	105.99085
Region 8	EMBANKMENT FILL, EL. +3.8 TO -2	31,30,20,6,27,32,12	191.10273
Region 9	MARSH, EL -6 to -11.5 (Protected)	29,2,16,3,34,35	97.615
Region 10	Silted-in Layer	1,21,48,22,16,2,29	325.895
Region 11	MARSH 1, EL. -2 TO -6	12,13,34,28	86.22286
Region 12	MARSH, EL -6 to -11.5 (Protected)	32,7,9,33	369.05
Region 13	BEACH SAND SP, EL. -13 TO -47	15,14,33,9,36,37,8	1610
Region 14	MARSH 2, EL. -6 TO -11.5	34,13,46,47,14,35	169.4
Region 15	MARSH 2, EL. -6 TO -11.5	13,32,33,14,47,46	235.95

Points

	X (ft)	Y (ft)
Point 1	50	-15.3
Point 2	148.1	-12.7
Point 3	164.5	-6
Point 4	191.1	3.1
Point 5	198.9	3.4
Point 6	209.5	3.5
Point 7	310	-6
Point 8	50	-15.5
Point 9	310	-11.5
Point 10	50	-47
Point 11	310	-47
Point 12	200	-2
Point 13	200	-6
Point 14	200	-11.5
Point 15	200	-15.5
Point 16	150.3	-11.7
Point 17	310	-70
Point 18	50	-70
Point 19	310	-4.4

Point 20	201	3.8
Point 21	50	-11.9
Point 22	146.3	-11.7
Point 23	188.1	1
Point 24	175.3	-2.2
Point 25	243.1	-4.4
Point 26	198.6	3.38846
Point 27	242.92268	-4.4
Point 28	169.20857	-4.4
Point 29	142.5	-15.2
Point 30	201	3.4
Point 31	200	3.4
Point 32	242.9	-6
Point 33	242.9	-11.5
Point 34	169.2	-6
Point 35	169.2	-11.5
Point 36	310	-20
Point 37	50	-20
Point 38	169.2	-47
Point 39	200	-47
Point 40	242.9	-47
Point 41	169.2	-70
Point 42	200	-70
Point 43	242.9	-70
Point 44	200	12.9
Point 45	200.5	12.9
Point 46	200	-6.9
Point 47	200	-10.3
Point 48	115.5	-11.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.26	(233.586, 19.081)	19.38085	(208.927, 3.52022)	(250.469, -4.4)

2	1833	1.27	(233.586, 19.081)	28.115	(210.313, 3.30779)	(249.048, -4.4)
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Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	209.2135	3.245218	-257.53081	20.090047	8.527719	0
2	Optimized	210.07515	2.418164	-208.86513	71.737415	30.450726	0
3	Optimized	211.22545	1.314068	-143.90132	134.85104	57.240869	0
4	Optimized	212.53295	0.113015	-73.425003	207.68495	88.157029	0
5	Optimized	213.6194	-0.839249	-17.713696	264.50421	112.27538	0
6	Optimized	214.5487	-1.635154	28.775962	314.86789	121.43882	0
7	Optimized	215.64415	-2.496898	78.804714	388.23902	131.34707	0
8	Optimized	216.6847	-3.2350945	121.31098	435.30708	133.28344	0
9	Optimized	217.66955	-3.9337565	161.54914	473.86754	132.57129	0
10	Optimized	219.0552	-4.791185	210.31473	528.98939	135.26937	0
11	Optimized	220.6997	-5.659525	258.88438	576.55494	134.84316	0
12	Optimized	221.74905	-6.153425	286.11529	594.24158	130.79185	0
13	Optimized	222.7884	-6.5773875	309.02183	625.02294	134.13451	0
14	Optimized	224.2152	-7.1184625	337.90886	642.114	129.12742	0
15	Optimized	225.71515	-7.6020725	362.965	670.81892	130.67623	0
16	Optimized	227.28825	-8.0282175	384.17621	672.59828	122.4279	0

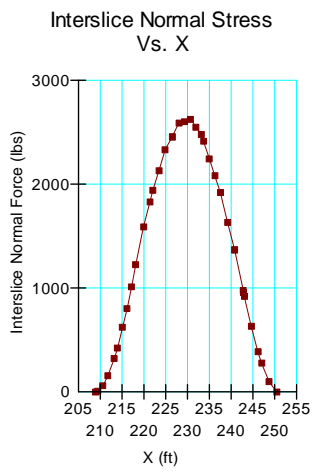
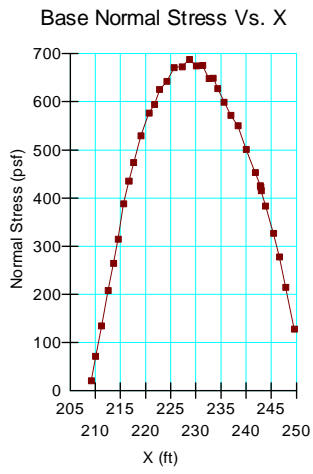
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17	Optimized	228.7406	-8.3449825	398.98282	687.73689	122.56883	0
18	Optimized	230.0722	-8.5523675	407.3752	674.09094	113.21411	0
19	Optimized	231.35865	-8.68118	411.01768	675.13408	112.11076	0
20	Optimized	232.59995	-8.73142	409.91491	648.25719	101.17029	0
21	Optimized	233.4671	-8.7355445	407.21112	649.15694	102.69991	0
22	Optimized	234.3585	-8.6596225	399.4212	626.87056	96.546526	0
23	Optimized	235.64825	-8.5497695	388.165	599.39833	89.663229	0
24	Optimized	236.93795	-8.4399165	376.90108	572.12697	82.868473	0
25	Optimized	238.398	-8.2375525	359.28675	549.70046	80.825824	0
26	Optimized	240.02845	-7.9426775	335.31378	501.12683	70.383463	0
27	Optimized	241.83895	-7.520125	302.76457	452.57797	63.592018	0
28	Optimized	242.8671	-7.232874	281.32057	425.30175	61.116383	0
29	Optimized	242.91135	-7.216557	280.15767	423.16752	60.704082	0
30	Optimized	243.01135	-7.179687	277.51409	414.861	58.300304	0
31	Optimized	243.87775	-6.8602485	254.61828	383.1851	54.573377	0
32	Optimized	245.4332	-6.2867495	213.52202	326.31506	47.877807	0
33	Optimized	246.6189	-5.84958	182.19062	277.73606	40.556632	0
34	Optimized	247.88745	-5.37437	148.20617	214.75082	28.246529	0
35	Optimized	249.6086	-4.72479	101.79016	127.59918	10.955278	0

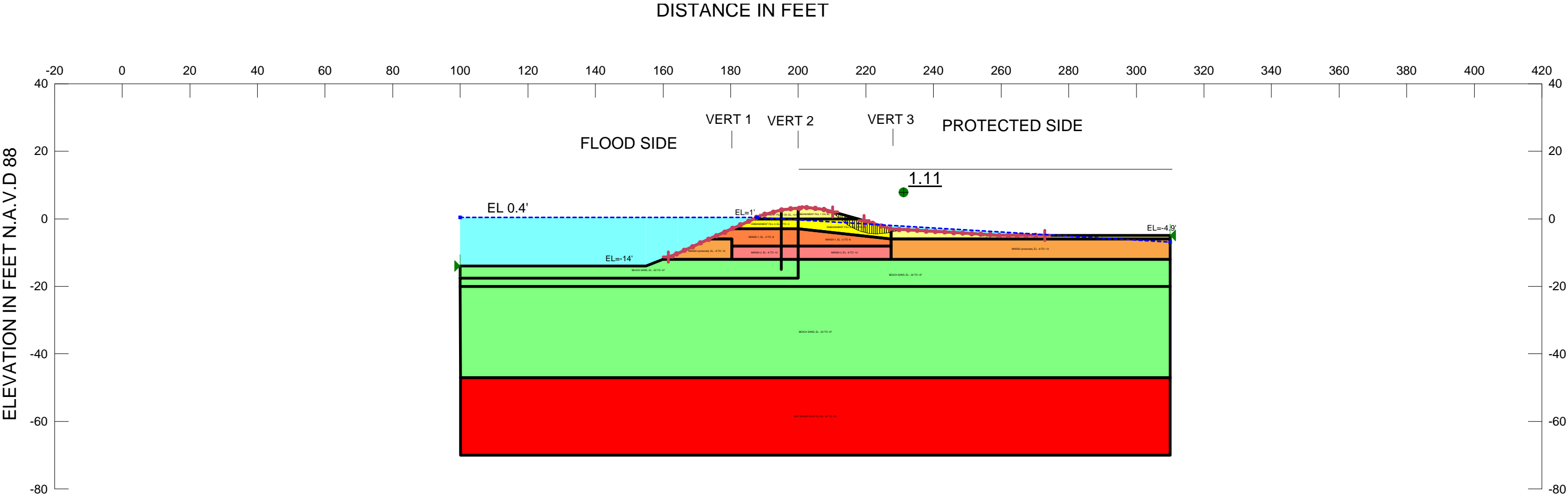
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Slices of Slip Surface: 1833

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	1833	210.9378	2.4568575	- 214.22982	47.329315	20.090102	0
2	1833	212.187	0.8719044	- 119.59851	141.90586	60.235462	0
3	1833	213.43625	-0.5047041	-37.96344	229.31165	97.337021	0
4	1833	214.78215	-1.7969095	38.07173	322.18701	120.59978	0
5	1833	216.2247	-3.013285	109.04675	416.73889	130.60756	0
6	1833	217.60225	-4.033827	168.01904	486.89864	135.35636	0
7	1833	218.91475	-4.889265	216.91437	535.19928	135.10393	0
8	1833	220.22725	-5.6454605	259.62204	575.86755	134.23826	0
9	1833	221.525	-6.3047835	296.32633	612.92073	134.38635	0
10	1833	222.808	-6.8759355	327.58552	646.04366	135.17746	0
11	1833	224.091	-7.372559	354.19173	671.72599	134.7853	0
12	1833	225.374	-7.798798	376.40592	690.30239	133.24114	0
13	1833	226.657	-8.1579655	394.43212	702.04354	130.5733	0
14	1833	227.94005	-8.4526935	408.44032	707.19256	126.8128	0
15	1833	229.2231	-8.685039	418.55276	705.92665	121.98298	0
16	1833	230.5061	-8.8565615	424.87126	698.37797	116.09671	0
17	1833	231.7891	-8.9683795	427.46537	684.65085	109.16876	0
18	1833	233.0721	-9.0212075	426.38398	664.80522	101.20381	0
19	1833	234.3698	-9.014635	421.54156	646.62474	95.542141	0
20	1833	235.68215	-8.94726	412.84892	630.50816	92.390867	0
21	1833	236.99445	-8.818026	400.30406	608.70059	88.459075	0
22	1833	238.3068	-8.6260655	383.84254	581.161	83.756716	0
23	1833	239.61915	-8.3700595	363.38143	547.75884	78.263568	0
24	1833	240.9315	-8.0481905	338.81563	508.32274	71.951499	0
25	1833	242.2552	-7.654087	309.70176	462.09796	64.688352	0
26	1833	243.01135	-7.4060955	291.63968	430.39301	58.897294	0
27	1833	243.89715	-7.06012	267.02897	401.38074	57.028945	0
28	1833	245.49145	-6.3728465	218.69349	342.31792	52.475457	0

29	1833	246.97835	-5.6261525	167.01986	261.51106	40.109135	0
30	1833	248.3578	-4.8261525	112.39011	154.38222	17.824594	0





Name: EMBANKMENT FILL 1 CH, EL. +3.5 TO -0 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -3 TO -8 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -20 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 2, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: FILL (protected) ,EL -3 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: EMBANKMENT FILL 2, EL. 0 TO -3 Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH (protected), EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN HE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 15 STA. 100+28 TO STA. 104+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 189
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 2:47:40 PM
File Name: Reach 15_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 2:50:58 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (protected) ,EL -3 to -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. 0 TO -3

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH (protected), EL. -6 TO -12

Model: Mohr-Coulomb
Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (161.58644, -11.3374) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.5 TO -0

Model: Mohr-Coulomb
Unit Weight: 113 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3 TO -8

Model: Mohr-Coulomb
Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -20 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (210.17778, 2.1) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (219.4424, -0.50796) ft
Right-Zone Right Coordinate: (272.9, -4.9) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (100, -14) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
100	0.4
187.8	0.4
310	-6.9

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 88
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.3, 88)
Data Point: (200, 109)
Data Point: (227.5, 88)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL 1 CH, EL. +3.5 TO -0	30,36,3,41,4,28,20	26.4
Region 2	MARSH 1, EL. -3 TO -8	47,46,45,21,11,12,22,31	108.4375

Region 3	Fill (protected) ,EL -3 to -6 (Protected Side)	15,37,6,7,16	121.625
Region 4	MARSH 2, EL. -8 TO -12	31,22,12,13,23,48	78.8
Region 5	BEACH SAND, EL. -20 TO -47	27,24,13,17,8,34,33,32	1130
Region 6	MARSH (protected), EL. -6 TO -12	16,7,8,17,44	495
Region 7	BEACH SAND, EL. -20 TO -47	13,24,27,1,50,19,49,48,23	435.05263
Region 8	EMBANKMENT FILL 2, EL. 0 TO -3	21,11,28,20,30,35,45	49.175
Region 9	EMBANKMENT FILL 1 CH, EL. +3.5 TO -0	28,4,26,38,5,29	38.03
Region 10	EMBANKMENT FILL 2, EL. 0 TO -3	11,28,29,15,16	109.2
Region 11	BEACH SAND, EL. -20 TO -47	9,32,33,34,10,18,14	5668.65
Region 12	BAY SOUND CLAY CL, EL. -47 TO -70	9,14,18,10,40,39	4827.7
Region 13	MARSH 2, EL. -8 TO -12	12,44,17,13	110
Region 14	MARSH 1, EL. -3 TO -8	12,11,16,44	96.25
Region 15	MARSH (protected), EL. -6 TO -12	49,2,46,47,31,48	79.929867

Points

	X (ft)	Y (ft)
Point 1	100	-15.1
Point 2	164.4	-10.2
Point 3	195	2.6
Point 4	200	3.1
Point 5	208	2.7
Point 6	310	-4.9
Point 7	310	-6
Point 8	310	-12
Point 9	100.1	-47
Point 10	310	-47
Point 11	200	-3
Point 12	200	-8
Point 13	200	-12

Point 14	200	-47
Point 15	227.5	-3
Point 16	227.5	-6
Point 17	227.5	-12
Point 18	231.5	-47
Point 19	155	-14
Point 20	195	0
Point 21	195	-3
Point 22	195	-8
Point 23	195	-12
Point 24	200	-17.5
Point 25	195	-15
Point 26	201	3.1
Point 27	100	-17.5
Point 28	200	0
Point 29	217.8	0
Point 30	186.8	0
Point 31	180.3	-8
Point 32	100	-20
Point 33	200	-20
Point 34	310	-20
Point 35	181.5	-2.5
Point 36	189	1
Point 37	260	-4.9
Point 38	201	3.5
Point 39	100.1	-70
Point 40	310	-70
Point 41	199	3.1
Point 42	200	12.9
Point 43	200.5	12.9
Point 44	227.5	-8
Point 45	180.3	-3
Point 46	173.675	-6
Point 47	180.3	-6
Point 48	180.3	-12
Point 49	159.94737	-12

Point 50	100	-14
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Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.11	(222.913, 10.385)	10.42381	(209.807, 2.20209)	(231.042, -3.20705)
2	2123	1.13	(222.913, 10.385)	15.193	(210.178, 2.1)	(229.84, -3.13679)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	210.1742	1.8857305	-176.10946	17.059895	7.2414956	0
2	Optimized	210.92215	1.245965	-138.9749	51.71059	21.949843	0
3	Optimized	211.5791	0.69192	-106.85604	81.888906	34.759778	0
4	Optimized	212.13115	0.23064	-80.13056	106.66144	45.275094	0
5	Optimized	212.671	-0.220415	-53.997526	128.85373	54.695164	0
6	Optimized	213.3722	-0.797296	-20.613066	155.60158	66.048951	0
7	Optimized	213.93235	-1.253821	5.7861846	176.74887	72.569355	0
8	Optimized	214.3288	-1.5466825	22.582409	200.22472	75.404687	0
9	Optimized	214.87615	-1.9322875	44.604738	219.5512	74.260367	0
10	Optimized	215.5935	-2.37494	69.551676	252.35729	77.596379	0
11	Optimized	216.3287	-2.763835	91.077871	276.20327	78.581071	0
12	Optimized	216.9116	-3.041925	106.25752	285.58604	76.120443	0

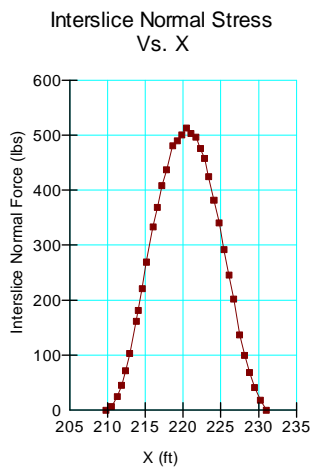
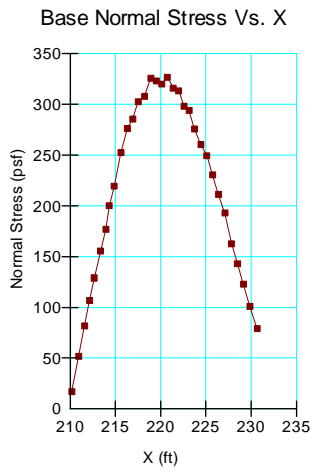
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13	Optimized	217.50155	-3.296803	119.96294	302.36328	77.424348	0
14	Optimized	218.21405	-3.573328	134.56658	308.10826	73.664076	0
15	Optimized	218.9262	-3.809975	146.674	325.80315	76.035817	0
16	Optimized	219.5224	-3.961885	153.93122	322.91002	71.727242	0
17	Optimized	220.1186	-4.113795	161.18845	320.01688	67.418668	0
18	Optimized	220.74145	-4.2364	166.51373	326.73329	68.009166	0
19	Optimized	221.39095	-4.3297	169.91228	315.97375	61.999415	0
20	Optimized	222.00435	-4.3928575	171.57214	313.42233	60.211833	0
21	Optimized	222.5817	-4.4258725	171.48049	298.20513	53.79142	0
22	Optimized	223.1246	-4.427229	169.5413	293.89332	52.784299	0
23	Optimized	223.7296	-4.3911735	165.03949	275.81045	47.019485	0
24	Optimized	224.43115	-4.3493645	159.81753	260.32955	42.664822	0
25	Optimized	225.10425	-4.28886	153.52789	249.49842	40.73707	0
26	Optimized	225.74895	-4.20966	146.18119	230.37729	35.739121	0
27	Optimized	226.39365	-4.13046	138.83603	211.24076	30.733984	0
28	Optimized	227.108	-4.008455	128.56127	192.82319	27.277564	0
29	Optimized	227.8299	-3.856695	116.39955	162.74876	19.674072	0
30	Optimized	228.4897	-3.717985	105.28464	142.7348	15.89665	0
31	Optimized	229.1495	-3.579275	94.169729	122.71491	12.11671	0

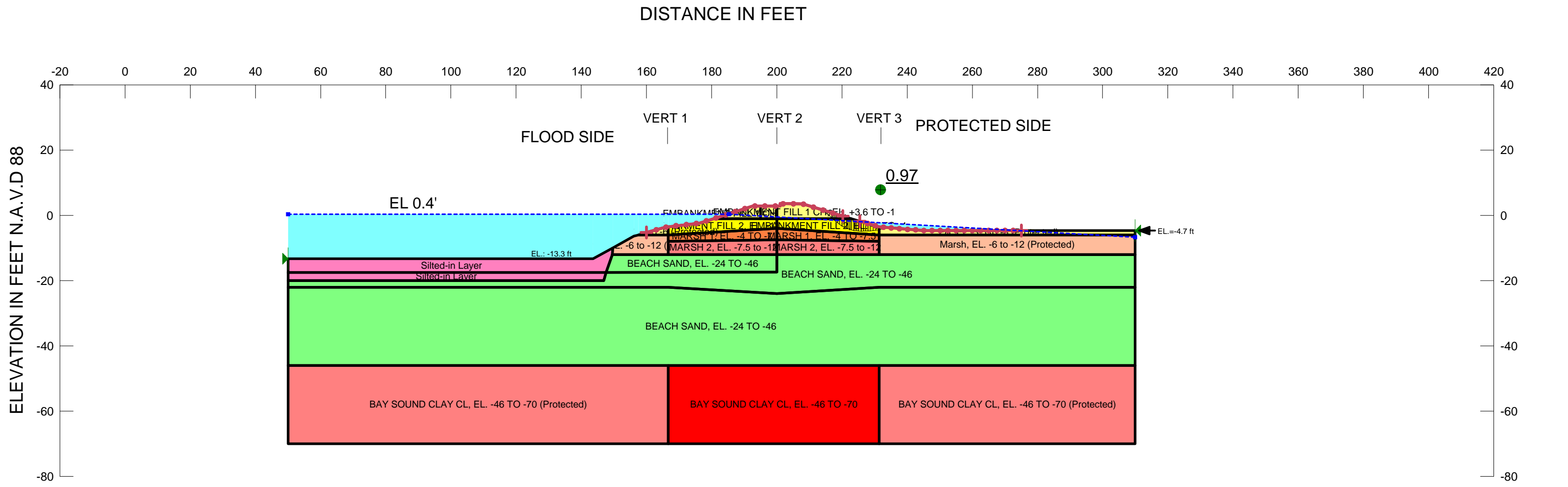
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32	Optimized	229.86995	-3.4342015	82.43205	101.01493	7.8879625	0
33	Optimized	230.65105	-3.2827645	70.070699	78.919089	3.7559186	0

Slices of Slip Surface: 2123

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	2123	210.45205	1.7061995	-165.95088	20.589661	8.7397926	0
2	2123	211.0006	0.96553855	-121.77781	62.21523	26.408798	0
3	2123	211.54915	0.30933855	-82.871869	101.65053	43.148091	0
4	2123	212.1104	-0.2903947	-47.540639	137.05332	58.175684	0
5	2123	212.68435	-0.8422392	-15.245322	168.29486	71.436928	0
6	2123	213.31625	-1.384907	16.262218	202.47439	79.042376	0
7	2123	214.0061	-1.9158625	46.82198	238.04343	81.168692	0
8	2123	214.6959	-2.387488	73.680823	268.75487	82.80402	0
9	2123	215.3857	-2.806185	97.236211	294.98484	83.939314	0
10	2123	216.0755	-3.1768805	117.79566	317.01621	84.564105	0
11	2123	216.7653	-3.503434	135.59785	335.02438	84.651542	0
12	2123	217.4551	-3.788907	150.84313	349.19847	84.196845	0
13	2123	218.10995	-4.025015	163.13266	359.32345	83.278048	0
14	2123	218.7298	-4.2171025	172.81242	365.84806	81.938769	0
15	2123	219.34965	-4.3806785	180.70671	369.44274	80.11369	0
16	2123	219.96955	-4.5166845	186.88107	370.12201	77.781164	0
17	2123	220.58945	-4.625871	191.39047	367.87465	74.913089	0
18	2123	221.2093	-4.7088215	194.25911	362.66083	71.482287	0
19	2123	221.82915	-4.7659675	195.50921	354.42682	67.456523	0
20	2123	222.44905	-4.7976005	195.1755	343.08899	62.785551	0
21	2123	223.0689	-4.803881	193.25589	328.55114	57.429427	0
22	2123	223.72225	-4.7823655	189.4777	315.85917	53.645749	0
23	2123	224.40915	-4.7300365	183.65204	304.947	51.486655	0
24	2123	225.096	-4.6461545	175.8473	290.23089	48.552953	0
25	2123	225.78285	-4.530186	166.05624	271.40867	44.719453	0
26	2123	226.4697	-4.3813735	154.20933	248.16449	39.881601	0

27	2123	227.15655	-4.198709	140.25273	220.00373	33.852293	0
28	2123	227.79245	-3.9995545	125.45416	188.25166	26.655958	0
29	2123	228.3774	-3.787566	110.0461	162.06238	22.079601	0
30	2123	228.96235	-3.5478025	92.903779	131.25393	16.278674	0
31	2123	229.5473	-3.278799	73.9375	95.12006	8.9914633	0





Name: EMBANKMENT FILL 1 CH, EL. +3.6 TO -1 Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, EL. -4 TO -7.5 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -24 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: MARSH 2, EL. -7.5 to -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 250 psf Phi: 0 ° Piezometric Line: 1

Name: EMBANKMENT FILL 2, EL. -1 TO -4 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill, EL. -3.5 to -6 (Protected) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh, EL. -6 to -12 (Protected) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -46 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



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New Orleans District

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
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BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 16 STA. 104+00 TO STA. 112+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 252
Last Edited By: Johnson, Andrew S MVN
Date: 1/25/2012
Time: 3:01:56 PM
File Name: Reach 16_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 3:03:36 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -7.5 to -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 250 psf
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. -1 TO -4

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. -3.5 to -6 (Protected)

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh, EL. -6 to -12 (Protected)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.6 TO -1

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -4 TO -7.5

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -24 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (160.0047, -5.25405) ft
Left-Zone Right Coordinate: (220.2, -0.18456) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (225.5, -1.76906) ft
Right-Zone Right Coordinate: (275, -4.7) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (50, -13.3) ft
Right Coordinate: (310, -4.7) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
50	0.4
185.4	0.4
310	-6.7

Unit Weight Functions

Marsh 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (166.7, 80)
Data Point: (200, 97)
Data Point: (231.4, 80)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	55,30,4,5,33,24,21	50.995458
Region 2	Marsh, EL. -6 to -12 (Protected)	25,3,8,58,41,42,43	87.847408
Region 3	Fill, EL. -3.5 to -6 (Protected)	36,31,32,7,9,18	110.58019
Region 4	Marsh, EL. -6 to -12 (Protected)	18,9,19,38,37	471.6
Region 5	Silted-in Layer	52,57,20,3,25,51	422.335
Region 6	EMBANKMENT FILL 2, EL. -1 TO -4	35,41,12,24,21,55,29	111.5815
Region 7	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	24,33,34,23,6,56	69.275
Region 8	EMBANKMENT FILL 2, EL. -1 TO -4	12,24,56,36,18	114.85463
Region 9	BEACH SAND, EL. -24 TO -46	10,26,44,39,40,27,11,47,17,45	6175.3
Region 10	MARSH 1, EL. -4 TO -7.5	12,13,42,41	91.575
Region 11	MARSH 2, EL. -7.5 to -12	42,43,14,54,13	141.525
Region 12	BEACH SAND, EL. -24 TO -46	25,43,14,22,51	280.301
Region 13	MARSH 1, EL. -4 TO -7.5	12,18,37,13	86.35
Region 14	MARSH 2, EL. -7.5 to -12	14,54,13,37,38	133.45
Region 15	BEACH SAND, EL. -24 TO -46	39,44,26,1,2,51,22,14,38,19,27,40	1599.169
Region	Silted-in Layer	52,51,2,1	243.15

16			
Region 17	BAY SOUND CLAY CL, EL. -46 TO -70	45,17,47,48,53,46	1552.8
Region 18	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	47,48,15,11	1886.4
Region 19	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	10,16,46,45	2800.8
Region 20	Fill, EL. -3.5 to -6 (Protected)	35,41,58,28	12.328367

Points

	X (ft)	Y (ft)
Point 1	50	-20
Point 2	146.9	-20
Point 3	149.7	-10
Point 4	195	2.8
Point 5	199	2.9
Point 6	208	3.5
Point 7	310	-4.7
Point 8	156.1	-6.4
Point 9	310	-6
Point 10	50	-46
Point 11	310	-46
Point 12	200	-4
Point 13	200	-7.5
Point 14	200	-12
Point 15	310	-70
Point 16	50	-70
Point 17	200	-46
Point 18	231.4	-6
Point 19	310	-12
Point 20	143.6	-13.3
Point 21	195	-1
Point 22	200	-17.4
Point 23	201	3.6
Point 24	200	-1

Point 25	149.5	-12
Point 26	50	-22
Point 27	310	-22
Point 28	165.3	-3.7
Point 29	176.2	-2.4
Point 30	192.6	2.8
Point 31	231.5	-3.5
Point 32	245.2	-4.7
Point 33	200	2.9
Point 34	201	2.9
Point 35	166.66154	-3.5
Point 36	231.35185	-3.5
Point 37	231.4	-8
Point 38	231.4	-12
Point 39	200	-24
Point 40	231.4	-22
Point 41	166.7	-6
Point 42	166.7	-8
Point 43	166.7	-12
Point 44	166.7	-22
Point 45	166.7	-46
Point 46	166.7	-70
Point 47	231.4	-46
Point 48	231.4	-70
Point 49	200	12.9
Point 50	200.5	12.9
Point 51	147.62	-17.5
Point 52	50	-17.5
Point 53	200	-70
Point 54	200	-11.6
Point 55	180.71818	-1
Point 56	222.9	-1
Point 57	50	-13.3
Point 58	157.46296	-6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.97	(226.426, 9.488)	10.27412	(213.739, 1.76674)	(234.296, -3.7449)
2	1908	0.98	(226.426, 9.488)	14.526	(214.212, 1.62378)	(232.715, -3.60644)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	214.0247	1.557701	-174.01631	10.573469	4.4881711	0
2	Optimized	214.59605	1.1396208	-149.96195	31.719841	13.464273	0
3	Optimized	215.1674	0.72154025	-125.90758	52.867343	22.440855	0
4	Optimized	215.80685	0.2058375	-96.001851	76.06781	32.28887	0
5	Optimized	216.5144	-0.4074875	-60.246381	108.53405	46.069969	0
6	Optimized	217.0241	-0.857075	-34.00489	129.82611	55.107912	0
7	Optimized	217.419	-1.2190685	-12.820094	145.00239	61.549864	0
8	Optimized	217.88735	-1.6483635	12.302624	162.48142	63.747116	0
9	Optimized	218.3969	-2.073075	36.993124	191.68868	65.664369	0
10	Optimized	218.95735	-2.502045	61.76714	209.66879	62.780528	0
11	Optimized	219.6543	-2.98069	89.157231	237.91408	63.143537	0
12	Optimized	220.3872	-3.4040125	112.96583	261.69325	63.131044	0
13	Optimized	221.0196	-3.7223375	130.58107	268.69923	58.627679	0

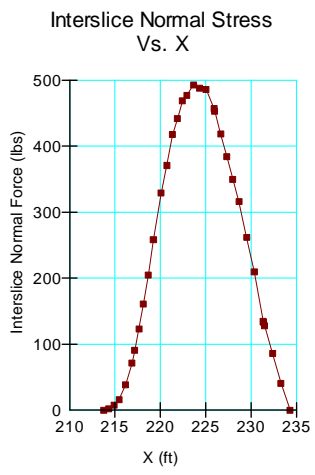
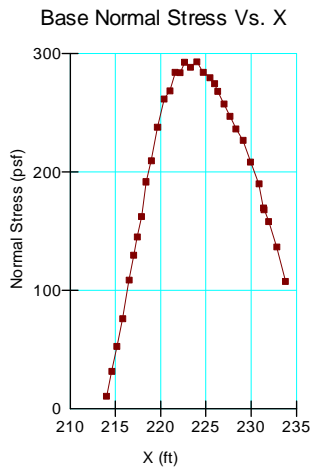
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14	Optimiz ed	221.6081 5	-3.9830075	144.75521	284.09853	59.14773	0
15	Optimiz ed	222.1528 5	-4.1860225	155.4861	283.90931	54.512415	0
16	Optimiz ed	222.6626	-4.34775	163.76535	292.47896	54.635685	0
17	Optimiz ed	223.2781 5	-4.503895	171.32246	288.56197	49.765221	0
18	Optimiz ed	223.9995	-4.650865	177.92207	293.10237	48.891135	0
19	Optimiz ed	224.6859	-4.752955	181.85604	284.09603	43.398299	0
20	Optimiz ed	225.4662	-4.819385	183.22519	279.67394	40.940066	0
21	Optimiz ed	225.9443 5	-4.833073	182.38369	274.70617	39.188566	0
22	Optimiz ed	226.3214	-4.817504	180.06516	268.06793	37.354961	0
23	Optimiz ed	226.9933 5	-4.78976	175.94607	257.52485	34.628138	0
24	Optimiz ed	227.6652 5	-4.762016	171.82698	246.98176	31.901314	0
25	Optimiz ed	228.3371 5	-4.734272	167.70789	236.43868	29.17449	0
26	Optimiz ed	229.0941	-4.6793025	161.58199	226.61192	27.603566	0
27	Optimiz ed	229.9361 5	-4.5971075	153.46212	208.48107	23.354162	0
28	Optimiz ed	230.8545 5	-4.469859	142.25512	189.8452	20.200792	0
29	Optimiz ed	231.3603 5	-4.3822385	134.98867	169.79297	14.773552	0
30	Optimiz ed	231.4344	-4.369406	133.92649	168.25872	14.573167	0
31	Optimiz ed	231.9316 5	-4.2832715	126.78672	158.16381	13.318784	0
32	Optimiz	232.8276	-4.102895	112.3459	136.75979	10.363082	0

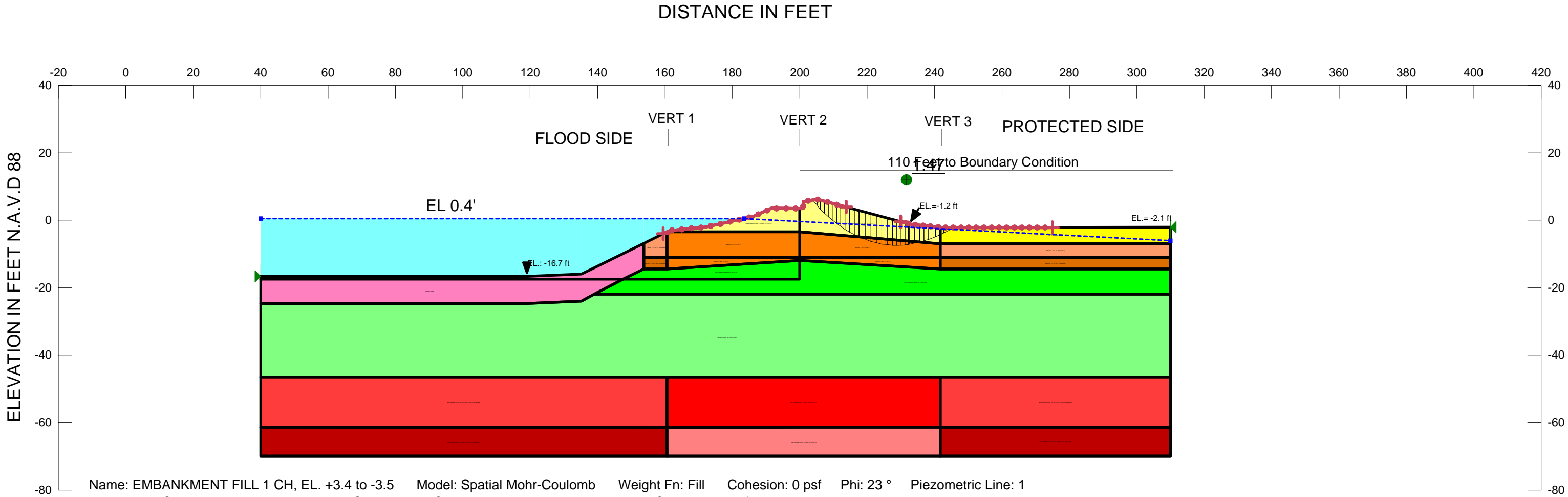
	ed						
33	Optimiz ed	233.7939 5	-3.8710955	94.44248	107.59013	5.5808468	0

Slices of Slip Surface: 1908

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	1908	214.48275	1.2326689	-155.36811	20.136649	8.5475004	0
2	1908	215.0234	0.4986394	-111.48708	60.984973	25.886585	0
3	1908	215.56405	-0.1489811	-72.998453	99.655267	42.301151	0
4	1908	216.10475	-0.72684265	-38.862439	136.00748	57.73175	0
5	1908	216.5863	-1.1945525	-11.389081	162.93049	69.159891	0
6	1908	217.10265	-1.6446385	14.860859	187.10184	73.111961	0
7	1908	217.7129	-2.1290225	42.915901	214.76959	72.947562	0
8	1908	218.32315	-2.5630305	67.827707	238.30401	72.362898	0
9	1908	218.9334	-2.9519635	89.927346	258.04823	71.363083	0
10	1908	219.54365	-3.299953	109.47288	274.23775	69.938538	0
11	1908	220.1539	-3.610275	126.66677	287.0668	68.085775	0
12	1908	220.76415	-3.88556	141.67429	296.68831	65.799547	0
13	1908	221.3744	-4.1279395	154.63407	303.19953	63.0623	0
14	1908	221.98465	-4.3391495	165.64371	306.68347	59.867827	0
15	1908	222.5949	-4.5206025	174.78701	307.1813	56.19804	0
16	1908	223.20855	-4.674145	182.18632	307.31003	53.111865	0
17	1908	223.82565	-4.800394	187.87519	307.24227	50.668316	0
18	1908	224.44275	-4.899079	191.83702	304.40281	47.781343	0
19	1908	225.05985	-4.9707655	194.11539	298.75572	44.417184	0
20	1908	225.6769	-5.015854	194.73662	290.23574	40.536968	0
21	1908	226.28355	-5.0347125	193.76286	284.03683	38.319028	0
22	1908	226.87985	-5.0283145	191.23017	280.59272	37.932154	0
23	1908	227.4761	-4.9973795	187.19303	274.74269	37.162628	0
24	1908	228.07235	-4.9417495	181.59223	266.37304	35.987319	0
25	1908	228.66865	-4.861137	174.44734	255.34133	34.337461	0
26	1908	229.2649	-4.755117	165.70827	241.44888	32.149979	0
27	1908	229.86115	-4.6231155	155.35265	224.46508	29.336487	0
28	1908	230.45745	-4.464394	143.32825	204.12168	25.805279	0

29	1908	231.05375	-4.278026	129.5779	180.01523	21.409376	0
30	1908	231.35835	-4.175462	122.09809	160.36938	16.245196	0
31	1908	231.4324	-4.148306	120.13857	157.54604	15.878526	0
32	1908	231.8038	-4.002385	109.71023	142.92142	14.097315	0
33	1908	232.4114	-3.7438595	91.41803	112.26949	8.8509207	0





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OUTFALL CANAL REEVALUATION REPORT
REACH 17 STA. 118+90 TO STA. 119+63
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 232
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Time: 3:11:01 PM
File Name: Reach 17_S-case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 1/25/2012
Last Solved Time: 3:12:56 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Fn: Clay 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILTY BEACH SAND, EL -12 TO -22

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill -2.2 to -7 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 1, -7 to -11 (Protected)

Model: Mohr-Coulomb
Unit Weight: 85 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2, -11 to -14.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.4 to -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3.5 to -11

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -22 TO -46.5

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46.5 TO -61.5

Model: Spatial Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -11 to -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion Fn: Marsh 2
Phi: 0 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -61.5 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -61.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 119 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46.5 TO -61.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (159.42992, -4.07583) ft
Left-Zone Right Coordinate: (213.8, 3.85891) ft
Left-Zone Increment: 20
Right Projection: Range

Right-Zone Left Coordinate: (229.9, -0.47345) ft
Right-Zone Right Coordinate: (274.9963, -2.15125) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (40, -16.7) ft
Right Coordinate: (310, -2.1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
40	0.4
183.5	0.4
310	-6.1

Cohesion Functions

Marsh 2

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 300
Data Points: X (ft), Cohesion (psf)
Data Point: (160.6, 300)
Data Point: (200, 320)
Data Point: (241.7, 300)

Unit Weight Functions

Marsh 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 85

Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 85)
Data Point: (200, 90)
Data Point: (241.7, 85)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 100
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 100)
Data Point: (200, 110)
Data Point: (241.7, 100)

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 116
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 116)
Data Point: (200, 90)
Data Point: (241.7, 116)

Clay 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 109)
Data Point: (200, 110)
Data Point: (241.7, 109)

Clay 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 119
Data Points: X (ft), Unit Weight (pcf)
Data Point: (160.6, 119)
Data Point: (200, 102)
Data Point: (241.7, 119)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh 1, -7 to -11 (Protected)	47,46,42,45	40.034938
Region 2	Fill -2.2 to -7 (Protected)	27,5,7,15	331.255
Region 3	Marsh 1, -7 to -11 (Protected)	15,7,43,30	273.2
Region 4	Silted-in Layer	40,17,57,2,46,47,21,39	185.47806
Region 5	EMBANKMENT FILL 1 CH, EL. +3.4 to -3.5	10,28,3,25,20,24,6,42	141.455
Region 6	BEACH SAND, EL. -22 TO -46.5	8,22,58,1,56,55,53,54,23,9,35,14,33	6360.6115
Region 7	SILTY BEACH SAND, EL -12 TO -22	21,32,11,18,39	197.27
Region 8	Silted-in Layer	40,39,56,1,58,22	719.33199
Region 9	EMBANKMENT FILL 1 CH, EL. +3.4 to -3.5	10,28,29,19,4,26,27,15	299.59
Region 10	MARSH 1, EL. -3.5 to -11	30,15,10,44	239.775
Region 11	MARSH 1, EL. -3.5 to -11	44,10,42,45	295.5
Region 12	Marsh 2, -11 to -14.5 (Protected)	31,30,43,16	239.05
Region 13	MARSH 1, EL. -11 to -12	11,32,45,44	88.65
Region 14	MARSH 1, EL. -11 to -12	44,30,31,11	93.825
Region 15	Marsh 2, -11 to -14.5 (Protected)	21,47,45,32	24.15
Region 16	BAY SOUND CLAY CL, EL. -46.5 TO -61.5 (protected)	8,33,49,48	1815.03
Region 17	BAY SOUND CLAY CL, EL. -61.5 TO -70 (protected)	48,49,34,13	1019.07
Region 18	BAY SOUND CLAY CL, EL. -46.5 TO -61.5	33,14,35,51,50,49	1218.47

Region 19	BAY SOUND CLAY CL, EL. -61.5 TO -70	49,50,51,36,41,34	687.38
Region 20	BAY SOUND CLAY CL, EL. -46.5 TO -61.5 (protected)	35,9,52,51	1024.5
Region 21	BAY SOUND CLAY CL, EL. -61.5 TO -70 (protected)	51,52,12,36	580.55
Region 22	SILTY BEACH SAND, EL -12 TO -22	56,39,18,11,31,16,23,54,53,55	1132.1815

Points

	X (ft)	Y (ft)
Point 1	135.2	-24
Point 2	135.2	-16
Point 3	199	3.4
Point 4	205.1	6.2
Point 5	310	-2.1
Point 6	161.4	-3.1
Point 7	310	-7
Point 8	40	-46.5
Point 9	310	-46.5
Point 10	200	-3.5
Point 11	200	-12
Point 12	310	-70
Point 13	40	-70
Point 14	200	-46.5
Point 15	241.7	-7
Point 16	310	-14.5
Point 17	40	-16.7
Point 18	200	-17.5
Point 19	201	5.5
Point 20	186.1	1
Point 21	153.7	-14.5
Point 22	40	-24.7
Point 23	310	-22
Point 24	171.9	-2.1
Point 25	191.6	3.5

Point 26	232.6	-1.2
Point 27	241.7	-2.2
Point 28	200	3.4
Point 29	201	3.4
Point 30	241.7	-11
Point 31	241.7	-14.5
Point 32	160.6	-14.5
Point 33	160.6	-46.5
Point 34	160.6	-70
Point 35	241.7	-46.5
Point 36	241.7	-70
Point 37	200	12.9
Point 38	200.5	12.9
Point 39	147.62	-17.5
Point 40	40	-17.5
Point 41	200	-70
Point 42	160.6	-3.5
Point 43	310	-11
Point 44	200	-11
Point 45	160.6	-11
Point 46	153.7	-6.89567
Point 47	153.7	-11
Point 48	40	-61.5
Point 49	160.6	-61.6
Point 50	200	-61.5
Point 51	241.7	-61.5
Point 52	310	-61.5
Point 53	200	-22
Point 54	241.7	-22
Point 55	160.6	-22
Point 56	139.02154	-22
Point 57	119	-16.68313
Point 58	119	-24.68313

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.47	(228.022, 23.172)	19.99344	(203.78, 5.9747)	(245.875, -2.19389)
2	1718	1.48	(228.022, 23.172)	30.853	(202.548, 5.76431)	(245.586, -2.19431)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	204.4402	5.1906325	-366.07662	64.957655	27.572889	0
2	Optimiz ed	205.5971	3.8158615	-284.00116	162.5991	69.019222	0
3	Optimiz ed	206.72485	2.6327775	-213.79089	244.53387	103.79847	0
4	Optimiz ed	207.98615	1.4480125	-143.90838	309.71247	131.46514	0
5	Optimiz ed	209.20955	0.38861882	-81.723143	385.27287	163.53863	0
6	Optimiz ed	210.39505	-0.54540368	-27.240827	434.47638	184.42428	0
7	Optimiz ed	211.558	-1.4616575	26.20435	485.98311	195.1645	0
8	Optimiz ed	212.78835	-2.32824	76.33534	563.37965	206.73804	0
9	Optimiz ed	214.1087	-3.16292	124.18257	607.85312	205.30597	0
10	Optimiz ed	215.4561	-3.927774	167.5896	671.99458	214.10721	0
11	Optimiz ed	216.83055	-4.622802	206.5523	702.18564	210.38387	0
12	Optimiz ed	217.5744	-4.998953	227.64071	718.03894	208.1617	0
13	Optimiz ed	218.49145	-5.353945	246.85281	753.56611	215.08704	0

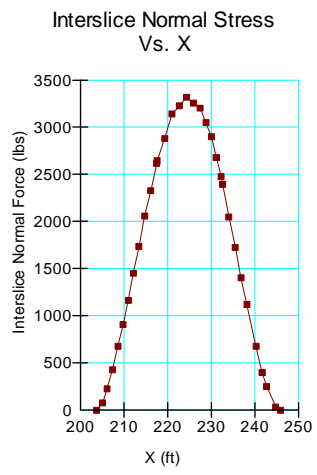
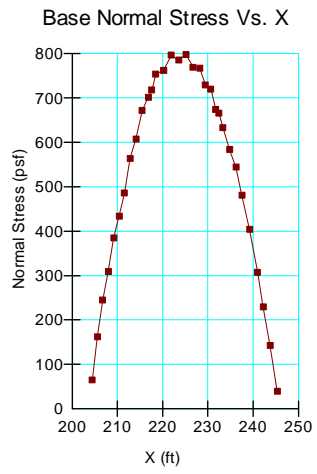
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14	Optimiz ed	220.2123	-6.006655	282.06161	762.25964	203.83197	0
15	Optimiz ed	221.89455	-6.5301725	309.33989	796.61336	206.83532	0
16	Optimiz ed	223.5383	-6.9244975	328.67252	785.25514	193.80782	0
17	Optimiz ed	225.14725	-7.2126775	341.49737	798.2703	193.8886	0
18	Optimiz ed	226.7213	-7.3947125	347.80831	769.61865	179.04787	0
19	Optimiz ed	228.1521	-7.4844875	348.82168	767.58787	177.7557	0
20	Optimiz ed	229.4397	-7.4820025	344.54237	729.6566	163.47129	0
21	Optimiz ed	230.6336	-7.410795	336.26576	720.27323	163.0015	0
22	Optimiz ed	231.73385	-7.270865	324.0125	673.70365	148.43508	0
23	Optimiz ed	232.442	-7.1658155	315.17385	665.96422	148.90168	0
24	Optimiz ed	233.3309	-6.9684475	300.01963	633.12991	141.39693	0
25	Optimiz ed	234.80105	-6.642022	274.9326	583.98088	131.18321	0
26	Optimiz ed	236.19745	-6.2853125	248.19868	543.91668	125.52485	0
27	Optimiz ed	237.51175	-5.9001775	219.94848	480.92509	110.778	0
28	Optimiz ed	239.20875	-5.32555	178.65243	403.98205	95.64675	0
29	Optimiz ed	240.9743	-4.6120165	128.47044	307.52309	76.003344	0
30	Optimiz ed	242.2072	-4.0488665	89.37495	229.32633	59.405837	0
31	Optimiz ed	243.7539	-3.2833255	36.64613	142.98435	45.137894	0
32	Optimiz ed	245.33425	-2.471674	-	39.091371	16.593303	0

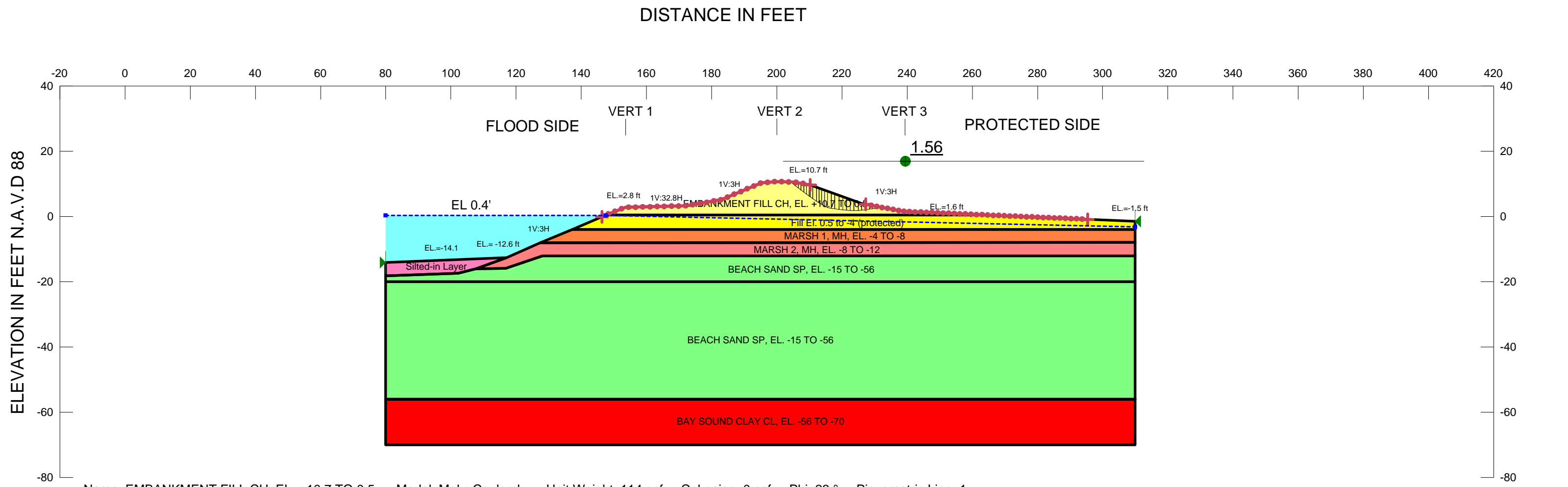
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Slices of Slip Surface: 1718

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	1718	203.1861	4.8972855	-343.75045	67.443944	28.628256	0
2	1718	204.46205	3.274845	-246.59993	204.61332	86.853201	0
3	1718	205.7028	1.887333	-163.99927	313.92216	133.25205	0
4	1718	206.9084	0.6891502	-93.09691	392.92737	166.78777	0
5	1718	208.114	-0.3863301	-29.853347	465.1372	197.43903	0
6	1718	209.4892	-1.4764763	33.762413	543.21815	216.25113	0
7	1718	211.034	-2.567016	96.859521	623.68715	223.62506	0
8	1718	212.5788	-3.5236275	151.59767	691.72917	229.27222	0
9	1718	214.1236	-4.3603565	198.85996	748.29641	233.22194	0
10	1718	215.63365	-5.073793	238.53596	789.20219	233.74395	0
11	1718	217.109	-5.6763715	271.40182	815.98057	231.15996	0
12	1718	218.58435	-6.1925	298.87866	835.02241	227.57952	0
13	1718	220.05965	-6.6266855	321.24435	846.6413	223.01777	0
14	1718	221.535	-6.982477	338.71496	851.1112	217.4993	0
15	1718	223.01035	-7.262632	351.46422	848.44723	210.95677	0
16	1718	224.48565	-7.4692305	359.62581	838.78348	203.39037	0
17	1718	225.961	-7.603757	363.29354	822.10736	194.75491	0
18	1718	227.43635	-7.667158	362.5167	798.45432	185.04454	0
19	1718	228.91165	-7.6598725	357.32942	767.57395	174.13847	0
20	1718	230.387	-7.58185	347.73476	729.34146	161.98243	0
21	1718	231.86235	-7.4325485	333.68619	683.43258	148.45853	0
22	1718	233.21825	-7.234316	316.97178	645.98853	139.65933	0
23	1718	234.4548	-6.996817	298.18023	618.64093	136.0275	0
24	1718	235.69135	-6.706275	276.08712	585.96645	131.53597	0
25	1718	236.9834	-6.3429835	249.27805	540.62671	123.67017	0
26	1718	238.331	-5.899457	217.27879	480.57031	111.76062	0
27	1718	239.6786	-5.3854785	180.88807	410.64456	97.525846	0
28	1718	241.0262	-4.7971535	139.85214	329.61206	80.548308	0
29	1718	242.4646	-4.0786395	90.405287	241.15203	63.988196	0

30	1718	243.99375	-3.2105365	31.335068	141.12612	46.603538	0
31	1718	245.172	-2.4709855	-18.591398	43.182679	18.32996	0





Name: EMBANKMENT FILL CH, EL. +10.7 TO 0.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH 1, MH, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND SP, EL. -15 TO -56 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY CL, EL. -56 TO -70 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: MARSH 2, MH, EL. -8 TO -12 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill El. 0.5 to -4 (protected) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 18A STA. 120+29 TO STA. 122+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 193
Last Edited By: Johnson, Andrew S MVN
Date: 2/7/2012
Time: 1:31:46 PM
File Name: Reach 18A_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 2/7/2012
Last Solved Time: 1:37:14 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill El. 0.5 to -4 (protected)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (146.3, -0.0625) ft
Left-Zone Right Coordinate: (210.2, 9.7) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (227.3, 3.7504) ft
Right-Zone Right Coordinate: (295.4, -0.86699) ft
Right-Zone Increment: 40
Radius Increments: 4

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +10.7 TO 0.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -15 TO -56

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -56 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (80, -14.1) ft
Right Coordinate: (310, -1.5) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
80	0.4
147.5	0.4
310	-3.2

Regions

	Material	Points	Area (ft ²)
Region 1	Fill El. 0.5 to -4 (protected)	9,10,4,5,30	708.07097
Region 2	MARSH 1, MH, EL. -4 TO -8	3,4,10,11	719.44
Region 3	BEACH SAND SP, EL. -15 TO -56	13,1,2,23,29,24,12,14	1627.215
Region 4	BEACH SAND SP, EL. -15 TO -56	15,13,14,16	8280
Region 5	BAY SOUND CLAY CL, EL. -56 TO -70	15,16,18,17	3220
Region 6	Silted-in Layer	1,20,21,23,2	126.145
Region 7	EMBANKMENT FILL CH, EL. +10.7 TO 0.5	5,6,19,25,7,22,8,26,27,28,30	474.59403
Region 8	MARSH 2, MH, EL. -8 TO -12	23,21,3,11,12,24,29	774.82

Points

	X (ft)	Y (ft)
Point 1	80	-18.2
Point 2	102.2	-17.4
Point 3	127.4	-8.1
Point 4	137.2	-4
Point 5	147.6	0.5
Point 6	153.6	2.8
Point 7	195.4	10.4
Point 8	205	10.6

Point 9	310	-1.5
Point 10	310	-4
Point 11	310	-8
Point 12	310	-12
Point 13	80	-20
Point 14	310	-20
Point 15	80	-56
Point 16	310	-56
Point 17	80	-70
Point 18	310	-70
Point 19	172.4	3.3
Point 20	80	-14.1
Point 21	117.1	-12.6
Point 22	200	10.7
Point 23	107.7	-16
Point 24	128.2	-12
Point 25	183.2	5.2
Point 26	210.2	9.7
Point 27	226	4
Point 28	238.5	1.6
Point 29	116.8	-15.9
Point 30	263.87097	0.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.56	(222.499, 21.056)	14.04858	(204.411, 10.6118)	(232.438, 2.76397)
2	5753	1.61	(222.499, 21.056)	19.717	(205.88, 10.4477)	(230.657, 3.10593)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
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1	Optimiz ed	204.70535	10.34043	699.368 96	21.147835	8.9767233	0
2	Optimiz ed	205.3485	9.748115	663.288 36	63.059306	26.767087	0
3	Optimiz ed	206.13165	9.089265	623.264 25	110.87942	47.065523	0
4	Optimiz ed	207.001	8.413475	582.296 35	155.18942	65.874	0
5	Optimiz ed	207.85045	7.76624	543.077 33	199.93719	84.868301	0
6	Optimiz ed	208.67995	7.14756	505.621 72	240.52376	102.09628	0
7	Optimiz ed	209.50945	6.52888	468.166 12	281.11033	119.32426	0
8	Optimiz ed	210.0621	6.1213505	443.511 37	312.10606	132.48116	0
9	Optimiz ed	210.62075	5.7235805	419.449 43	331.35624	140.65238	0
10	Optimiz ed	211.59015	5.065965	379.754 76	367.16979	155.85433	0
11	Optimiz ed	212.5555	4.4599925	343.275 36	399.94828	169.76797	0
12	Optimiz ed	213.3889	3.9641175	313.484 96	417.7359	177.31837	0
13	Optimiz ed	214.25725	3.473765	284.090 58	445.27423	189.0077	0

14	Optimiz ed	215.16055	2.988935	255.080 64	460.13036	195.31375	0
15	Optimiz ed	216.1451	2.650955	235.355 61	546.71879	232.06836	0
16	Optimiz ed	217.21085	2.459825	224.901 11	525.16331	222.9186	0
17	Optimiz ed	218.444	2.26348	214.356 03	507.12742	215.26282	0
18	Optimiz ed	219.7173	2.1024875	206.067 02	483.51334	205.23923	0
19	Optimiz ed	220.8633	1.9820625	200.139 72	449.49427	190.799	0
20	Optimiz ed	222.0022	1.896645	196.382 36	426.16595	180.89672	0
21	Optimiz ed	223.134	1.846235	194.802 33	383.15215	162.63844	0
22	Optimiz ed	224.38615	1.843675	196.375 69	344.67141	146.30433	0
23	Optimiz ed	225.5362	1.9155335	202.451 29	296.57977	125.89064	0
24	Optimiz ed	226.6658	2.0353985	211.487 54	241.91874	102.68841	0
25	Optimiz ed	227.87155	2.1753315	221.889 95	195.75985	83.095128	0
26	Optimiz ed	228.9515	2.313895	232.029 71	149.54311	63.477286	0

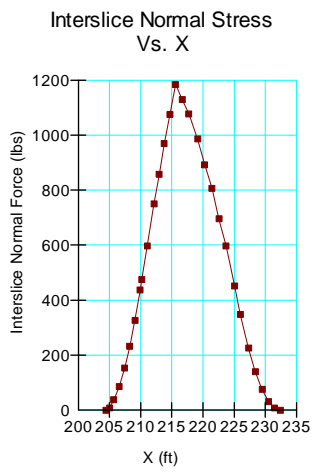
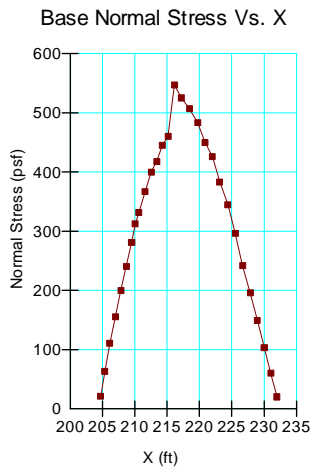
27	Optimiz ed	230.03145	2.4524585	242.160 28	103.33556	43.863342	0
28	Optimiz ed	231.03795	2.5822965	251.656 7	60.229696	25.565989	0
29	Optimiz ed	231.9711	2.7034095	260.509 32	20.076211	8.521846	0

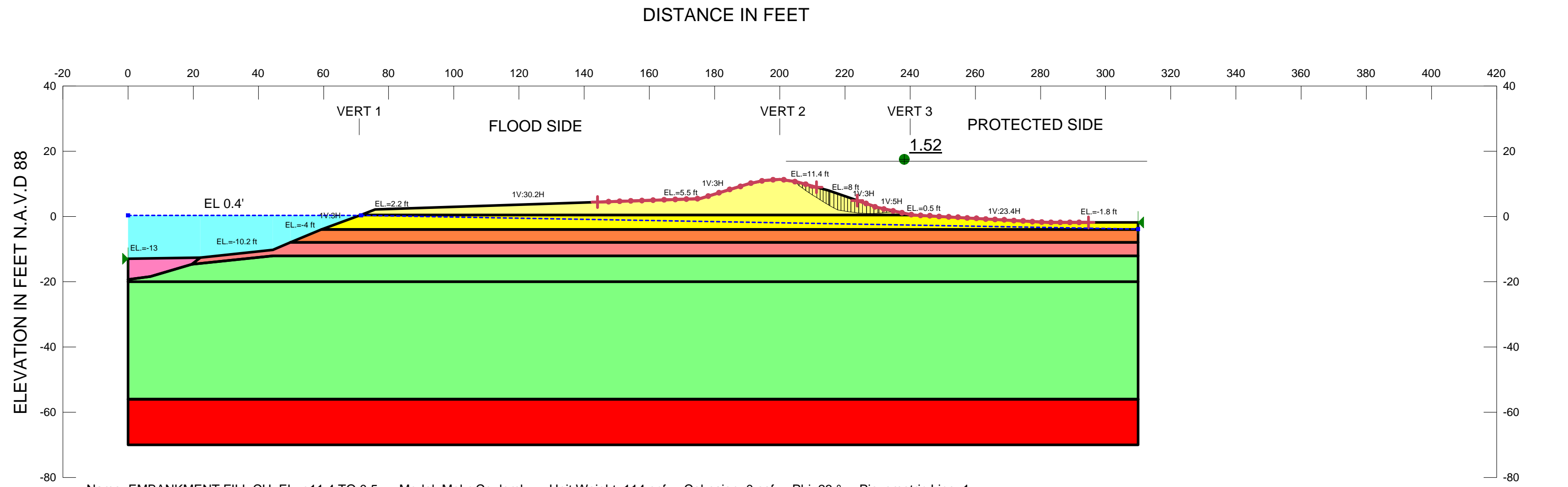
Slices of Slip Surface: **5753**

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	5753	206.3119	9.8250425	669.4543 6	36.473948	15.482272	0
2	5753	207.1759	8.6679965	598.4174	110.80349	47.033289	0
3	5753	208.03995	7.667067	537.1575 2	181.18352	76.907843	0
4	5753	208.904	6.7888465	483.5486 5	247.37555	105.00469	0
5	5753	209.768	6.0115865	436.2388 2	309.36142	131.31613	0
6	5753	210.6158	5.331762	394.9917 1	359.56218	152.62509	0
7	5753	211.4474	4.7359525	358.9685 4	397.502	168.72959	0
8	5753	212.27895	4.2022335	326.8049 5	430.90378	182.9078	0
9	5753	213.1105	3.724842	-	459.89269	195.21287	0

				298.1716 1			
10	5753	213.9421	3.2992175	- 272.7635 8	484.53749	205.67396	0
11	5753	214.7737	2.9217025	- 250.3484 1	504.88975	214.31299	0
12	5753	215.6053	2.5893375	- 230.7579 4	520.97691	221.14158	0
13	5753	216.43685	2.2997155	- 213.8360 7	532.78227	226.15265	0
14	5753	217.2684	2.050877	- 199.4658 8	540.27613	229.33361	0
15	5753	218.1	1.8412345	- 187.5283 9	543.41971	230.66798	0
16	5753	218.9316	1.669514	- 177.9681 6	542.10039	230.10796	0
17	5753	219.76315	1.5347125	- 170.7021 4	536.21001	227.60765	0
18	5753	220.5947	1.4360675	- 165.6995 1	525.58486	223.09754	0
19	5753	221.4263	1.373034	- 162.9175 5	510.05393	216.50505	0
20	5753	222.2579	1.34527	- 162.3295 8	489.34553	207.71485	0
21	5753	223.0895	1.3526265	- 163.9398 1	463.17593	196.60652	0
22	5753	223.92105	1.3951425	-	431.17241	183.02183	0

				167.7361 3			
23	5753	224.7526	1.4730475	- 173.7498 9	392.88452	166.76959	0
24	5753	225.5842	1.586767	- 181.9936 6	347.775	147.62173	0
25	5753	226.38805	1.730729	- 192.0913 2	306.24463	129.99313	0
26	5753	227.16415	1.903323	- 203.9345 5	268.93321	114.15537	0
27	5753	227.94025	2.109268	- 217.8547 5	224.6662	95.365142	0
28	5753	228.71635	2.349667	- 233.9341 2	172.52825	73.233895	0
29	5753	229.49245	2.625871	- 252.2382 3	111.34358	47.262544	0
30	5753	230.26855	2.939522	- 272.8866 8	39.596042	16.807522	0





Name: EMBANKMENT FILL CH, EL. +11.4 TO 0.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, MH, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -15 TO -56 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -56 TO -70 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
Name: MARSH 2, MH, EL. -8 TO -12 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill El. 0.5 to -4 (protected) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 18B STA. 122+00 TO STA. 125+80
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 191
Last Edited By: Johnson, Andrew S MVN
Date: 2/7/2012
Time: 1:37:27 PM
File Name: Reach 188_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 2/7/2012
Last Solved Time: 1:44:02 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill El. 0.5 to -4 (protected)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (144.1, 4.45964) ft
Left-Zone Right Coordinate: (211.2963, 9) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (223.8, 4.91126) ft
Right-Zone Right Coordinate: (294.7, -1.8) ft
Right-Zone Increment: 25
Radius Increments: 4

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +11.4 TO 0.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -15 TO -56

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -56 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (0, -13) ft
Right Coordinate: (310, -1.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates		
	X (ft)	Y (ft)
	0	0.4
	71.5	0.4
	310	-3.8

Regions

	Material	Points	Area (ft²)
Region 1	Fill El. 0.5 to -4 (protected)	9,10,3,26,25,29	989.035
Region 2	MARSH 1, MH, EL. -4 TO -8	28,3,10,11	1021.6
Region 3	BEACH SAND SP, EL. -15 TO -56	13,1,2,27,32,12,14	2341.2
Region 4	BEACH SAND SP, EL. -15 TO -56	15,13,14,16,30	11160
Region 5	BAY SOUND CLAY CL, EL. -56 TO -70	15,30,16,18,31,17	4340
Region 6	Silted-in Layer	1,20,23,27,2	91.58
Region 7	EMBANKMENT FILL CH, EL. +11.4 TO 0.5	26,4,5,19,6,21,7,8,24,25	771.43
Region 8	MARSH 2, MH, EL. -8 TO -12	27,23,22,28,11,12,32	1099.01

Points

	X (ft)	Y (ft)
Point 1	0	-19.3
Point 2	6.9	-18.4
Point 3	59.4	-4
Point 4	75.9	2.2
Point 5	175.5	5.5
Point 6	195	11
Point 7	205	10.7
Point 8	215	8

Point 9	310	-1.8
Point 10	310	-4
Point 11	310	-8
Point 12	310	-12
Point 13	0	-20
Point 14	310	-20
Point 15	0	-56
Point 16	310	-56
Point 17	0	-70
Point 18	310	-70
Point 19	190.3	10
Point 20	0	-13
Point 21	200	11.4
Point 22	44.5	-10.2
Point 23	22.2	-12.6
Point 24	230.1	2.7
Point 25	240.7	0.5
Point 26	71.4	0.5
Point 27	19.6	-14.7
Point 28	49.8	-8
Point 29	282.2	-1.8
Point 30	281.4	-56
Point 31	281.1	-70
Point 32	44.6	-12

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.52	(224.464, 20.265)	15.56192	(204.677, 10.7453)	(235.394, 1.60134)
2	2488	1.60	(224.464, 20.265)	19.46	(208, 9.88988)	(231.971, 2.31162)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal	Frictional Strength	Cohesive
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	ed			320.76869			
14	Optimized	217.14895	2.359485	282.3178	452.70164	192.16044	0
15	Optimized	218.25055	1.947875	257.84595	548.51004	232.8287	0
16	Optimized	219.2916	1.761325	247.35096	528.53173	224.34841	0
17	Optimized	220.31135	1.5903925	237.80377	514.43003	218.36259	0
18	Optimized	221.30985	1.4350775	229.21394	492.34189	208.98673	0
19	Optimized	222.40625	1.28978	221.34551	476.61042	202.30912	0
20	Optimized	223.6006	1.1545	214.21553	443.68939	188.33497	0
21	Optimized	224.78905	1.0513275	209.08585	420.22297	178.37407	0
22	Optimized	225.97155	0.9802625	205.95408	379.07099	160.90609	0
23	Optimized	227.15155	0.936825	204.5421	344.3172	146.15398	0
24	Optimized	228.32905	0.921015	204.8478	295.40441	125.39173	0
25	Optimized	229.5089	0.96089	208.63404	254.24586	107.92097	0
26	Optimiz	230.3049	1.02523	-	213.19119	90.494292	0

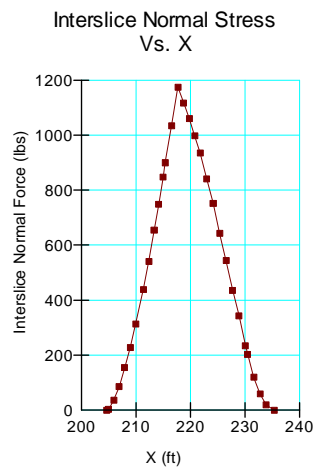
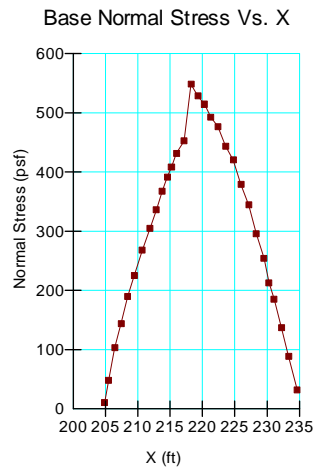
					Stress (psf)	(psf)	Strengt h (psf)
1	Optimiz ed	204.83825	10.5828	781.92997	10.694918	4.5397233	0
2	Optimiz ed	205.4784	9.939715	742.48355	48.266592	20.487953	0
3	Optimiz ed	206.4488	9.083325	690.13225	103.22625	43.816945	0
4	Optimiz ed	207.43275	8.331735	644.31404	144.15816	61.191508	0
5	Optimiz ed	208.4405	7.619295	600.96745	190.14577	80.71209	0
6	Optimiz ed	209.47215	6.946005	560.08741	225.02693	95.518265	0
7	Optimiz ed	210.67985	6.182115	513.74677	267.86428	113.70164	0
8	Optimiz ed	211.8707	5.4465925	469.16014	304.97583	129.45456	0
9	Optimiz ed	212.86865	4.8300375	431.77771	336.13496	142.68082	0
10	Optimiz ed	213.7757	4.2800335	398.45988	367.72155	156.08854	0
11	Optimiz ed	214.5919	3.7965805	369.18678	391.59751	166.22328	0
12	Optimiz ed	215.2029	3.434672	347.26794	407.99053	173.18171	0
13	Optimiz	215.98685	2.996155	-	431.51026	183.16524	0

Slices of Slip Surface: 2488

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	2488	208.3893	9.3188245	706.95974	30.471654	12.93445	0
2	2488	209.16705	8.2525705	641.28241	92.268622	39.165706	0
3	2488	209.94475	7.3211815	584.01855	150.44536	63.860265	0
4	2488	210.72245	6.496873	533.42968	204.82993	86.945149	0
5	2488	211.5002	5.7611865	488.38195	255.40735	108.41399	0
6	2488	212.27795	5.1011135	448.04181	302.23253	128.2901	0
7	2488	213.05565	4.5070875	-	345.3826	146.60622	0

				411.8303 7			
8	2488	213.8334	3.9718455	- 379.2904 5	384.92241	163.38987	0
9	2488	214.61115	3.489735	- 350.0619 3	420.93023	178.67428	0
10	2488	215.39735	3.0520365	- 323.6098 6	450.74708	191.33078	0
11	2488	216.1921	2.65607	- 299.7766 5	474.09401	201.24097	0
12	2488	216.98685	2.3039865	- 278.6781 2	493.54719	209.49835	0
13	2488	217.78155	1.993243	- 260.1580 7	509.11333	216.10579	0
14	2488	218.5763	1.721755	- 244.0897 6	520.78799	221.06138	0
15	2488	219.37105	1.487816	- 230.3725 8	528.50894	224.33874	0
16	2488	220.1658	1.2900345	- 218.9062 7	532.24486	225.92454	0
17	2488	220.96055	1.1272865	- 209.6188 5	531.89422	225.7757	0
18	2488	221.75525	0.9986831	- 202.4666 8	527.34291	223.84378	0
19	2488	222.55	0.90354285	- 197.4055 7	518.451	220.06939	0
20	2488	223.34475	0.84137275	-	505.04073	214.37707	0

				194.3962 1			
21	2488	224.13945	0.81185625	- 193.4334	486.88603	206.67086	0
22	2488	224.9342	0.81484445	- 194.4855	463.71602	196.83577	0
23	2488	225.72895	0.8503524	- 197.5835 2	435.22115	184.74042	0
24	2488	226.5237	0.9185595	- 202.7077 6	400.97374	170.20325	0
25	2488	227.31845	1.0198138	- 209.8993 7	360.49072	153.01923	0
26	2488	228.11315	1.154642	- 219.1821 9	313.18803	132.94043	0
27	2488	228.9079	1.323762	- 230.6081 8	258.30566	109.64425	0
28	2488	229.70265	1.528104	- 244.2383 4	194.89384	82.727526	0
29	2488	230.5678	1.7938115	- 261.7691 1	124.84139	52.992024	0
30	2488	231.50345	2.130016	- 283.7793 8	44.953157	19.081483	0



PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 176
Last Edited By: Johnson, Andrew S MVN
Date: 2/7/2012
Time: 1:55:23 PM
File Name: Reach 19_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. West Side SlopeW S-Case Analysis\
Last Solved Date: 2/7/2012
Last Solved Time: 2:01:20 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +11.6 TO +3.1

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 1 CH/CL, EL. +3.1 TO -3

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -16 TO -50

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, CL , EL. -58 TO -70

Model: Mohr-Coulomb

Unit Weight: 121 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, CL, EL. -50 TO -58

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (protected) EL 3.1 to -3

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -7 TO -16

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 2 CH/CL, EL. -3 TO -7

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill (protected) CH/CL, EL. -3 to -7

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -7 TO -16 (protected)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (147.5, 1.8) ft
Left-Zone Right Coordinate: (208.16824, 10.4) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (219.12824, 7) ft
Right-Zone Right Coordinate: (275.5, 0.78625) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (60, -11.7) ft
Right Coordinate: (310, 0.7) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	60	0.4
	143	0.4
	310	-1.3

Regions

	Material	Points	Area (ft²)
--	----------	--------	------------

Region 1	EMBANKMENT FILL CH, EL. +11.6 TO +3.1	2,25,22,3,18,4,5,19	317.66
Region 2	Fill (protected) EL 3.1 to -3	24,6,8,7,5	339.585
Region 3	Spoil Fill (protected) CH/CL, EL. -3 to -7	7,8,9,30	313.2
Region 4	MARSH, MH, EL. -7 TO -16	29,20,30,27,28	573.3
Region 5	BEACH SAND SP, EL. -16 TO -50	35,28,27,10,12,11	8500
Region 6	BAY SOUND CLAY 1, CL, EL. -50 TO -58	11,12,14,13	2000
Region 7	BAY SOUND CLAY 2, CL, EL. -58 TO -70	13,14,16,15	3000
Region 8	Spoil Fill 1 CH/CL, EL. +3.1 TO -3	5,7,23,31,32,17,26,2,19	545.32414
Region 9	Spoil Fill 2 CH/CL, EL. -3 TO -7	33,29,20,30,7,23,31,32	464.2438
Region 10	MARSH, MH, EL. -7 TO -16 (protected)	27,30,9,10	704.7
Region 11	MARSH, MH, EL. -7 TO -16 (protected)	35,34,1,33,29,28	820.79205

Points

	X (ft)	Y (ft)
Point 1	80	-11.7
Point 2	165.6	3.1
Point 3	195	11.6
Point 4	204.3	11.6
Point 5	231.7	3.1
Point 6	310	0.7
Point 7	231.7	-3
Point 8	310	-3
Point 9	310	-7
Point 10	310	-16
Point 11	60	-50
Point 12	310	-50
Point 13	60	-58
Point 14	310	-58
Point 15	60	-70
Point 16	310	-70
Point 17	137.1	-1.2
Point 18	200	11.6
Point 19	200	3.1
Point 20	200	-7
Point 21	200	-16

Point 22	189	10
Point 23	200	-3
Point 24	270	0.8
Point 25	168	3.4
Point 26	147.5	1.8
Point 27	231.7	-16
Point 28	168	-16
Point 29	168	-7
Point 30	231.7	-7
Point 31	168	-3
Point 32	126.93429	-3
Point 33	104.34381	-7
Point 34	60	-11.7
Point 35	60	-16

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.60	(222.128, 22.029)	15.10394	(202.47, 11.6)	(232.919, 3.02679)
2	2018	1.70	(222.128, 22.029)	20.03	(205.201, 11.3205)	(230.022, 3.62041)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	202.9275	11.15924	709,441.96	35.030168	14.869424	0
2	Optimized	203.8425	10.277725	655,017.23	105.08736	44.606936	0
3	Optimized	204.44515	9.697125	619,182.99	147.65534	62.675971	0

4	Optimized	205.0722	9.179585	587,273.62	185.80339	78.86886	0
5	Optimized	206.03605	8.424195	540,751.31	224.68222	95.371942	0
6	Optimized	206.9459	7.7694635	500,470.83	271.20689	115.12049	0
7	Optimized	207.80165	7.21539	466,443.68	297.21034	126.15831	0
8	Optimized	208.6574	6.6613165	432,416.53	323.2236	137.20028	0
9	Optimized	209.5694	6.107005	398,402.59	359.02298	152.39622	0
10	Optimized	210.53765	5.552455	364,418.19	382.67405	162.4355	0
11	Optimized	211.5558	4.983005	329,529.52	410.8708	174.40431	0
12	Optimized	212.59285	4.425655	295,410.14	436.89892	185.45259	0
13	Optimized	213.8291	3.7875	256,370.2	464.89095	197.3345	0
14	Optimized	215.0439	3.33589	228,959.8	558.79265	237.19341	0
15	Optimized	216.0071	3.17863	219,758.78	542.74722	230.38253	0
16	Optimized	216.5594	3.088455	214,487.09	533.55199	226.47938	0

17	Optimized	217.14445	3.0016225	209,438.74	527.56477	223.93796	0
18	Optimized	218.1731	2.8510475	200,694.89	508.29752	215.7595	0
19	Optimized	219.23545	2.70683	192,370.54	492.54497	209.07294	0
20	Optimized	220.3315	2.56897	184,467.87	469.17192	199.15167	0
21	Optimized	221.38085	2.44835	177,605.6	451.03272	191.45203	0
22	Optimized	222.38355	2.34497	171,792.23	426.71772	181.13093	0
23	Optimized	223.4027	2.2619	167,256.74	408.98475	173.60373	0
24	Optimized	224.43825	2.19914	163,998.74	378.00485	160.45354	0
25	Optimized	225.4738	2.13638	160,740.74	347.02496	147.30335	0
26	Optimized	226.48555	2.1095115	159,706.82	325.39543	138.12216	0
27	Optimized	227.4735	2.118535	160,891.03	286.033	121.4138	0
28	Optimized	228.46145	2.1275585	162,085.36	246.66044	104.70115	0
29	Optimized	229.44985	2.1923625	166,760.31	214.49359	91.047128	0

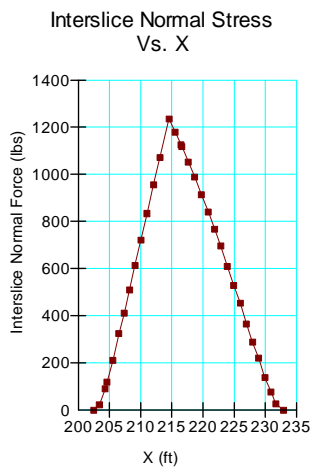
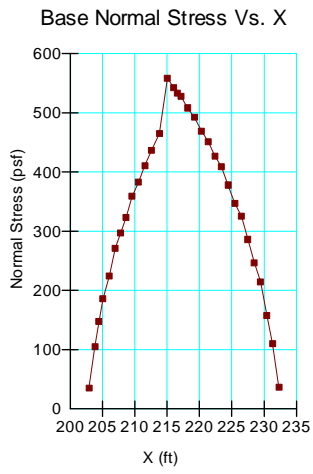
30	Optimize d	230.4387	2.3129475	174.911 61	157.41442	66.818459	0
31	Optimize d	231.31655	2.499431	187.103 3	110.45362	46.88478	0
32	Optimize d	232.3095	2.8262085	208.129 6	36.410602	15.455384	0

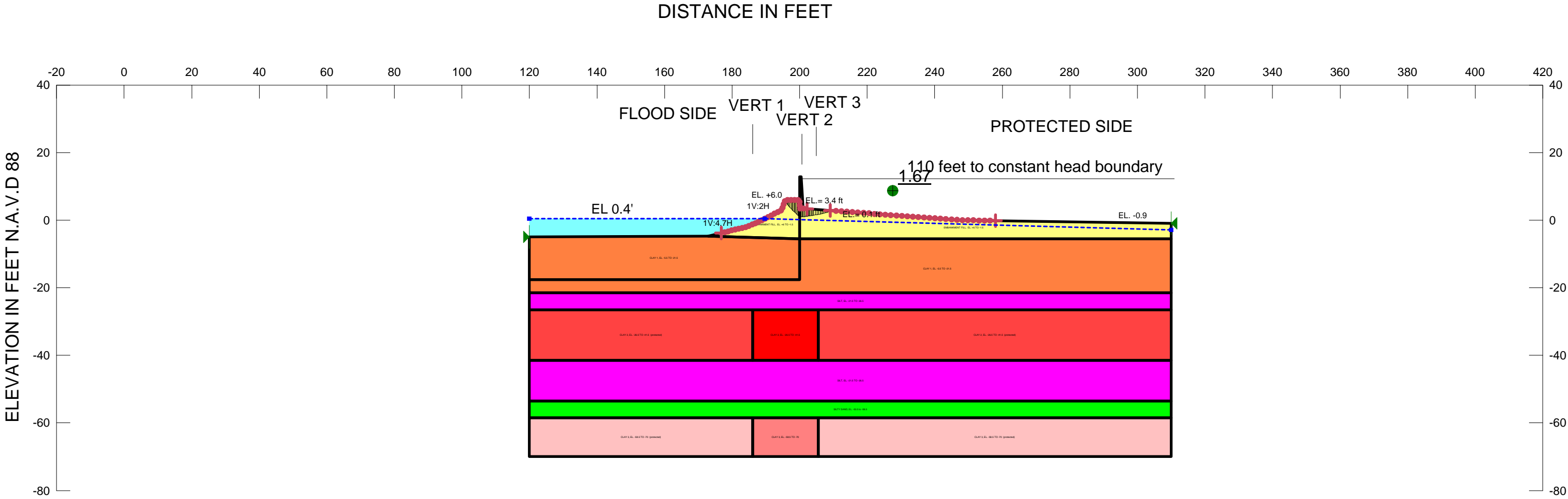
Slices of Slip Surface: 2018

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	2018	205.6	10.73634	684.7505 8	31.061361	13.184765	0
2	2018	206.39825	9.6451465	617.1717 4	93.621466	39.739955	0
3	2018	207.19655	8.691309	558.1532	151.91407	64.483698	0
4	2018	207.99485	7.8466995	505.9618 4	205.83814	87.373108	0
5	2018	208.79315	7.092585	459.4058 9	255.45184	108.43287	0
6	2018	209.59145	6.415743	417.6865 8	300.85506	127.7054	0
7	2018	210.38975	5.806436	380.1685 6	342.1517	145.23478	0
8	2018	211.18805	5.257264	346.4041 7	379.454	161.06867	0
9	2018	211.98635	4.762463	-	412.85027	175.24454	0

				316.0375 2			
10	2018	212.7846	4.317458	288.7791	442.39797	187.7868	0
11	2018	213.58285	3.918566	264.3967 8	468.16063	198.7224	0
12	2018	214.38115	3.5627895	242.6965 5	490.16386	208.06221	0
13	2018	215.17945	3.2476715	223.5388 9	508.4285	215.81509	0
14	2018	215.98795	2.9681435	206.6188	523.07542	222.03234	0
15	2018	216.8066	2.7234595	191.8651 7	533.99115	226.6658	0
16	2018	217.62525	2.516177	179.4511 2	540.88854	229.59356	0
17	2018	218.44395	2.3451125	169.2931 9	543.69529	230.78496	0
18	2018	219.2626	2.2093255	161.3451 3	542.3184	230.2005	0
19	2018	220.08125	2.1080935	155.5465 3	536.6179	227.78078	0
20	2018	220.8999	2.040891	151.8769 6	526.44259	223.46162	0
21	2018	221.71855	2.0073745	150.2996 5	511.59525	217.1593	0
22	2018	222.53725	2.0073745	150.8247 9	491.82316	208.76655	0

23	2018	223.3559	2.040891	153.4375 5	466.84761	198.16506	0
24	2018	224.17455	2.1080935	158.1468 7	436.31037	185.20277	0
25	2018	224.9932	2.2093255	164.9840 4	399.76019	169.68814	0
26	2018	225.81185	2.3451125	173.9757 7	356.68035	151.40182	0
27	2018	226.63055	2.516177	185.1761 3	306.40115	130.05957	0
28	2018	227.4492	2.7234595	198.6245 5	248.09521	105.31017	0
29	2018	228.26785	2.9681435	214.4203 4	180.73768	76.718592	0
30	2018	229.0135	3.2231405	230.7972 8	110.64644	46.966627	0
31	2018	229.6861	3.483347	247.4714 2	38.747347	16.447273	0





Name: EMBANKMENT FILL, EL. +6 TO -1.5 Model: Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 1, EL. -5.5 TO -21.5 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: SILT, EL. -21.5 TO -26.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: CLAY 2, EL. -26.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: SILTY SAND, EL. -53.5 to -58.5 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: CLAY 3, EL. -58.5 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 2, EL. -26.5 TO -41.5 (protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 3, EL. -58.5 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 20 STA. 1+57 TO STA. 6+30
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 290
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 9:09:09 AM
File Name: Reach 20_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 9:09:38 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILTY SAND, EL. -53.5 to -58.5

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (176.8, -3.77818) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +6 TO -1.5

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -21.5 TO -26.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (202.2, 3.34) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (209.1, 2.84662) ft
Right-Zone Right Coordinate: (258, -0.1524) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -5) ft
Right Coordinate: (310, -0.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
189.6	0.4
310	-2.9

Regions

	Material	Points	Area (ft²)
Region 1	CLAY 3, EL. -58.5 TO -70	40,11,12,41	223.1
Region 2	EMBANKMENT FILL, EL. +6 TO -1.5	2,3,4,9,24,10,19,21,27	134.177
Region 3	EMBANKMENT FILL, EL. +6 TO -1.5	10,24,17,18,22,23,5	660.19
Region 4		17,24,9,25,26	7.125
Region 5	SILTY SAND, EL. -53.5 to -58.5	7,32,33,8,11,40	950
Region 6	SILT, EL. -21.5 TO -26.5	32,31,37,39,30,33	2280
Region 7	CLAY 2, EL. -26.5 TO -41.5	36,38,39,37	291
Region 8	CLAY 1, EL. -5.5 TO -21.5	16,35,34,42,10,5,6,15	2072
Region 9	SILT, EL. -21.5 TO -26.5	16,28,36,38,29,6,15	950
Region 10	CLAY 1, EL. -5.5 TO -21.5	35,34,42,10,19,20	1013.225
Region 11	CLAY 2, EL. -26.5 TO -41.5 (protected)	38,29,30,39	1567.5
Region 12	CLAY 2, EL. -26.5 TO -41.5 (protected)	37,31,28,36	991.5
Region 13	CLAY 3, EL. -58.5 TO -70 (protected)	14,41,40,7	760.15

Region 14	CLAY 3, EL. -58.5 TO -70 (protected)	12,11,8,13	1201.75
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Points

	X (ft)	Y (ft)
Point 1	205.5	0.1
Point 2	186.8	-1
Point 3	194.8	3
Point 4	195.7	6
Point 5	310	-5.5
Point 6	310	-21.5
Point 7	120	-58.5
Point 8	310	-58.5
Point 9	200	6
Point 10	200	-5.5
Point 11	205.5	-58.5
Point 12	205.5	-70
Point 13	310	-70
Point 14	120	-70
Point 15	200	-21.5
Point 16	120	-21.5
Point 17	201	3.4
Point 18	203	3.3
Point 19	172.9	-4.7
Point 20	120	-5
Point 21	183.9	-2.1
Point 22	247.4	0
Point 23	310	-0.9
Point 24	200	3.4
Point 25	200	12.9
Point 26	200.5	12.9
Point 27	185.46	-1.5
Point 28	120	-26.5
Point 29	310	-26.5
Point 30	310	-41.5
Point 31	120	-41.5

Point 32	120	-53.5
Point 33	310	-53.5
Point 34	200	-17.6
Point 35	120	-17.6
Point 36	186.1	-26.5
Point 37	186.1	-41.5
Point 38	205.5	-26.5
Point 39	205.5	-41.5
Point 40	186.1	-58.5
Point 41	186.1	-70
Point 42	200	-13.1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.67	(202.948, 9.546)	6.749751	(195.623, 5.74246)	(209.393, 2.82483)
2	19237	2.25	(202.948, 9.546)	9.096	(195.291, 4.63649)	(209.1, 2.84662)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	195.66135	5.6848755	340.14071	13.136917	5.5762902	0
2	Optimized	195.8769	5.363634	320.46785	44.860774	19.042269	0
3	Optimized	196.2307	4.8363115	288.1691	82.035045	34.821811	0
4	Optimized	196.59	4.3645525	259.3513	127.84895	54.268661	0

5	Optimized	196.9548	3.9483575	234.00158	160.38441	68.079141	0
6	Optimized	197.33515	3.53284	208.71933	198.60426	84.302506	0
7	Optimized	197.731	3.118	183.50141	232.00145	98.478771	0
8	Optimized	198.12905	2.72122	159.43072	272.85872	115.82166	0
9	Optimized	198.52935	2.3425	136.4838	304.38011	129.20169	0
10	Optimized	198.938	1.95135	112.77495	334.51819	141.99455	0
11	Optimized	199.355	1.54777	88.304736	367.86316	156.14865	0
12	Optimized	199.7787	1.162555	64.99232	415.53076	176.38234	0
13	Optimized	199.99695	0.97926575	53.927751	622.4614	264.21919	0
14	Optimized	200.25	0.99060275	55.068755	298.72032	126.79925	0
15	Optimized	200.6185	1.007112	56.72725	296.668	125.92809	0
16	Optimized	200.8685	1.0205015	57.993649	297.4546	126.26199	0
17	Optimized	201.21105	1.0415515	59.891312	293.50975	124.5875	0

18	Optimized	201.6289	1.0830425	63.194672	297.02885	126.08127	0
19	Optimized	202.04255	1.1400875	67.462576	286.92192	121.79113	0
20	Optimized	202.43705	1.194963	71.561495	277.59697	117.83292	0
21	Optimized	202.81235	1.247669	75.492866	268.28305	113.8794	0
22	Optimized	203.195	1.3014035	79.499286	258.18349	109.59239	0
23	Optimized	203.58495	1.356166	83.582684	247.29443	104.97026	0
24	Optimized	203.9749	1.4109285	87.666082	236.39775	100.34489	0
25	Optimized	204.41845	1.486095	93.115398	228.46745	96.978678	0
26	Optimized	204.9156	1.581665	99.93031	210.74868	89.457506	0
27	Optimized	205.41275	1.677235	106.74325	193.02398	81.933818	0
28	Optimized	205.90935	1.778505	113.9123	176.74789	75.02503	0
29	Optimized	206.39755	1.891775	121.81618	159.3671	67.64732	0
30	Optimized	206.8778	2.011345	130.09864	137.95677	58.559176	0

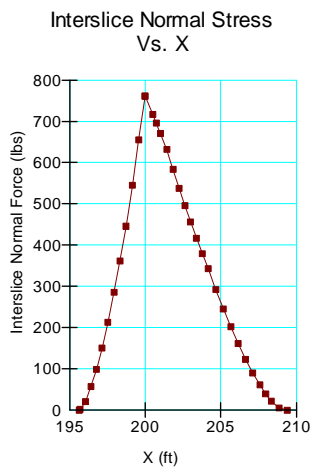
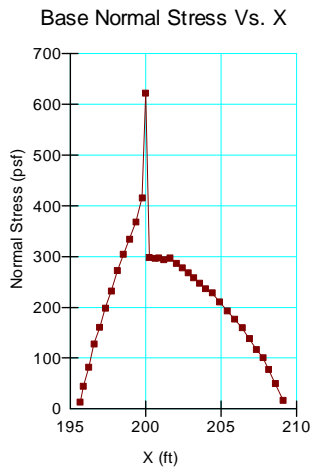
31	Optimized	207.35805	2.130915	138.3811	116.54645	49.471032	0
32	Optimized	207.7819	2.2557325	146.89499	100.81391	42.792966	0
33	Optimized	208.1493	2.3857975	155.63911	77.781068	33.016104	0
34	Optimized	208.59805	2.54433	166.29904	49.663252	21.0808	0
35	Optimized	209.12815	2.7313305	178.87452	16.554476	7.0269584	0

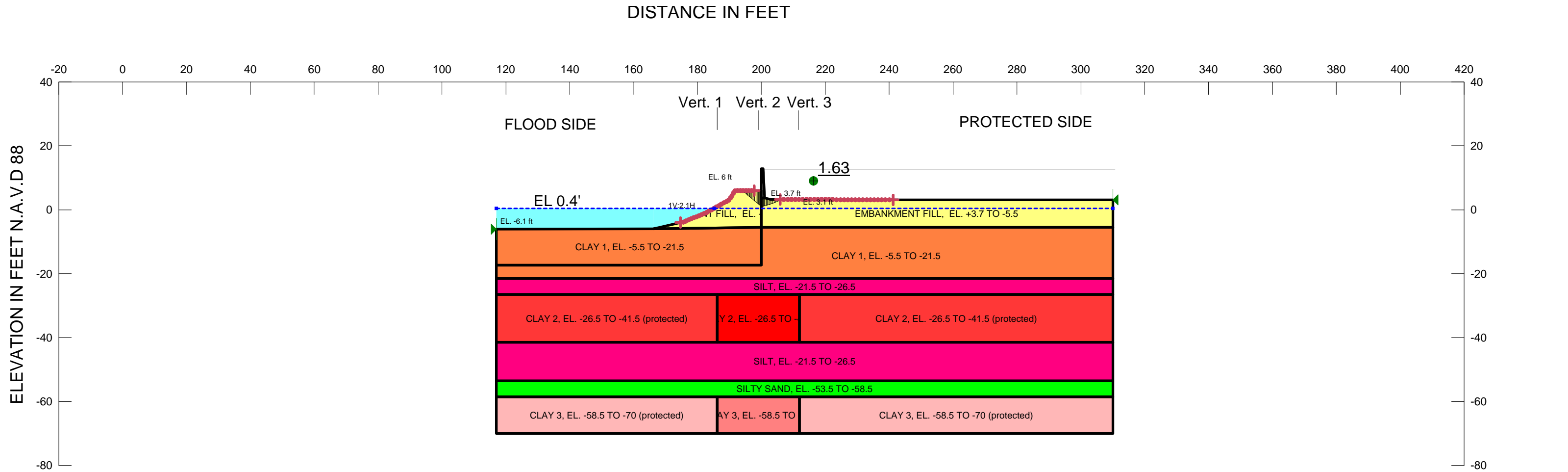
Slices of Slip Surface: 19237

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	19237	195.49545	4.343518	256.15901	76.688173	32.552198	0
2	19237	195.9389	3.761121	220.58053	185.75342	78.84765	0
3	19237	196.4167	3.224872	187.93635	240.86305	102.2403	0
4	19237	196.89445	2.7648075	160.04602	291.39305	123.68901	0
5	19237	197.3722	2.366057	135.97466	337.83303	143.40162	0
6	19237	197.85	2.0187665	115.12143	380.58403	161.54834	0

7	19237	198.3278	1.7160295	97.048123	419.94039	178.25412	0
8	19237	198.80555	1.4528105	81.439188	456.17869	193.63637	0
9	19237	199.2833	1.225337	68.063188	489.4466	207.75775	0
10	19237	199.7611	1.0307308	56.735662	519.89884	220.68397	0
11	19237	200.25	0.8636513	47.146496	270.71275	114.91075	0
12	19237	200.75	0.7236916	39.267864	291.37477	123.68125	0
13	19237	201.25	0.6138923	33.272267	307.86769	130.68208	0
14	19237	201.75	0.53314725	29.088239	320.10544	135.8767	0
15	19237	202.25	0.4806776	26.669102	329.42543	139.8328	0
16	19237	202.75	0.45599215	25.983847	335.76049	142.52187	0
17	19237	203.2346	0.4579543	26.934955	338.32179	143.60908	0
18	19237	203.70385	0.48493215	29.420566	337.1695	143.11996	0
19	19237	204.1731	0.53641215	33.436828	332.99567	141.34828	0

20	19237	204.6423	0.61281905	39.007766	325.63005	138.22176	0
21	19237	205.11155	0.7148017	46.173893	314.83611	133.64	0
22	19237	205.5808	0.843262	54.992072	300.34618	127.48939	0
23	19237	206.05	0.9993976	65.537035	281.74014	119.59159	0
24	19237	206.5192	1.184765	77.906262	258.54429	109.74554	0
25	19237	206.98845	1.401368	92.224184	230.06886	97.658437	0
26	19237	207.4577	1.6517895	108.6545	195.37344	82.931103	0
27	19237	207.9269	1.9393885	127.40243	153.18105	65.021497	0
28	19237	208.39615	2.2686015	148.74852	101.48133	43.076267	0
29	19237	208.8654	2.6454335	173.0705	37.139461	15.764766	0





Name: EMBANKMENT FILL, EL. +3.7 TO -5.5 Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 1, EL. -5.5 TO -21.5 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: SILT, EL. -21.5 TO -26.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: CLAY 2, EL. -26.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: SILTY SAND, EL. -53.5 TO -58.5 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: CLAY 3, EL. -58.5 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 2, EL. -26.5 TO -41.5 (protected) Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 3, EL. -58.5 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
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New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 21 STA. 6+30 TO STA. 10+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 215
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 9:35:59 AM
File Name: Reach 21_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 9:37:08 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.7 TO -5.5

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 1, EL. -5.5 TO -21.5

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILT, EL. -21.5 TO -26.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5

Model: Mohr-Coulomb

Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

SILTY SAND, EL. -53.5 TO -58.5

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -26.5 TO -41.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 3, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (174.7, -4.03158) ft

Left-Zone Right Coordinate: (197.8, 6) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (205.9, 3.19216) ft
Right-Zone Right Coordinate: (241.21199, 3.1) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (117, -6.1) ft
Right Coordinate: (310, 3.1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	117	0.4
	185.2	0.4
	310	0.4

Regions

	Material	Points	Area (ft²)
Region 1	CLAY 3, EL. -58.5 TO -70	45,12,42,43,13,44	295.55
Region 2	EMBANKMENT FILL, EL. +3.7 TO -5.5	2,3,4,9,25,10,11,21,22,23	196.39
Region 3	EMBANKMENT FILL, EL. +3.7 TO -5.5	10,25,18,1,19,24,5,39,11	949.15
Region 4	CLAY 1, EL. -5.5 TO -21.5	17,20,21,11,48,16	943.89
Region 5		25,9,26,27,18	6.825
Region 6	SILTY SAND, EL. -53.5 TO -58.5	7,32,28,35,8,42,12,45	965
Region 7	SILT, EL. -21.5 TO -26.5	32,6,46,29,41,36,35,28	2316
Region 8	CLAY 2, EL. -26.5 TO -41.5	47,30,40,41,29,46	385.5
Region 9	SILT, EL. -21.5 TO -26.5	33,34,31,38,37,40,30,47	965
Region 10	CLAY 1, EL. -5.5 TO -21.5	34,17,16,48,11,39,38,31	2108.6
Region 11	CLAY 2, EL. -26.5 TO -41.5 (protected)	6,46,47,33	1038
Region 12	CLAY 3, EL. -58.5 TO -70 (protected)	7,15,44,45	795.8
Region 13	CLAY 3, EL. -58.5 TO -70 (protected)	43,42,8,14	1128.15

Region 14	CLAY 2, EL. -26.5 TO -41.5 (protected)	41,40,37,36	1471.5
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Points

	X (ft)	Y (ft)
Point 1	203	3.2
Point 2	186.2	1
Point 3	189.9	3
Point 4	191.8	6
Point 5	310	3.1
Point 6	117	-41.5
Point 7	117	-58.5
Point 8	310	-58.5
Point 9	200	6
Point 10	200	1
Point 11	200	-5.5
Point 12	200	-58.5
Point 13	200	-70
Point 14	310	-70
Point 15	117	-70
Point 16	200	-17.3
Point 17	117	-17.3
Point 18	201	3.7
Point 19	240	3.1
Point 20	117	-6.1
Point 21	166.2	-6
Point 22	175.7	-3.8
Point 23	182.6	-1
Point 24	247.3	3.1
Point 25	200	3.7
Point 26	200	12.8
Point 27	200.5	12.8
Point 28	200	-53.5
Point 29	200	-41.5
Point 30	200	-26.5
Point 31	200	-21.5

Point 32	117	-53.5
Point 33	117	-26.5
Point 34	117	-21.5
Point 35	310	-53.5
Point 36	310	-41.5
Point 37	310	-26.5
Point 38	310	-21.5
Point 39	310	-5.5
Point 40	211.9	-26.5
Point 41	211.9	-41.5
Point 42	211.9	-58.5
Point 43	211.9	-70
Point 44	186.2	-70
Point 45	186.2	-58.5
Point 46	186.2	-41.5
Point 47	186.2	-26.5
Point 48	200	-6.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.63	(201.124, 6.856)	6.379894	(194.033, 6)	(206.391, 3.19084)
2	25975	2.02	(201.124, 6.856)	6.02	(195.165, 6)	(205.9, 3.19216)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	194.2096	5.8592135	340.65617	12.470184	5.2932791	0
2	Optimized	194.56205	5.57764	323.07692	37.410774	15.879931	0

3	Optimized	194.9145	5.2960665	305.51984	62.352028	26.466866	0
4	Optimized	195.27635	4.9919785	286.54008	86.712245	36.807164	0
5	Optimized	195.64765	4.665375	266.1567	114.80814	48.733163	0
6	Optimized	196.019	4.3387715	245.77333	142.90403	60.659161	0
7	Optimized	196.42845	3.987055	223.82687	175.50625	74.497982	0
8	Optimized	196.83895	3.6361	201.93287	204.01503	86.599242	0
9	Optimized	197.21245	3.31102	181.6485	232.08679	98.514996	0
10	Optimized	197.62085	2.9644825	160.02358	265.82658	112.83669	0
11	Optimized	198.0642	2.5964875	137.06141	298.05693	126.51766	0
12	Optimized	198.46255	2.2636975	116.29535	325.75687	138.27559	0
13	Optimized	198.8159	1.9661125	97.724897	351.71092	149.29243	0
14	Optimized	199.2311	1.62014	76.136317	384.03401	163.01277	0
15	Optimized	199.70815	1.22578	51.528736	418.60838	177.68871	0

16	Optimized	199.97335	1.0109817	38.125317	465.53266	197.60689	0
17	Optimized	200.0087	0.98762165	36.667728	253.09434	107.43218	0
18	Optimized	200.2587	1.0390085	39.873371	381.25282	161.83222	0
19	Optimized	200.63015	1.1269485	45.361629	368.64268	156.47953	0
20	Optimized	200.88015	1.1857425	49.031756	359.52152	152.60783	0
21	Optimized	201.20885	1.2624885	53.819893	341.08934	144.78384	0
22	Optimized	201.62655	1.360016	59.904529	312.2048	132.52308	0
23	Optimized	202.13975	1.50292	68.822714	286.35585	121.55085	0
24	Optimized	202.72205	1.7039375	81.365192	246.00302	104.42209	0
25	Optimized	203.2501	1.9069865	94.035902	203.07829	86.201619	0
26	Optimized	203.7503	2.099329	106.0381	172.63427	73.278901	0
27	Optimized	204.2499	2.2991475	118.50601	143.93042	61.09484	0
28	Optimized	204.74895	2.5064425	131.4412	110.46916	46.891378	0

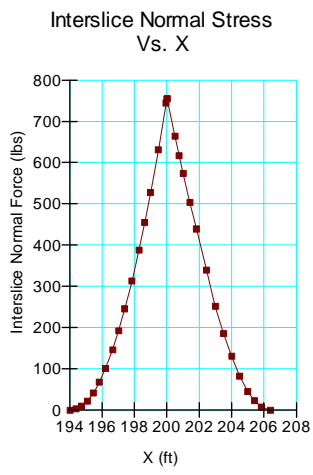
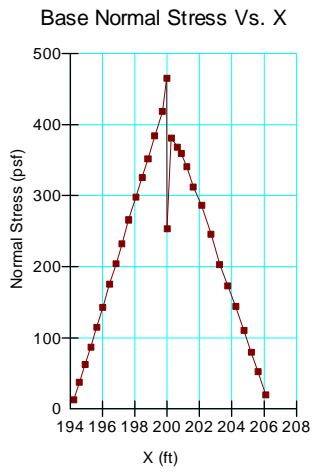
29	Optimized	205.20675	2.6951125	143.21536	79.635217	33.803144	0
30	Optimized	205.62325	2.8651575	153.82687	52.312915	22.205515	0
31	Optimized	206.1111	3.070508	166.64471	19.614633	8.3259176	0

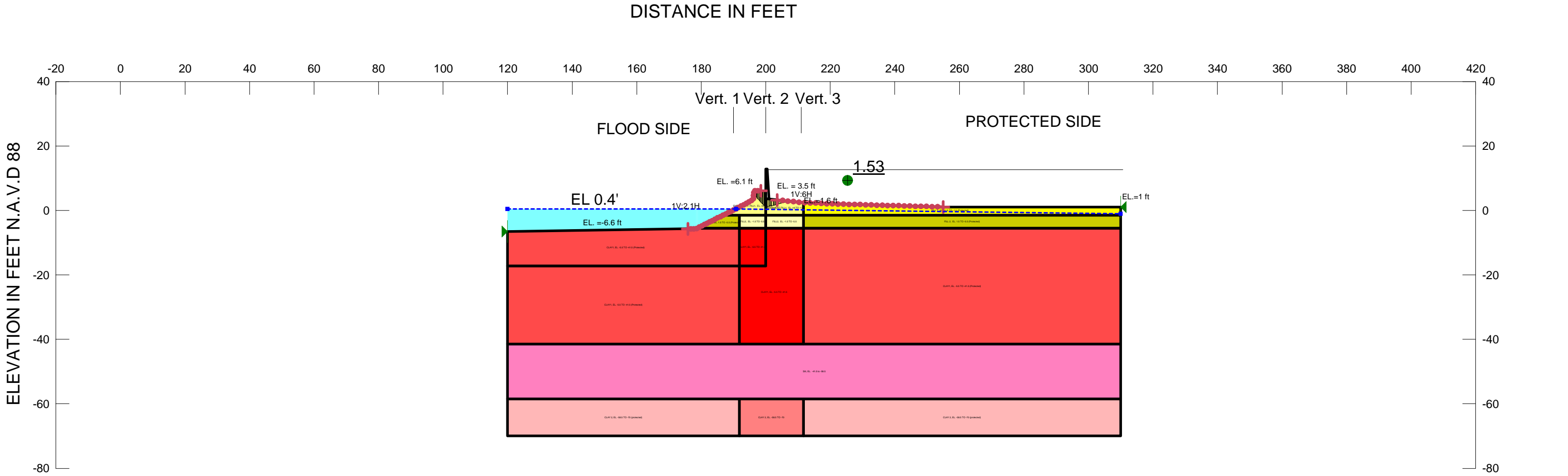
Slices of Slip Surface: 25975

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	25975	195.33785	5.340674	308.29917	31.663297	13.440272	0
2	25975	195.6832	4.3120605	244.11124	110.62705	46.958397	0
3	25975	196.02855	3.666894	203.84931	173.30802	73.564888	0
4	25975	196.3739	3.16859	172.75947	227.73097	96.666063	0
5	25975	196.71925	2.7604655	147.29208	276.25028	117.26129	0
6	25975	197.06455	2.4168735	125.85363	320.17947	135.90812	0
7	25975	197.4099	2.1234775	107.54596	360.26337	152.92273	0
8	25975	197.75525	1.871289	91.808537	397.09483	168.55676	0

9	25975	198.1006	1.654252	78.266353	430.98819	182.94363	0
10	25975	198.44595	1.4680825	66.649622	462.29213	196.23137	0
11	25975	198.7913	1.309651	-56.7614	491.19364	208.49933	0
12	25975	199.13665	1.1766235	48.462383	517.88689	219.82994	0
13	25975	199.482	1.067239	41.636487	542.44994	230.25634	0
14	25975	199.82735	0.98017195	36.202511	565.05099	239.84992	0
15	25975	200.0863	0.9269744	32.88293	317.57635	134.80316	0
16	25975	200.3363	0.8902684	30.591856	327.14693	138.86563	0
17	25975	200.75	0.853101	28.273269	340.66055	144.60182	0
18	25975	201.16665	0.8387286	27.376705	346.97119	147.28053	0
19	25975	201.5	0.85036255	28.102582	343.09708	145.63607	0
20	25975	201.83335	0.8805998	29.990238	336.72361	142.93069	0
21	25975	202.16665	0.929726	33.055966	327.66416	139.08519	0
22	25975	202.5	0.9982182	37.329452	315.79046	134.0451	0

23	25975	202.83335	1.086768	42.854866	300.80958	127.68609	0
24	25975	203.18125	1.2021195	50.052001	287.84826	122.18434	0
25	25975	203.54375	1.347714	59.137091	276.73077	117.46524	0
26	25975	203.90625	1.521898	70.006951	261.26341	110.89974	0
27	25975	204.26875	1.727605	82.842747	240.45279	102.06615	0
28	25975	204.63125	1.9688475	97.895036	212.92355	90.380686	0
29	25975	204.99375	2.2512685	115.51997	176.23226	74.806158	0
30	25975	205.35625	2.5831465	136.22867	125.79643	53.397417	0
31	25975	205.71875	2.977426	160.83062	51.168365	21.719682	0





Name: EMBANKMENT FILL1, EL. +6 TO -1.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY1, EL. -5.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Silt, EL. -41.5 to -58.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1

Name: FILL 1, EL. +1.6 TO -1.5 (Protected) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: FILL 2, EL. 1.5 TO -5.5 (Protected) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: FILL2, EL. -1.5 TO -5.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY1, EL. -5.5 TO -41.5 (Protected) Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 2, EL. -58.5 TO -70 Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: CLAY 2, EL. -58.5 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 22 STA. 10+00 TO 1+85, 13+55 TO 21+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 253
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 12:43:22 PM
File Name: Reach 22_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 12:49:26 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL 2, EL. 1.5 TO -5.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL2, EL. -1.5 TO -5.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY1, EL. -5.5 TO -41.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY 2, EL. -58.5 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL1, EL. +6 TO -1.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

CLAY1, EL. -5.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silt, EL. -41.5 to -58.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL 1, EL. +1.6 TO -1.5 (Protected)

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (175.9, -5.74) ft
Left-Zone Right Coordinate: (198.5, 6.1) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (203.5, 3.24299) ft
Right-Zone Right Coordinate: (255, 1.04762) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -6.6) ft
Right Coordinate: (310, 1) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
190.8	0.4
310	-1

Regions

	Material	Points	Area (ft²)
Region 1	CLAY 2, EL. -58.5 TO -70	30,8,32,33,9,31	228.85
Region 2	EMBANKMENT FILL1, EL. +6 TO -1.5	41,6,14,43,21,28	52.615
Region 3		6,18,19,20,14	6.975
Region 4	EMBANKMENT FILL1, EL. +6 TO -1.5	39,40,1,22,23,24,18,6,41	51.118363
Region 5	FILL 1, EL. +1.6 TO -1.5 (Protected)	43,21,28,29,2,15,42	274.76
Region 6	FILL 2, EL. 1.5 TO -5.5 (Protected)	28,27,25,29	393.2

Region 7	CLAY 2, EL. -58.5 TO -70 (protected)	4,11,31,30	825.7
Region 8	CLAY 2, EL. -58.5 TO -70 (protected)	32,33,10,5	1130.45
Region 9	Silt, EL. -41.5 to -58.5	34,4,30,8,32,5,3,37,36	3230
Region 10	CLAY1, EL. -5.5 TO -41.5	7,12,38,36,37,27	620.46
Region 11	CLAY1, EL. -5.5 TO -41.5 (Protected)	35,26,17,16,13,38	801.9953
Region 12	CLAY1, EL. -5.5 TO -41.5 (Protected)	13,38,36,34	1744.74
Region 13	CLAY1, EL. -5.5 TO -41.5 (Protected)	27,37,3,25	3538.8
Region 14	CLAY1, EL. -5.5 TO -41.5	35,38,12,7	95.94
Region 15	FILL 2, EL. 1.5 TO -5.5 (Protected)	40,39,35,26	35.73136
Region 16	FILL2, EL. -1.5 TO -5.5	39,35,7,41	32.8
Region 17	FILL2, EL. -1.5 TO -5.5	28,27,7,41	46.8

Points

	X (ft)	Y (ft)
Point 1	191.8	1
Point 2	310	1
Point 3	310	-41.5
Point 4	120	-58.5
Point 5	310	-58.5
Point 6	200	3.5
Point 7	200	-5.5
Point 8	200	-58.5
Point 9	200	-70
Point 10	310	-70
Point 11	120	-70
Point 12	200	-17.2
Point 13	120	-17.2
Point 14	201	3.5
Point 15	256.7	1
Point 16	120	-6.6
Point 17	178.5	-5.7
Point 18	200	6.1
Point 19	200	12.8
Point 20	200.5	12.8
Point 21	211.7	1.6

Point 22	196.1	3.3
Point 23	196.4	6.1
Point 24	199	6.1
Point 25	310	-5.5
Point 26	178.89701	-5.5
Point 27	211.7	-5.5
Point 28	211.7	-1.5
Point 29	310	-1.5
Point 30	191.8	-58.5
Point 31	191.8	-70
Point 32	211.7	-58.5
Point 33	211.7	-70
Point 34	120	-41.5
Point 35	191.8	-5.5
Point 36	191.8	-41.5
Point 37	211.7	-41.5
Point 38	191.8	-17.2
Point 39	191.8	-1.5
Point 40	186.83731	-1.5
Point 41	200	-1.5
Point 42	221	2
Point 43	211.7	2.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.53	(201.162, 5.713)	5.583144	(196.334, 5.48674)	(207.038, 2.87924)
2	26009	1.95	(201.162, 5.713)	4.835	(196.333, 5.47507)	(205.21, 3.06721)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
--	--------------	--------	--------	-----------	--------------------------	---------------------------	---------------------------

1	Optimiz ed	196.36715	5.4152065	317.027 69	20.886821	8.8659296	0
2	Optimiz ed	196.56115	4.9927465	290.806 56	61.156128	25.959236	0
3	Optimiz ed	196.9077	4.369445	252.171 62	116.22476	49.334482	0
4	Optimiz ed	197.2352	3.92222	224.512 15	157.78652	66.976406	0
5	Optimiz ed	197.5194	3.57252	202.890 9	183.12264	77.73095	0
6	Optimiz ed	197.82095	3.22418	181.375 28	218.63923	92.806848	0
7	Optimiz ed	198.1398	2.8772	-159.957	245.01685	104.00348	0
8	Optimiz ed	198.4744	2.527776	138.397 78	279.73569	118.74075	0
9	Optimiz ed	198.8248	2.175908	116.697 17	307.28434	130.43447	0
10	Optimiz ed	199.03265	1.967197	103.826 35	323.62638	137.37125	0
11	Optimiz ed	199.2185	1.7871585	92.7273 17	343.00402	145.59657	0
12	Optimiz ed	199.5249	1.492635	74.5747 86	366.41525	155.53405	0
13	Optimiz ed	199.8313	1.1981115	56.4222 55	389.85002	165.48151	0
14	Optimiz	199.99225	1.0477085	-	503.43219	213.69429	0

	ed			47.1540 45			
15	Optimiz ed	200.0021	1.0437085	46.9118 9	244.7453	103.88822	0
16	Optimiz ed	200.2521	1.095703	50.3399 2	333.92265	141.74176	0
17	Optimiz ed	200.75	1.2018595	57.3274 06	319.16585	135.47787	0
18	Optimiz ed	201.0302	1.2616065	61.2619 55	310.44418	131.77574	0
19	Optimiz ed	201.258	1.3126975	64.6166 91	302.55984	128.42903	0
20	Optimiz ed	201.6532	1.4019925	70.4788 19	284.36873	120.70736	0
21	Optimiz ed	202.1123	1.50895	77.4897 35	264.86494	112.4285	0
22	Optimiz ed	202.5227	1.6099125	84.0906 68	248.08258	105.30481	0
23	Optimiz ed	202.8205	1.6872175	89.1316 23	232.63796	98.748954	0
24	Optimiz ed	203.1548	1.774455	94.8204 33	215.58422	91.510074	0
25	Optimiz ed	203.5256	1.871625	101.156 93	196.19127	83.278253	0
26	Optimiz ed	203.93125	1.976865	108.021 01	174.58259	74.105911	0
27	Optimiz	204.3717	2.090175	-	151.92117	64.486712	0

	ed			115.413 56			
28	Optimiz ed	204.81115	2.20916	123.159 38	130.78061	55.513075	0
29	Optimiz ed	205.2496	2.33382	131.261 05	106.0895	45.032321	0
30	Optimiz ed	205.665	2.456536	139.222 94	83.332562	35.372574	0
31	Optimiz ed	206.0574	2.5773085	147.046 86	59.522215	25.265681	0
32	Optimiz ed	206.44975	2.698081	154.870 78	35.714303	15.159822	0
33	Optimiz ed	206.8421	2.818853	162.692 27	11.904687	5.0532396	0

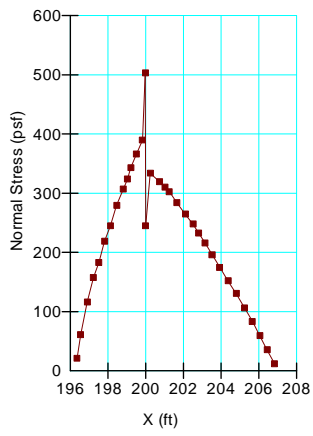
Slices of Slip Surface: 26009

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	26009	196.3665	5.175919	302.0928 2	15.253138	6.4745729	0
2	26009	196.54445	4.3772555	252.3945 7	83.116738	35.280962	0
3	26009	196.83335	3.5839805	203.0994 2	160.63748	68.186564	0
4	26009	197.12225	3.0694325	171.2062 3	218.59864	92.789618	0
5	26009	197.41115	2.670526	-	267.71867	113.63984	0

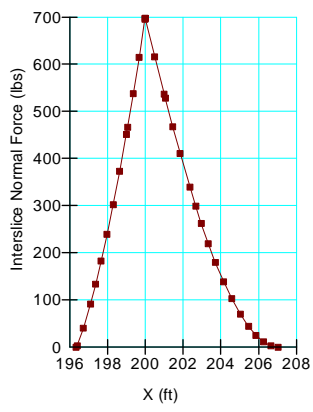
				146.5268 6			
6	26009	197.7	2.3439425	126.3583 1	310.97753	132.00213	0
7	26009	197.98885	2.069647	109.4554 9	349.85249	148.50357	0
8	26009	198.27775	1.8363235	95.10575 3	385.24939	163.52866	0
9	26009	198.56665	1.636838	82.86954 1	417.71994	177.3116	0
10	26009	198.85555	1.466372	72.44606 9	447.67035	190.02479	0
11	26009	199.16665	1.312307	63.06008 5	477.30154	202.60248	0
12	26009	199.5	1.175645	54.77653 9	506.61116	215.04368	0
13	26009	199.83335	1.066893	48.23388 1	533.53485	226.47211	0
14	26009	200.125	0.9917414	43.75982 1	272.72827	115.76628	0
15	26009	200.375	0.94363215	40.94163 4	283.97881	120.54185	0
16	26009	200.56135	0.9153051	39.30923 4	291.73028	123.83216	0
17	26009	200.81135	0.893873	38.15550 9	300.48058	127.54644	0
18	26009	201.15035	0.879752	-	309.28534	131.28384	0

				37.52208 6			
19	26009	201.45105	0.88837025	38.28183 2	312.85074	132.79726	0
20	26009	201.75175	0.9158361	40.21617 2	314.34893	133.4332	0
21	26009	202.05245	0.96247775	43.34588	313.67499	133.14713	0
22	26009	202.35315	1.0288706	47.70734 3	310.67788	131.87494	0
23	26009	202.65385	1.115874	53.35728 9	305.15321	129.52985	0
24	26009	202.95455	1.224693	60.36943 1	296.8192	125.99228	0
25	26009	203.25525	1.3569715	68.84357 1	285.28402	121.09588	0
26	26009	203.55595	1.514942	78.92236 4	269.98388	114.60136	0
27	26009	203.85665	1.7016645	90.79277	250.05901	106.14375	0
28	26009	204.15735	1.921429	104.7262 8	224.10254	95.125886	0
29	26009	204.45805	2.1804835	121.1118 4	189.55927	80.463138	0
30	26009	204.75875	2.4884715	140.5513 2	140.92649	59.819745	0
31	26009	205.05945	2.8616955	164.0608	62.400989	26.487648	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



PS Global Stability (Entry/Exit)_Global

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File Information

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Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Global Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70

Model: Mohr-Coulomb

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, MH, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (166.1, -4.97778) ft
Left-Zone Right Coordinate: (204, 4.07647) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (222.18182, 3.3) ft
Right-Zone Right Coordinate: (265, 1.7) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (90, -6.1) ft
Right Coordinate: (310, 1.7) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
90	0.4
190.2	0.4
310	-0.3

Regions

	Material	Points	Area (ft ²)
Region 1	MARSH, EL. -4.5 TO -17.5	14,10,11,16,17,21,22,23,40	911.965
Region 2	MARSH, EL. -4.5 TO -17.5	16,11,10,1,2,4,12,3	1903
Region 3	Prodelta, MH, EL. -17.5 TO -41.5	3,12,4,6,5	5280
Region 4	BEACH SAND SP, EL. -41.5 TO -57	5,6,7,38,13,39,8	3410
Region 5	EMBANKMENT FILL, EL. 4.3 TO -4.5	10,33,28,27,29,30,31,32,1	757.98
Region 6	EMBANKMENT FILL, EL. 4.3 TO -4.5	20,9,24,33,10,14,40,18,19	91.95
Region 7		25,26,27,28,33	6.725
Region 8	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	8,34,35,39	1246.7
Region 9	BAY SOUND CLAY CL, EL. -57 TO -70	39,35,36,38,13	858
Region 10	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	38,36,37,7	755.3

Points

	X (ft)	Y (ft)
Point 1	310	-4.5
Point 2	310	-7.5
Point 3	90	-17.5
Point 4	310	-17.5
Point 5	90	-41.5
Point 6	310	-41.5
Point 7	310	-57
Point 8	90	-57

Point 9	197.1	3.8
Point 10	200	-4.5
Point 11	200	-13.2
Point 12	200	-17.5
Point 13	200	-57
Point 14	197	-4.5
Point 15	197	-10
Point 16	90	-13.2
Point 17	90	-6.1
Point 18	183.5	-4
Point 19	188	-1.2
Point 20	194.4	3.5
Point 21	110	-5
Point 22	149.1	-4.6
Point 23	176.1	-5.2
Point 24	199	4
Point 25	200	12.9
Point 26	200.5	12.9
Point 27	201	4.2
Point 28	201	4
Point 29	201.2	4.2
Point 30	208	3.9
Point 31	260	1.7
Point 32	310	1.7
Point 33	200	4
Point 34	90	-70
Point 35	185.9	-70
Point 36	251.9	-70
Point 37	310	-70
Point 38	251.9	-57
Point 39	185.9	-57
Point 40	180.4	-4.5

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
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15	Optimized	223.7971	-5.9274	382.58066	1058.2787	286.81681	0
16	Optimized	225.5779	-6.17814	397.57739	1077.9074	288.78294	0
17	Optimized	227.35875	-6.42888	412.57412	1097.5916	290.77268	0
18	Optimized	229.12705	-6.6084865	423.13434	1115.2078	293.76777	0
19	Optimized	230.8828	-6.71696	429.26235	1118.846	292.71088	0
20	Optimized	232.6386	-6.8254335	435.39605	1122.541	291.67572	0
21	Optimized	234.49435	-6.8670485	437.31236	1123.7535	291.37697	0
22	Optimized	236.45005	-6.841805	435.02691	1111.1759	287.00821	0
23	Optimized	238.40575	-6.8165615	432.73636	1098.5983	282.64161	0
24	Optimized	240.64715	-6.680665	423.42125	1078.1075	277.89781	0
25	Optimized	243.17425	-6.434115	407.11612	1037.1871	267.44926	0
26	Optimized	245.68975	-6.0794675	384.08552	989.84433	257.12936	0
27	Optimized	248.1937	-5.6167225	354.2979	923.82852	241.75141	0
28	Optimized	250.9847	-4.942675	311.22117	838.03043	223.61726	0
29	Optimized	253.1511	-4.31955	271.54523	754.13487	204.84715	0
30	Optimized	255.32005	-3.51153	220.33677	652.46361	183.42696	0
31	Optimized	258.4308	-1.9767925	123.43503	458.24361	142.11781	0
32	Optimized	260.00635	-1.0659425	66.022863	339.50227	116.08512	0
33	Optimized	260.7516	-0.53940773	32.895307	278.74093	104.35528	0

	Surface					
1	Optimized	7.80	(234.985, 49.803)	24.91199	(201, 4.2)	(263.916, 1.7)
2	27848	7.85	(234.985, 49.803)	56.699	(201.298, 4.19568)	(265, 1.7)

Slices of Slip Surface: Optimized

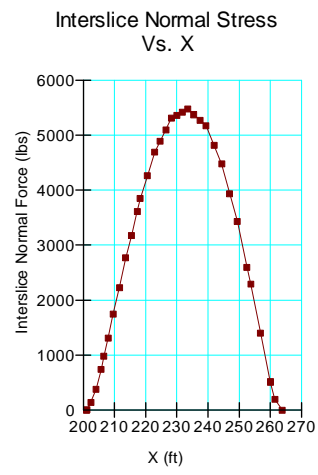
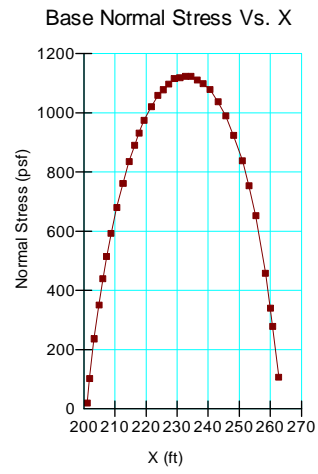
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	201.1	4.0131875	-229.43574	19.940722	8.4643345	0
2	Optimized	201.82515	3.214074	-179.83891	102.29749	43.422707	0
3	Optimized	203.2708	1.971181	-102.80855	236.33946	100.32015	0
4	Optimized	204.91175	0.863223	-34.269348	350.83998	148.92274	0
5	Optimized	206.17575	0.009782	18.524453	439.64627	178.75561	0
6	Optimized	207.30965	-0.6401015	58.664123	514.03037	193.2915	0
7	Optimized	208.7975	-1.3953465	105.25086	592.69645	206.90838	0
8	Optimized	210.60085	-2.196195	154.56267	680.8602	223.40005	0
9	Optimized	212.61255	-2.988245	203.25435	761.80485	237.09062	0
10	Optimized	214.5337	-3.6632025	244.67274	835.06641	250.60725	0
11	Optimized	216.3643	-4.2210675	278.8153	890.40309	259.60361	0
12	Optimized	217.75105	-4.64367	304.6835	931.88534	266.23138	0
13	Optimized	219.39355	-5.0410125	328.87651	974.37783	273.99905	0
14	Optimized	221.73565	-5.5483575	359.68104	1020.1548	280.35448	0

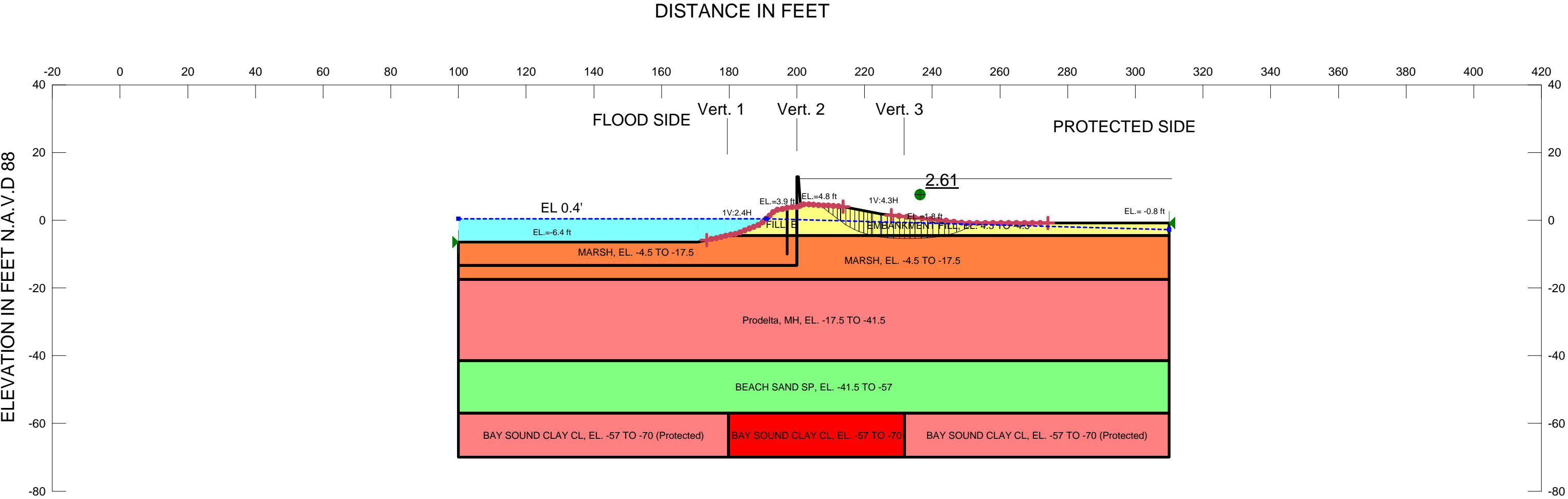
34	Optimized	262.7034	0.84172227	-53.999521	107.3765	45.578621	0
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Slices of Slip Surface: 27848

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	27848	202.3049	3.4852465	-196.93312	73.423888	31.166591	0
2	27848	204.3187	2.1271555	-112.92097	214.47801	91.040513	0
3	27848	206.3325	0.88967365	-36.437825	343.45159	145.78655	0
4	27848	207.6697	0.11826241	11.210869	424.39044	175.38432	0
5	27848	209.0675	-0.61210024	56.274416	501.92497	189.16744	0
6	27848	211.20245	-1.654239	120.52491	612.59493	208.87133	0
7	27848	213.3374	-2.5886735	178.05829	711.41933	226.39833	0
8	27848	215.4724	-3.42109	229.22131	798.9741	241.84571	0
9	27848	217.60735	-4.1562195	274.31297	875.67751	255.2641	0
10	27848	219.76215	-4.803114	313.89628	941.54709	266.42196	0
11	27848	221.9368	-5.3634015	348.06486	996.80441	275.3736	0
12	27848	224.11145	-5.833077	376.58003	1042.024	282.46419	0
13	27848	226.2861	-6.214423	399.58104	1077.382	287.70945	0
14	27848	228.4607	-6.509237	417.18665	1103.0574	291.13486	0
15	27848	230.63535	-6.718876	429.47708	1119.0832	292.72045	0
16	27848	232.81	-6.8442865	436.50896	1125.6091	292.50565	0
17	27848	234.98465	-6.886028	438.32042	1122.5296	290.42956	0
18	27848	237.1593	-6.8442865	434.92366	1109.9399	286.52739	0
19	27848	239.33395	-6.718876	426.30432	1087.6308	280.71643	0
20	27848	241.5086	-6.509237	412.42689	1055.5969	273.00946	0
21	27848	243.6832	-6.214423	393.23762	1013.5843	263.32154	0
22	27848	245.85785	-5.833077	368.65055	961.46556	251.63504	0
23	27848	248.0325	-5.3634015	338.55102	898.84684	237.83146	0
24	27848	250.20715	-4.803114	302.7958	825.49264	221.87164	0
25	27848	252.38265	-4.149086	261.19199	739.78451	203.15047	0
26	27848	254.559	-3.397785	213.51627	641.08784	181.49336	0
27	27848	256.7354	-2.5452485	159.52281	529.70601	157.13345	0
28	27848	258.9118	-1.586427	98.899002	404.88484	129.88328	0
29	27848	261.02475	-0.54978849	33.443429	275.51921	102.75507	0

30	27848	263.52475	0.84008901	-54.197217	106.36815	45.150601	0
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Name: EMBANKMENT FILL, EL. 4.3 TO -4.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -4.5 TO -17.5 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -41.5 TO -57 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO -70 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Prodelta, MH, EL. -17.5 TO -41.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -57 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 24 STA. 24+00 TO STA. 33+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 213
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 1:28:24 PM
File Name: Reach 24_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 1:32:42 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 6000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70

Model: Mohr-Coulomb

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, MH, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (173.3, -5.8552) ft
Left-Zone Right Coordinate: (213.7, 3.96583) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (227.88462, 1.5) ft
Right-Zone Right Coordinate: (274.2, -0.8) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (100, -6.4) ft
Right Coordinate: (310, -0.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	0.4
191	0.4
310	-2.8

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. 4.3 TO -4.5	32,18,21,19,22,20,10,23,31,11,15	89.001625
Region 2	MARSH, EL. -4.5 TO -17.5	1,2,32,15,11,12,17	737.05588
Region 3	MARSH, EL. -4.5 TO -17.5	17,12,11,4,5,7,13,6	1850
Region 4	Prodelta, MH, EL. -17.5 TO -41.5	6,13,7,9,14,8	5040
Region 5		31,24,25,26,41	6.9
Region 6	EMBANKMENT FILL, EL. 4.3 TO -4.5	26,27,30,28,29,3,4,11,31,41	552.2
Region 7	BEACH SAND SP, EL. -41.5 TO -57	8,33,35,36,34,9,14	3255
Region 8	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	33,37,38,35	1037.4
Region 9	BAY SOUND CLAY CL, EL. -57 TO -70	35,38,39,36	676
Region 10	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	36,39,40,34	1016.6

Points

	X (ft)	Y (ft)
Point 1	100	-6.4
Point 2	170.7	-6.4
Point 3	310	-2.5
Point 4	310	-4.5
Point 5	310	-7.5
Point 6	100	-17.5
Point 7	310	-17.5

Point 8	100	-41.5
Point 9	310	-41.5
Point 10	197.1	3.6
Point 11	200	-4.5
Point 12	200	-13.3
Point 13	200	-17.5
Point 14	200	-41.5
Point 15	197.1	-4.5
Point 16	197.1	-10
Point 17	100	-13.3
Point 18	180	-4.4
Point 19	188.3	-1.5
Point 20	193.5	2.9
Point 21	182.5	-3.9
Point 22	189.5	-1
Point 23	199	3.9
Point 24	200	12.8
Point 25	200.5	12.8
Point 26	201	4.8
Point 27	213	4.1
Point 28	250	-0.8
Point 29	310	-0.8
Point 30	225	1.8
Point 31	200	3.9
Point 32	179.7675	-4.5
Point 33	100	-57
Point 34	310	-57
Point 35	179.8	-57
Point 36	231.8	-57
Point 37	100	-70
Point 38	179.8	-70
Point 39	231.8	-70
Point 40	310	-70
Point 41	201	3.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.61	(233.483, 33.951)	19.43713	(206.89, 4.45642)	(252.774, -0.8)
2	11264	2.63	(233.483, 33.951)	40.006	(206.424, 4.48359)	(253.304, -0.8)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.5283	3.954559	-249.53754	45.512598	19.318952	0
2	Optimized	208.80485	2.9508395	-189.04826	136.53964	57.957639	0
3	Optimized	210.07655	1.951145	-128.80395	227.21602	96.44748	0
4	Optimized	211.3434	0.955475	-68.79598	317.51036	134.77515	0
5	Optimized	212.41545	0.13498395	-19.398121	396.26344	168.20385	0
6	Optimized	212.92705	-0.2413515	3.2271632	430.87532	181.52587	0
7	Optimized	213.72385	-0.82749045	38.465369	477.82905	186.49882	0
8	Optimized	215.09725	-1.715715	91.587716	566.26269	201.48757	0
9	Optimized	216.39635	-2.427245	133.8034	616.82295	205.02963	0
10	Optimized	217.70885	-3.0476925	170.31685	677.66717	215.35744	0
11	Optimized	219.03475	-3.5770575	201.12881	708.55619	215.39014	0
12	Optimized	220.2936	-4.006305	225.80102	748.41024	221.83445	0
13	Optimized	221.4853	-4.335435	244.3394	760.04122	218.90243	0

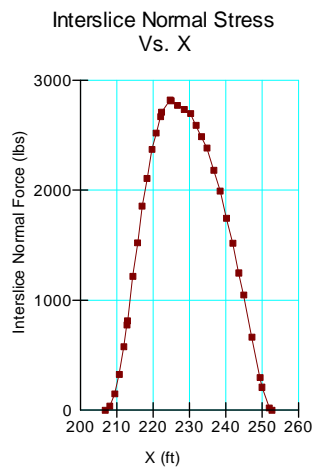
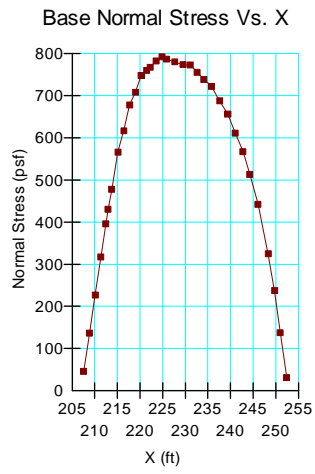
	ed	5					
14	Optimized	222.24875	-4.54628	256.21284	767.36729	216.97219	0
15	Optimized	223.5596	-4.783835	268.83659	782.70847	218.12567	0
16	Optimized	224.85145	-4.9862155	279.29917	792.21428	217.71955	0
17	Optimized	225.88915	-5.0638025	282.39558	786.90573	214.15185	0
18	Optimized	227.6675	-5.1967655	287.71153	780.40098	209.13427	0
19	Optimized	229.4459	-5.3297285	293.02187	773.89624	204.11906	0
20	Optimized	231.088	-5.40221	294.79012	772.91844	202.95343	0
21	Optimized	232.5938	-5.41421	293.0104	755.71886	196.40809	0
22	Optimized	234.0996	-5.42621	291.23731	738.51928	189.85993	0
23	Optimized	235.7681	-5.382115	285.68406	722.34802	185.35285	0
24	Optimized	237.59935	-5.281925	276.36028	687.77913	174.63694	0
25	Optimized	239.36755	-5.12863	263.82656	657.00452	166.89414	0
26	Optimized	241.0726	-4.92223	248.08849	611.00721	154.04986	0
27	Optimized	242.75095	-4.659515	228.87572	567.52286	143.74718	0
28	Optimized	244.2546	-4.369085	208.23389	512.9468	129.34296	0
29	Optimized	246.07185	-3.915495	176.87592	442.54868	112.77139	0
30	Optimized	248.3319	-3.141555	124.79011	324.8036	84.900691	0
31	Optimized	249.72625	-2.5344985	84.571339	237.52302	64.924136	0
32	Optimized	251.0000	-1.8095235	37.195186	137.49891	42.576407	0

	ed	5					
33	Optimized	252.38695	-1.02017	-14.387437	31.061946	13.185014	0

Slices of Slip Surface: 11264

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	11264	207.198	3.8088285	-239.89095	60.50724	25.6838	0
2	11264	208.74555	2.5249805	-162.37314	178.56019	75.794302	0
3	11264	210.29305	1.3652271	-92.601952	288.20903	122.33748	0
4	11264	211.8406	0.31666815	-29.770079	389.78675	165.45466	0
5	11264	212.8072	-0.2976286	6.9399582	450.92745	188.46151	0
6	11264	213.78635	-0.85897615	40.325245	498.27145	194.38663	0
7	11264	215.35905	-1.703642	90.391221	564.49876	201.24671	0
8	11264	216.93175	-2.460806	135.00036	621.68932	206.58721	0
9	11264	218.50445	-3.135842	174.48637	670.2352	210.43289	0
10	11264	220.07715	-3.733175	209.11812	710.43967	212.79837	0
11	11264	221.64985	-4.256458	239.13445	742.47022	213.65336	0
12	11264	223.07715	-4.6726875	262.70933	764.59729	213.0388	0
13	11264	224.35905	-4.9955345	280.70255	778.12589	211.14368	0
14	11264	225.81375	-5.3046775	297.5553	795.10095	211.1956	0
15	11264	227.44125	-5.5880095	312.50588	814.32166	213.00816	0
16	11264	229.06875	-5.80272	323.17301	825.94764	213.41517	0
17	11264	230.69625	-5.9499185	329.6281	829.86255	212.33693	0
18	11264	232.32375	-6.0303515	331.91376	826.13006	209.78237	0
19	11264	233.9513	-6.0444225	330.05841	814.62453	205.68612	0
20	11264	235.57885	-5.9922025	324.06851	795.15361	199.96376	0
21	11264	237.20635	-5.87343	313.92867	767.64629	192.5917	0
22	11264	238.83385	-5.687505	299.59733	731.73063	183.42971	0
23	11264	240.46135	-5.4334755	281.01611	687.23345	172.42903	0
24	11264	242.08885	-5.1100105	258.09762	633.64816	159.41175	0
25	11264	243.71635	-4.715364	230.73971	570.64807	144.28254	0
26	11264	245.21385	-4.29026	201.7039	503.45926	128.08755	0
27	11264	246.58135	-3.8435625	171.53056	433.07924	111.02083	0
28	11264	247.9488	-3.3413845	137.9039	354.47174	91.92759	0

29	11264	249.31625	-2.7814465	100.67175	267.04103	70.619571	0
30	11264	250.62185	-2.1918515	61.687217	183.71252	51.796669	0
31	11264	251.86555	-1.5752085	21.12148	105.03254	35.61813	0
32	11264	252.8959	-1.0267215	-14.832991	31.83849	13.514637	0



PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 182
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 1:49:12 PM
File Name: Reach 25_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 1:50:42 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Phreatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Prodelta, MH, EL. -17.5 TO -41.5

Model: Mohr-Coulomb
Unit Weight: 98 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (179.9375, -4.2) ft
Left-Zone Right Coordinate: (210.4, 3.276) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (218, 1.3) ft
Right-Zone Right Coordinate: (273.8, -2.36716) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (120, -7.3) ft
Right Coordinate: (310, -2.3) ft

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.3 TO -4.5

Model: Mohr-Coulomb
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4.5 TO -17.5

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -41.5 TO -57

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -57 TO -70

Model: Mohr-Coulomb

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
120	0.4
189	0.4
310	-4.3

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +4.3 TO -4.5	32,3,20,21,12,40,41,13,17	100.28
Region 2	MARSH, EL. -4.5 TO -17.5	1,2,32,17,13,14,19	541.51
Region 3	MARSH, EL. -4.5 TO -17.5	14,13,5,7,15,31	1430
Region 4	Prodelta, MH, EL. -17.5 TO -41.5	15,7,9,30,29	2640
Region 5	BEACH SAND SP, EL. -41.5 TO -57	30,9,10,38,16,37,11,8	2945
Region 6		4,22,23,28	6.525
Region 7	EMBANKMENT FILL, EL. +4.3 TO -4.5	4,28,24,25,26,27,5,13,41	390.415
Region 8	MARSH, EL. -4.5 TO -17.5	6,19,14,31,15	344
Region 9	Prodelta, MH, EL. -17.5 TO -41.5	6,33,29,15	144
Region 10	Prodelta, MH, EL. -17.5 TO -41.5	33,29,30,8	1776
Region 11	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	11,34,36,37	769.6
Region 12	BAY SOUND CLAY CL, EL. -57 TO -70	37,36,39,38,16	634.4
Region 13	BAY SOUND CLAY CL, EL. -57 TO -70 (Protected)	38,39,35,10	1066

Points

	X (ft)	Y (ft)
Point 1	120	-7.3
Point 2	171.2	-7.3
Point 3	184.4	-2.5

Point 4	200	4.2
Point 5	310	-4.5
Point 6	120	-17.5
Point 7	310	-17.5
Point 8	120	-41.5
Point 9	310	-41.5
Point 10	310	-57
Point 11	120	-57
Point 12	197	3.3
Point 13	200	-4.5
Point 14	200	-13.2
Point 15	200	-17.5
Point 16	200	-57
Point 17	197	-4.5
Point 18	197	-10
Point 19	120	-13.2
Point 20	186.5	-1.4
Point 21	190.5	2
Point 22	200	12.9
Point 23	200.5	12.9
Point 24	208	3.9
Point 25	223	0
Point 26	256.1	-2.4
Point 27	310	-2.3
Point 28	201	4.2
Point 29	200	-19.3
Point 30	200	-41.5
Point 31	200	-14.6
Point 32	179.15	-4.5
Point 33	120	-19.3
Point 34	120	-70
Point 35	310	-70
Point 36	179.2	-70
Point 37	179.2	-57
Point 38	228	-57
Point 39	228	-70

Point 40	199	3.6
Point 41	200	3.6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.84	(219.515, 14.721)	8.883335	(206.896, 3.94733)	(225.863, -0.207584)
2	11979	1.85	(219.515, 14.721)	16.395	(207.167, 3.93569)	(226.233, -0.234435)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.1717	3.7063575	-250.36009	20.07656	8.521994	0
2	Optimized	207.7239	3.2244085	-221.62666	60.228315	25.565403	0
3	Optimized	208.15	2.852532	-199.45493	88.356125	37.50495	0
4	Optimized	208.63635	2.47522	-177.09289	115.68174	49.103987	0
5	Optimized	209.36955	1.97522	-147.66957	148.90121	63.204814	0
6	Optimized	210.03	1.575035	-124.29383	175.79601	74.620981	0
7	Optimized	210.5572	1.281845	-107.27784	191.06316	81.101501	0
8	Optimized	211.0844	0.988655	-90.260188	206.33031	87.582022	0
9	Optimized	211.59535	0.7177975	-74.597184	224.26117	95.19322	0
10	Optimized	212.0901	0.4692725	-60.288252	236.23646	100.27643	0
11	Optimized	212.57985	0.2310775	-46.61264	250.33198	106.25962	0

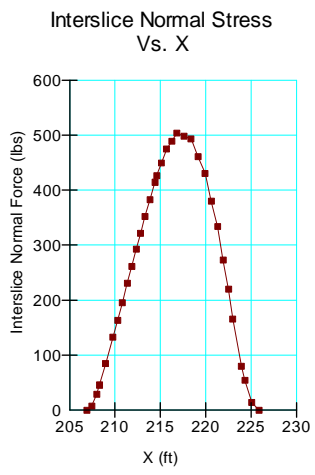
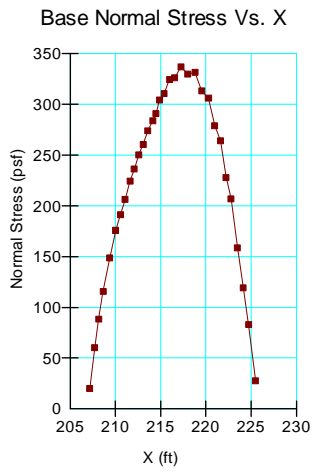
12	Optimized	213.0646	0.0032125	-33.568643	260.61857	110.62602	0
13	Optimized	213.5779	-0.22960135	-20.285045	273.88698	116.25813	0
14	Optimized	214.1197	-0.4673641	-6.7615691	283.8081	120.46939	0
15	Optimized	214.49115	-0.63038775	2.5106728	290.70876	122.33283	0
16	Optimized	214.8614	-0.7728125	10.500519	304.33006	124.72324	0
17	Optimized	215.40075	-0.9693775	21.458143	310.61873	122.74139	0
18	Optimized	215.9631	-1.150485	31.397197	324.52483	124.4253	0
19	Optimized	216.5485	-1.316135	40.314521	326.1357	121.32389	0
20	Optimized	217.2279	-1.4666625	48.061015	337.16325	122.71662	0
21	Optimized	218.0013	-1.6020675	54.635399	329.64894	116.73632	0
22	Optimized	218.77425	-1.6942325	58.512646	331.61171	115.92368	0
23	Optimized	219.54675	-1.7431575	59.693467	313.41239	107.70111	0
24	Optimized	220.27685	-1.749175	58.299673	305.97599	105.13236	0
25	Optimized	220.9645	-1.712285	54.331032	279.03919	95.382952	0
26	Optimized	221.61295	-1.6359175	47.994363	264.02704	91.700431	0
27	Optimized	222.2223	-1.5200725	39.288049	227.97645	80.093475	0
28	Optimized	222.7635	-1.3781	29.118339	207.00354	75.507788	0
29	Optimized	223.4736	-1.1257515	11.650128	158.6411	62.393966	0
30	Optimized	224.1276	-0.89334155	-4.4378868	119.38736	50.676926	0

31	Optimized	224.69675	-0.6738184	-19.515521	83.06398	35.258568	0
32	Optimized	225.4742	-0.36299515	-40.795082	27.688391	11.753025	0

Slices of Slip Surface: 11979

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	11979	207.58365	3.493206	-238.05742	34.877453	14.804601	0
2	11979	208.30885	2.761321	-194.15138	90.498053	38.414144	0
3	11979	208.92655	2.210509	-161.27137	127.63558	54.17809	0
4	11979	209.54425	1.7123645	-131.68694	161.72735	68.649186	0
5	11979	210.16195	1.2610085	-105.01989	192.82096	81.84764	0
6	11979	210.77965	0.8518525	-80.985397	220.9801	93.800486	0
7	11979	211.39735	0.48124445	-59.356179	246.2626	104.53227	0
8	11979	212.01505	0.14623439	-39.948564	268.7229	114.0661	0
9	11979	212.63275	-0.15558981	-22.612238	288.39052	122.41451	0
10	11979	213.25045	-0.4262172	-7.2223812	305.2884	129.58724	0
11	11979	213.874	-0.66930575	6.4350615	319.75405	132.99602	0
12	11979	214.5034	-0.88571315	18.413509	331.50973	132.90146	0
13	11979	215.1328	-1.0740858	28.642473	340.17912	132.23946	0
14	11979	215.76215	-1.235418	37.183254	345.77132	130.98786	0
15	11979	216.3915	-1.3705245	44.08948	348.27679	129.11985	0
16	11979	217.0209	-1.4800635	49.398966	347.71018	126.6256	0
17	11979	217.6503	-1.564551	53.145082	344.02944	123.47308	0
18	11979	218.27965	-1.624376	55.352363	337.19677	119.63585	0
19	11979	218.909	-1.6598095	56.03915	327.14644	115.07822	0
20	11979	219.5384	-1.6710095	55.211513	313.80108	109.76476	0
21	11979	220.1678	-1.658026	52.876881	297.02563	103.635	0
22	11979	220.7972	-1.6208015	49.028017	276.70924	96.64494	0
23	11979	221.42655	-1.5591695	43.656187	252.67409	88.722836	0
24	11979	222.0559	-1.4728505	36.744306	224.74474	79.801452	0
25	11979	222.6853	-1.361446	28.267012	192.64531	69.774447	0
26	11979	223.3171	-1.223809	18.147256	164.17047	61.983176	0
27	11979	223.95125	-1.059065	6.3307982	139.49494	56.524825	0

28	11979	224.5958	-0.8631616	-7.4559334	108.59906	46.097565	0
29	11979	225.2508	-0.63406885	-23.338949	70.258559	29.822989	0
30	11979	225.90575	-0.3730882	-41.211481	24.937502	10.585341	0



PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 223
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Last Solved Date: 1/26/2012
Last Solved Time: 2:05:20 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL., 0.5 TO -4 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -11 (protected)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -2.5 TO -11

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -10.5 TO -42

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -44 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (173.6, -6.76176) ft
Left-Zone Right Coordinate: (204.7, 3.79444) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (212, 2.25758) ft
Right-Zone Right Coordinate: (236.3, 1.8) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (100, -8.4) ft
Right Coordinate: (310, 1.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	100	0.4
	189.6	0.4
	310	-0.2

Regions

	Material	Points	Area (ft ²)
Region 1	BEACH SAND SP, EL. -10.5 TO -42	20,24,14,17,47,41	825
Region 2	BEACH SAND SP, EL. -10.5 TO -42	17,14,24,38,8,10,16,11,42,9	5729.7
Region 3	MARSH, EL. -4 TO -11 (protected)	15,7,8,38	566.3
Region 4	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	25,30,4,31,12,23,27	9.23
Region 5	Fill, EL., 0.5 TO -4 (Protected Side)	15,35,6,7	469.22
Region 6	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	25,27,23,13,40,39,29	52.06

Region 7	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	23,26,5,34,35,15,13	151.06
Region 8	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	23,12,32,22,33,26	17.1
Region 9		12,36,37,22,32	7.1
Region 10	MARSH, MH, EL. -2.5 TO -11	13,40,39,41,20,24,45	132.6
Region 11	MARSH, MH, EL. -2.5 TO -11	13,15,38,24,45	225.525
Region 12	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	9,18,43,42	2363.2
Region 13	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	16,44,19,10	2265.2
Region 14	BAY SOUND CLAY CL, EL. -44 TO -70	42,43,44,16,11	1206.9
Region 15	MARSH, EL. -4 TO -11 (protected)	47,46,48,3,28,39,41	106.255
Region 16	Silted-in Layer	46,1,2,3,48	158.185

Points

	X (ft)	Y (ft)
Point 1	100	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	1.9
Point 6	310	1.8
Point 7	310	-4
Point 8	310	-11
Point 9	310	-42
Point 10	310	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42

Point 17	100	-19.2
Point 18	100	-70
Point 19	310	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11
Point 25	192.3	2
Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	191	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	1.9
Point 35	229.1	1.8
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8
Point 46	100	-10.6
Point 47	100	-11
Point 48	167.8	-10.6

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
--	------	-----	-------------	-------------	------------	-----------

	Surface					
1	Optimized	3.27	(210.908, 8.343)	8.252238	(201, 4)	(219.059, 1.9)
2	12047	3.47	(210.908, 8.343)	10.554	(201.296, 3.98356)	(219.267, 1.9)

Slices of Slip Surface: Optimized

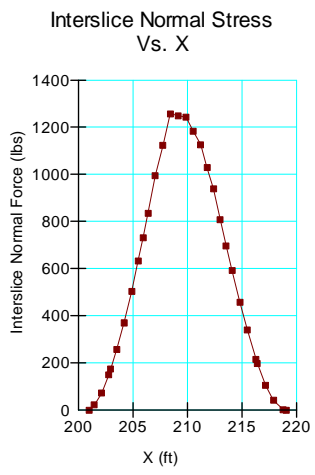
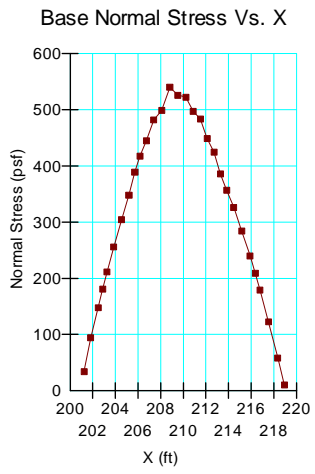
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz ed	201.2349	3.577608	-201.90442	33.876636	14.379779	0
2	Optimiz ed	201.8014	2.92226	-161.17914	94.620867	40.164175	0
3	Optimiz ed	202.4645 5	2.30742	-123.01852	147.55587	62.633752	0
4	Optimiz ed	202.8795 5	1.92265	-99.143008	180.67593	76.69238	0
5	Optimiz ed	203.2460 5	1.61355	-79.969132	211.53063	89.789427	0
6	Optimiz ed	203.8638	1.117175	-49.187653	256.16299	108.73474	0
7	Optimiz ed	204.5485 5	0.5881555	-16.388908	304.47127	129.24038	0
8	Optimiz ed	205.1929	0.1015005	13.777184	348.17149	141.94196	0
9	Optimiz ed	205.7154	-0.2724834	36.952314	389.15611	149.50164	0
10	Optimiz ed	206.1718	-0.57593015	55.744131	417.18235	153.42142	0
11	Optimiz ed	206.7212 5	-0.94124675	78.370024	444.66622	155.48351	0
12	Optimiz ed	207.3943	-1.3233725	102.00516	482.32834	161.43761	0
13	Optimiz ed	208.0979 5	-1.6604375	122.81865	498.87505	159.62647	0
14	Optimiz ed	208.8079 5	-1.8566225	134.84088	540.02607	171.99091	0

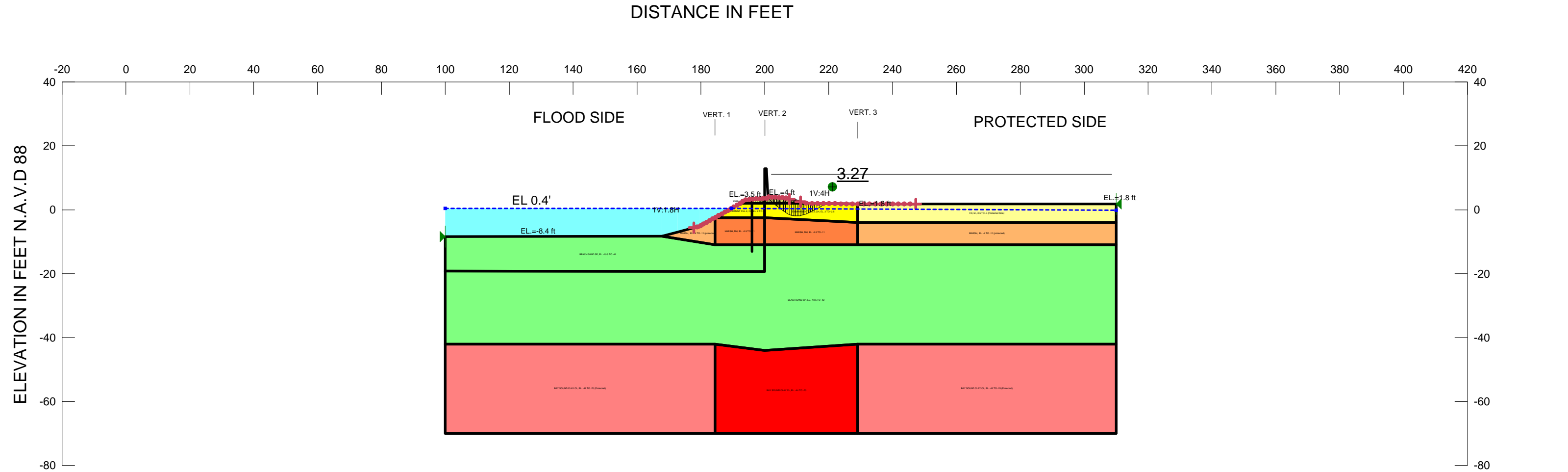
15	Optimiz ed	209.5242 5	-1.9119275	138.06868	525.87053	164.61212	0
16	Optimiz ed	210.2153	-1.913725	137.96551	522.43961	163.19957	0
17	Optimiz ed	210.8811	-1.862015	134.53179	497.17718	153.93383	0
18	Optimiz ed	211.5129	-1.764515	128.25118	483.69722	150.87789	0
19	Optimiz ed	212.1107	-1.621225	119.12512	449.03122	140.03683	0
20	Optimiz ed	212.7048	-1.424748	106.67879	424.93057	135.08987	0
21	Optimiz ed	213.2773 5	-1.182637	91.39434	386.14661	125.11491	0
22	Optimiz ed	213.8320 5	-0.948079	76.58508	357.08931	119.06698	0
23	Optimiz ed	214.4585	-0.66151	58.508772	326.41044	113.71751	0
24	Optimiz ed	215.1567 5	-0.32293	37.163032	284.18031	104.85261	0
25	Optimiz ed	215.902	0.05665655	13.246114	239.73671	96.139556	0
26	Optimiz ed	216.3595 5	0.29959155	-2.0557845	209.06246	88.74175	0
27	Optimiz ed	216.7908	0.5455	-17.534999	179.01605	75.987804	0
28	Optimiz ed	217.5304	0.97204	-44.380379	122.39713	51.954499	0
29	Optimiz ed	218.3501	1.4628605	-75.262501	57.962625	24.603675	0
30	Optimiz ed	218.9293 5	1.8202055	-97.740049	10.39582	4.4127636	0

Slices of Slip Surface: 12047

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	12047	201.5901	3.426259	-192.56878	43.009592	18.256489	0

2	12047	202.1783	2.434481	-130.86558	127.24419	54.011954	0
3	12047	202.7339	1.679272	-83.910452	196.59697	83.450461	0
4	12047	203.2569	1.0829928	-46.865262	254.06958	107.84614	0
5	12047	203.77985	0.56773735	-14.875975	305.52552	129.68789	0
6	12047	204.33615	0.09319215	14.562378	355.46369	144.70402	0
7	12047	204.92585	-0.34464445	41.700534	403.45622	153.55618	0
8	12047	205.5155	-0.7229889	65.125932	445.55168	161.48115	0
9	12047	206.10515	-1.0490889	85.290892	482.39801	168.56197	0
10	12047	206.7	-1.330327	102.65487	508.5441	172.28976	0
11	12047	207.3	-1.569989	117.42287	524.02859	172.59389	0
12	12047	207.9	-1.768396	129.61783	534.8904	172.028	0
13	12047	208.5	-1.927949	139.38687	541.39205	170.64108	0
14	12047	209.1	-2.0504445	146.84413	543.67254	168.44367	0
15	12047	209.7	-2.137187	152.07047	541.83155	165.44376	0
16	12047	210.3	-2.1890625	155.12039	535.95879	161.65631	0
17	12047	210.9	-2.206587	156.02828	526.03316	157.05775	0
18	12047	211.5	-2.189933	154.80208	512.05762	151.64598	0
19	12047	212.1	-2.138937	151.43343	493.94795	145.38879	0
20	12047	212.7	-2.0530915	145.88946	471.5929	138.25291	0
21	12047	213.29335	-1.933268	138.2282	453.36697	133.76847	0
22	12047	213.88005	-1.779021	128.41991	439.51932	132.05387	0
23	12047	214.46675	-1.587743	116.3026	421.38552	129.50002	0
24	12047	215.0535	-1.357234	101.73653	398.63641	126.02652	0
25	12047	215.64025	-1.0846021	84.541374	370.82436	121.51992	0
26	12047	216.22695	-0.7660446	64.481735	337.37739	115.83733	0
27	12047	216.81365	-0.3965073	41.23921	297.46686	108.76218	0
28	12047	217.40035	0.0308638	14.388671	249.96152	99.99474	0
29	12047	217.9703	0.5093391	-15.645466	192.69489	81.794127	0
30	12047	218.52345	1.047377	-49.389837	122.10265	51.829501	0
31	12047	219.03335	1.618037	-85.158608	42.015113	17.834358	0





Name: EMBANKMENT FILL 1, CH, EL. 3.5 TO 2 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, MH, EL. -2.5 TO -11 Model: Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND SP, EL. -10.5 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -44 TO -70 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill, EL., 0.5 TO -4 (Protected Side) Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, CH, EL. 2 TO -2.5 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -4 TO -11 (protected) Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -42 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 26B STA. 47+00 TO STA. 48+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 208
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 2:21:44 PM
File Name: Reach 26B_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 2:27:42 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL., 0.5 TO -4 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, CH, EL. 2 TO -2.5

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -11 (protected)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (177.8, -5.65) ft

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, CH, EL. 3.5 TO 2

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -2.5 TO -11

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -10.5 TO -42

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -44 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (207.7, 3.36515) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (211.2, 2.46364) ft
Right-Zone Right Coordinate: (247.3, 1.8) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (100, -8.4) ft
Right Coordinate: (310, 1.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X (ft)	Y (ft)
	100	0.4
	189.6	0.4
	310	-0.2

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND SP, EL. -10.5 TO -42	20,24,14,17,1,2,41	1027.08
Region 2	BEACH SAND SP, EL. -10.5 TO -42	17,14,24,38,8,10,16,11,42,9	5729.7
Region 3	MARSH, EL. -4 TO -11 (protected)	15,7,8,38	566.3
Region 4	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	25,30,4,31,12,23,27	9.23
Region 5	Fill, EL., 0.5 TO -4 (Protected Side)	15,35,6,7	469.22
Region 6	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	25,27,23,13,40,39,29	52.06
Region 7	EMBANKMENT FILL 2, CH, EL. 2 TO -2.5	23,26,5,34,35,15,13	151.06
Region 8	EMBANKMENT FILL 1, CH, EL. 3.5 TO 2	23,12,32,22,33,26	17.1
Region 9		12,36,37,22,32	7.1
Region 10	MARSH, MH, EL. -2.5 TO -11	13,40,39,41,20,24,45	132.6
Region 11	MARSH, MH, EL. -2.5 TO -11	13,15,38,24,45	225.525

Region 12	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	9,18,43,42	2363.2
Region 13	BAY SOUND CLAY CL, EL. -42 TO -70 (Protected)	16,44,19,10	2265.2
Region 14	BAY SOUND CLAY CL, EL. -44 TO -70	42,43,44,16,11	1206.9
Region 15	MARSH, EL. -4 TO -11 (protected)	2,3,28,39,41	62.36

Points

	X (ft)	Y (ft)
Point 1	100	-8.4
Point 2	167.8	-8.3
Point 3	172.7	-7
Point 4	196	3.3
Point 5	218.8	1.9
Point 6	310	1.8
Point 7	310	-4
Point 8	310	-11
Point 9	100	-42
Point 10	310	-42
Point 11	200	-44
Point 12	200	3.5
Point 13	200	-2.5
Point 14	200	-19.3
Point 15	229.1	-4
Point 16	229.1	-42
Point 17	100	-19.2
Point 18	100	-70
Point 19	310	-70
Point 20	196	-11
Point 21	196	-13
Point 22	201	4
Point 23	200	2
Point 24	200	-11
Point 25	192.3	2

Point 26	213	2
Point 27	196	2
Point 28	179.5	-5.2
Point 29	188.6	-0.2
Point 30	193.7	3.1
Point 31	199	3.5
Point 32	201	3.5
Point 33	206.4	3.7
Point 34	221.2	1.9
Point 35	229.1	1.8
Point 36	200	12.8
Point 37	200.5	12.8
Point 38	229.1	-11
Point 39	184.4	-2.5
Point 40	196	-2.5
Point 41	184.4	-11
Point 42	184.4	-42
Point 43	184.4	-70
Point 44	229.1	-70
Point 45	200	-10.8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	3.27	(210.332, 7.488)	8.275202	(201, 4)	(219.078, 1.9)
2	10683	3.51	(210.332, 7.488)	9.787	(201.192, 3.98934)	(218.373, 1.90737)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	201.2284	3.6186265	-204.46387	31.721349	13.464914	0

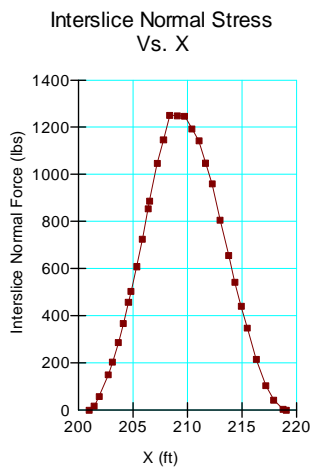
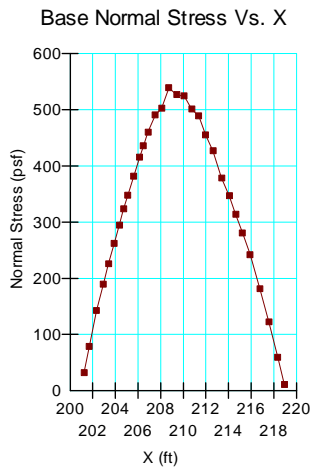
2	Optimized	201.68525	3.040482	-168.5273	79.281659	33.653068	0
3	Optimized	202.33615	2.375705	-127.24861	143.06182	60.72614	0
4	Optimized	202.9429	1.83611	-93.762836	189.75382	80.54572	0
5	Optimized	203.39705	1.453355	-70.019532	226.17444	96.005355	0
6	Optimized	203.90045	1.0505325	-45.040795	262.51235	111.42988	0
7	Optimized	204.3676	0.6826175	-22.226942	294.69996	125.09271	0
8	Optimized	204.72455	0.41133695	-5.4106342	323.45701	137.29935	0
9	Optimized	205.1066	0.14089496	11.346165	348.07883	142.93454	0
10	Optimized	205.62395	-0.22534289	34.03802	381.9023	147.65963	0
11	Optimized	206.1413	-0.59158075	56.731612	415.74154	152.39067	0
12	Optimized	206.46525	-0.82087485	70.940311	435.67073	154.81888	0
13	Optimized	206.8817	-1.075605	86.703278	460.25006	158.5612	0
14	Optimized	207.52075	-1.41593	107.74164	490.6407	162.53101	0
15	Optimized	208.09645	-1.67947	124.00736	502.94383	160.84899	0
16	Optimized	208.72685	-1.8425725	133.98939	539.25749	172.02611	0
17	Optimized	209.4119	-1.9052375	137.6862	526.84272	165.18715	0
18	Optimized	210.08345	-1.9165725	138.18496	524.73825	164.08213	0
19	Optimized	210.74155	-1.8765775	135.48369	501.12298	155.20467	0
20	Optimized	211.37265	-1.7884925	129.79174	489.12298	152.52706	0

21	Optimized	211.9768	-1.6523175	121.10602	455.181	141.80642	0
22	Optimized	212.63945	-1.4386135	107.5647	426.67647	135.45491	0
23	Optimized	213.3929	-1.1343235	88.343426	378.37362	123.11051	0
24	Optimized	214.07345	-0.84264665	69.930875	347.03524	117.62383	0
25	Optimized	214.6487	-0.57664	53.15264	313.94895	110.70147	0
26	Optimized	215.22395	-0.31063335	36.375983	280.86267	103.77844	0
27	Optimized	215.913	0.04462085	13.993417	242.45738	96.977201	0
28	Optimized	216.76625	0.51704085	-15.751508	181.49571	77.040356	0
29	Optimized	217.5669	0.97205	-44.393103	122.59151	52.037009	0
30	Optimized	218.35785	1.4519095	-74.581792	59.414811	25.220091	0
31	Optimized	218.9391	1.8134645	-97.323282	11.282311	4.7890568	0

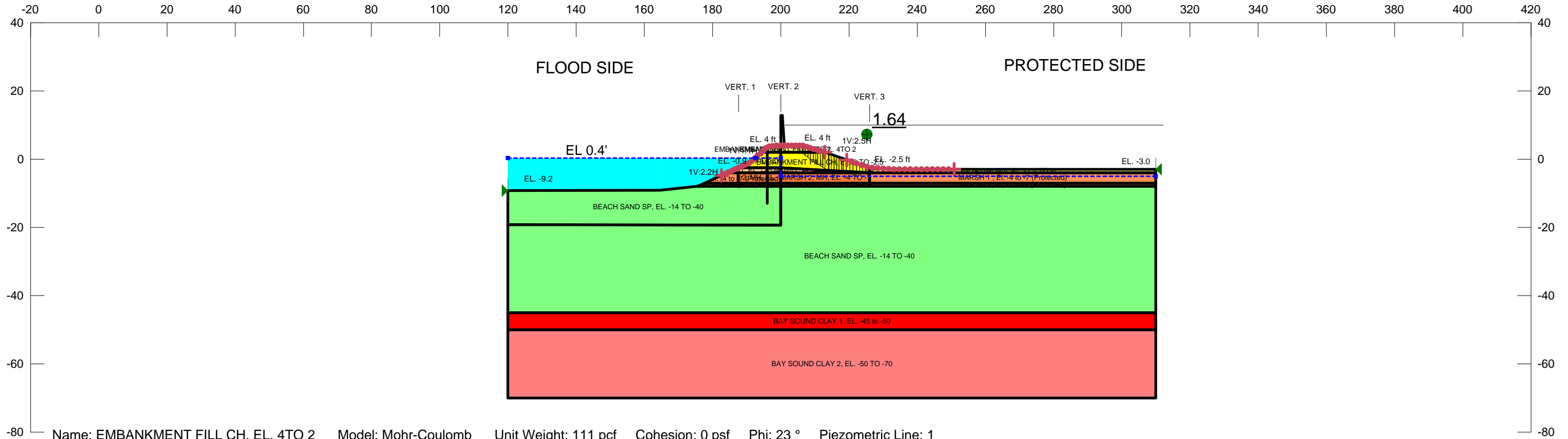
Slices of Slip Surface: 10683

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	10683	201.4511	3.4230685	-192.32514	42.115633	17.877025	0
2	10683	201.9695	2.4283985	-130.41533	125.39244	53.225935	0
3	10683	202.586	1.5350855	-74.867719	207.70959	88.167491	0
4	10683	203.30055	0.70005765	-22.983557	289.84338	123.03122	0
5	10683	203.93205	0.09263365	14.722419	353.65242	143.86725	0
6	10683	204.4805	-0.3494153	42.135595	402.55207	152.98772	0
7	10683	205.0289	-0.73108775	65.781894	445.4201	161.14686	0
8	10683	205.57735	-1.0605455	86.170247	483.02951	168.45676	0
9	10683	206.1258	-1.343675	103.66579	515.90084	174.98339	0
10	10683	206.675	-1.5851295	118.5632	538.80252	178.38101	0

11	10683	207.225	-1.788096	131.05718	551.758	178.5769	0
12	10683	207.775	-1.9546895	141.28154	560.64046	178.0073	0
13	10683	208.325	-2.0868165	149.35503	565.59558	176.68363	0
14	10683	208.875	-2.1858945	155.36521	566.76884	174.63048	0
15	10683	209.425	-2.252936	159.37921	564.24853	171.85683	0
16	10683	209.975	-2.288602	161.43222	558.06378	168.36011	0
17	10683	210.525	-2.2932365	161.55048	548.25727	164.1473	0
18	10683	211.075	-2.2668845	159.73596	534.74356	159.18128	0
19	10683	211.625	-2.209292	155.97136	517.49553	153.45791	0
20	10683	212.175	-2.1198955	150.22237	496.37238	146.93196	0
21	10683	212.725	-1.997793	142.43186	471.20581	139.55626	0
22	10683	213.2811	-1.839573	132.38573	449.44967	134.58566	0
23	10683	213.84325	-1.642637	119.92188	431.0367	132.06041	0
24	10683	214.4054	-1.405835	104.97126	407.96549	128.61342	0
25	10683	214.9676	-1.1258617	87.324746	379.73819	124.12214	0
26	10683	215.52975	-0.7983134	66.711102	345.70905	118.4276	0
27	10683	216.0919	-0.4172311	42.756615	304.95664	111.29731	0
28	10683	216.6541	0.02566575	14.945078	256.10633	102.36688	0
29	10683	217.17475	0.4982748	-14.707019	199.80652	84.812835	0
30	10683	217.65385	1.0032252	-46.365563	133.34926	56.603402	0
31	10683	218.13295	1.590525	-83.161952	49.313605	20.932383	0



DISTANCE IN FEET



Name: EMBANKMENT FILL CH, EL. 4 TO 2	Model: Mohr-Coulomb	Unit Weight: 111 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH 2, MH, EL. -4 TO -7	Model: Mohr-Coulomb	Unit Weight: 103 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BEACH SAND SP, EL. -14 TO -40	Model: Mohr-Coulomb	Unit Weight: 122 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: Fill (Protected), EL., -2.5 TO -4	Model: Mohr-Coulomb	Unit Weight: 105 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH 2, EL. -7 to -8 (Protected)	Model: Mohr-Coulomb	Unit Weight: 99 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: EMBANKMENT FILL CH, EL. 2 TO -2.5	Model: Mohr-Coulomb	Unit Weight: 111 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: Marsh1, EL., -2.5 TO -4	Model: Mohr-Coulomb	Unit Weight: 103 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BAY SOUND CLAY 1, EL. -45 to -50	Model: Spatial Mohr-Coulomb	Weight Fn: Bay Sound 1	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BAY SOUND CLAY 2, EL. -50 TO -70	Model: Spatial Mohr-Coulomb	Weight Fn: Bay Sound 2	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH 1, EL. -4 to -7 (Protected)	Model: Mohr-Coulomb	Unit Weight: 105 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH 2, EL. -7 TO -8	Model: Spatial Mohr-Coulomb	Weight Fn: Marsh2	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

 $H_w = \text{CANAL WATER LEVEL}$

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 27 STA. 48+50 TO STA. 58+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 259
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 2:30:43 PM
File Name: Reach 27_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 2:38:32 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, El, -7 to -8 (Protected)

Model: Mohr-Coulomb
Unit Weight: 99 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL CH, EL. 2 TO -2.5

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh1, El., -2.5 TO -4

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, EL. -45 to -50

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. -50 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound 2
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. 4TO 2

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -4 TO -7

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -14 TO -40

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected), El., -2.5 TO -4

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1 , El, -4 to -7 (Protected)

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -7 TO -8

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (182.6, -4.74208) ft
Left-Zone Right Coordinate: (212.9, 2.03003) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (219.3, -0.16412) ft
Right-Zone Right Coordinate: (250.8, -3) ft
Right-Zone Increment: 20
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -9.2) ft
Right Coordinate: (310, -3) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
192.6	0.4
200	0.4
200	-5
310	-5

Unit Weight Functions

Marsh2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 99
Data Points: X (ft), Unit Weight (pcf)
Data Point: (187.56, 99)
Data Point: (200, 103)
Data Point: (226.1, 99)

Bay Sound 1

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (191.1, 107)
Data Point: (200, 110)
Data Point: (238.5, 107)

Bay Sound 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)

Data Point: (191.1, 112)
Data Point: (200, 110)
Data Point: (226.1, 112)

Regions

	Material	Points	Area (ft²)
Region 1	Marsh1, El., -2.5 TO -4	5,26,16,20,27,50,4	21.15
Region 2	Marsh1, El., -2.5 TO -4	16,21,19,20	19.575
Region 3	BEACH SAND SP, EL. -14 TO -40	28,17,18,23,1,24,2,25,51	842.83
Region 4	BEACH SAND SP, EL. -14 TO -40	23,18,17,14,22,11,13,12	6130
Region 5	MARSH 2, MH, EL. -4 TO -7	50,27,20,42,41,52	37.32
Region 6		15,30,31,32	6.675
Region 7	MARSH 2, MH, EL. -4 TO -7	20,19,21,33,34,42	78.3
Region 8	EMBANKMENT FILL CH, EL. 4TO 2	6,53,15,38,39,37	8.876
Region 9	EMBANKMENT FILL CH, EL. 4TO 2	15,32,7,36,38	19.4
Region 10	EMBANKMENT FILL CH, EL. 2 TO -2.5	37,47,46,5,26,16,38,39	38.211
Region 11	EMBANKMENT FILL CH, EL. 2 TO -2.5	38,16,21,8,36	107.55
Region 12	Fill (Protected), El., -2.5 TO -4	21,8,43,9,10	86.025
Region 13	MARSH 2, El, -7 to -8 (Protected)	35,33,22,11	83.9
Region 14	BAY SOUND CLAY 1, EL. -45 to -50	12,13,49,48	950
Region 15	BAY SOUND CLAY 2, EL. -50 TO -70	48,49,45,44	3800
Region 16	MARSH 1 , El, -4 to -7 (Protected)	33,21,10,35	251.7
Region 17	MARSH 1 , El, -4 to -7 (Protected)	40,3,4,50,52	19.905
Region 18	MARSH 2, El, -7 to -8 (Protected)	25,51,52,40	11.055
Region 19	MARSH 2, EL. -7 TO -8	17,28,51,52,41,42	12.44
Region 20	MARSH 2, EL. -7 TO -8	17,42,34,33,22,14	26.1

Points

	X (ft)	Y (ft)
Point 1	120	-11.2
Point 2	164.5	-9.1
Point 3	179.82	-6
Point 4	184.24	-4
Point 5	187.56	-2.5
Point 6	196	3.7

Point 7	206.4	4
Point 8	226.1	-2.5
Point 9	310	-3
Point 10	310	-4
Point 11	310	-8
Point 12	120	-45
Point 13	310	-45
Point 14	202	-8
Point 15	200	4
Point 16	200	-2.5
Point 17	200	-8
Point 18	200	-19.3
Point 19	202	-4
Point 20	200	-4
Point 21	226.1	-4
Point 22	226.1	-8
Point 23	120	-19.2
Point 24	120	-9.2
Point 25	175.4	-8
Point 26	196	-2.5
Point 27	196	-4
Point 28	196	-8
Point 29	196	-13
Point 30	200	12.9
Point 31	200.5	12.9
Point 32	201	4
Point 33	226.1	-7
Point 34	202	-7
Point 35	310	-7
Point 36	213	2
Point 37	194.44	2
Point 38	200	2
Point 39	196	2
Point 40	177.61	-7
Point 41	196	-7
Point 42	200	-7

Point 43	234.6	-3
Point 44	120	-70
Point 45	310	-70
Point 46	191.1	-0.9
Point 47	193.4	1.2
Point 48	120	-50
Point 49	310	-50
Point 50	187.56	-4
Point 51	187.56	-8
Point 52	187.56	-7
Point 53	199	4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.64	(221.223, 16.036)	12.41029	(204.125, 4)	(228.889, -2.66405)
2	14554	1.66	(221.223, 16.036)	20.75	(204.32, 4)	(230.07, -2.73352)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	204.49375	3.6423425	-539.27806	27.513512	11.678793	0
2	Optimized	205.23205	2.9270275	-494.64788	82.541508	35.036791	0
3	Optimized	205.91025	2.284685	-454.56249	134.31499	57.013332	0
4	Optimized	206.30965	1.916799	-431.60869	163.12048	69.240536	0

5	Optimize d	206.76375	1.498544	405.507 76	187.23987	79.478608	0
6	Optimize d	207.52165	0.8599025	365.661 53	232.38396	98.641141	0
7	Optimize d	208.3099	0.2527275	327.771 74	262.94705	111.6144	0
8	Optimize d	209.13455	-0.350915	290.098 37	301.05519	127.79035	0
9	Optimize d	209.88655	-0.861115	258.267 46	331.01097	140.50582	0
10	Optimize d	210.5294	-1.281405	232.044 9	350.63232	148.83459	0
11	Optimize d	211.2203	-1.7153875	204.962 1	377.70248	160.32519	0
12	Optimize d	211.9593	-2.1630625	177.022 72	397.56328	168.7556	0
13	Optimize d	212.6644	-2.574571	151.345 08	423.49057	179.76108	0
14	Optimize d	213.4832	-3.0324555	122.778 67	440.71176	187.07105	0
15	Optimize d	214.0345	-3.3407395	103.534 94	451.2539	191.54592	0
16	Optimize d	214.47325	-3.4468265	96.9185 12	533.20706	226.33297	0
17	Optimize d	215.21455	-3.58286	88.4295 52	519.66028	220.5827	0

18	Optimize d	215.95585	-3.7188935	79.9405 91	506.1135	214.83243	0
19	Optimize d	216.7128	-3.8401825	72.3721 44	502.3172	213.221	0
20	Optimize d	217.4854	-3.9467275	65.7237 34	484.23763	205.54668	0
21	Optimize d	218.0864	-4.02961	60.5522 04	470.17467	199.57731	0
22	Optimize d	218.77405	-4.10034	56.1383 21	464.08563	196.99266	0
23	Optimize d	219.71995	-4.18258	51.0069 74	436.24871	185.17659	0
24	Optimize d	220.6879	-4.2364475	47.6457 23	418.46006	177.62576	0
25	Optimize d	221.67795	-4.2619425	46.0544 36	381.70698	162.025	0
26	Optimize d	222.6304	-4.2432225	47.2226 69	360.7675	153.13672	0
27	Optimize d	223.54525	-4.1802875	51.1495 31	314.93411	133.6816	0
28	Optimize d	224.41715	-4.07441	57.7564 81	284.62658	120.81681	0
29	Optimize d	224.9854	-3.972391	64.1213 34	246.38887	104.58587	0
30	Optimize d	225.3573	-3.905626	68.2886 81	220.86866	93.753185	0

31	Optimize d	225.8377	-3.7791715	76.1789 76	201.68853	85.611703	0
32	Optimize d	226.4843	-3.5639715	89.6076 71	145.10554	61.593647	0
33	Optimize d	227.37365	-3.243065	109.628 84	96.432693	40.93325	0
34	Optimize d	228.38375	-2.857055	133.718 52	32.143306	13.644024	0

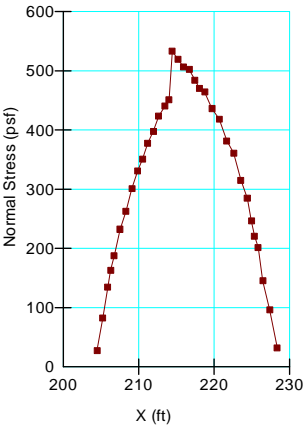
Slices of Slip Surface: 14554

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	14554	204.72525	3.468315	528.4229 9	36.440824	15.468212	0
2	14554	205.5353	2.468315	466.0212 8	110.60829	46.950431	0
3	14554	206.17015	1.757708	421.6744 6	167.77745	71.217301	0
4	14554	206.8125	1.1169794	381.6967 6	213.02343	90.42308	0
5	14554	207.6375	0.36103183	334.5323 4	261.57495	111.03198	0
6	14554	208.4625	-0.31832992	292.1318 7	305.98876	129.88452	0
7	14554	209.2875	-0.9303634	253.9442 4	346.37142	147.02594	0

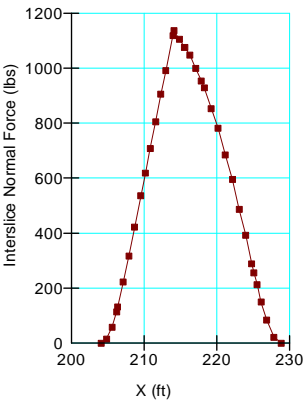
8	14554	210.1125	-1.4821615	219.5137 7	382.83119	162.5022	0
9	14554	210.9375	-1.979283	188.4970 8	415.42621	176.33797	0
10	14554	211.7625	-2.4261615	160.6032 2	444.23704	188.56744	0
11	14554	212.5875	-2.82638	135.6374 2	469.30304	199.20732	0
12	14554	213.3275	-3.149998	115.4401	487.53484	206.94626	0
13	14554	214.0169	-3.4188075	98.66590 9	499.19241	211.89461	0
14	14554	214.74065	-3.6718715	82.87577 1	507.91482	215.59705	0
15	14554	215.4644	-3.895449	68.92361 7	513.80775	218.09845	0
16	14554	216.25435	-4.105596	55.81036	516.8361	219.38391	0
17	14554	217.1105	-4.297766	43.81910 2	516.39567	219.19696	0
18	14554	217.96665	-4.4523725	34.17161 4	511.81864	217.25412	0
19	14554	218.82275	-4.570263	26.81535 3	502.99815	213.51005	0
20	14554	219.6789	-4.652067	21.71049 7	489.78201	207.90013	0
21	14554	220.53505	-4.698212	18.83109	471.98566	200.34603	0

				7			
22	14554	221.3912	-4.708936	- 18.16223	449.38379	190.7521	0
23	14554	222.24735	-4.684294	- 19.70041 4	421.69176	178.99753	0
24	14554	223.1035	-4.6241595	- 23.45280 1	388.57297	164.93944	0
25	14554	223.95965	-4.5282205	- 29.43869 8	349.61493	148.40273	0
26	14554	224.8158	-4.395972	- 37.69091 9	304.29746	129.16661	0
27	14554	225.67195	-4.2267015	- 48.25338 2	252.00231	106.96863	0
28	14554	226.35965	-4.066354	- 58.25916 1	203.92945	86.562917	0
29	14554	227.0506	-3.873751	- 70.27774 2	177.58019	75.378319	0
30	14554	227.91325	-3.6005495	- 87.32539 6	138.37311	58.735902	0
31	14554	228.7759	-3.2849885	- 107.0168 9	90.507157	38.418009	0
32	14554	229.6385	-2.924948	- 129.4822 4	32.494531	13.79311	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



PS Slope Stability (Entry/Exit)_Global

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File Information

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Last Solved Date: 1/26/2012
Last Solved Time: 3:09:24 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Pheatic Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Fn: Clay
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL, EL. 0 TO -2.7

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -7/-8 TO -12

Model: Mohr-Coulomb
Unit Weight: 97 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 3, EL. -12 to -15

Model: Mohr-Coulomb
Unit Weight: 89 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 3.9 TO 0

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3 TO -8/-7

Model: Mohr-Coulomb
Unit Weight: 86 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12/-15 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -45 TO -70

Model: Spatial Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 2 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (175.5, -7.94118) ft
Left-Zone Right Coordinate: (210.4, 2.2442) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (215.9386, 0.5) ft
Right-Zone Right Coordinate: (257.3, -3.9) ft
Right-Zone Increment: 20
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -9.3) ft
Right Coordinate: (310, -3.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
193.8	0.4
200	0.4
200	-5.9
310	-5.9

Unit Weight Functions

Clay
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (123.4, 112)
Data Point: (188.9, 112)
Data Point: (200, 106)
Data Point: (226.1, 112)
Data Point: (310, 112)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -12/-15 TO -45	26,11,15,27,30	747.35
Region 2	BEACH SAND, EL. -12/-15 TO -45	9,15,11,26,31,28,10	5466.85
Region 3	BAY SOUND CLAY, EL. -45 TO -70	16,9,10,17	4750
Region 4		5,19,6,20,21	7.375
Region 5	Marsh 2 (Protected)	39,2,35,32,30,27,38	105.67052
Region 6	EMBANKMENT FILL, EL. 3.9 TO 0	5,19,6,18,29,22	40.13948
Region 7	EMBANKMENT FILL, EL. 0 TO -2.7	22,29,13,33,23	115.01053
Region 8	MARSH 1, EL. -3 TO -8/-7	24,23,33	69.165
Region 9	MARSH 1, EL. -3 TO -8/-7	32,37,35	23.294132
Region 10	MARSH 2, MH, EL. -7/-8 TO -12	24,33,31,25,36	117.45
Region 11	Marsh 3, EL. -12 to -15	26,31,25	39.15
Region 12	Fill (Protected)	7,8,34,33,13	271.31
Region 13	Marsh 2 (Protected)	31,33,34,28	419.5
Region 14	EMBANKMENT FILL, EL. 3.9 TO 0	5,40,12,4,22	15.445
Region 15	EMBANKMENT FILL, EL. 0 TO -2.7	22,4,3,37,23	23.328102
Region 16	Marsh 3, EL. -12 to -15	26,25,30	16.65
Region 17	MARSH 2, MH, EL. -7/-8 TO -12	25,36,24,32,30	49.95
Region 18	MARSH 1, EL. -3 TO -8/-7	24,23,37,32	53.302231
Region 19	Silted-in Layer	38,1,14,2,39	116.61

Points

	X (ft)	Y (ft)
Point 1	120	-9.3
Point 2	175.8	-7.9
Point 3	190.4	-2.1
Point 4	193.3	0
Point 5	200	3.1
Point 6	201	3.5
Point 7	244.8	-3.9
Point 8	310	-3.9
Point 9	120	-45
Point 10	310	-45
Point 11	200	-21.6
Point 12	196	2.7
Point 13	226.1	-2.7
Point 14	165.6	-9.3
Point 15	120	-21.5
Point 16	120	-70
Point 17	310	-70
Point 18	208	3
Point 19	201	3.1
Point 20	200.5	12.8
Point 21	200	12.8
Point 22	200	0
Point 23	200	-2.7
Point 24	200	-8
Point 25	200	-12
Point 26	200	-15
Point 27	120	-12
Point 28	310	-12
Point 29	217.52632	0
Point 30	188.9	-12
Point 31	226.1	-12
Point 32	188.9	-7
Point 33	226.1	-7

Point 34	310	-7
Point 35	178.06552	-7
Point 36	200	-11.9
Point 37	188.88966	-2.7
Point 38	120	-11.6
Point 39	165.6	-11.6
Point 40	199	3.1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.74	(219.386, 16.34)	12.18854	(203.203, 3.34262)	(228.275, -2.83956)
2	15824	1.79	(219.386, 16.34)	21.014	(202.855, 3.36751)	(228.01, -2.82258)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	203.5596	3.0903175	560.99973	19.539475	8.294015	0
2	Optimiz ed	204.2722	2.5857125	529.50477	58.61957	24.882531	0
3	Optimiz ed	205.00385	2.037305	495.28383	98.306907	41.728806	0
4	Optimiz ed	205.6817	1.502875	461.93436	138.9698	58.98918	0
5	Optimiz ed	206.32575	0.9939375	430.18452	177.35214	75.281519	0
6	Optimiz ed	207.0088	0.4527125	396.414	218.44286	92.723491	0

				63			
7	Optimiz ed	207.47055	0.09105	373.83568	249.12434	105.74701	0
8	Optimiz ed	207.7954	-0.1549108	358.49215	267.01323	113.34039	0
9	Optimiz ed	208.54915	-0.7256258	322.88131	295.92856	125.61422	0
10	Optimiz ed	209.4492	-1.36442	283.02619	337.56299	143.28699	0
11	Optimiz ed	210.151	-1.8104	255.18656	354.65159	150.54067	0
12	Optimiz ed	210.85285	-2.25638	227.35896	371.74019	157.79435	0
13	Optimiz ed	211.6007	-2.6927135	200.14002	402.29942	170.76597	0
14	Optimiz ed	212.39455	-3.1194	173.51091	415.74713	176.47419	0
15	Optimiz ed	213.18845	-3.5460865	146.88179	429.20593	182.18711	0
16	Optimiz ed	214.01185	-3.82059	129.75457	511.50922	217.12278	0
17	Optimiz ed	214.86475	-3.94291	122.11785	494.46007	209.88585	0
18	Optimiz ed	215.717	-4.0522425	115.30015	483.27588	205.13844	0
19	Optimiz ed	216.56865	-4.1485875	109.287	463.31245	196.66447	0

				79			
20	Optimized	217.2604	-4.213235	105.25443	457.33667	194.1279	0
21	Optimized	217.957	-4.2563925	102.56165	437.91786	185.8851	0
22	Optimized	218.8184	-4.3097575	99.231642	414.75612	176.05353	0
23	Optimized	219.7678	-4.340135	97.339878	397.32176	168.65308	0
24	Optimized	220.8052	-4.347525	96.877181	362.41705	153.83691	0
25	Optimized	221.82285	-4.322805	98.417126	335.96722	142.60962	0
26	Optimized	222.8208	-4.265975	101.96468	293.98883	124.79085	0
27	Optimized	223.9426	-4.156515	108.7943	251.63757	106.81381	0
28	Optimized	225.1889	-3.929035	122.9847	189.83661	80.580858	0
29	Optimized	225.9562	-3.72752	135.5625	147.45162	62.589498	0
30	Optimized	226.46245	-3.533626	147.6562	108.13478	45.900493	0
31	Optimized	227.18735	-3.255998	164.98281	64.881386	27.540514	0
32	Optimized	227.9123	-2.97837	182.309	21.626699	9.1799892	0

				42			
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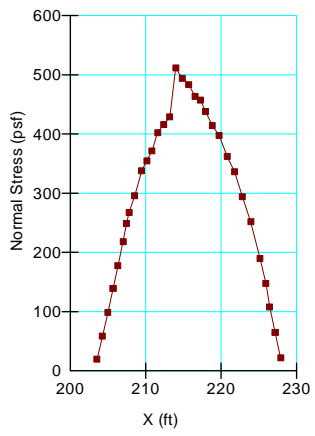
Slices of Slip Surface: 15824

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	15824	203.2697	2.871133	547.31575	34.01951	14.440425	0
2	15824	204.09935	1.9345445	488.87283	102.41027	43.470579	0
3	15824	204.929	1.1007882	436.84626	167.73259	71.198262	0
4	15824	205.75865	0.35362215	390.22448	229.87673	97.576882	0
5	15824	206.6301	-0.34902185	346.38392	289.41883	122.85101	0
6	15824	207.54335	-1.0097384	305.15504	346.24091	146.97055	0
7	15824	208.433	-1.586018	269.18829	388.76622	165.02147	0
8	15824	209.29905	-2.087636	237.89324	416.44232	176.76928	0
9	15824	210.1651	-2.5362025	209.89942	440.07185	186.79942	0
10	15824	211.0311	-2.9354335	184.98984	459.70414	195.13283	0
11	15824	211.8971	-3.288349	162.9685	475.37719	201.78565	0

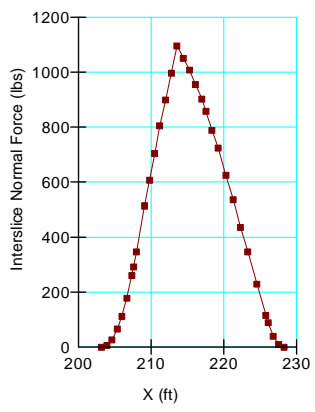
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12	15824	212.76315	-3.5974145	143.68293	487.12152	206.77082	0
13	15824	213.6292	-3.8646465	127.00712	494.92466	210.08305	0
14	15824	214.4952	-4.0916905	112.83566	498.76552	211.7134	0
15	15824	215.36125	-4.2798775	101.09533	498.57481	211.63245	0
16	15824	216.2273	-4.430265	91.711197	494.28703	209.8124	0
17	15824	217.0933	-4.543671	84.635117	485.78218	206.2023	0
18	15824	217.955	-4.6204915	79.841529	474.1409	201.26087	0
19	15824	218.8124	-4.661483	77.28333	459.30444	194.96317	0
20	15824	219.66975	-4.6674175	76.913298	439.93441	186.74108	0
21	15824	220.5271	-4.638325	78.728484	415.79969	176.4965	0
22	15824	221.3845	-4.5740595	82.73926	386.60265	164.10309	0
23	15824	222.24185	-4.474294	88.96365	351.98817	149.41011	0
24	15824	223.0992	-4.3385135	97.436706	311.52194	132.23322	0
25	15824	223.9566	-4.166002	108.2020	264.67341	112.3472	0

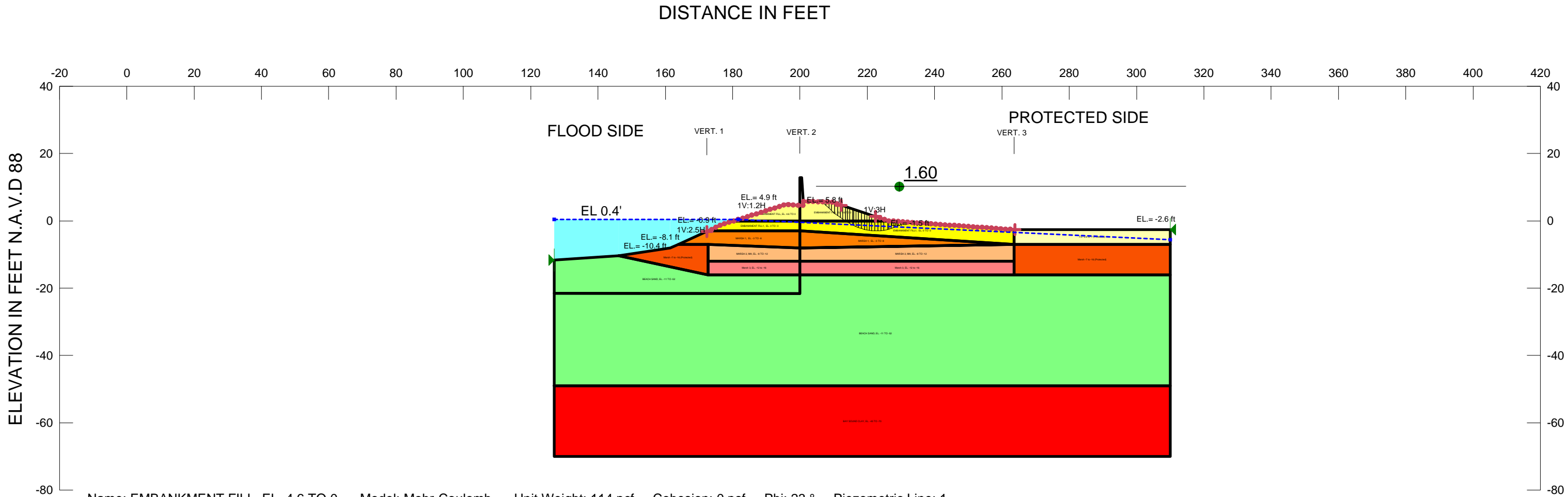
				1			
26	15824	224.81395	-3.9558215	121.31888	210.77283	89.467758	0
27	15824	225.6713	-3.706784	136.859	149.00124	63.247275	0
28	15824	226.57755	-3.398398	156.09768	87.324393	37.067005	0
29	15824	227.5327	-3.0234965	179.49012	31.401845	13.329292	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. 4.6 TO 0 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -3 TO -8 Model: Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -11 TO -52 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Clay Gamma Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL1, EL. 0 TO -3 Model: Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, MH, EL. -8 TO -12 Model: Mohr-Coulomb Unit Weight: 97 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh 3, EL. -12 to -16 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill -2.6 to -7 (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh -7 to -16 (Protected) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 29 STA. 69+09 TO STA. 70+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 257
Last Edited By: Johnson, Andrew S MVN
Date: 1/26/2012
Time: 3:14:38 PM
File Name: Reach 29_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/26/2012
Last Solved Time: 3:21:00 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Spatial Fn: Clay Gamma
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL1, EL. 0 TO -3

Model: Mohr-Coulomb
Unit Weight: 103 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, MH, EL. -8 TO -12

Model: Mohr-Coulomb
Unit Weight: 97 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh 3, EL. -12 to -16

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill -2.6 to -7 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh -7 to -16 (Protected)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 4.6 TO 0

Model: Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3 TO -8

Model: Mohr-Coulomb
Unit Weight: 93 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -11 TO -52

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -45 TO -70

Model: Spatial Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (172.4, -3.13661) ft
Left-Zone Right Coordinate: (212.3, 4.61754) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (222.43036, 1.3) ft
Right-Zone Right Coordinate: (263.9, -2.6) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (127, -11.6) ft
Right Coordinate: (310, -2.6) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
127	0.4
181.7	0.4
310	-5.6

Spatial Functions

Clay Gamma

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (127.5, -49, 112)
Data Point: (127.5, -70, 112)
Data Point: (172.7, -49, 112)
Data Point: (172.7, -70, 112)
Data Point: (200, -49, 106)

Data Point: (200, -70, 106)
Data Point: (231, -49, 112)
Data Point: (231, -70, 112)
Data Point: (310, -49, 112)
Data Point: (310, -70, 112)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -11 TO -52	25,10,14,1,13,27	575.13
Region 2	BEACH SAND, EL. -11 TO -52	8,14,10,25,28,26,9	5633.85
Region 3	BAY SOUND CLAY, EL. -45 TO -70	15,8,9,16	3843
Region 4		4,18,5,19,20	6.45
Region 5	Marsh -7 to -16 (Protected)	13,2,38,29,37,27	128.94137
Region 6	EMBANKMENT FILL, EL. 4.6 TO 0	4,18,5,17,33,21	99.79
Region 7	EMBANKMENT FILL1, EL. 0 TO -3	21,33,6,30,22	269.64
Region 8	MARSH 1, EL. -3 TO -8	23,22,30	159
Region 9	MARSH 2, MH, EL. -8 TO -12	23,30,34,24,39	286.2
Region 10	Marsh 3, EL. -12 to -16	25,28,34,24	254.4
Region 11	Fill -2.6 to -7 (Protected)	6,7,31,30	204.16
Region 12	Marsh -7 to -16 (Protected)	28,34,30,31,26	417.6
Region 13	EMBANKMENT FILL, EL. 4.6 TO 0	4,32,11,36,21	56.9916
Region 14	EMBANKMENT FILL1, EL. 0 TO -3	21,36,3,35,22	71.5206
Region 15	Marsh 3, EL. -12 to -16	25,24,37,27	109.2
Region 16	MARSH 2, MH, EL. -8 TO -12	24,39,23,29,37	122.85
Region 17	MARSH 1, EL. -3 TO -8	23,22,35,38,29	140.41862

Points

	X (ft)	Y (ft)
Point 1	127	-11.6
Point 2	161.5	-8.1
Point 3	177.3	-0.9
Point 4	200	4.6
Point 5	201	5.8
Point 6	263.6	-2.6
Point 7	310	-2.6
Point 8	127	-49

Point 9	310	-49
Point 10	200	-21.6
Point 11	196	4.9
Point 12	231	-1.5
Point 13	146.1	-10.4
Point 14	127	-21.5
Point 15	127	-70
Point 16	310	-70
Point 17	209.3	5.6
Point 18	201	4.6
Point 19	200.5	12.8
Point 20	200	12.8
Point 21	200	0
Point 22	200	-3
Point 23	200	-8
Point 24	200	-12
Point 25	200	-16
Point 26	310	-16
Point 27	172.7	-16
Point 28	263.6	-16
Point 29	172.7	-7
Point 30	263.6	-7
Point 31	310	-7
Point 32	199	4.6
Point 33	226.4	0
Point 34	263.6	-12
Point 35	172.7	-3
Point 36	180.432	0
Point 37	172.7	-12
Point 38	163.91569	-7
Point 39	200	-8.3

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
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1	Optimized	1.60	(222.605, 16.129)	12.52783	(206.593, 5.66522)	(231.978, -0.389888)
2	17084	1.62	(222.605, 16.129)	18.981	(206.772, 5.66091)	(231.955, -0.388266)

Slices of Slip Surface: Optimized

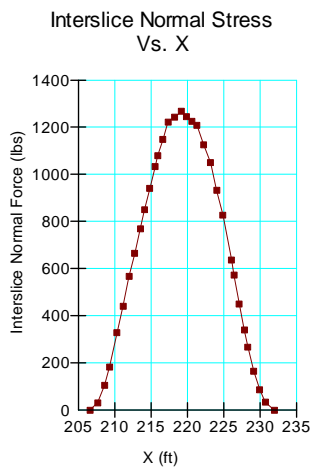
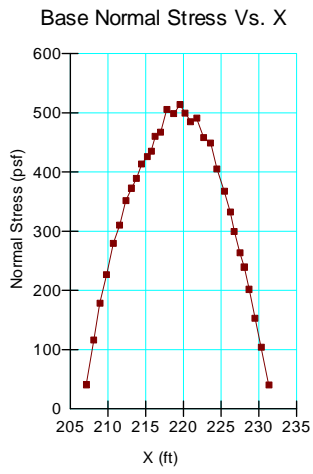
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	207.1376	5.145542	-370.35487	40.772452	17.306879	0
2	Optimized	208.1456	4.18735	-313.50021	116.30504	49.368558	0
3	Optimized	208.9546	3.440433	-269.25122	178.3958	75.724526	0
4	Optimized	209.8116	2.675188	-224.00561	226.89963	96.313177	0
5	Optimized	210.74075	1.90611	-178.72469	279.87767	118.80102	0
6	Optimized	211.5759	1.28163	-142.19723	310.36358	131.74152	0
7	Optimized	212.3776	0.7270425	-109.92909	351.44325	149.17881	0
8	Optimized	213.1458	0.2423475	-81.926362	372.64677	158.17917	0
9	Optimized	213.8105	-0.177045	-57.69609	389.43278	165.30441	0
10	Optimized	214.46175	-0.5615969	-35.600295	413.39659	175.47644	0
11	Optimized	215.20305	-0.9766109	-11.867158	425.76753	180.72759	0
12	Optimized	215.74885	-1.282159	5.6066408	435.27762	182.38451	0
13	Optimized	216.2812	-1.54567	20.496087	460.15539	186.6243	0
14	Optimized	216.99555	-1.87661	39.062847	467.44593	181.83783	0
15	Optimized	217.8106	-2.171045	55.056893	505.26889	191.10365	0

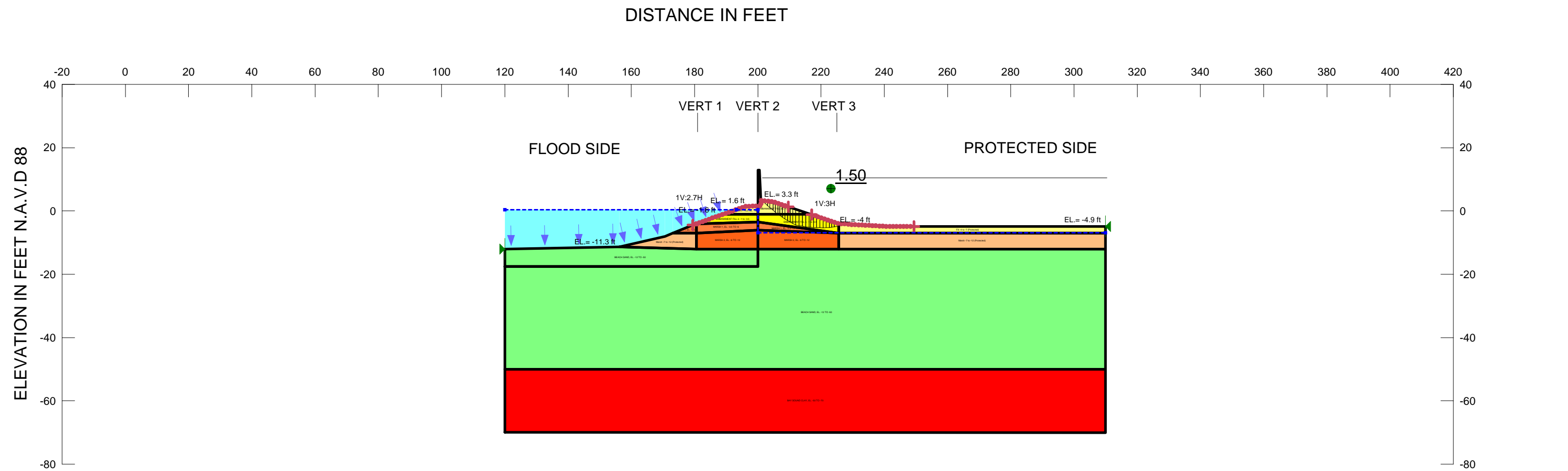
	ed						
16	Optimized	218.7264	-2.428975	68.478738	498.35301	182.4708	0
17	Optimized	219.54065	-2.6168015	77.82315	513.80918	185.06509	0
18	Optimized	220.2533	-2.734525	83.089722	499.50747	176.75885	0
19	Optimized	220.96595	-2.8522485	88.356294	485.21961	168.45848	0
20	Optimized	221.7898	-2.9280775	90.684021	490.73934	169.81341	0
21	Optimized	222.72485	-2.9620125	90.072721	457.89799	156.13256	0
22	Optimized	223.6121	-2.9386375	86.024415	448.98443	154.06738	0
23	Optimized	224.45145	-2.8579525	78.541144	405.12842	138.62808	0
24	Optimized	225.4646	-2.68746	64.945325	367.31305	128.34748	0
25	Optimized	226.22905	-2.500284	51.03472	332.69399	119.55727	0
26	Optimized	226.76385	-2.321891	38.343136	299.64538	110.91622	0
27	Optimized	227.4915	-2.079157	21.072299	263.76876	103.01854	0
28	Optimized	228.09185	-1.869192	6.2187247	239.27461	98.926354	0
29	Optimized	228.72865	-1.630665	-10.523535	201.72283	85.626262	0
30	Optimized	229.52915	-1.330807	-31.570957	152.82458	64.870186	0
31	Optimized	230.32965	-1.030949	-52.618262	103.92984	44.1156	0
32	Optimized	231.35415	-0.6354542	-80.284017	40.24636	17.083566	0

Slices of Slip Surface: 17084

	Slip Surfac	X (ft)	Y (ft)	PWP (psf)	Base Normal	Frictional Strength	Cohesive
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	e				Stress (psf)	(psf)	Strengt h (psf)
1	17084	207.1935	5.0736215	-366.02475	40.208003	17.067285	0
2	17084	208.0361	3.9810805	-300.31534	122.22993	51.883528	0
3	17084	208.8787	3.034221	-243.69104	200.79709	85.233309	0
4	17084	209.71245	2.2105835	-194.72151	264.75153	112.38036	0
5	17084	210.53735	1.488603	-152.08041	312.93558	132.83327	0
6	17084	211.36225	0.8452678	-114.34436	356.15794	151.18007	0
7	17084	212.1871	0.2709423	-80.912733	394.61891	167.50579	0
8	17084	212.9563	-0.21066145	-53.105831	424.61736	180.23937	0
9	17084	213.66985	-0.61173195	-30.161261	446.80557	189.65771	0
10	17084	214.38335	-0.973637	-9.6602272	465.89584	197.76105	0
11	17084	215.15655	-1.322856	9.8746863	483.40884	201.00332	0
12	17084	215.9894	-1.655477	28.199374	498.46877	199.61752	0
13	17084	216.82225	-1.9436135	43.749047	508.9532	197.46745	0
14	17084	217.6551	-2.18937	56.653586	514.93144	194.52741	0
15	17084	218.48795	-2.394438	67.019398	516.48503	190.78684	0
16	17084	219.3208	-2.5601605	74.930568	513.60587	186.20662	0
17	17084	220.15365	-2.6875785	80.451366	506.27091	180.74967	0
18	17084	220.9865	-2.777468	83.630111	494.452	174.38354	0
19	17084	221.81935	-2.830364	84.49979	478.01957	167.03924	0
20	17084	222.6522	-2.8465765	83.080758	456.86372	158.66145	0
21	17084	223.48505	-2.8262	79.378977	430.80205	149.17024	0
22	17084	224.3179	-2.7691155	73.387077	399.58654	138.46346	0
23	17084	225.15075	-2.674988	65.083115	362.92531	126.42651	0
24	17084	225.9836	-2.543257	54.432163	320.42549	112.90747	0
25	17084	226.80385	-2.376273	41.618978	287.19981	104.24288	0
26	17084	227.6115	-2.1741755	26.650934	264.16861	100.82027	0
27	17084	228.41915	-1.9337185	9.2899665	235.85559	96.171401	0
28	17084	229.21455	-1.6582395	-10.220895	200.10597	84.939943	0
29	17084	229.9976	-1.3471345	-31.918779	155.31265	65.926309	0
30	17084	230.7806	-0.9945836	-56.202721	101.36266	43.025896	0
31	17084	231.56365	-0.5979586	-83.237314	36.410837	15.455483	0





Name: EMBANKMENT FILL, EL. 1.6 TO -1 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1, EL. -3.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -12 TO -50 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -50 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, -1 to -3.5 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill -4 to -7 (Protected) Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Marsh -7 to -12 (Protected) Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2, EL. -6 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 30 STA. 74+13 TO STA. 76+90
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 281
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 6:28:05 AM
File Name: Reach 30_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 6:35:44 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, -1 to -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: Fill 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill -4 to -7 (Protected)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh -7 to -12 (Protected)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2, EL. -6 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (179.4, -4.46023) ft

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 1.6 TO -1

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1, EL. -3.5 TO -6

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -50

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -50 TO -70

Model: Mohr-Coulomb

Left-Zone Right Coordinate: (209.7, 1.35096) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (217, -1.10577) ft
Right-Zone Right Coordinate: (249.4, -4.9) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -12) ft
Right Coordinate: (310, -4.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
193.2	0.4
200	0.4
200	-6.9
310	-6.9

Unit Weight Functions

Fill 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 94
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.6, 94)
Data Point: (200, 103)
Data Point: (225.6, 94)

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %

Segment Curvature: 0 %
Y-Intercept: 94
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.6, 94)
Data Point: (200, 96)
Data Point: (225.6, 94)

Marsh 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 94
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.6, 94)
Data Point: (200, 103)
Data Point: (225.6, 94)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -12 TO -50	14,12,11,34,8,10,9	6780
Region 2	BAY SOUND CLAY, EL. -50 TO -70	15,9,10,16	3790.5
Region 3	Marsh -7 to -12 (Protected)	1,13,32,31,35	74.070055
Region 4		21,18,24,23,22,4	8.9
Region 5	BEACH SAND, EL. -12 TO -50	20,1,35,11,12,14	461.21
Region 6	EMBANKMENT FILL 2, -1 to -3.5	28,17,27,26,25	40.414849
Region 7	EMBANKMENT FILL, EL. 1.6 TO -1	28,25,4,36,3	18.239396
Region 8	MARSH 1, EL. -3.5 TO -6	27,2,32,31	11.379148
Region 9	Fill -4 to -7 (Protected)	19,6,7,33,30	184.395
Region 10	Marsh -7 to -12 (Protected)	30,33,8,34	422
Region 11	MARSH 2, EL. -6 TO -12	30,34,11,37	140.8
Region 12	MARSH 2, EL. -6 TO -12	31,35,11,37	106.7
Region 13	EMBANKMENT FILL, EL. 1.6 TO -1	18,5,29,25,4,21	42.14142
Region 14	EMBANKMENT FILL 2, -1 to -3.5	29,25,26,30,19	95.428565
Region 15	MARSH 1, EL. -3.5 TO -6	26,37,30	32
Region 16	MARSH 1, EL. -3.5 TO -6	31,27,26,37	53.35

Points

	X (ft)	Y (ft)

Point 1	156.2	-11.3
Point 2	179.8	-4.3
Point 3	196	1.4
Point 4	200	1.6
Point 5	204.8	3
Point 6	241.5	-4.9
Point 7	310	-4.9
Point 8	310	-12
Point 9	120	-50
Point 10	310	-50
Point 11	200	-12
Point 12	200	-17.5
Point 13	170.6	-8
Point 14	120	-17.5
Point 15	120	-69.9
Point 16	310	-70
Point 17	187.5	-1.6
Point 18	201	3.3
Point 19	225.6	-4
Point 20	120	-12
Point 21	201	1.6
Point 22	200	12.9
Point 23	200.3	12.9
Point 24	200.5	12.9
Point 25	200	-1
Point 26	200	-3.5
Point 27	180.6	-4
Point 28	189.21717	-1
Point 29	216.68571	-1
Point 30	225.6	-7
Point 31	180.6	-7
Point 32	173.05989	-7
Point 33	310	-7
Point 34	225.6	-12
Point 35	180.6	-12
Point 36	199	1.6

Point 37	200	-6
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Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.50	(219.224, -17.166)	12.99238	(201.346, 3.27271)	(226.876, -4.07222)
2	21466	1.52	(219.224, -17.166)	22.822	(201.103, 3.29184)	(227.489, -4.10695)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	201.85765	2.820332	606.55024	32.424818	13.763519	0
2	Optimized	202.72645	2.055975	558.85331	87.504802	37.143585	0
3	Optimized	203.43995	1.432025	519.92243	132.34389	56.176649	0
4	Optimized	204.29835	0.69406835	473.86963	187.20175	79.462429	0
5	Optimized	205.1798	-0.05444165	427.16531	233.58125	99.14936	0
6	Optimized	205.9736	-0.688485	387.59967	273.64461	116.15525	0
7	Optimized	206.6622	-1.206625	355.25951	295.70767	125.52046	0
8	Optimized	207.35735	-1.6892125	325.150	325.47899	138.15763	0

				97			
9	Optimized	208.19845	-2.2411375	290.70848	343.53023	145.81993	0
10	Optimized	209.0129	-2.7509875	258.89484	369.06076	156.657	0
11	Optimized	209.80065	-3.2187625	229.70791	382.09337	162.18901	0
12	Optimized	210.655	-3.698435	199.77834	404.873	171.85839	0
13	Optimized	211.576	-4.190005	169.10658	415.54394	176.38794	0
14	Optimized	212.5645	-4.53045	147.85561	493.28391	209.3866	0
15	Optimized	213.6205	-4.71977	136.04618	471.21229	200.01775	0
16	Optimized	214.6526	-4.88068	126.00381	459.50629	195.04885	0
17	Optimized	215.66085	-5.01318	117.73337	432.85599	183.73647	0
18	Optimized	216.42535	-5.09917	112.37244	424.75468	180.29766	0
19	Optimized	217.1491	-5.1540425	108.94267	403.26862	171.17738	0
20	Optimized	218.07595	-5.2243075	104.5628	377.63062	160.29469	0
21	Optimized	219.06285	-5.27028	101.690	359.3699	152.54347	0

				8			
22	Optimiz ed	220.1098	-5.29196	100.344 35	323.88459	137.48085	0
23	Optimiz ed	221.1321	-5.28292	100.905 28	297.45723	126.26311	0
24	Optimiz ed	222.12965	-5.24316	103.389 35	256.43003	108.84809	0
25	Optimiz ed	223.01625	-5.1736575	107.723 43	229.47767	97.407492	0
26	Optimiz ed	223.79195	-5.0744125	113.916 58	188.47988	80.004961	0
27	Optimiz ed	224.7855	-4.8715	126.575 29	139.62734	59.26829	0
28	Optimiz ed	225.4956	-4.6727825	-138.978	99.350297	42.171699	0
29	Optimiz ed	226.23795	-4.349787	159.134 23	44.005911	18.679401	0

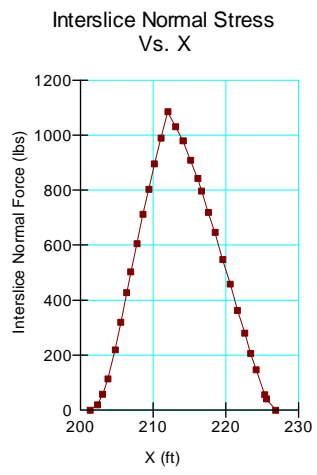
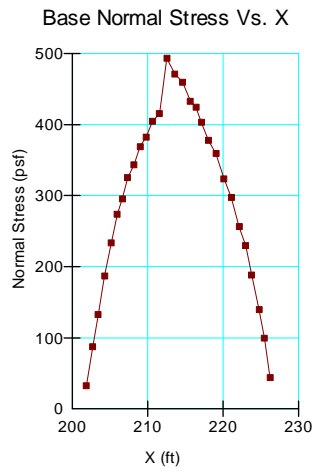
Slices of Slip Surface: 21466

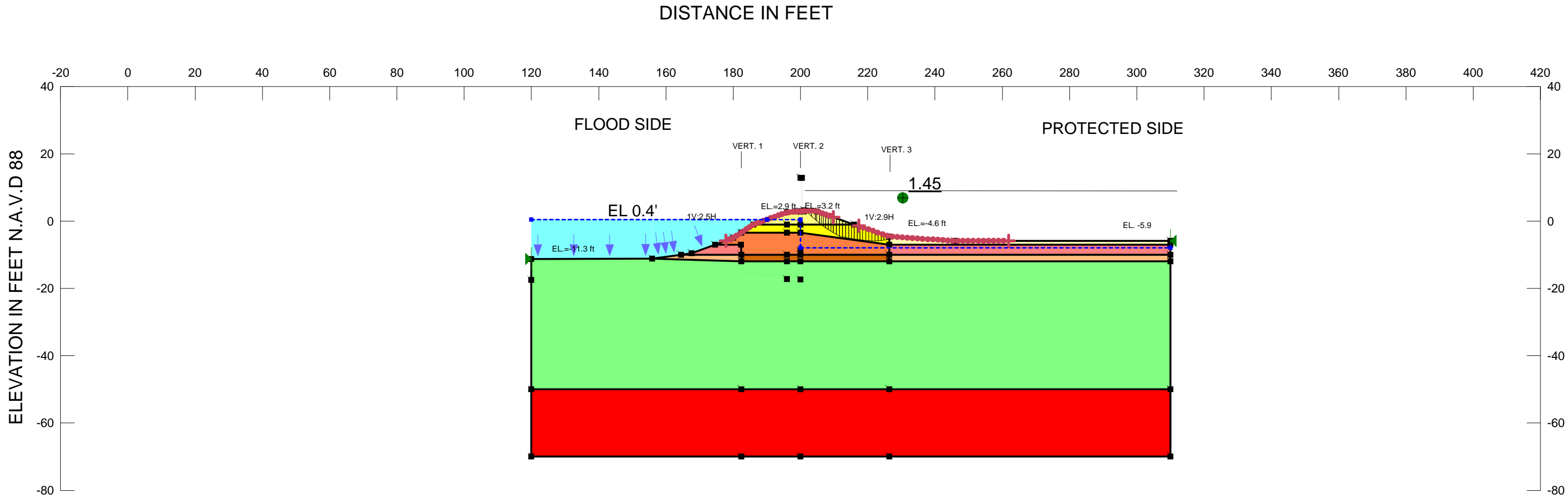
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	21466	201.56545	2.7267365	600.7075 6	36.66782	15.564566	0
2	21466	202.4896	1.662853	534.3232 5	111.04158	47.134353	0
3	21466	203.41375	0.71985825	475.4809 9	182.63668	77.524672	0

4	21466	204.3379	-0.1222336	422.9353 8	251.19962	106.62791	0
5	21466	205.10465	-0.76005535	383.1271 4	299.75566	127.23873	0
6	21466	205.843	-1.314042	348.5642 5	331.00017	140.50124	0
7	21466	206.7104	-1.9125555	311.2136 8	362.16041	153.72797	0
8	21466	207.5778	-2.4544675	277.4007 9	389.39409	165.28799	0
9	21466	208.4452	-2.94437	246.8299 8	412.75842	175.20556	0
10	21466	209.31265	-3.385994	219.2786 8	432.31659	183.50751	0
11	21466	210.1801	-3.782401	194.5373 3	448.10267	190.2083	0
12	21466	211.0475	-4.1361215	172.4635 2	460.13234	195.31459	0
13	21466	211.9149	-4.449256	152.9263 4	468.42223	198.83344	0
14	21466	212.7823	-4.72355	135.8106 5	472.94841	200.75469	0
15	21466	213.64975	-4.960451	121.0254 1	473.69385	201.07111	0
16	21466	214.5172	-5.161151	108.5038 1	470.60018	199.75792	0

17	21466	215.3846	-5.3266205	98.17879 3	463.60882	196.79027	0
18	21466	216.252	-5.457634	90.00402 3	452.61478	192.12358	0
19	21466	217.1314	-5.5556635	83.88609 5	439.55442	186.57978	0
20	21466	218.02285	-5.620213	79.85844 7	424.4696	180.17665	0
21	21466	218.9143	-5.649765	78.01472 4	405.1211	171.96371	0
22	21466	219.8057	-5.6444555	78.34645 6	381.28616	161.84637	0
23	21466	220.69715	-5.6042595	80.85372 3	352.72893	149.72455	0
24	21466	221.5886	-5.5289915	85.55056 3	319.11727	135.45724	0
25	21466	222.48	-5.4183005	92.45822 4	280.06608	118.881	0
26	21466	223.3714	-5.271662	101.6085 1	235.08364	99.787087	0
27	21466	224.26285	-5.0883635	113.0425 6	183.60117	77.934073	0
28	21466	225.1543	-4.8674885	126.8265 6	124.84422	52.993225	0
29	21466	226.07235	-4.5989	143.5873	72.513557	30.780179	0
30	21466	227.0171	-4.2786115	-	26.112398	11.084055	0

				163.5705 8			
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Name: EMBANKMENT FILL 1, EL. 2.5 TO -1 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -3.5 TO -10 Model: Mohr-Coulomb Unit Weight: 92 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -12 TO -50 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -50 TO -70 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, -1 to -3.5 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill, EL -4 to -7 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 1,-7 to -10 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH 2,-10 to -12 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -10 TO -12 Model: Mohr-Coulomb Unit Weight: 92 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 31 STA. 76+90 TO STA. 83+73
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 287
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 6:35:13 AM
File Name: Reach 31_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 6:43:14 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, -1 to -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: Fill 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL -4 to -7 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 1,-7 to -10 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH 2,-10 to -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -10 TO -12

Model: Mohr-Coulomb
Unit Weight: 92 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, EL. 2.5 TO -1

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -3.5 TO -10

Model: Mohr-Coulomb
Unit Weight: 92 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -50

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -50 TO -70

Model: Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (177.8, -5.81613) ft
Left-Zone Right Coordinate: (209.8, 1.15893) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (217.3, -1.45) ft
Right-Zone Right Coordinate: (261.9, -5.9) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (120, -11.3) ft
Right Coordinate: (310, -5.9) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
190	0.4
200	0.4
200	-7.9
310	-7.9

Unit Weight Functions

Fill 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96

Data Points: X (ft), Unit Weight (pcf)
Data Point: (182.4, 96)
Data Point: (200, 103)
Data Point: (226.4, 96)

Regions

	Material	Points	Area (ft²)
Region 1	BAY SOUND CLAY, EL. -50 TO -70	5,3,46,9,49,4,6,50,48,47	3800
Region 2	MARSH 1,-7 to -10 (protected)	8,7,45,39	250.8
Region 3	Fill, EL -4 to -7 (protected)	1,11,12,7,8	104.505
Region 4	BEACH SAND, EL. -12 TO -50	3,13,14,15,10,2,4,49,9,46	6784
Region 5	BEACH SAND, EL. -12 TO -50	13,16,17,44,27,15,14	476.645
Region 6	MARSH, EL. -3.5 TO -10	20,26,21,37,51,52,41,40	114.725
Region 7	MARSH, EL. -3.5 TO -10	51,37,21,8,39	125.4
Region 8		23,34,29,30,25,24	7.675
Region 9	EMBANKMENT FILL 1, EL. 2.5 TO -1	23,24,25,31,32,33	41.03
Region 10	EMBANKMENT FILL 1, EL. 2.5 TO -1	23,34,38,22,35,36,33	33.15
Region 11	EMBANKMENT FILL 2, -1 to -3.5	20,35,36,33,21,26	39.5
Region 12	EMBANKMENT FILL 2, -1 to -3.5	21,33,32,1,8	93.48
Region 13	MARSH, EL. -3.5 TO -10	20,19,42,40	11.8163
Region 14	MARSH 1,-7 to -10 (protected)	40,42,18,43,41	35.76269
Region 15	MARSH 2,-10 to -12 (protected)	41,43,17,44	36.356
Region 16	MARSH 2,-10 to -12 (protected)	2,10,39,45	167.2
Region 17	MARSH, EL. -10 TO -12	15,51,39,10	52.8
Region 18	MARSH, EL. -10 TO -12	44,41,52,51,15,27	35.2

Points

	X (ft)	Y (ft)
Point 1	226.4	-4.6
Point 2	310	-12
Point 3	120	-50
Point 4	310	-50
Point 5	120	-70
Point 6	310	-70
Point 7	310	-7

Point 8	226.4	-7
Point 9	200	-50
Point 10	226.4	-12
Point 11	245.7	-5.9
Point 12	310	-5.9
Point 13	120	-17.5
Point 14	200	-17.4
Point 15	200	-12
Point 16	120	-11.3
Point 17	155.9	-11.1
Point 18	167.6	-9.6
Point 19	180	-5
Point 20	182.4	-3.5
Point 21	200	-3.5
Point 22	196	2.6
Point 23	200	2.8
Point 24	201	2.8
Point 25	201	3.2
Point 26	196	-3.5
Point 27	196	-12
Point 28	196	-17.2
Point 29	200	12.9
Point 30	200.5	12.9
Point 31	204.8	2.9
Point 32	216	-1
Point 33	200	-1
Point 34	200	2.9
Point 35	186	-1
Point 36	196	-1
Point 37	200	-8.8
Point 38	199	2.9
Point 39	226.4	-10
Point 40	182.3	-7
Point 41	182.4	-10
Point 42	174.6087	-7
Point 43	164.48	-10

Point 44	182.4	-12
Point 45	310	-10
Point 46	182.4	-50
Point 47	182.4	-70
Point 48	200	-70
Point 49	226.4	-50
Point 50	226.4	-70
Point 51	200	-10
Point 52	196	-10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.45	(220.56, -19.326)	13.68368	(201.362, 3.17142)	(228.238, -4.7238)
2	21403	1.47	(220.56, -19.326)	25.463	(201, 3.2)	(228.811, -4.7624)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimiz ed	201.8638	2.7166565	662.48002	32.144163	13.644387	0
2	Optimiz ed	202.86725	1.807139	605.72766	96.433226	40.933476	0
3	Optimiz ed	203.89985	0.878985	547.80741	162.95951	69.172206	0
4	Optimiz ed	204.61535	0.24759294	508.40243	210.85018	89.500593	0
5	Optimiz ed	205.1779	-0.23378707	478.37035	237.35565	100.7515	0

6	Optimiz ed	205.8427	-0.778585	444.37074	271.60589	115.28986	0
7	Optimiz ed	206.44665	-1.24469	415.28572	290.65256	123.37469	0
8	Optimiz ed	207.13165	-1.740795	384.33449	319.95336	135.81214	0
9	Optimiz ed	207.86755	-2.243625	-352.963	336.60404	142.87994	0
10	Optimiz ed	208.6267	-2.7356325	322.25418	362.67748	153.94746	0
11	Optimiz ed	209.4091	-3.2168175	292.22793	376.39506	159.77022	0
12	Optimiz ed	210.25695	-3.7126775	261.28849	399.39676	169.53387	0
13	Optimiz ed	211.1703	-4.2232125	-229.435	411.31435	174.59258	0
14	Optimiz ed	212.0777	-4.577545	207.31913	489.28831	207.69057	0
15	Optimiz ed	212.97915	-4.775675	194.95691	473.66489	201.05882	0
16	Optimiz ed	213.88065	-4.973805	182.59468	457.94396	194.38568	0
17	Optimiz ed	214.74855	-5.1387255	172.30757	456.22318	193.65525	0
18	Optimiz ed	215.58285	-5.270437	164.07933	435.90713	185.0316	0
19	Optimiz ed	216.4549	-5.4081065	155.493	416.80988	176.92534	0

				54			
20	Optimized	217.31315	-5.5243	148.23877	409.60972	173.86901	0
21	Optimized	218.1198	-5.61306	-142.706	389.58578	165.36935	0
22	Optimized	218.95825	-5.6953775	137.5732	373.00905	158.33295	0
23	Optimized	219.82855	-5.7712525	132.83403	349.27887	148.26009	0
24	Optimized	220.73495	-5.821655	129.69195	334.17843	141.85033	0
25	Optimized	221.67745	-5.846585	128.13284	301.76605	128.09209	0
26	Optimized	222.59675	-5.84468	128.25463	277.86831	117.9481	0
27	Optimized	223.49285	-5.81594	130.05035	240.50393	102.08786	0
28	Optimized	224.35855	-5.7438425	134.54274	214.79401	91.174647	0
29	Optimized	225.19385	-5.6283875	141.75314	167.44018	71.074141	0
30	Optimized	226.00575	-5.443536	153.28124	130.16654	55.252419	0
31	Optimized	226.85945	-5.168258	170.46543	71.288086	30.259997	0
32	Optimized	227.7784	-4.8719495	188.95263	23.763041	10.086812	0

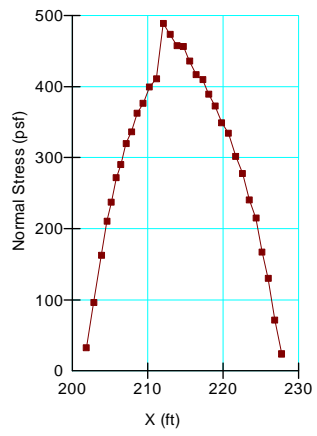
Slices of Slip Surface: 21403

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	21403	201.475	2.48556	648.05593	48.026121	20.385879	0
2	21403	202.425	1.4649993	584.37477	120.39979	51.106677	0
3	21403	203.375	0.5480399	527.1565	190.3075	80.780739	0
4	21403	204.325	-0.27996625	475.4882	257.53077	109.31533	0
5	21403	205.01185	-0.83664135	440.75481	300.33454	127.48445	0
6	21403	205.69555	-1.339372	409.38329	326.7014	138.67652	0
7	21403	206.6392	-1.986915	368.97973	358.57256	152.20502	0
8	21403	207.58285	-2.5746565	332.29858	386.35214	163.99675	0
9	21403	208.5265	-3.107312	299.06345	410.08813	174.07208	0
10	21403	209.47015	-3.5887345	269.02147	429.82577	182.45022	0
11	21403	210.41385	-4.0221015	241.98541	445.5805	189.1377	0
12	21403	211.3575	-4.4100515	217.776	457.36813	194.14125	0
13	21403	212.30115	-4.7547845	196.2586	465.17087	197.45332	0

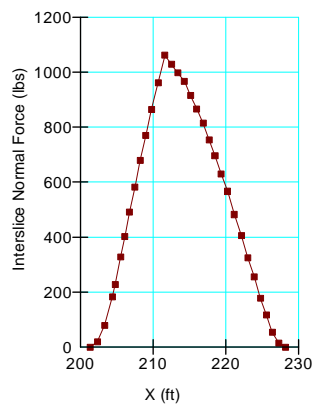
				9			
14	21403	213.2448	-5.058137	177.33351	468.95786	199.0608	0
15	21403	214.18845	-5.3216395	160.89429	468.68851	198.94647	0
16	21403	215.33015	-5.5842235	144.50362	462.03757	196.12331	0
17	21403	216.4751	-5.8020735	130.91349	452.27116	191.97772	0
18	21403	217.42535	-5.938245	122.41127	442.15731	187.68464	0
19	21403	218.3756	-6.0380995	116.1845	428.07188	181.70573	0
20	21403	219.3258	-6.102065	112.18873	409.84154	173.96741	0
21	21403	220.27225	-6.130441	110.41713	386.9903	164.26763	0
22	21403	221.215	-6.1236255	110.84355	359.2315	152.48473	0
23	21403	222.15775	-6.0818415	113.45649	326.4481	138.569	0
24	21403	223.10045	-6.004916	118.25318	288.27642	122.36608	0
25	21403	224.04315	-5.892527	125.26275	244.31542	103.70574	0
26	21403	224.9859	-5.744197	134.52302	194.04407	82.366821	0

27	21403	225.92865	-5.559282	146.05683	136.83885	58.084645	0
28	21403	226.80185	-5.3559615	158.74921	91.251845	38.73411	0
29	21403	227.60555	-5.1386075	172.30958	58.833482	24.973331	0
30	21403	228.4092	-4.89264	187.65795	20.81945	8.8373322	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



PS Slope Stability (Entry/Exit)_Global

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File Information

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Last Solved Date: 1/27/2012
Last Solved Time: 6:52:26 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. 0 TO -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: FILL 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh EL. -7 to -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 95 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill (Protected) -4.5 to -7

Model: Mohr-Coulomb
Unit Weight: 85 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (175.4, -3.33466) ft
Left-Zone Right Coordinate: (210.2, 0.92) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (220.1, -2.03293) ft
Right-Zone Right Coordinate: (265.1, -4.5) ft
Right-Zone Increment: 20
Radius Increments: 20

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.9 TO 0

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -3.5 TO -14

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -9 TO -52

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -48 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (120, -14.9) ft
Right Coordinate: (310, -4.5) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
120	0.4
181.5	0.4
200	0.4
200	-6.5
310	-6.5

Unit Weight Functions

FILL 2

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 85
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (174, 85)
Data Point: (200, 105)
Data Point: (230.4, 85)

Marsh

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 95
Data Points: X (ft), Unit Weight (pcf)
Data Point: (174, 95)
Data Point: (200, 98)
Data Point: (230.4, 95)

Regions

	Material	Points	Area (ft²)
Region 1	Fill (Protected) -4.5 to -7	5,6,7,17	199
Region 2	BEACH SAND, EL. -9 TO -52	14,13,12,18,8,10,9	5368.1
Region 3	BAY SOUND CLAY, EL. -48 TO -70	15,9,10,16	4199
Region 4	Marsh EL. -7 to -12 (protected)	17,7,8,18	398
Region 5	EMBANKMENT FILL, EL. +2.9 TO 0	33,20,3,37,36,28,22	41.597439
Region 6	EMBANKMENT FILL, EL. +2.9 TO 0	28,25,4,21,22	24.8
Region 7	EMBANKMENT FILL 2, EL. 0 TO -3.5	32,33,22,11	87.807785
Region 8	EMBANKMENT FILL 2, EL. 0 TO -3.5	22,21,35,5,17,11	117.55
Region 9		23,24,25,28	7.6
Region 10	BEACH SAND, EL. -9 TO -52	1,26,29,30,12,13,14	1331.08
Region 11	MARSH, EL. -3.5 TO -14	32,11,19,12,30,34	236.65446
Region 12	Marsh EL. -7 to -12 (protected)	29,2,31,34,30	77.659999
Region 13	MARSH, EL. -3.5 TO -14	18,12,19,11,17	235.6
Region 14	MARSH, EL. -3.5 TO -14	31,34,32,27	9.7192665

Points

	X (ft)	Y (ft)
Point 1	120	-14.9
Point 2	163.8	-7.6
Point 3	185.9	2.1
Point 4	206	2.6
Point 5	230.4	-4.5
Point 6	310	-4.5
Point 7	310	-7
Point 8	310	-12
Point 9	120	-47.9
Point 10	310	-48
Point 11	200	-3.5
Point 12	200	-14
Point 13	200	-29.9
Point 14	120	-29.9
Point 15	120	-70.1
Point 16	310	-70

Point 17	230.4	-7
Point 18	230.4	-12
Point 19	200	-7
Point 20	180.5	0.1
Point 21	212.5	0
Point 22	200	0
Point 23	200	13
Point 24	200.5	13
Point 25	201	2.8
Point 26	144.6	-14.5
Point 27	173.1	-4.9
Point 28	200	2.9
Point 29	151.4	-12
Point 30	174	-12
Point 31	165.86667	-7
Point 32	173.96613	-4.30037
Point 33	180.35122	0
Point 34	174	-7
Point 35	213.7	-0.5
Point 36	199	2.9
Point 37	192.45	2.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.61	(221.206, 24.193)	13.84563	(201.344, 2.78625)	(230.66, -4.5)
2	9374	1.70	(221.206, 24.193)	30.361	(199.563, 2.9)	(231.131, -4.5)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimiz	201.8241	2.3414505	-	33.705299	14.307051	0

	ed			551.70928			
2	Optimized	202.78485	1.45185	496.19315	101.11895	42.922449	0
3	Optimized	203.81585	0.503525	437.0202	173.69301	73.72831	0
4	Optimized	204.6913	-0.297055	387.06158	228.8793	97.153497	0
5	Optimized	205.50805	-1.0221265	341.81992	274.55704	116.54255	0
6	Optimized	206.4488	-1.8406115	290.74664	308.67508	131.0248	0
7	Optimized	207.333	-2.5372925	247.27282	344.42176	146.19836	0
8	Optimized	208.20385	-3.1497175	209.05383	354.47197	150.46442	0
9	Optimized	209.10545	-3.5864	181.80746	423.88344	179.92784	0
10	Optimized	210.0378	-3.84734	165.52928	405.71509	172.21584	0
11	Optimized	210.94665	-4.05571	152.5192	404.67478	171.77425	0
12	Optimized	211.832	-4.21151	142.79695	378.86743	160.81968	0
13	Optimized	212.38735	-4.298371	137.37944	380.42175	161.47945	0
14	Optimiz	213.1	-4.355064	-	358.36786	152.11813	0

	ed			133.84383			
15	Optimized	214.15025	-4.438613	128.62624	334.4238	141.95448	0
16	Optimized	215.0507	-4.5102475	124.1649	321.8479	136.61633	0
17	Optimized	215.95115	-4.5818825	119.69248	309.27199	131.27817	0
18	Optimized	216.88795	-4.653745	115.21001	296.81795	125.99175	0
19	Optimized	217.86105	-4.725835	110.71106	282.72671	120.01037	0
20	Optimized	218.8342	-4.797925	106.21211	268.63546	114.02899	0
21	Optimized	219.44555	-4.84067	103.5412	262.422	111.39153	0
22	Optimized	219.989	-4.8665835	101.92525	254.27332	107.93262	0
23	Optimized	220.8264	-4.90501	99.527456	239.85078	101.81062	0
24	Optimized	221.6638	-4.9434365	97.129664	225.44017	95.693674	0
25	Optimized	222.56915	-4.97917	-94.8994	210.70614	89.43945	0
26	Optimized	223.5424	-5.01221	92.838446	192.80757	81.841957	0
27	Optimized	224.45065	-5.019135	92.4065	179.53253	76.207039	0

				55			
28	Optimized	225.2939	-4.999945	93.603992	159.11683	67.541086	0
29	Optimized	226.15305	-4.9720665	95.342671	139.03378	59.01634	0
30	Optimized	227.02815	-4.9355	97.625076	116.04988	49.260251	0
31	Optimized	227.9032	-4.8989335	99.90634	93.069399	39.505616	0
32	Optimized	228.9795	-4.815325	105.12481	63.388677	26.906897	0
33	Optimized	230.00915	-4.656211	115.0523	26.300868	11.164056	0
34	Optimized	230.53005	-4.531211	122.85295	3.285823	1.3947491	0

Slices of Slip Surface: 9374

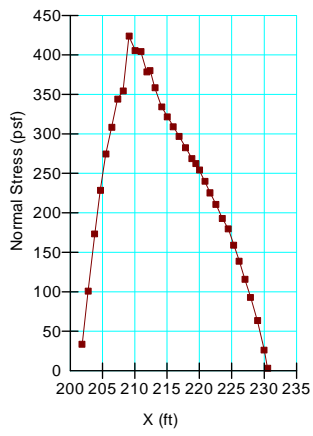
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	9374	199.78165	2.6825175	142.42862	16.986498	7.2103406	0
2	9374	200.25	2.2265365	544.53253	51.399853	21.817943	0
3	9374	200.75	1.7600705	515.42423	85.683348	36.370424	0
4	9374	201.46555	1.1335743	476.3311	135.28453	57.424877	0

				2			
5	9374	202.3966	0.36752275	428.53638	199.98365	84.888021	0
6	9374	203.3851	-0.37928445	381.92977	258.0046	109.51645	0
7	9374	204.43105	-1.105346	336.62841	309.27391	131.27899	0
8	9374	205.477	-1.7689665	295.21529	358.113	152.00995	0
9	9374	206.54165	-2.3846765	256.79426	387.27255	164.38744	0
10	9374	207.625	-2.954521	221.23561	395.54771	167.90004	0
11	9374	208.70835	-3.4702135	189.06255	399.71062	169.66709	0
12	9374	209.79165	-3.9347385	160.07547	399.79096	169.70119	0
13	9374	210.875	-4.3505995	134.11925	395.79588	168.00539	0
14	9374	211.95835	-4.719901	111.07809	387.72708	164.58038	0
15	9374	212.6282	-4.9309065	97.911486	382.2095	162.23831	0
16	9374	213.2282	-5.097171	87.536497	380.30539	161.43006	0
17	9374	214.206	-5.34559	72.03557	382.54808	162.38202	0

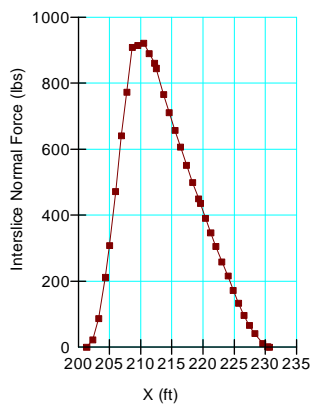
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18	9374	215.21795	-5.5673095	58.199823	388.55747	164.93286	0
19	9374	216.2299	-5.7531995	46.600471	391.22755	166.06624	0
20	9374	217.2419	-5.9039245	37.194625	390.48233	165.74992	0
21	9374	218.2539	-6.020012	29.951091	386.2544	163.95527	0
22	9374	219.26585	-6.1018605	24.844065	378.4053	160.62352	0
23	9374	220.2778	-6.149747	21.856002	366.83474	155.71211	0
24	9374	221.2898	-6.163833	20.976803	351.39208	149.15709	0
25	9374	222.30175	-6.1441655	22.204535	331.8978	140.88226	0
26	9374	223.35005	-6.087496	25.740281	308.35364	130.88835	0
27	9374	224.4347	-5.991095	31.755767	280.41042	119.02716	0
28	9374	225.5193	-5.855248	40.232759	247.49846	105.05686	0
29	9374	226.6039	-5.6794165	51.204349	209.24139	88.8177	0
30	9374	227.6885	-5.462888	64.71623	165.19308	70.120302	0

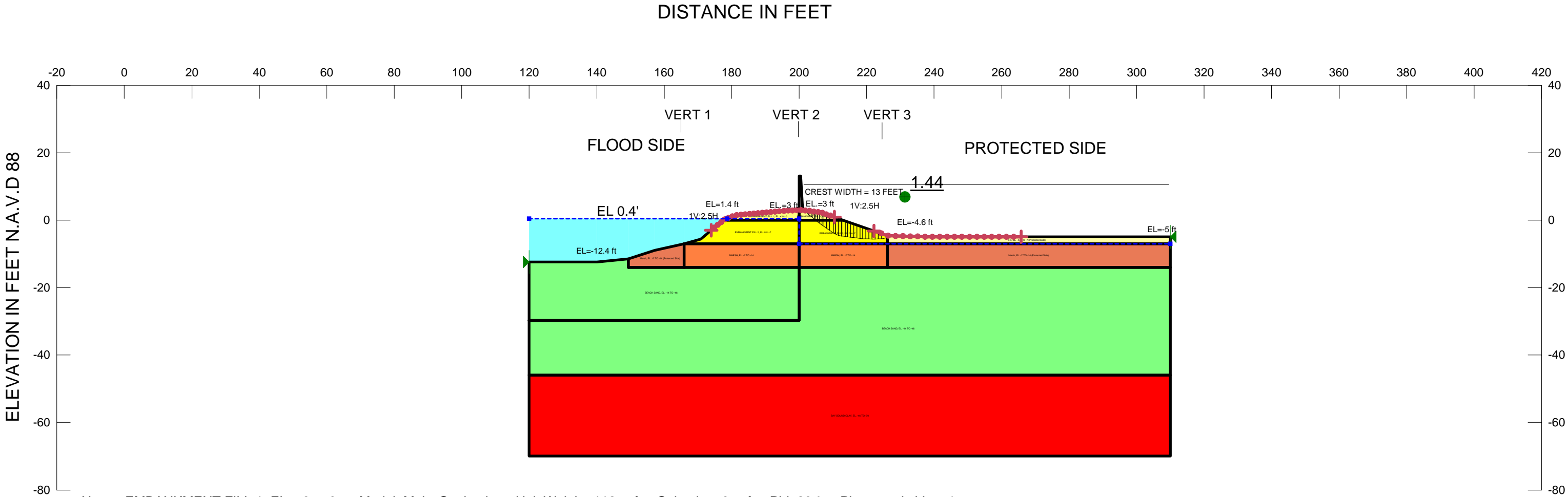
				5			
31	9374	228.7731	-5.2047615	80.822457	114.79864	48.729132	0
32	9374	229.8577	-4.903929	99.599129	57.397202	24.363667	0
33	9374	230.76575	-4.621342	117.22807	13.334582	5.6601944	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL 1, EL. +3 to 0 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: MARSH, EL. -7 TO -14 Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: BEACH SAND, EL. -14 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: EMBANKMENT FILL 2, EL. 0 to -7 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Fill, EL. -4.6 TO -7 (Protected Side) Model: Mohr-Coulomb Unit Weight: 84 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1

Name: Marsh, EL. -7 TO -14 (Protected Side) Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 33 STA. 90+00 TO STA. 93+00
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 277
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 6:56:15 AM
File Name: Reach 33_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 7:03:10 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 106 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. 0 to -7

Model: Spatial Mohr-Coulomb
Weight Fn: FILL 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL. -4.6 TO -7 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 84 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh, EL. -7 TO -14 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (173.91071, -3) ft
Left-Zone Right Coordinate: (210.46364, 0.9) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (222.2, -3.20606) ft
Right-Zone Right Coordinate: (265.8, -5) ft
Right-Zone Increment: 20
Radius Increments: 20

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, EL. +3 to 0

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -7 TO -14

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -14 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -70

Model: Mohr-Coulomb

Slip Surface Limits

Left Coordinate: (120, -12.4) ft
Right Coordinate: (310, -5) ft

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
120	0.4
178.6	0.4
200	0.4
200	-7
310	-7

Unit Weight Functions

FILL 2

Model: Spline Data Point Function
Function: Unit Weight vs. Y
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 84
Data Points: Y (ft), Unit Weight (pcf)
Data Point: (165.9, 84)
Data Point: (200, 105)
Data Point: (226.2, 84)

Marsh

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 94
Data Points: X (ft), Unit Weight (pcf)
Data Point: (165.9, 94)
Data Point: (200, 104)
Data Point: (226.2, 94)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -14 TO -46	12,13,14,22,36,1,2,35,33	1315.065
Region 2	Fill, EL. -4.6 TO -7 (Protected Side)	6,29,7,8,17	170.06
Region 3	BEACH SAND, EL. -14 TO -46	14,13,12,31,9,11,32,10	4816
Region 4	BAY SOUND CLAY, EL. -46 TO -70	15,10,32,11,16	4560
Region 5	Marsh, EL. -7 TO -14 (Protected Side)	17,8,9,31	586.6
Region 6	EMBANKMENT FILL 1, EL. +3 to 0	19,3,28,4,21	45.05
Region 7	EMBANKMENT FILL 1, EL. +3 to 0	4,25,5,20,21	24.9
Region 8	EMBANKMENT FILL 2, EL. 0 to -7	26,30,19,21,18	189.07
Region 9	EMBANKMENT FILL 2, EL. 0 to -7	18,21,20,6,17	153.04
Region 10		4,23,24,25	7.575
Region 11	Marsh, EL. -7 TO -14 (Protected Side)	35,33,26,27,2	81.825
Region 12	MARSH, EL. -7 TO -14	18,17,31,12,34	183.4
Region 13	MARSH, EL. -7 TO -14	33,26,18,34,12	238.7

Points

	X (ft)	Y (ft)
Point 1	140	-12.4
Point 2	149.3	-11.5
Point 3	181	1.4
Point 4	200	3
Point 5	206.8	2.2
Point 6	226.2	-4.6
Point 7	310	-5
Point 8	310	-7
Point 9	310	-14
Point 10	120	-46
Point 11	310	-46
Point 12	200	-14
Point 13	200	-29.8
Point 14	120	-29.8
Point 15	120	-70
Point 16	310	-70
Point 17	226.2	-7

Point 18	200	-7
Point 19	177.5	0
Point 20	213	0
Point 21	200	0
Point 22	120	-14
Point 23	200	13.1
Point 24	200.5	13.1
Point 25	201	3
Point 26	165.9	-7
Point 27	157.2	-9
Point 28	199	3
Point 29	238.5	-5
Point 30	170.8	-5.6
Point 31	226.2	-14
Point 32	200	-46
Point 33	165.9	-14
Point 34	200	-8.3
Point 35	149.3	-14
Point 36	120	-12.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.44	(219.061, 18.262)	13.25543	(201.135, -2.98138)	(227.338, -4.63702)
2	9753	1.48	(219.061, 18.262)	24	(200.54, 3)	(226.348, -4.60482)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	201.57735	2.6323145	601.05503	23.4067	9.9355548	0

2	Optimized	202.4621	1.9341915	557.49633	70.220101	29.806664	0
3	Optimized	203.32115	1.250845	514.84945	115.47281	49.015302	0
4	Optimized	204.15445	0.582275	473.13247	160.20367	68.002424	0
5	Optimized	204.7253	0.123995	444.53385	190.71414	80.953351	0
6	Optimized	205.1423	-0.21134	423.60612	208.87484	88.662108	0
7	Optimized	205.75385	-0.6954645	393.40414	233.56924	99.144259	0
8	Optimized	206.4513	-1.2410335	359.35466	259.08093	109.97333	0
9	Optimized	207.0447	-1.705249	330.40043	276.4575	117.34925	0
10	Optimized	207.71165	-2.18245	300.61311	299.93645	127.31547	0
11	Optimized	208.55615	-2.75399	264.94632	310.94932	131.99016	0
12	Optimized	209.54055	-3.37438	226.23992	333.06991	141.37979	0
13	Optimized	210.4675	-3.9042125	193.18085	348.9317	148.11272	0
14	Optimized	211.19705	-4.2946375	168.8157	352.02569	149.42604	0

15	Optimized	212.04045	-4.58309	150.81305	411.8163	174.80565	0
16	Optimized	212.75955	-4.714418	142.6202	403.17049	171.13572	0
17	Optimized	213.3362	-4.8057595	136.92123	391.51407	166.18786	0
18	Optimized	214.0086	-4.9122665	130.27457	380.83535	161.65501	0
19	Optimized	214.80835	-5.0251115	123.2298	373.53031	158.55421	0
20	Optimized	215.7354	-5.144295	115.79407	356.19811	151.19713	0
21	Optimized	216.66245	-5.2634785	108.35835	338.87661	143.84459	0
22	Optimized	217.5554	-5.360105	102.32993	328.94664	139.62957	0
23	Optimized	218.41425	-5.434175	97.707257	309.30752	131.29325	0
24	Optimized	219.27315	-5.508245	93.08574	289.66839	122.95694	0
25	Optimized	220.1582	-5.5591565	89.908819	276.67627	117.44211	0
26	Optimized	221.06945	-5.58691	88.17685	250.51575	106.33763	0
27	Optimized	221.9807	-5.6146635	86.44481	224.34426	95.228491	0

28	Optimized	222.9511	-5.594915	87.677452	204.45666	86.786704	0
29	Optimized	223.9807	-5.527665	91.874168	163.50718	69.404678	0
30	Optimized	225.1129	-5.37366	101.48302	121.40285	51.532451	0
31	Optimized	225.96515	-5.1632635	114.61285	78.913863	33.496948	0
32	Optimized	226.7691	-4.8551315	133.84317	28.945071	12.286454	0

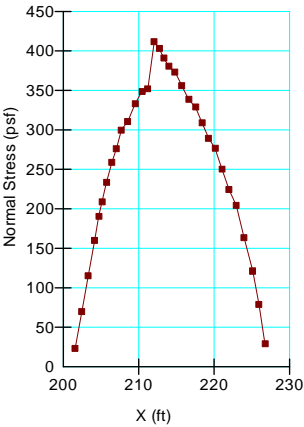
Slices of Slip Surface: 9753

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	9753	200.76975	2.7288425	607.07361	18.960509	8.0482585	0
2	9753	201.4149	2.0072755	562.05664	67.687173	28.7315	0
3	9753	202.2447	1.1491592	508.51187	126.40808	53.657046	0
4	9753	203.0745	0.37072615	459.93528	182.78431	77.587335	0
5	9753	203.9032	-0.3372634	415.75818	229.85599	97.56808	0
6	9753	204.73085	-0.9826819	375.48381	267.55898	113.57205	0

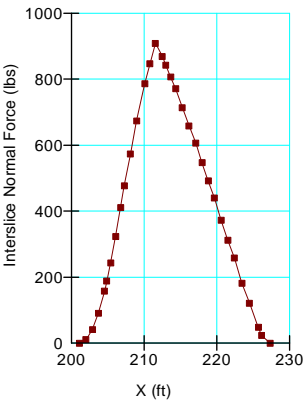
7	9753	205.5585	-1.57256	338.66802	303.18223	128.69322	0
8	9753	206.38615	-2.111739	305.02877	336.72887	142.93292	0
9	9753	207.24285	-2.6198375	273.3237	360.58644	153.05986	0
10	9753	208.12855	-3.097157	243.53828	373.99085	158.7497	0
11	9753	209.01425	-3.5280285	216.65461	384.15668	163.06484	0
12	9753	209.9	-3.915166	192.49464	391.12507	166.02274	0
13	9753	210.78575	-4.2608295	170.9285	394.86615	167.61074	0
14	9753	211.67145	-4.566907	151.82104	395.3749	167.82669	0
15	9753	212.55715	-4.834975	135.09554	392.59323	166.64594	0
16	9753	213.44	-5.065715	120.70397	390.8683	165.91375	0
17	9753	214.32	-5.2604345	108.5486	390.44255	165.73303	0
18	9753	215.2	-5.420866	98.537449	386.94718	164.24933	0
19	9753	216.08	-5.5477035	90.622968	380.28023	161.41938	0

20	9753	216.96	-5.641482	84.771904	370.31037	157.18743	0
21	9753	217.84	-5.7025905	80.958547	356.9117	151.50003	0
22	9753	218.72	-5.731279	79.168121	339.88604	144.27306	0
23	9753	219.6	-5.7276635	79.393635	319.04462	135.42641	0
24	9753	220.48	-5.69173	81.636524	294.12108	124.84699	0
25	9753	221.36	-5.6233325	85.904307	264.83344	112.41512	0
26	9753	222.24	-5.5221905	92.215422	230.81169	97.973751	0
27	9753	223.12	-5.387883	100.59658	191.65306	81.351896	0
28	9753	224	-5.21984	111.08248	146.81112	62.317622	0
29	9753	224.88	-5.01733	123.71695	95.671726	40.610238	0
30	9753	225.76	-4.779443	138.55914	37.437592	15.891315	0
31	9753	226.2741	-4.6281755	148.00236	2.9549643	1.2543079	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 365
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 7:20:48 AM
File Name: Reach 34_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 7:28:32 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL -4.8 to -7 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 84 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill 2 EL. 0 to -3.5

Model: Spatial Mohr-Coulomb
Weight Fn: Fill2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Marsh EL. -7 to -14 (Protected)

Model: Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

PLEISTOCENE CLAY, EL. -63 TO -70

Model: Spatial Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 23 °

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.7 TO 0

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -3.5 to -14

Model: Spatial Mohr-Coulomb
Weight Spatial Fn: Marsh Gamma
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -10 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -46 TO -63

Model: Spatial Mohr-Coulomb

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (175.4, -5.57146) ft
Left-Zone Right Coordinate: (206.46074, 1.5) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (217.54725, -1.9) ft
Right-Zone Right Coordinate: (247.9, -5.8) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (120, -12) ft
Right Coordinate: (310, -5.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
120	0.4
190	0.4
200	0.4
200	-7.8
310	-7.8

Unit Weight Functions

Fill2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 84

Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.4, 84)
Data Point: (200, 98)
Data Point: (227, 84)

Spatial Functions

Marsh Gamma

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (180.4, -3.5, 94)
Data Point: (180.4, -14, 94)
Data Point: (200, -3.5, 102)
Data Point: (200, -14, 102)
Data Point: (227, -7, 94)
Data Point: (227, -14, 94)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL. -10 TO -46	21,17,42,35,12,6,38,5,36	4999.75
Region 2	BAY SOUND CLAY, EL. -46 TO -63	5,38,6,44,43	3230
Region 3		19,20,11,18	7.7
Region 4	EMBANKMENT FILL, EL. +2.7 TO 0	23,18,37,1,13	20.85
Region 5	EMBANKMENT FILL, EL. +2.7 TO 0	18,11,9,26,23	18.289813
Region 6	Fill 2 EL. 0 to -3.5	23,22,24,13	53.9
Region 7	Fill 2 EL. 0 to -3.5	23,26,25,2,30,22	104.20037
Region 8	MARSH, EL. -3.5 to -14	22,24,27,34,28,29,17	220.58209
Region 9	MARSH, EL. -3.5 to -14	22,17,42,31,30	236.25
Region 10	Fill, EL -4.8 to -7 (Protected Side)	2,3,4,32,30	108.55
Region 11	Marsh EL. -7 to -14 (Protected)	30,32,33,31	581
Region 12	BEACH SAND, EL. -10 TO -46	31,33,12,35,42	480.25
Region 13	BEACH SAND, EL. -10 TO -46	17,29,41,39,10,45,36,21	557.08778
Region 14	Silted-in Layer	10,45,46,16,15,14,34,40,41,39	175.0014
Region 15	Marsh EL. -7 to -14 (Protected)	41,40,34,28,29	80.694834
Region 16	PLEISTOCENE CLAY, EL. -63 TO -70	7,43,44,8	1330

Points

	X (ft)	Y (ft)
Point 1	195	2.5
Point 2	227	-4.8
Point 3	244.9	-5.8
Point 4	310	-5.8
Point 5	120	-46
Point 6	310	-46
Point 7	120	-70
Point 8	310	-70
Point 9	203.2	2.5
Point 10	140	-15.4
Point 11	201	2.5
Point 12	310	-19
Point 13	188.8	0
Point 14	168.6	-8.4
Point 15	158.5	-10.8
Point 16	140	-12
Point 17	200	-14
Point 18	200	2.7
Point 19	200	12.9
Point 20	200.5	12.9
Point 21	200	-21.5
Point 22	200	-3.5
Point 23	200	0
Point 24	180.4	-3.5
Point 25	222.76443	-3.5
Point 26	211.35185	0
Point 27	177.25465	-4.8
Point 28	180.4	-7
Point 29	180.4	-14
Point 30	227	-7
Point 31	227	-14
Point 32	310	-7
Point 33	310	-14

Point 34	171.9657	-7
Point 35	227	-19
Point 36	120	-21.5
Point 37	199	2.7
Point 38	200	-46
Point 39	158.5	-14.2
Point 40	168.6	-12.4
Point 41	159.62222	-14
Point 42	200.9	-14
Point 43	120	-63
Point 44	310	-63
Point 45	120	-15.4
Point 46	120	-12

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.57	(219.395, 18.915)	14.02556	(199.896, 2.7)	(228.417, -4.87919)
2	10740	1.59	(219.395, 18.915)	25.24	(200.063, 2.68747)	(227.896, -4.85008)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	199.948	2.6594415	140.98732	3.3718975	1.4312856	0
2	Optimized	200.25	2.423868	637.97413	18.800493	7.9803359	0
3	Optimized	200.75	2.0338375	613.62589	42.912181	18.21514	0
4	Optimiz	201.24985	1.643916	-	71.171699	30.210594	0

	ed			589.30804			
5	Optimized	201.9014	1.0998425	555.34889	112.39058	47.706972	0
6	Optimized	202.70485	0.4015075	511.76982	168.45436	71.504632	0
7	Optimized	203.13825	0.02617	488.35205	201.89032	85.697358	0
8	Optimized	203.18495	0.012450775	485.93859	204.90483	86.97694	0
9	Optimized	203.8333	-0.54847078	-452.494	226.55429	96.166591	0
10	Optimized	204.9576	-1.4148425	398.43392	272.16883	115.52881	0
11	Optimized	205.9396	-2.1004475	355.64974	295.6734	125.50591	0
12	Optimized	206.8437	-2.681785	319.37208	329.6859	139.94336	0
13	Optimized	207.6699	-3.158855	289.60455	342.06458	145.1978	0
14	Optimized	208.4961	-3.635925	259.83702	354.11834	150.31432	0
15	Optimized	209.40075	-4.1193525	229.67691	377.00445	160.02889	0
16	Optimized	210.3839	-4.6091375	199.11341	384.94349	163.39882	0
17	Optimized	211.1137	-4.896017	181.209	449.90711	190.97424	0

				37			
18	Optimized	211.71135	-5.001371	174.64081	439.98527	186.76267	0
19	Optimized	212.3678	-5.117089	167.42065	430.77078	182.85135	0
20	Optimized	213.16975	-5.24477	159.45121	424.48497	180.18318	0
21	Optimized	214.1796	-5.39543	150.04868	407.89342	173.14049	0
22	Optimized	215.2393	-5.539135	141.0785	394.73896	167.55675	0
23	Optimized	216.34895	-5.675885	132.54564	373.84507	158.68782	0
24	Optimized	217.27485	-5.7791015	126.10356	361.26951	153.34981	0
25	Optimized	218.01695	-5.848784	121.75539	345.17016	146.51604	0
26	Optimized	218.71205	-5.9140525	117.68248	330.30364	140.20558	0
27	Optimized	219.6199	-5.97098	114.13054	317.11864	134.60888	0
28	Optimized	220.7875	-6.02398	110.81956	286.96901	121.81112	0
29	Optimized	222.06785	-6.0420175	109.69686	259.14386	110.00004	0
30	Optimized	223.17205	-6.0286025	110.535	224.52653	95.305859	0

				2			
31	Optimized	224.26485	-5.95832	114.92316	194.89497	82.728006	0
32	Optimized	225.64535	-5.76165	127.19385	141.37439	60.009868	0
33	Optimized	226.67035	-5.511084	142.82495	93.361842	39.629751	0
34	Optimized	227.7087	-5.135522	166.26462	33.945555	14.409033	0

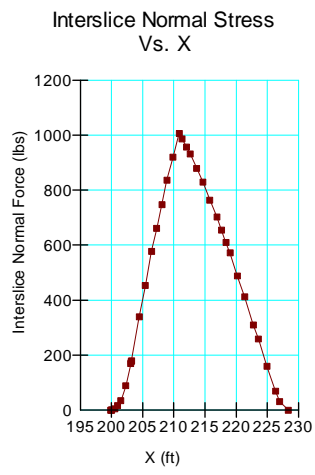
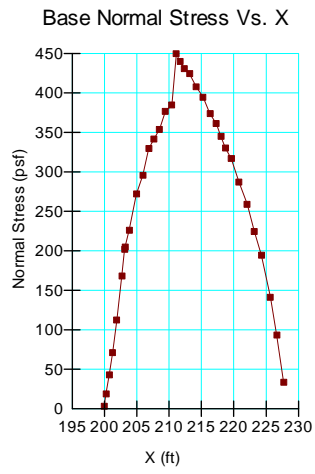
Slices of Slip Surface: 10740

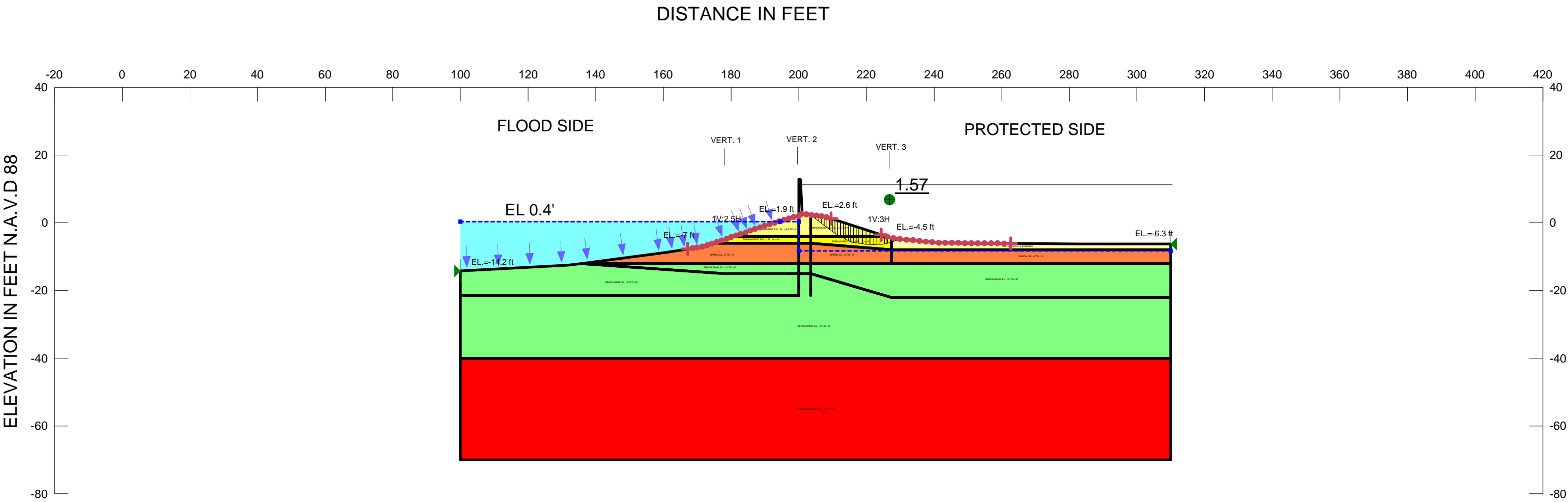
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	10740	200.28135	2.433877	638.59712	15.081679	6.401793	0
2	10740	200.75	1.906241	605.66441	47.321997	20.086996	0
3	10740	201.42075	1.2051843	561.92474	98.038643	41.614935	0
4	10740	202.2622	0.3890878	510.99877	165.3393	70.182369	0
5	10740	202.94145	-0.2222822	472.84264	216.18429	91.764786	0
6	10740	203.6429	-0.7984702	436.89808	250.89075	106.4968	0
7	10740	204.52875	-1.4752925	394.6600	283.79217	120.46263	0

				3			
8	10740	205.4146	-2.092955	356.12283	312.91968	132.82653	0
9	10740	206.3004	-2.656558	320.95413	338.36299	143.62657	0
10	10740	207.1862	-3.170253	288.89673	360.18973	152.89147	0
11	10740	208.07205	-3.63746	259.74568	378.45025	160.6426	0
12	10740	208.9579	-4.061022	233.31485	393.19206	166.90013	0
13	10740	209.8437	-4.443318	209.45309	404.45501	171.68097	0
14	10740	210.7295	-4.7863495	188.04671	412.2481	174.98894	0
15	10740	211.26215	-4.978812	176.04027	415.76949	176.48368	0
16	10740	211.80225	-5.151436	165.2737	420.33577	178.42195	0
17	10740	212.703	-5.417389	148.67799	426.85246	181.18812	0
18	10740	213.6038	-5.6474375	134.3185	430.10878	182.57035	0
19	10740	214.5046	-5.8425835	122.14192	430.05064	182.54566	0
20	10740	215.4054	-6.003648	112.09509	426.6322	181.09462	0
21	10740	216.3062	-6.13129	-	419.78216	178.18696	0

				104.12801			
22	10740	217.207	-6.226019	98.216657	409.41394	173.78591	0
23	10740	218.1078	-6.2882065	94.336307	395.40359	167.83887	0
24	10740	219.0086	-6.3180935	92.471222	377.61274	160.2871	0
25	10740	219.9094	-6.3157945	92.614852	355.89081	151.06668	0
26	10740	220.8102	-6.2813015	94.767126	330.04453	140.09559	0
27	10740	221.63655	-6.222466	98.437789	303.43472	128.8004	0
28	10740	222.38845	-6.144016	103.33343	276.84374	117.5132	0
29	10740	223.18795	-6.034699	110.15471	245.15393	104.06167	0
30	10740	224.0351	-5.891064	119.12145	207.6561	88.144785	0
31	10740	224.88225	-5.717467	129.94865	165.72543	70.346271	0
32	10740	225.72935	-5.5132685	142.68674	118.97608	50.502349	0
33	10740	226.57645	-5.2776925	157.3921	66.93125	28.41063	0
34	10740	227.4482	-5.001017	174.6591	19.894295	8.4446273	0

				8			
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Name: EMBANKMENT FILL, EL. +2.6 TO -6 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 88 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -12 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: FILL, EL. -6.8 to -8 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: EMBANKMENT FILL 2, EL. -4 to -6 Model: Mohr-Coulomb Unit Weight: 88 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35A STA. 102+42 TO STA. 103+50
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 371
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Date: 1/27/2012
Time: 7:28:01 AM
File Name: Reach 35A_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 7:33:38 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Fn: Clay
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. -6.8 to -8 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. -4 to -6

Model: Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (167.1, -7.77143) ft
Left-Zone Right Coordinate: (209.6, 1.22462) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (224.3, -3.50302) ft
Right-Zone Right Coordinate: (262.6, -6.10528) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (100, -14.2) ft
Right Coordinate: (310, -6.3) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.6 TO -6

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -6 TO -12

Model: Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -40

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -40 TO -70

Model: Spatial Mohr-Coulomb

Piezometric Lines

Piezometric Line 1

Coordinates	
X (ft)	Y (ft)
100	0.4
194.5	0.4
200	0.4
200	-8.3
310	-8.3

Unit Weight Functions

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (103, 107)
Data Point: (174.8, 107)
Data Point: (200, 108)
Data Point: (227.4, 107)
Data Point: (310, 107)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.6 TO -6	2,35,31,36,41	61.349915
Region 2	EMBANKMENT FILL 2, EL. -4 to -6	40,4,25,11,14,36,37	78.311328
Region 3	BEACH SAND, EL. -12 TO -40	1,28,29,44,45,18,9,12	776.65176
Region 4	BEACH SAND, EL. -12 TO -40	12,9,18,22,16,20,6,5	3938.15
Region 5	BAY SOUND CLAY, EL. -40 TO -70	5,6,8,7	6300
Region 6	BEACH SAND, EL. -12 TO -40	18,17,21,15,19,20,16,22	991.85
Region 7	MARSH, EL. -6 TO -12	44,43,30,42,14,24,34,17	253.04524
Region 8	MARSH, EL. -6 TO -12	17,34,24,14,11,25,15,21	140.5
Region 9	BEACH SAND, EL. -12 TO -40	44,17,18,45	129.44189

Region 10	MARSH, EL. -6 TO -12	15,25,26,19	330.4
Region 11	FILL, EL. -6.8 to -8 (protected)	4,25,26,27,38,39	163.94
Region 12		13,32,33,23	7.725
Region 13	EMBANKMENT FILL 2, EL. -4 to -6	42,41,36,14	44.47119
Region 14	EMBANKMENT FILL, EL. +2.6 TO -6	36,31,13,23,46,3,40,37	101.34367

Points

	X (ft)	Y (ft)
Point 1	100	-15
Point 2	189.2	-1.1
Point 3	207.5	1.9
Point 4	227.4	-4.5
Point 5	100	-40
Point 6	310	-40
Point 7	100	-70
Point 8	310	-70
Point 9	200	-21.5
Point 10	203.5	-21.5
Point 11	203.5	-6
Point 12	100	-21.5
Point 13	200	2.6
Point 14	200	-6
Point 15	227.4	-12
Point 16	227.4	-22
Point 17	200	-12
Point 18	200	-15
Point 19	310	-12
Point 20	310	-22
Point 21	203.5	-12
Point 22	203.5	-15
Point 23	201	2.6
Point 24	200	-7
Point 25	227.4	-8
Point 26	310	-8
Point 27	310	-6.3

Point 28	100	-14.2
Point 29	131.8	-12.5
Point 30	171.9	-7
Point 31	200	1.9
Point 32	200	12.9
Point 33	200.5	12.9
Point 34	200	-10
Point 35	199	1.9
Point 36	200	-4
Point 37	203.5	-4
Point 38	282.9	-6.3
Point 39	241.2	-5.9
Point 40	225.84531	-4
Point 41	180.69661	-4
Point 42	174.8322	-6
Point 43	160.7	-8.8
Point 44	135.70541	-12
Point 45	178	-15
Point 46	203.5	2.33077

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.57	(221.464, 12.614)	13.2582	(203.602, 2.31976)	(230.214, -4.78545)
2	2853	1.59	(221.464, 12.614)	19.313	(205.236, 2.14384)	(229.91, -4.75464)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	203.9355	2.0531455	646.03739	18.654347	7.9183006	0

2	Optimized	204.6021	1.5199085	612.7679	55.96187	23.754405	0
3	Optimized	205.41075	0.869045	572.14818	101.20262	42.957963	0
4	Optimized	206.2896	0.1638175	528.14207	151.17205	64.168728	0
5	Optimized	207.09655	-0.47814755	488.07973	196.12217	83.248921	0
6	Optimized	207.88125	-1.1024551	449.1294	233.23654	99.003038	0
7	Optimized	208.67055	-1.69063	412.42303	270.88592	114.98425	0
8	Optimized	209.4866	-2.26033	376.87296	296.77979	125.97555	0
9	Optimized	210.292	-2.78765	343.96707	331.54061	140.73064	0
10	Optimized	211.0868	-3.27259	313.7118	351.60338	149.24678	0
11	Optimized	211.8816	-3.75753	283.44579	371.66616	157.76293	0
12	Optimized	212.3263	-4.02885	266.5208	382.38684	162.31359	0
13	Optimized	212.7588	-4.2687625	251.55029	397.68556	168.8075	0
14	Optimized	213.52915	-4.6908875	225.20792	405.77952	172.24319	0

15	Optimized	214.2862	-5.0868575	200.50549	421.86336	179.07037	0
16	Optimized	215.02995	-5.4566725	177.42581	427.07645	181.2832	0
17	Optimized	215.79435	-5.70975	161.62703	495.94903	210.51788	0
18	Optimized	216.5795	-5.84609	153.11903	480.48906	203.9555	0
19	Optimized	217.36465	-5.98243	144.61102	465.02908	197.39313	0
20	Optimized	218.3079	-6.1159075	136.28499	457.22869	194.08207	0
21	Optimized	219.40925	-6.2465225	128.13404	429.49382	182.30931	0
22	Optimized	220.50825	-6.3407275	122.26292	413.55591	175.54407	0
23	Optimized	221.60495	-6.3985225	118.64794	378.2347	160.55111	0
24	Optimized	222.61835	-6.414	117.68535	358.75222	152.28128	0
25	Optimized	223.5484	-6.38716	119.36196	320.01816	135.83965	0
26	Optimized	224.66635	-6.294835	125.12439	283.18145	120.2034	0
27	Optimized	225.5823	-6.1612665	133.45622	245.32653	104.13493	0

28	Optimized	226.0485	-6.0643715	139.50227	216.33129	91.827183	0
29	Optimized	226.82585	-5.847819	153.01956	177.15072	75.196021	0
30	Optimized	227.75175	-5.566709	170.55527	130.02	55.190215	0
31	Optimized	228.63105	-5.2913015	187.74274	85.009651	36.084456	0
32	Optimized	229.68615	-4.9540645	208.78661	28.33655	12.028152	0

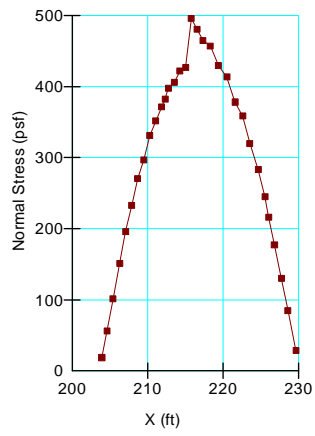
Slices of Slip Surface: 2853

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	2853	205.61315	1.600687	617.80008	32.265917	13.696069	0
2	2853	206.3679	0.5839641	554.35782	98.144049	41.659677	0
3	2853	207.12265	-0.3084326	498.67186	161.49674	68.5513	0
4	2853	207.9117	-1.1331472	447.20963	217.9574	92.517427	0
5	2853	208.7351	-1.9001185	399.35027	266.53787	113.13861	0
6	2853	209.5585	-2.5837355	356.69216	310.66922	131.87126	0

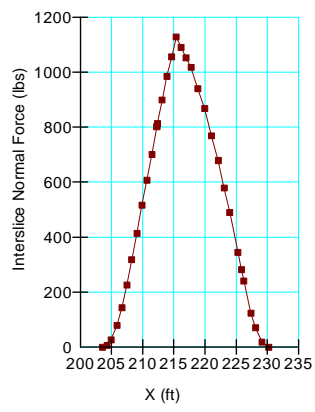
7	2853	210.3819	-3.194891	318.55894	350.48046	148.77013	0
8	2853	211.2053	-3.741756	284.43729	386.0845	163.88315	0
9	2853	212.0355	-4.2341995	253.70364	413.6121	175.56792	0
10	2853	212.8725	-4.676353	226.11842	433.21263	183.88785	0
11	2853	213.70945	-5.0678475	201.68127	449.19819	190.67332	0
12	2853	214.5464	-5.411994	180.21628	461.61737	195.94495	0
13	2853	215.38335	-5.7114685	161.52669	470.48447	199.70881	0
14	2853	216.2203	-5.9684365	145.48427	475.79059	201.96112	0
15	2853	217.05725	-6.184646	131.99556	477.50823	202.69022	0
16	2853	217.8942	-6.361493	120.96629	475.56356	201.86476	0
17	2853	218.7312	-6.500072	112.31496	469.8685	199.44734	0
18	2853	219.56815	-6.601213	106.00431	460.32068	195.39453	0
19	2853	220.4051	-6.6655065	101.99243	446.73284	189.62684	0

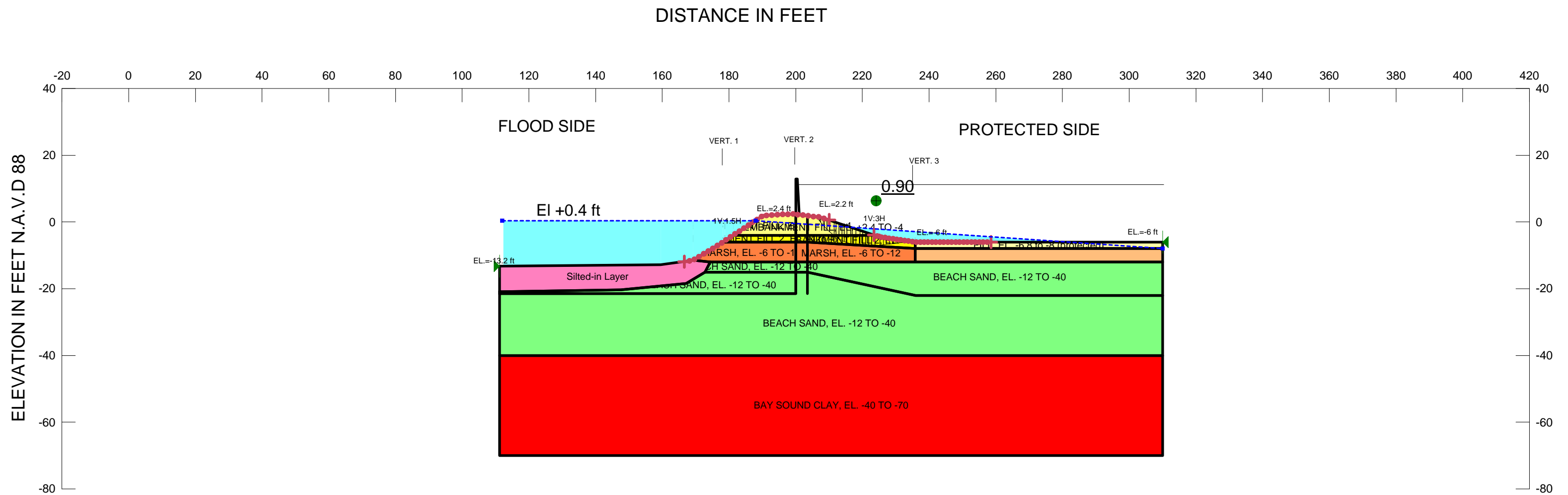
20	2853	221.24205	-6.693321	100.25662	428.94243	182.07526	0
21	2853	222.079	-6.6848145	100.78808	406.68475	172.62743	0
22	2853	222.91595	-6.6399395	103.58719	379.65924	161.15579	0
23	2853	223.7529	-6.5584395	108.67391	347.49171	147.50148	0
24	2853	224.5899	-6.439844	116.07375	309.72415	131.4701	0
25	2853	225.42685	-6.283453	125.83647	265.7756	112.81505	0
26	2853	226.234	-6.096628	137.49623	220.4178	93.561807	0
27	2853	227.01135	-5.880981	150.94511	173.76554	73.759097	0
28	2853	227.81835	-5.618627	167.31245	140.31492	59.560149	0
29	2853	228.655	-5.3049725	186.88696	91.928242	39.021224	0
30	2853	229.49165	-4.945869	209.29776	33.115441	14.056671	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +2.4 TO -4	Model: Mohr-Coulomb	Unit Weight: 110 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH, EL. -6 TO -12	Model: Mohr-Coulomb	Unit Weight: 88 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BEACH SAND, EL. -12 TO -40	Model: Mohr-Coulomb	Unit Weight: 122 pcf	Cohesion: 0 psf	Phi: 30 °	Piezometric Line: 1
Name: BAY SOUND CLAY, EL. -40 TO -70	Model: Spatial Mohr-Coulomb	Weight Fn: Clay	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: Silted-in Layer	Model: Mohr-Coulomb	Unit Weight: 90 pcf	Cohesion: 0 psf	Phi: 28 °	Piezometric Line: 1
Name: FILL, EL. -6.8 to -8 (protected)	Model: Mohr-Coulomb	Unit Weight: 96 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: EMBANKMENT FILL 2, EL. -4 to -6	Model: Mohr-Coulomb	Unit Weight: 88 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH, EL. -8 TO -12 (protected)	Model: Mohr-Coulomb	Unit Weight: 96 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

 $H_w = \text{CANAL WATER LEVEL}$

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B STA. 103+50 TO STA. 114+66
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

5. LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 337
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 7:48:30 AM
File Name: Reach 35B_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 7:51:02 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Fn: Clay
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

FILL, EL. -6.8 to -8 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

EMBANKMENT FILL 2, EL. -4 to -6

Model: Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -8 TO -12 (protected)

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (166.6, -11.85816) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.4 TO -4

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -6 TO -12

Model: Mohr-Coulomb
Unit Weight: 88 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -12 TO -40

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY, EL. -40 TO -70

Model: Spatial Mohr-Coulomb

Left-Zone Right Coordinate: (210, 0.57135) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (223.4, -3.87022) ft
Right-Zone Right Coordinate: (258.6, -6) ft
Right-Zone Increment: 30
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (111.2, -13.2) ft
Right Coordinate: (310, -6) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
112	0.4
188	0.4
310	-8

Unit Weight Functions

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 107
Data Points: X (ft), Unit Weight (pcf)
Data Point: (111.2, 107)
Data Point: (178.2, 107)
Data Point: (200, 108)
Data Point: (235.5, 107)
Data Point: (310, 107)

Regions

	Material	Points	Area (ft²)
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Region 1	EMBANKMENT FILL, EL. +2.4 TO -4	44,4,40,35,15,41	86.9756
Region 2	EMBANKMENT FILL 2, EL. -4 to -6	43,38,6,29,13,17,41,46	90.397883
Region 3	BEACH SAND, EL. -12 TO -40	1,2,28,16,21,11,14	278.58
Region 4	BEACH SAND, EL. -12 TO -40	14,11,21,25,19,23,8,7	3760.7
Region 5	BAY SOUND CLAY, EL. -40 TO -70	7,8,10,9	5964
Region 6	BEACH SAND, EL. -12 TO -40	21,20,24,18,22,23,19,25	962.1
Region 7	MARSH, EL. -6 TO -12	3,34,45,17,27,39,20	158.45
Region 8	MARSH, EL. -6 TO -12	20,39,27,17,13,29,18,24	182.5
Region 9	BEACH SAND, EL. -12 TO -40	16,3,20,21	79.2
Region 10	MARSH, EL. -8 TO -12 (protected)	18,29,30,22	296.8
Region 11	FILL, EL. -6.8 to -8 (protected)	6,29,30,31	148.4
Region 12	Silted-in Layer	1,32,33,34,3,16,28,2	437.325
Region 13		15,35,36,37,26	8.025
Region 14	EMBANKMENT FILL 2, EL. -4 to -6	45,42,44,41,17	40.5744
Region 15	EMBANKMENT FILL, EL. +2.4 TO -4	41,15,26,48,47,5,43,46	87.887136

Points

	X (ft)	Y (ft)
Point 1	111.2	-20.9
Point 2	147.6	-20.3
Point 3	174.4	-12
Point 4	190.2	1.9
Point 5	207.5	1.4
Point 6	235.8	-6
Point 7	111.2	-40
Point 8	310	-40
Point 9	111.2	-70
Point 10	310	-70
Point 11	200	-21.5
Point 12	203.5	-21.5
Point 13	203.5	-6
Point 14	111.2	-21.5
Point 15	200	2.2
Point 16	172.8	-15
Point 17	200	-6

Point 18	235.8	-12
Point 19	235.9	-22
Point 20	200	-12
Point 21	200	-15
Point 22	310	-12
Point 23	310	-22
Point 24	203.5	-12
Point 25	203.5	-15
Point 26	201	2.2
Point 27	200	-7
Point 28	167.2	-18.4
Point 29	235.8	-8
Point 30	310	-8
Point 31	310	-6
Point 32	111.2	-13.2
Point 33	159.5	-12.8
Point 34	169.3	-11.5
Point 35	200	2.4
Point 36	200	12.9
Point 37	200.5	12.9
Point 38	225.3	-4.5
Point 39	200	-10
Point 40	199	2.4
Point 41	200	-4
Point 42	178.8	-5.6
Point 43	223.79153	-4
Point 44	181.232	-4
Point 45	178.2	-6
Point 46	203.5	-4
Point 47	203.5	1.89231
Point 48	201.9	2.08923

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
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1	Optimized	0.90	(222.361, 12.689)	14.17955	(206.211, 1.55866)	(235.054, -5.89343)
2	26180	0.93	(222.361, 12.689)	20.252	(205.375, 1.66157)	(231.497, -5.38534)

Slices of Slip Surface: Optimized

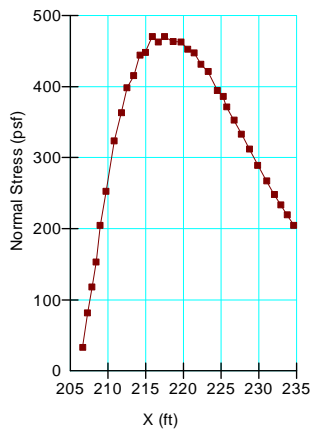
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	206.6628	0.9851385	-116.69232	33.273165	14.12362	0
2	Optimized	207.30735	0.17652736	-69.007133	81.549397	34.615665	0
3	Optimized	207.88385	-0.52702274	-27.582802	117.68717	49.955241	0
4	Optimized	208.435	-1.1996601	12.022113	153.34638	59.988594	0
5	Optimized	208.9928	-1.789385	46.424266	204.57364	67.130425	0
6	Optimized	209.77385	-2.560475	91.184829	252.74452	68.57802	0
7	Optimized	210.8372	-3.47301	143.56088	323.68772	76.459307	0
8	Optimized	211.79565	-4.22375	186.28628	363.00952	75.014565	0
9	Optimized	212.52995	-4.721245	214.17114	398.62166	78.294601	0
10	Optimized	213.42725	-5.268735	244.48161	415.54644	72.61271	0
11	Optimized	214.2423	-5.706715	268.31321	444.46575	74.772316	0
12	Optimized	214.9751	-6.035185	285.65949	448.33847	69.053127	0
13	Optimized	215.88105	-6.3227675	299.70948	470.49971	72.496151	0
14	Optimized	216.6805	-6.5055325	307.68706	462.77769	65.832066	0
15	Optimized	217.5171	-6.6512875	313.18355	470.29408	66.689464	0

	ed						
16	Optimized	218.6705	-6.8239625	319.00563	463.42591	61.302769	0
17	Optimized	219.68585	-6.9483375	322.40355	463.15771	59.746593	0
18	Optimized	220.5631	-7.0244125	323.38023	452.75503	54.916346	0
19	Optimized	221.4523	-7.0742325	322.66255	447.35915	52.930563	0
20	Optimized	222.35345	-7.0977975	320.26646	431.36302	47.15769	0
21	Optimized	223.29775	-7.078337	314.99851	421.05582	45.018659	0
22	Optimized	224.5095	-7.001662	305.00434	394.29204	37.90038	0
23	Optimized	225.26375	-6.951885	298.66271	386.0528	37.094895	0
24	Optimized	225.76915	-6.891315	292.70611	371.32968	33.373723	0
25	Optimized	226.70745	-6.778865	281.6586	352.82192	30.207038	0
26	Optimized	227.7032	-6.65756	269.81212	333.33113	26.962222	0
27	Optimized	228.75645	-6.5274	257.16674	312.15813	23.342461	0
28	Optimized	229.87725	-6.3975875	244.24502	289.36962	19.154254	0
29	Optimized	231.06555	-6.2681225	231.06068	267.22561	15.351101	0
30	Optimized	232.084	-6.1646445	220.23312	247.9647	11.771358	0
31	Optimized	232.9326	-6.087154	211.74817	233.64708	9.2955369	0
32	Optimized	233.78115	-6.0096635	203.27496	219.32946	6.8147345	0
33	Optimized	234.6297	-5.932173	194.79001	205.01185	4.3389135	0

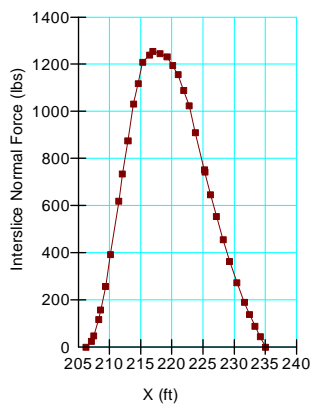
Slices of Slip Surface: 26180

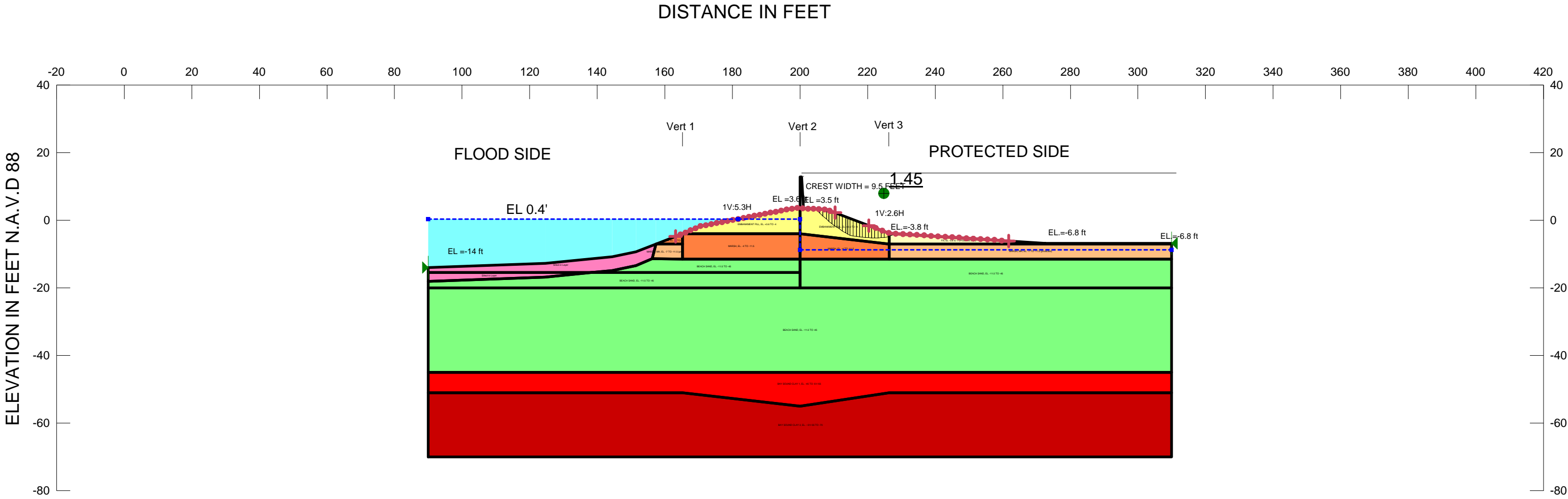
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	26180	205.8751	0.95841665	-111.64345	39.932999	16.950552	0
2	26180	206.8757	-0.3394084	-34.958466	121.86405	51.72822	0
3	26180	207.438	-1.0016701	3.9509378	168.67794	69.922465	0
4	26180	207.92355	-1.5002355	32.975462	205.90219	73.40304	0
5	26180	208.77065	-2.314882	80.170153	265.05531	78.479092	0
6	26180	209.61775	-3.0416775	121.886	316.82289	82.7458	0
7	26180	210.46485	-3.6924035	158.84675	361.92798	86.202866	0
8	26180	211.3494	-4.298847	192.89049	397.38444	86.802533	0
9	26180	212.27145	-4.8627205	224.11152	423.22147	84.517158	0
10	26180	213.1935	-5.3618955	251.30035	443.25677	81.480664	0
11	26180	214.1155	-5.801635	274.78253	457.84211	77.704183	0
12	26180	215.03755	-6.1861085	294.81002	467.20467	73.177188	0
13	26180	215.9596	-6.518645	311.59684	471.5315	67.888235	0
14	26180	216.69915	-6.7534145	323.06558	476.06671	64.945126	0
15	26180	217.40355	-6.942083	331.81275	484.0079	64.603008	0
16	26180	218.25525	-7.1378315	340.37397	490.76348	63.83656	0
17	26180	219.107	-7.295377	346.54227	494.0936	62.631826	0
18	26180	219.95875	-7.4156195	350.38675	493.98749	60.954899	0
19	26180	220.81045	-7.4992265	351.94862	490.43365	58.783405	0
20	26180	221.6622	-7.5466535	351.24967	483.34817	56.072489	0
21	26180	222.51395	-7.5581545	348.30279	472.66897	52.790311	0
22	26180	223.36565	-7.5337905	343.12299	458.26343	48.87422	0
23	26180	224.16745	-7.47897	336.26081	444.36025	45.885491	0
24	26180	224.9217	-7.3970765	327.90917	431.45668	43.953308	0
25	26180	225.74265	-7.273868	316.68886	411.62758	40.299098	0
26	26180	226.628	-7.103455	302.2496	393.03269	38.535134	0
27	26180	227.51335	-6.891546	285.22988	370.01674	35.989885	0
28	26180	228.39865	-6.636773	265.52103	342.17584	32.538035	0
29	26180	229.284	-6.3374105	243.04729	308.97299	27.9838	0
30	26180	230.16935	-5.991309	217.63979	269.74661	22.118035	0
31	26180	231.0547	-5.595806	189.15422	223.53106	14.592102	0

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL, EL. +3.6 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: MARSH, EL. -4 TO -11.5 Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BEACH SAND, EL. -11.5 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Piezometric Line: 1
Name: BAY SOUND CLAY 1, EL. -45 TO -51/-55 Model: Spatial Mohr-Coulomb Weight Fn: Clay1 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 28 ° Piezometric Line: 1
Name: MARSH, MH, EL. -7 TO -11.5 (protected) Model: Mohr-Coulomb Unit Weight: 74 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: Fill, EL -3.8 to -7 (Protected Side) Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1
Name: BAY SOUND CLAY 2, EL. --51/-55 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay2 Cohesion: 0 psf Phi: 23 ° Piezometric Line: 1



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

HW=CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 36 STA. 120+39 TO STA. 126+67
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 239
Last Edited By: Johnson, Andrew S MVN
Date: 1/27/2012
Time: 7:47:40 AM
File Name: Reach 36_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 1/27/2012
Last Solved Time: 7:54:20 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0

Weight Fn: Clay1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -7 TO -11.5 (protected)

Model: Mohr-Coulomb
Unit Weight: 74 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill, EL -3.8 to -7 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2, EL. --51/-55 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (163.12, -4.8) ft

Tension Crack Fluid Unit Weight: 9.807 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.6 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, EL. -4 TO -11.5

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND, EL. -11.5 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 1, EL. -45 TO -51/-55

Model: Spatial Mohr-Coulomb

Left-Zone Right Coordinate: (210.3, 2.25914) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (220.4, -1.54194) ft
Right-Zone Right Coordinate: (261.74333, -6.1) ft
Right-Zone Increment: 20
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (90, -14) ft
Right Coordinate: (310, -6.8) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
90	0.4
181.7	0.4
200	0.4
200	-8.8
310	-8.8

Unit Weight Functions

Marsh

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 74
Data Points: X (ft), Unit Weight (pcf)
Data Point: (165.2, 74)
Data Point: (200, 90)
Data Point: (226.4, 74)

Clay1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %

Segment Curvature: 0 %
Y-Intercept: 103
Data Points: X (ft), Unit Weight (pcf)
Data Point: (96, 103)
Data Point: (165.6, 103)
Data Point: (200, 107)
Data Point: (226.4, 103)
Data Point: (310, 103)

Clay2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 118
Data Points: X (ft), Unit Weight (pcf)
Data Point: (96, 118)
Data Point: (165.2, 118)
Data Point: (200, 120)
Data Point: (226.4, 118)
Data Point: (310, 118)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 108
Data Points: X (ft), Unit Weight (pcf)
Data Point: (165.2, 108)
Data Point: (200, 118)
Data Point: (226.4, 108)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +3.6 TO -4	3,34,35,4,5,14	155.595
Region 2		5,17,18,19	7
Region 3	EMBANKMENT FILL, EL. +3.6 TO -4	5,19,6,36,12,14	165.95
Region 4	MARSH, EL. -4 TO -11.5	27,28,3	11.7
Region 5	Fill, EL -3.8 to -7 (Protected Side)	37,7,8,12,36	85.87
Region 6	MARSH, MH, EL. -7 TO -11.5 (protected)	12,8,9,13	376.2
Region 7	BAY SOUND CLAY 1, EL. -45 TO -51/-	29,10,11,30,45,44,46	1442.4

	55		
Region 8	Silted-in Layer	22,25,26,24,28,41,23,39,42,40	197.09974
Region 9	MARSH, MH, EL. -7 TO -11.5 (protected)	41,28,27,38	37.41
Region 10	BEACH SAND, EL. -11.5 TO -45	31,16,15,13,9,33	935
Region 11	BEACH SAND, EL. -11.5 TO -45	10,32,31,33,11	5500
Region 12	MARSH, EL. -4 TO -11.5	3,27,38,15,43,14	261
Region 13	MARSH, EL. -4 TO -11.5	14,12,13,15,43	158.4
Region 14	BEACH SAND, EL. -11.5 TO -45	42,39,23,41,38,15,16	201.69026
Region 15	BEACH SAND, EL. -11.5 TO -45	16,31,32,1,2,42	418.87474
Region 16	Silted-in Layer	1,2,42,40	76.125264
Region 17	BAY SOUND CLAY 2, EL. --51/-55 TO -70	20,29,46,44,45,30,21	4057.6

Points

	X (ft)	Y (ft)
Point 1	90	-18.1
Point 2	124.5	-16.8
Point 3	165.2	-4
Point 4	199	3.6
Point 5	200	3.6
Point 6	207.8	3.2
Point 7	310	-6.8
Point 8	310	-7
Point 9	310	-11.5
Point 10	90	-45
Point 11	310	-45
Point 12	226.4	-7
Point 13	226.4	-11.5

Point 14	200	-4
Point 15	200	-11.5
Point 16	200	-15.5
Point 17	200	12.9
Point 18	200.5	12.9
Point 19	201	3.5
Point 20	90	-70
Point 21	310	-70
Point 22	90	-14
Point 23	151.5	-13.4
Point 24	151.5	-9.3
Point 25	124.6	-12.7
Point 26	144.4	-10.8
Point 27	165.2	-7
Point 28	157.4	-7
Point 29	90	-51
Point 30	310	-51
Point 31	200	-20
Point 32	90	-20
Point 33	310	-20
Point 34	170.7	-1.7
Point 35	196.8	3.3
Point 36	226.4	-3.8
Point 37	272.5	-6.8
Point 38	165.2	-11.5
Point 39	144.4	-14.9
Point 40	90	-15.5
Point 41	156.2	-11.4
Point 42	138.11579	-15.5
Point 43	200	-6.9
Point 44	200	-55
Point 45	226.4	-51
Point 46	165.2	-51

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.45	(220.947, 12.137)	12.54577	(204.571, 3.34244)	(228.604, -3.94341)
2	17718	1.48	(220.947, 12.137)	17.688	(205.626, 3.29589)	(228.351, -3.92695)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	204.88445	3.05026	739.45907	21.988084	9.3333878	0
2	Optimized	205.51055	2.4659	702.99519	65.829978	27.943168	0
3	Optimized	206.2867	1.73632	657.46251	119.78125	50.844126	0
4	Optimized	207.2749	0.82517875	600.61183	190.36496	80.80513	0
5	Optimized	208.1771	0.01123875	549.82402	241.15779	102.36541	0
6	Optimized	208.9781	-0.6567525	508.13473	284.68048	120.83969	0
7	Optimized	209.82595	-1.3123375	467.23016	311.86932	132.38067	0
8	Optimized	210.58155	-1.8645825	432.76731	348.00425	147.71904	0
9	Optimized	211.24485	-2.3134875	404.762	364.45994	154.70407	0

				66			
10	Optimiz ed	212.0602	-2.839735	371.924 64	391.83288	166.32319	0
11	Optimiz ed	213.0307	-3.432905	334.910 6	415.56024	176.39486	0
12	Optimiz ed	213.8355	-3.9012275	305.684 57	437.87768	185.86805	0
13	Optimiz ed	214.47155	-4.2551225	283.606 58	447.30239	189.8686	0
14	Optimiz ed	215.27185	-4.5164825	267.287 9	542.36812	230.22161	0
15	Optimiz ed	216.23635	-4.6853075	256.758 56	519.19541	220.38538	0
16	Optimiz ed	217.1544	-4.82441	248.073 22	509.85303	216.41977	0
17	Optimiz ed	218.02595	-4.93379	241.254 08	483.66936	205.30546	0
18	Optimiz ed	218.8975	-5.04317	234.423 56	457.62229	194.24914	0
19	Optimiz ed	219.79695	-5.128355	229.107 07	443.96691	188.45277	0
20	Optimiz ed	220.72425	-5.189345	225.308 52	409.13437	173.66724	0
21	Optimiz ed	221.6538	-5.2202225	223.381 18	386.81485	164.19316	0
22	Optimiz ed	222.5856	-5.2209875	223.327	343.49082	145.8032	0

				52			
23	Optimiz ed	223.5022	-5.18227	225.744 19	314.57625	133.5297	0
24	Optimiz ed	224.4036	-5.10407	230.629 56	260.66026	110.64372	0
25	Optimiz ed	225.4402	-4.943795	240.629 98	207.60332	88.122381	0
26	Optimiz ed	226.21305	-4.758847	252.168 03	157.71449	66.945828	0
27	Optimiz ed	226.7673	-4.5697965	263.962 35	114.22392	48.485178	0
28	Optimiz ed	227.5019	-4.319242	279.604	68.53461	29.091216	0
29	Optimiz ed	228.23645	-4.0686875	295.232 75	22.8453	9.6972543	0

Slices of Slip Surface: 17718

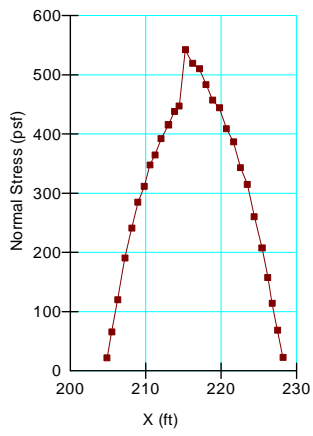
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	17718	205.98875	2.7204465	718.8788 9	34.66337	14.713728	0
2	17718	206.71325	1.65318	652.2753 4	106.59249	45.24583	0
3	17718	207.43775	0.7322605	594.8105	176.34007	74.851918	0
4	17718	208.172	-0.0856461	543.7776 2	234.99088	99.747709	0
5	17718	208.916	-0.8198731	-	281.12553	119.33071	0

				497.9631 2			
6	17718	209.66	-1.4737745	457.1589 6	322.69923	136.97769	0
7	17718	210.404	-2.05854	420.6653 3	359.90436	152.77034	0
8	17718	211.148	-2.5824625	387.9701 5	392.88187	166.76846	0
9	17718	211.892	-3.0518715	358.6808 2	421.77438	179.0326	0
10	17718	212.636	-3.471707	332.4875 1	446.69	189.60866	0
11	17718	213.38	-3.845891	309.1358 2	467.69441	198.5245	0
12	17718	214.124	-4.1775755	288.4410 5	484.84782	205.80569	0
13	17718	214.868	-4.469314	270.2334 6	498.1964	211.47183	0
14	17718	215.612	-4.723186	254.3974 6	507.7313	215.51915	0
15	17718	216.356	-4.940885	240.8066 2	513.44043	217.94253	0
16	17718	217.1	-5.123782	229.3995 3	515.28965	218.72748	0
17	17718	217.844	-5.2729765	220.0810 2	513.20479	217.84251	0
18	17718	218.588	-5.389331	-	507.08219	215.24362	0

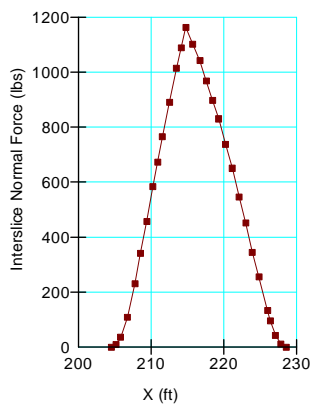
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19	17718	219.332	-5.4734975	207.5703 2	496.81423	210.88513	0
20	17718	220.076	-5.5259375	204.2950 3	482.2238	204.69186	0
21	17718	220.82	-5.546933	202.9921 3	463.07957	196.56562	0
22	17718	221.564	-5.5365965	203.6391 8	439.15406	186.40984	0
23	17718	222.308	-5.4948735	206.2408 6	410.06954	174.06419	0
24	17718	223.052	-5.4215395	210.8149 4	375.45531	159.37132	0
25	17718	223.796	-5.316195	217.3904 1	334.76107	142.09764	0
26	17718	224.54	-5.1782545	225.9907 8	287.35783	121.97616	0
27	17718	225.284	-5.0069295	236.6817 3	232.40781	98.651261	0
28	17718	226.028	-4.8012055	249.5233 7	168.84218	71.669251	0
29	17718	226.72515	-4.5771885	263.5010 1	116.03492	49.2539	0
30	17718	227.3754	-4.337895	278.4395 6	75.661179	32.116265	0
31	17718	228.02565	-4.0689835	-	27.137388	11.519138	0

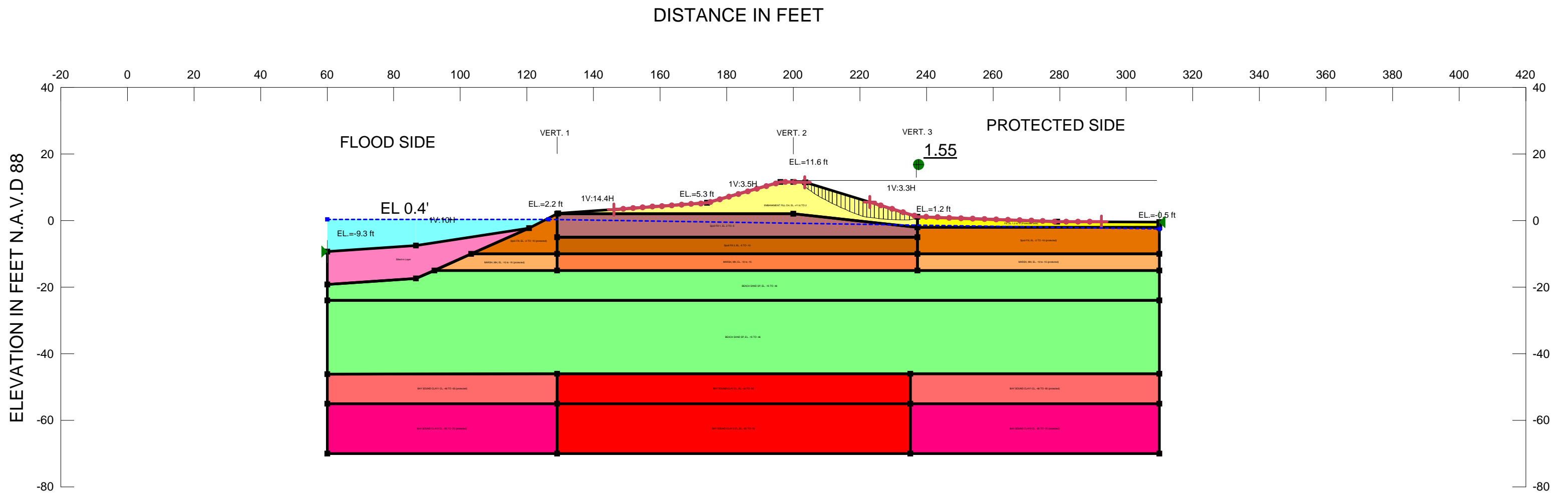
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Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X





Name: EMBANKMENT FILL CH, EL. +11.6 TO 2	Model: Spatial Mohr-Coulomb	Weight Fn: Fill	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH, MH, EL. -10 to -15	Model: Spatial Mohr-Coulomb	Weight Fn: Marsh	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BEACH SAND SP, EL. -15 TO -46	Model: Mohr-Coulomb	Unit Weight: 122 pcf	Cohesion: 0 psf	Phi: 30 °	Piezometric Line: 1
Name: BAY SOUND CLAY CL, EL. -46 TO -55	Model: Spatial Mohr-Coulomb	Weight Fn: Clay 1	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: Silted-in Layer	Model: Mohr-Coulomb	Unit Weight: 90 pcf	Cohesion: 0 psf	Phi: 28 °	Piezometric Line: 1
Name: Fill ,EL 1.2 to -2 (Protected Side)	Model: Mohr-Coulomb	Unit Weight: 112 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: Spoil Fill 1, EL. 2 TO -5	Model: Spatial Mohr-Coulomb	Weight Fn: Spoil Fill 1	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BAY SOUND CLAY2 CL, -55 TO -70 (protected)	Model: Mohr-Coulomb	Unit Weight: 120 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: Spoil Fill 2, EL. -5 TO -10	Model: Mohr-Coulomb	Unit Weight: 85 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: MARSH, MH, EL. -10 to -15 (protected)	Model: Mohr-Coulomb	Unit Weight: 93 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: Spoil Fill, EL. -2 TO -10 (protected)	Model: Mohr-Coulomb	Unit Weight: 109 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BAY SOUND CLAY1 CL, -46 TO -55 (protected)	Model: Mohr-Coulomb	Unit Weight: 108 pcf	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1
Name: BAY SOUND CLAY 2 CL, EL. -55 TO -70	Model: Spatial Mohr-Coulomb	Weight Fn: Clay 2	Cohesion: 0 psf	Phi: 23 °	Piezometric Line: 1



**US Army Corps
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New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 37 STA. 129+03 TO STA. 137+60
FLOOD SIDE STABILITY ANALYSIS
CASE: S-CASE F/S GLOBAL STABILITY
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

 $H_w = \text{CANAL WATER LEVEL}$

Name: PS Slope Stability (Entry/Exit)_Global
File Name: Reach 37_S-Case.gsz Directory: G:\F&MHOME\London Ave Reevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Edited By: Johnson, Andrew S MVN

PS Slope Stability (Entry/Exit)_Global

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File Information

Created By: Liljegren, James
Revision Number: 194
Last Edited By: Johnson, Andrew S MVN
Date: 2/7/2012
Time: 2:10:32 PM
File Name: Reach 37_S-Case.gsz
Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\London Ave. East Side SlopeW S-Case Analysis\
Last Solved Date: 2/7/2012
Last Solved Time: 2:17:58 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

PS Slope Stability (Entry/Exit)_Global

Kind: SLOPE/W
Method: Spencer
Settings
Apply Porewater Correction: No
PWP Conditions Source: Piezometric Line
Use Staged Rapid Drawdown: No
SlipSurface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 5 ft
Optimization Maximum Iterations: 3000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +11.6 TO 2

Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -10 to -15

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BEACH SAND SP, EL. -15 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY CL, EL. -46 TO -55

Model: Spatial Mohr-Coulomb

Weight Fn: Clay 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Fill ,EL 1.2 to -2 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 112 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 1, EL. 2 TO -5

Model: Spatial Mohr-Coulomb
Weight Fn: Spoil Fill 1
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY2 CL, -55 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill 2, EL. -5 TO -10

Model: Mohr-Coulomb
Unit Weight: 85 pcf
Cohesion: 0 psf
Phi: 23 °

Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

MARSH, MH, EL. -10 to -15 (protected)

Model: Mohr-Coulomb
Unit Weight: 93 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Spoil Fill, EL. -2 TO -10 (protected)

Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY1 CL, -46 TO -55 (protected)

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

BAY SOUND CLAY 2 CL, EL. -55 TO -70

Model: Spatial Mohr-Coulomb
Weight Fn: Clay 2
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (146.07127, 3.35617) ft
Left-Zone Right Coordinate: (203.42047, 11.50755) ft
Left-Zone Increment: 20
Right Projection: Range

Right-Zone Left Coordinate: (222.94804, 5.59956) ft
Right-Zone Right Coordinate: (292.56144, -0.38676) ft
Right-Zone Increment: 20
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (60, -9.3) ft
Right Coordinate: (310, -0.5) ft

Piezometric Lines

Piezometric Line 1

Coordinates

X (ft)	Y (ft)
60	0.4
126.5	0.4
310	-2.5

Unit Weight Functions

Spoil Fill 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 109
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 109)
Data Point: (200, 110)
Data Point: (237.3, 109)

Marsh

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 93
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 93)
Data Point: (200, 98)

Data Point: (237.3, 93)

Clay 1

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 108
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 108)
Data Point: (200, 119)
Data Point: (237.3, 108)

Clay 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 120
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 120)
Data Point: (200, 119)
Data Point: (237.3, 120)

Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 112
Data Points: X (ft), Unit Weight (pcf)
Data Point: (129.1, 112)
Data Point: (200, 113)
Data Point: (237.3, 112)

Regions

	Material	Points	Area (ft²)
Region 1	Fill, EL 1.2 to -2 (Protected Side)	18,3,4,2,13	151.935
Region 2	Spoil Fill, EL -2 TO -10 (protected)	37,11,30,33,31	150.27899
Region 3	MARSH, MH, EL -10 to -15 (protected)	31,32,36,37	156.71688
Region 4	EMBANKMENT FILL CH, EL +11.6 TO 2	14,15,16,9,17,18,3,10,30	513.69
Region 5	BEACH SAND SP, EL -15 TO -46	35,36,32,28,6,19,20,34	2155.29
Region 6	BEACH SAND SP, EL -15 TO -46	20,19,8,21,40,7	5503.455
Region 7	Spoil Fill, EL -2 TO -10 (protected)	3,4,5,27,29	581.6

Region 8	MARSH, MH, EL -10 to -15 (protected)	27,5,6,28	363.5
Region 9	Spoil Fill 1, EL 2 TO -5	33,30,10,3,29	682.8
Region 10	Spoil Fill 2, EL -5 TO -10	33,29,27,31	541
Region 11	MARSH, MH, EL -10 to -15	31,27,28,32	541
Region 12	Silted-in Layer	34,1,12,11,37,36,35	432.54914
Region 13	BAY SOUND CLAY1 CL, -46 TO -55 (protected)	7,40,39,38	618.445
Region 14	BAY SOUND CLAY2 CL, -55 TO -70 (protected)	38,24,41,39	1036.5
Region 15	BAY SOUND CLAY1 CL, -46 TO -55 (protected)	21,8,25,22	674.1
Region 16	BAY SOUND CLAY2 CL, -55 TO -70 (protected)	22,25,26,23	1123.5
Region 17	BAY SOUND CLAY CL, EL -46 TO -55	40,21,22,39	954
Region 18	BAY SOUND CLAY 2 CL, EL -55 TO -70	39,22,23,41	1590

Points

	X (ft)	Y (ft)
Point 1	60	-9.3
Point 2	310	-0.5
Point 3	237.3	-2
Point 4	310	-2
Point 5	310	-10
Point 6	310	-15
Point 7	60	-46.1
Point 8	310	-46
Point 9	200	11.6
Point 10	200	2
Point 11	120.6	-2.3
Point 12	86.7	-7.5
Point 13	279.2	-0.3

Point 14	129.4	2.2
Point 15	174.1	5.3
Point 16	196.1	11.6
Point 17	203.7	11.5
Point 18	237.3	1.2
Point 19	310	-24
Point 20	60	-24
Point 21	235.1	-46
Point 22	235.1	-55
Point 23	235.1	-70
Point 24	60	-70
Point 25	310	-55
Point 26	310	-70
Point 27	237.3	-10
Point 28	237.3	-15
Point 29	237.3	-5
Point 30	129.1	2
Point 31	129.1	-10
Point 32	129.1	-15
Point 33	129.1	-5
Point 34	60	-19.2
Point 35	86.7	-17.4
Point 36	92.2	-15
Point 37	103.31325	-10
Point 38	60	-55
Point 39	129.1	-55
Point 40	129.1	-46
Point 41	129.1	-70

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.55	(230.357, 53.213)	17.89455	(202.152, 11.5418)	(238.298, 1.16426)
2	1917	1.62	(230.357,	52.964	(197.592,	(239.862,

			53.213)		11.6)	1.10828)
--	--	--	---------	--	-------	----------

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	202.5	11.200045	748.86702	25.589828	10.862237	0
2	Optimized	203.27385	10.48248	704.85686	82.354598	34.957453	0
3	Optimized	204.09805	9.7557	660.31523	129.81128	55.101617	0
4	Optimized	204.9701	9.07384	618.62911	175.60203	74.538638	0
5	Optimized	205.91815	8.41212	578.27922	207.55326	88.101131	0
6	Optimized	206.9553	7.7480425	537.85798	248.48432	105.47534	0
7	Optimized	208.08155	7.0816075	497.38128	277.39189	117.74587	0
8	Optimized	209.15385	6.481095	460.97197	311.01566	132.01832	0
9	Optimized	210.17215	5.946505	428.61925	331.60455	140.75778	0
10	Optimized	211.1905	5.411915	396.25783	352.17605	149.48986	0
11	Optimized	212.365	4.8276875	360.960	381.33615	161.86759	0

				86			
12	Optimized	213.69555	4.1938225	322.72072	402.66812	170.92248	0
13	Optimized	214.96055	3.62109	288.2337	430.09219	182.5633	0
14	Optimized	216.2733	3.07251	255.29348	447.53879	189.96895	0
15	Optimized	217.6993	2.48695	220.16581	461.90773	196.0682	0
16	Optimized	219.03625	1.95176	188.08436	479.11464	203.3721	0
17	Optimized	220.28415	1.46694	159.06499	489.08655	207.60492	0
18	Optimized	221.48175	1.1456335	140.19357	551.69919	234.18241	0
19	Optimized	222.62905	0.98784015	131.48112	529.73242	224.85807	0
20	Optimized	223.77635	0.83004665	122.76868	507.78292	215.54106	0
21	Optimized	225.0277	0.68484665	114.93797	491.63463	208.68652	0
22	Optimized	226.3831	0.55224	107.99896	458.9662	194.81959	0
23	Optimized	227.7385	0.41963335	101.05994	426.32713	180.96513	0
24	Optimized	229.021	0.32690165	96.5431	404.07878	171.52127	0

				46			
25	Optimized	230.2306	0.274045	94.43702	366.30893	155.48891	0
26	Optimized	231.4402	0.22118835	92.330895	328.55559	139.46358	0
27	Optimized	232.76495	0.21841	93.460085	293.84572	124.73011	0
28	Optimized	234.2049	0.26571	97.832892	233.22334	98.997435	0
29	Optimized	235.8122	0.429075	109.61527	164.42291	69.793384	0
30	Optimized	236.99975	0.6806173	126.48085	95.457919	40.519483	0
31	Optimized	237.79915	0.9783523	145.85193	31.812767	13.503719	0

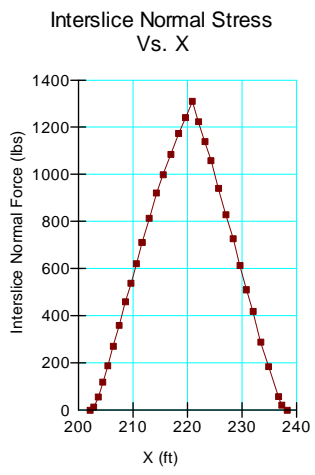
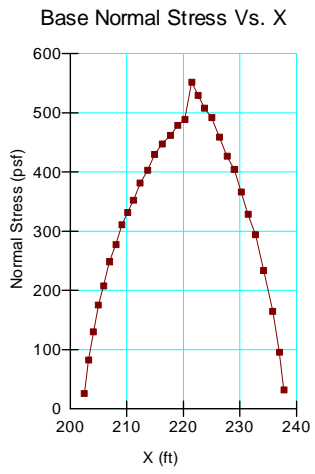
Slices of Slip Surface: **1917**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1917	198.19365	11.139695	740.85167	39.030942	16.567652	0
2	1917	199.3979	10.245542	686.25635	116.8913	49.617412	0
3	1917	200.61665	9.3931595	634.26114	192.2219	81.593354	0
4	1917	201.85	8.5807495	584.7857	264.84138	112.4185	0

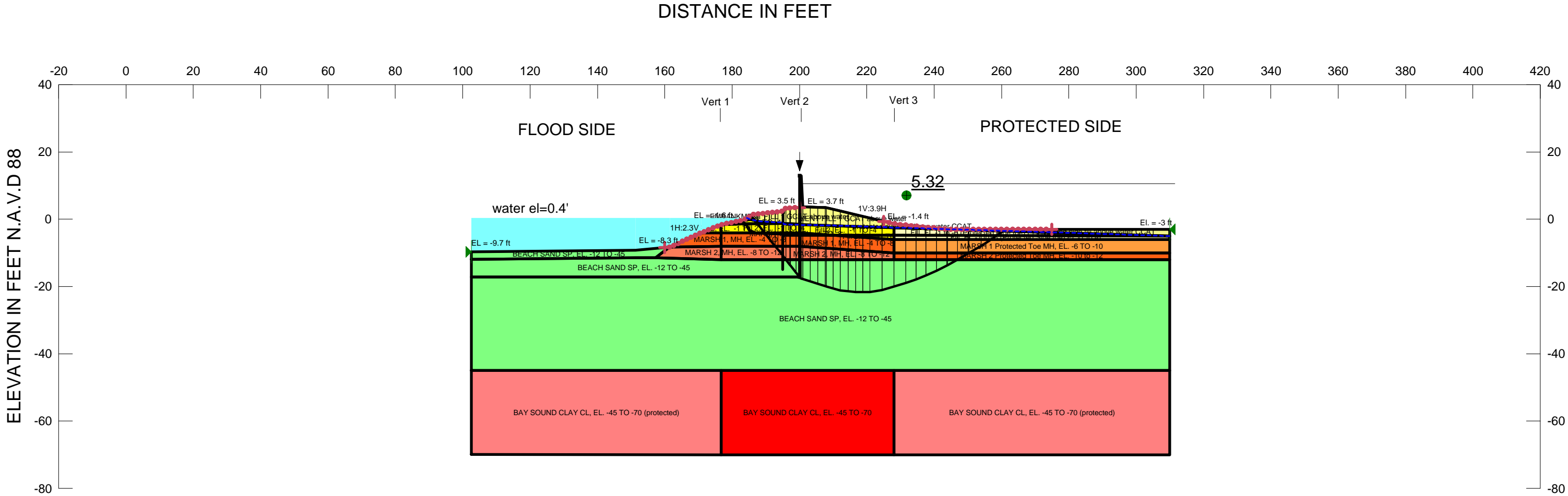
				3			
5	1917	203.08335	7.8163835	538.30746	335.2224	142.29347	0
6	1917	204.4	7.0522645	491.9227	389.68551	165.41168	0
7	1917	205.8	6.29227	445.87974	427.12212	181.30258	0
8	1917	207.2	5.5855505	403.16307	460.39256	195.42505	0
9	1917	208.6	4.929763	363.62251	489.49059	207.77643	0
10	1917	210	4.3228555	327.13097	514.39548	218.34793	0
11	1917	211.4	3.763027	293.57996	535.09747	227.1354	0
12	1917	212.8	3.248693	262.8644	551.55901	234.12291	0
13	1917	214.2	2.77846	234.90431	563.74856	239.29707	0
14	1917	215.6	2.3511035	209.61228	571.6181	242.63749	0
15	1917	217	1.96555	186.94005	575.11401	244.12141	0
16	1917	218.4	1.620862	166.80711	574.16661	243.71927	0
17	1917	219.8	1.316224	149.18018	568.70177	241.39958	0
18	1917	221.2	1.0509339	-	558.6284	237.12369	0

				134.0077 8			
19	1917	222.6	0.82439345	- 121.2493 8	543.84868	230.85007	0
20	1917	224	0.6361014	- 110.8852 2	524.2459	222.52918	0
21	1917	225.4	0.48564765	- 102.8748 9	499.68923	212.10549	0
22	1917	226.8	0.37270875	- 97.20853 3	470.02179	199.51241	0
23	1917	228.2	0.2970444	- 93.86488 2	435.08143	184.68111	0
24	1917	229.6	0.25849465	- 92.84051 7	394.68111	167.53219	0
25	1917	231	0.2569784	- 94.12878 9	348.59578	147.97013	0
26	1917	232.4	0.29249245	- 97.72719 3	296.59332	125.8964	0
27	1917	233.8	0.3651115	- 103.6375 1	238.39477	101.19258	0
28	1917	235.2	0.474989	- 111.8721 9	173.68357	73.724303	0
29	1917	236.6	0.6223586	- 122.4545 7	102.12586	43.349856	0
30	1917	237.94055	0.79812075	- 134.7416 5	49.618241	21.061694	0
31	1917	239.2216	0.9995339	-	17.510457	7.4327479	0

				148.5691 4			
--	--	--	--	---------------	--	--	--



APPENDIX K.2 S-CASE STABILITY ANALYSES PROTECTED SIDE GCAT RESULTS



Name: MARSH 1, MH, EL. -4 TO -8 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °
Name: BEACH SAND SP, EL. -12 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY CL, EL. -45 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 1 Protected Toe MH, EL. -6 TO -10 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 24 °
Name: Fill ,EL. -1 to -6 (Protected Side toe) El. -1 to -6 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 26 °
Name: Fill 2, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: fill Cohesion: 0 psf Phi: 26 °
Name: MARSH 2 Protected Toe MH, EL. -10 to -12 Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 24 °
Name: MARSH 2, MH, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY CL, EL. -45 TO -70 (protected) Model: Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL 1 GCAT above water Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °
Name: protected side fill above water CCAT Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



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New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 7, STA. 59+00 TO STA. 66+00
PROTECTED SIDE S-CASE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) around
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Entry/Exit) around

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File Information

Created By: Liljegren, James
Revision Number: 327
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
Time: 9:50:01 AM
File Name: Reach 7s.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/21/2013
Last Solved Time: 9:52:21 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) around

Kind: SLOPE/W
Parent: Gap Analysis (Seepage)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Fill 2, EL. -1 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: fill
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2 Protected Toe MH, EL. -10 to -12

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

MARSH 2, MH, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -45 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

EMBANKMENT FILL 1 GCAT above water

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

protected side fill above water CCAT

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -12 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -45 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1 Protected Toe MH, EL. -6 TO -10

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill ,EL -1 to -6 (Protected Side toe) EL. -1 to -6

Model: Mohr-Coulomb
Unit Weight: 96 pcf

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (160, -8.43235) ft
Left-Zone Right Coordinate: (200, 3.5) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (225, -0.64428) ft
Right-Zone Right Coordinate: (274.97156, -3) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (102.6, -9.7) ft
Right Coordinate: (310, -3) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -17.2) ft
Slip Surface Intersection: (200, -17.208) ft
Total Length: 30.1 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

	X (ft)	Y (ft)
	183.4	-0.4
	186.3	1.2
	195.09412	2.2

Unit Weight Functions

Marsh 3
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.7, 96)
Data Point: (200, 98)
Data Point: (228, 96)

fill
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.7, 96)
Data Point: (200, 105)
Data Point: (228.1, 96)

Regions

	Material	Points	Area (ft ²)
Region 1	Fill 2, EL. -1 TO -4	4,38,60,61	1.615
Region 2	Fill 2, EL. -1 TO -4	3,4,63,64,65,55	27.73
Region 3	Fill 2, EL. -1 TO -4	13,72,73,27,68,14	70.724
Region 4	Fill ,EL -1 to -6 (Protected Side toe) El. -1 to -6	73,41,69,27	89.615
Region 5	EMBANKMENT FILL 1 GCAT above water	6,32,42,7,8,73,72,13	107.556
Region 6	BEACH SAND SP, EL. -12 TO -45	11,24,17,16,26,29,12,52,33,53	6337.72
Region 7	BAY SOUND CLAY CL, EL. -45 TO -70	53,33,52,59,35,58	1285
Region 8	MARSH 1, MH, EL. -4 TO -8	2,3,55,65,66,67,70,15,21,56	130.995
Region 9	BEACH SAND SP, EL. -12 TO -45	16,17,24,50,51,49,57,23	532.945
Region 10	MARSH 2, MH, EL. -8 TO -12	15,44,16,23,57,49,37,2,56,21	155.01
Region 11	MARSH 2 Protected Toe MH, EL. -10 to -12	45,46,29,26	164
Region	MARSH 1 Protected Toe MH, EL. -6 TO -	25,28,46,45,54	328

12	10		
Region 13	MARSH 2, MH, EL. -8 TO -12	45,26,16,44,15	84
Region 14		6,47,48,42,32	7.085
Region 15	BEACH SAND SP, EL. -12 TO -45	50,1,36,2,37,49,51	127.58
Region 16	MARSH 1, MH, EL. -4 TO -8	15,70,68,25,54,45	108.7
Region 17	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	31,11,53,58	1848.795
Region 18	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	59,52,12,30	2047.5
Region 19	EMBANKMENT FILL 1 GCAT above water	60,5,18,39,40,6,13,71,19,62,61	48.94
Region 20	Fill 2, EL. -1 TO -4	19,71,13,14,20,65,64,63	40.255
Region 21	MARSH 1, MH, EL. -4 TO -8	65,20,14,68,70,67,66	8.575
Region 22	Fill 2, EL. -1 TO -4	68,27,25	11.7
Region 23	Fill ,EL -1 to -6 (Protected Side toe) El. -1 to -6	25,27,69,28	94.3
Region 24	Fill 2, EL. -1 TO -4	4,61,62,19,63	10.54
Region 25	protected side fill above water CCAT	8,73,41	8.745
Region 26	protected side fill above water CCAT	41,9,10,69	66

Points

	X (ft)	Y (ft)
Point 1	102.6	-9.7
Point 2	161.5	-8.3
Point 3	170.9	-4
Point 4	176.7	-1.6
Point 5	186.2	1.4

Point 6	200	3.5
Point 7	208	3.5
Point 8	228.1	-1.4
Point 9	310	-3
Point 10	310	-4
Point 11	102.6	-45
Point 12	310	-45
Point 13	200	-1.5
Point 14	200	-4
Point 15	200	-8
Point 16	200	-12
Point 17	200	-17.2
Point 18	195.1	2.4
Point 19	195.1	-1.2
Point 20	195	-4
Point 21	195	-8
Point 22	195	-15
Point 23	195	-12
Point 24	102.6	-17.2
Point 25	228	-6
Point 26	228	-12
Point 27	228	-4.7
Point 28	310	-6
Point 29	310	-12
Point 30	310	-70
Point 31	102.6	-69.9
Point 32	201	3.53
Point 33	200	-45
Point 34	200	-53
Point 35	200	-70
Point 36	151.3	-9.2
Point 37	160.5	-9
Point 38	183.4	-0.2
Point 39	195.9	3.3
Point 40	199	3.5
Point 41	244	-3

Point 42	201	3.7
Point 43	102.6	-12
Point 44	200	-9.9
Point 45	228	-10
Point 46	310	-10
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	157.3	-11.4
Point 50	102.6	-11.9
Point 51	151.3	-11.4
Point 52	228.1	-45
Point 53	176.7	-45
Point 54	228	-8
Point 55	176.7	-4
Point 56	176.7	-8
Point 57	176.7	-12
Point 58	176.7	-70
Point 59	228.1	-70
Point 60	184.4	0.4
Point 61	185.4	-0.1
Point 62	187.7	-0.6
Point 63	184.1	-1.4
Point 64	185.2	-3.4
Point 65	186.9	-4
Point 66	195	-4.4
Point 67	195.3	-4.7
Point 68	210	-4.7
Point 69	310	-5
Point 70	200	-4.7
Point 71	197.3	-1.4
Point 72	200.3	-1.62
Point 73	228.1	-2.5

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
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	Surface					
1	Optimized	5.32	(220.011, 14.406)	34.34287	(185.797, 1.17611)	(261.379, -3)
2	12741	5.72	(220.011, 14.406)	37.515	(185.144, 0.8134)	(253.243, -3)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	185.9985	0.66079475	-54.499823	40.605396	19.804575	75
2	Optimized	186.5112	-0.00505745	-17.567969	112.2025	54.724816	75
3	Optimized	187.1798	-0.8733647	25.442239	210.78956	90.399931	0
4	Optimized	187.6186	-1.4432	53.647268	266.17111	103.6548	0
5	Optimized	188.6437	-2.7744475	123.34289	395.98251	132.97522	0
6	Optimized	189.6405	-4.0689785	196.12089	525.51415	146.65533	0
7	Optimized	190.33605	-4.9722835	250.48088	606.92422	158.6988	0
8	Optimized	191.8996	-6.903305	366.92251	789.3198	188.06339	0
9	Optimized	193.2225	-8.478415	462.11702	936.59066	211.24928	0
10	Optimized	194.31215	-9.85207	544.65382	1060.2104	229.54059	0
11	Optimized	195.05	-10.81239	599.3604	1152.5388	246.2909	0
12	Optimized	195.2	-11.00762	604.38698	1179.7731	256.17842	0
13	Optimized	195.6	-11.52823	633.46898	1265.7398	281.50508	0
14	Optimized	195.93125	-11.959345	661.26583	1334.41	299.70309	0

15	Optimized	196.5674	-12.787285	713.06194	1397.0152	461.3323	0
16	Optimized	197.23615	-13.656645	766.973	1496.5901	492.13297	0
17	Optimized	198.15	-14.83102	838.8735	1627.9297	532.22516	0
18	Optimized	199.5	-16.56585	942.08452	1818.7636	591.32748	0
19	Optimized	200.1257	-17.369905	989.5947	1905.0944	617.51233	0
20	Optimized	200.2757	-17.53929	999.73888	2136.4953	766.75191	0
21	Optimized	200.4	-17.579485	1001.8706	2141.4693	768.66903	0
22	Optimized	200.75	-17.692665	1007.9695	2155.6937	774.14975	0
23	Optimized	202.1089	-18.132085	1031.8655	2221.0572	802.11989	0
24	Optimized	204.32665	-18.84924	1071.7655	2297.811	826.97814	0
25	Optimized	206.5444	-19.566395	1112.4378	2374.522	851.28656	0
26	Optimized	207.82665	-19.972155	1135.353	2432.9191	875.21939	0
27	Optimized	209	-20.2915	1153.0586	2444.8703	871.33796	0
28	Optimized	211.07905	-20.857335	1184.3375	2459.4375	860.06577	0
29	Optimized	213.29115	-21.28521	1206.7908	2500.6573	872.72402	0
30	Optimized	215.55725	-21.55361	1219.105	2474.1446	846.53491	0
31	Optimized	217.7511	-21.679615	1222.6942	2470.4625	841.63035	0
32	Optimized	219.87275	-21.66323	1217.5097	2411.9247	805.64313	0
33	Optimized	222.714	-21.37562	1193.998	2344.0502	775.72002	0

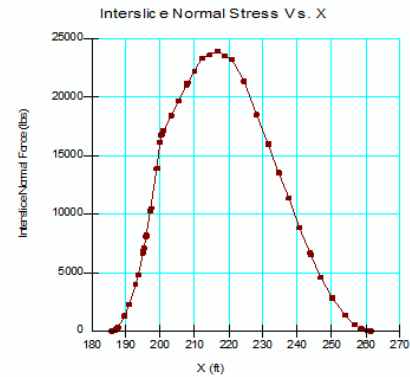
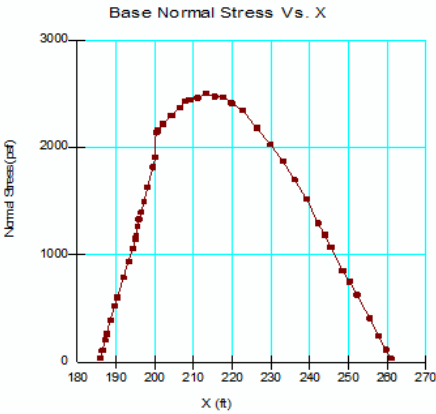
34	Optimized	226.2972	-20.55314	1135.6177	2182.4583	706.10295	0
35	Optimized	229.8326	-19.488165	1062.2039	2027.5022	651.10191	0
36	Optimized	233.06565	-18.411105	988.64097	1873.8987	597.1139	0
37	Optimized	236.0666	-17.30082	913.4475	1700.1975	530.66954	0
38	Optimized	239.11325	-16.00656	826.68692	1523.4846	469.996	0
39	Optimized	242.2056	-14.52832	728.33641	1298.1041	384.31319	0
40	Optimized	243.8759	-13.717995	674.49901	1189.3549	347.27471	0
41	Optimized	245.4349	-12.823395	615.58586	1070.0217	306.52084	0
42	Optimized	248.4973	-11.06608	499.72554	854.76144	158.07216	0
43	Optimized	250.23885	-10.06608	433.75875	753.81374	142.49767	0
44	Optimized	252.17625	-8.94333	359.84733	630.6522	120.5701	0
45	Optimized	255.42415	-6.94333	228.70076	413.82693	82.423481	0
46	Optimized	257.7456	-5.4060535	128.23498	248.91251	58.858364	0
47	Optimized	259.63055	-4.15785	46.683781	120.89513	36.195292	0
48	Optimized	260.9988	-3.2517965	-12.521513	38.438338	18.74763	75

Slices of Slip Surface: **12741**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	12741	185.28	0.22941235	-13.064773	28.475147	13.88257	75
2	12741	185.6944	-0.7346978	33.245285	151.73288	57.790263	0
3	12741	186.08645	-1.606512	74.468897	245.36017	83.349241	0

4	12741	186.76105	-2.9235385	139.31972	374.01809	114.47004	0
5	12741	187.51105	-4.327784	216.25905	511.75846	131.56481	0
6	12741	188.8113	-6.327784	336.0885	698.79812	161.48873	0
7	12741	190.78295	-9.071095	500.4189	969.35689	208.78465	0
8	12741	192.50365	-11.071095	618.89428	1182.0281	250.72331	0
9	12741	194.182	-12.777225	721.04871	1365.5702	434.73523	0
10	12741	195.05	-13.599015	769.88426	1475.0454	475.63719	0
11	12741	195.2	-13.731755	774.28675	1501.9948	490.84527	0
12	12741	195.6	-14.07704	794.89972	1586.3067	533.81072	0
13	12741	196.6	-14.89346	844.97155	1724.3178	593.12657	0
14	12741	198.15	-16.06263	914.35306	1882.5225	653.03855	0
15	12741	199.4011	-16.936245	964.76713	2000.2756	698.45927	0
16	12741	199.9011	-17.262795	983.54106	2042.8442	714.50899	0
17	12741	200.15	-17.4192	992.60685	2063.5171	722.33809	0
18	12741	200.4	-17.57413	1001.5387	2084.1485	730.22952	0
19	12741	200.75	-17.78503	1013.7384	2112.3627	741.0314	0
20	12741	202.16665	-18.566	1058.9419	2228.1691	788.65369	0
21	12741	204.5	-19.72754	1126.595	2375.9786	842.71983	0
22	12741	206.83335	-20.69567	1182.6651	2501.628	889.6517	0
23	12741	209	-21.44081	1224.965	2578.9316	913.26198	0
24	12741	211.125	-22.02239	1257.0969	2611.9066	913.83069	0
25	12741	213.375	-22.499095	1282.4551	2629.5184	908.60571	0
26	12741	215.625	-22.833875	1298.9335	2629.2942	897.33962	0
27	12741	217.875	-23.03056	1306.8082	2611.5752	880.07649	0
28	12741	220.125	-23.09133	1306.172	2576.4774	856.83186	0
29	12741	222.375	-23.01684	1297.1033	2523.9024	827.48639	0
30	12741	224.625	-22.80628	1279.5349	2453.6549	791.95391	0
31	12741	226.925	-22.446345	1252.5298	2362.7343	748.84237	0
32	12741	229.2357	-21.937635	1216.2395	2320.422	744.78056	0
33	12741	231.50715	-21.283545	1170.947	2232.271	715.87205	0
34	12741	233.7786	-20.46938	1115.6793	2123.2919	679.64327	0
35	12741	236.05	-19.483545	1049.6755	1991.6298	635.35618	0
36	12741	238.3214	-18.310425	972.0058	1834.7517	581.92947	0
37	12741	240.59285	-16.92883	881.33333	1649.0364	517.82229	0
38	12741	242.8643	-15.309425	775.78734	1429.5007	440.93524	0
39	12741	245.32895	-13.217995	640.41135	1157.145	348.54125	0

40	12741	247.57945	-11	497.39409	882.4627	171.44359	0
41	12741	249.99555	-8	305.02037	561.77739	114.31559	0
42	12741	251.86655	-5.394347	138.69364	270.52306	64.297505	0
43	12741	252.6701	-4.0321835	52.138069	120.50634	33.345432	0
44	12741	253.17015	-3.1378365	-4.6200299	52.334047	25.52502	75



Global Stability (Entry/Exit) in front

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File Information

Created By: Liljegren, James
Revision Number: 330
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
Time: 10:54:03 AM
File Name: Reach 7s.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/21/2013
Last Solved Time: 10:54:34 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: SLOPE/W
Parent: Gap Analysis (Seepage)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 2 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -12 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -45 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1 Protected Toe MH, EL. -6 TO -10

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill ,EL. -1 to -6 (Protected Side toe) EL. -1 to -6

Model: Mohr-Coulomb
Unit Weight: 96 pcf

Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Fill 2, EL. -1 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: fill
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2 Protected Toe MH, EL. -10 to -12

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

MARSH 2, MH, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -45 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

EMBANKMENT FILL 1 GCAT above water

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

protected side fill above water CCAT

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (200, 3.5) ft
Left-Zone Right Coordinate: (220, 0.57463) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (225, -0.64428) ft
Right-Zone Right Coordinate: (274.97156, -3) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (102.6, -9.7) ft
Right Coordinate: (310, -3) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -17.2) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 30.1 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

	X (ft)	Y (ft)
	201	2
	208	2
	220	-1.5

Unit Weight Functions

Marsh 3
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.7, 96)
Data Point: (200, 98)
Data Point: (228, 96)

fill
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
Data Point: (176.7, 96)
Data Point: (200, 105)
Data Point: (228.1, 96)

Regions

	Material	Points	Area (ft ²)
Region 1	Fill 2, EL. -1 TO -4	4,38,60,61	1.615
Region 2	Fill 2, EL. -1 TO -4	3,4,63,64,65,55	27.73
Region 3	Fill 2, EL. -1 TO -4	13,72,73,27,68,14	70.724
Region 4	Fill ,EL -1 to -6 (Protected Side toe) El. -1 to -6	73,41,69,27	89.615
Region 5	EMBANKMENT FILL 1 GCAT above water	6,32,42,7,8,73,72,13	107.556
Region 6	BEACH SAND SP, EL. -12 TO -45	11,24,17,16,26,29,12,52,33,53	6337.72
Region 7	BAY SOUND CLAY CL, EL. -45 TO -70	53,33,52,59,35,58	1285
Region 8	MARSH 1, MH, EL. -4 TO -8	2,3,55,65,66,67,70,15,21,56	130.995
Region 9	BEACH SAND SP, EL. -12 TO -45	16,17,24,50,51,49,57,23	532.945
Region 10	MARSH 2, MH, EL. -8 TO -12	15,44,16,23,57,49,37,2,56,21	155.01
Region 11	MARSH 2 Protected Toe MH, EL. -10 to -12	45,46,29,26	164
Region	MARSH 1 Protected Toe MH, EL. -6 TO -	25,28,46,45,54	328

12	10		
Region 13	MARSH 2, MH, EL. -8 TO -12	45,26,16,44,15	84
Region 14		6,47,48,42,32	7.085
Region 15	BEACH SAND SP, EL. -12 TO -45	50,1,36,2,37,49,51	127.58
Region 16	MARSH 1, MH, EL. -4 TO -8	15,70,68,25,54,45	108.7
Region 17	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	31,11,53,58	1848.795
Region 18	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	59,52,12,30	2047.5
Region 19	EMBANKMENT FILL 1 GCAT above water	60,5,18,39,40,6,13,71,19,62,61	48.94
Region 20	Fill 2, EL. -1 TO -4	19,71,13,14,20,65,64,63	40.255
Region 21	MARSH 1, MH, EL. -4 TO -8	65,20,14,68,70,67,66	8.575
Region 22	Fill 2, EL. -1 TO -4	68,27,25	11.7
Region 23	Fill ,EL -1 to -6 (Protected Side toe) El. -1 to -6	25,27,69,28	94.3
Region 24	Fill 2, EL. -1 TO -4	4,61,62,19,63	10.54
Region 25	protected side fill above water CCAT	8,73,41	8.745
Region 26	protected side fill above water CCAT	41,9,10,69	66

Points

	X (ft)	Y (ft)
Point 1	102.6	-9.7
Point 2	161.5	-8.3
Point 3	170.9	-4
Point 4	176.7	-1.6
Point 5	186.2	1.4

Point 6	200	3.5
Point 7	208	3.5
Point 8	228.1	-1.4
Point 9	310	-3
Point 10	310	-4
Point 11	102.6	-45
Point 12	310	-45
Point 13	200	-1.5
Point 14	200	-4
Point 15	200	-8
Point 16	200	-12
Point 17	200	-17.2
Point 18	195.1	2.4
Point 19	195.1	-1.2
Point 20	195	-4
Point 21	195	-8
Point 22	195	-15
Point 23	195	-12
Point 24	102.6	-17.2
Point 25	228	-6
Point 26	228	-12
Point 27	228	-4.7
Point 28	310	-6
Point 29	310	-12
Point 30	310	-70
Point 31	102.6	-69.9
Point 32	201	3.53
Point 33	200	-45
Point 34	200	-53
Point 35	200	-70
Point 36	151.3	-9.2
Point 37	160.5	-9
Point 38	183.4	-0.2
Point 39	195.9	3.3
Point 40	199	3.5
Point 41	244	-3

Point 42	201	3.7
Point 43	102.6	-12
Point 44	200	-9.9
Point 45	228	-10
Point 46	310	-10
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	157.3	-11.4
Point 50	102.6	-11.9
Point 51	151.3	-11.4
Point 52	228.1	-45
Point 53	176.7	-45
Point 54	228	-8
Point 55	176.7	-4
Point 56	176.7	-8
Point 57	176.7	-12
Point 58	176.7	-70
Point 59	228.1	-70
Point 60	184.4	0.4
Point 61	185.4	-0.1
Point 62	187.7	-0.6
Point 63	184.1	-1.4
Point 64	185.2	-3.4
Point 65	186.9	-4
Point 66	195	-4.4
Point 67	195.3	-4.7
Point 68	210	-4.7
Point 69	310	-5
Point 70	200	-4.7
Point 71	197.3	-1.4
Point 72	200.3	-1.62
Point 73	228.1	-2.5

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
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	Surface					
1	Optimized	1.84	(227.934, 19.723)	17.4026	(206.365, 3.54671)	(246.06, -3)
2	4820	1.87	(227.934, 19.723)	28.35	(205.807, 3.56267)	(244.886, -3)

Slices of Slip Surface: **Optimized**

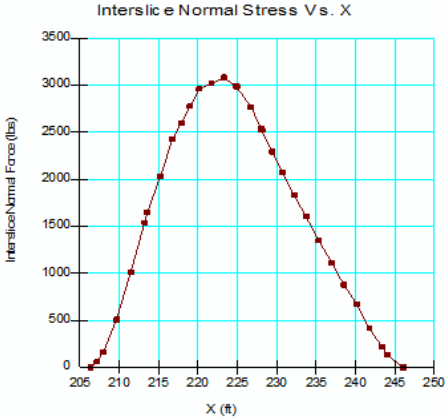
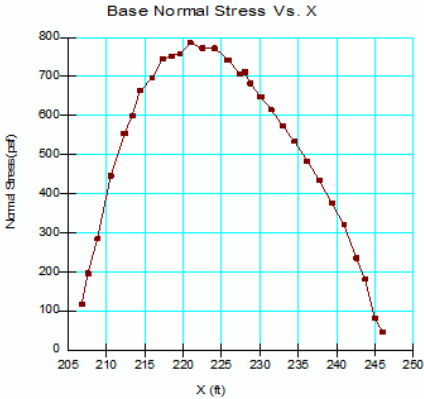
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	206.78505	1.47204	-204.09963	117.27206	57.197406	75
2	Optimized	207.60255	0.49797336	-144.1699	196.71475	95.944196	75
3	Optimized	208.84665	-0.89836164	-58.530008	284.96547	138.98695	75
4	Optimized	210.57075	-2.61987	46.389741	446.22146	195.01096	0
5	Optimized	212.3373	-4.045575	132.41647	554.53953	205.88318	0
6	Optimized	213.38555	-4.81714	178.66622	600.68205	205.83087	0
7	Optimized	214.3639	-5.357484	210.575	663.18139	201.51335	0
8	Optimized	215.9779	-6.191264	259.53614	696.26603	194.44468	0
9	Optimized	217.3335	-6.7972235	294.70129	745.28174	200.61134	0
10	Optimized	218.45515	-7.18799	316.87713	752.11803	193.78173	0
11	Optimized	219.5768	-7.5787565	339.03613	758.92064	186.94463	0
12	Optimized	220.9271	-7.9154975	357.32298	786.67411	191.15944	0
13	Optimized	222.5061	-8.1982125	371.72985	772.0241	178.22248	0
14	Optimized	224.10345	-8.375295	379.43297	772.37052	174.94707	0

15	Optimized	225.8227	-8.37451	375.57651	742.5691	163.39563	0
16	Optimized	227.36705	-8.2517435	364.54334	706.60652	152.29634	0
17	Optimized	228.05	-8.158673	357.22814	711.48376	157.72476	0
18	Optimized	228.7658	-8.061127	349.58791	681.84524	147.9305	0
19	Optimized	230.09735	-7.8796625	335.53891	648.33004	139.26359	0
20	Optimized	231.4943	-7.676505	320.21006	614.54081	131.04449	0
21	Optimized	232.9567	-7.451655	303.4686	574.73168	120.7741	0
22	Optimized	234.50685	-7.1888075	284.21244	533.98216	111.20464	0
23	Optimized	236.1448	-6.8879625	262.40352	483.60909	98.487064	0
24	Optimized	237.748	-6.553155	238.30154	435.66858	87.873464	0
25	Optimized	239.35415	-6.1755	211.50618	376.41562	73.422415	0
26	Optimized	240.96425	-5.6756925	176.89038	321.16737	70.368589	0
27	Optimized	242.57505	-5.0491975	134.08467	235.55309	49.489451	0
28	Optimized	243.69885	-4.533651	99.071207	181.5535	40.229303	0
29	Optimized	244.9842	-3.6988555	43.896237	81.23552	18.211585	0
30	Optimized	246.01435	-3.0298245	1.1465243	47.575826	22.645084	75

Slices of Slip Surface: **4820**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4820	206.35485	1.3557473	-196.35052	132.58861	64.667785	75

2	4820	207.4516	0.1380075	-121.50321	232.21845	113.26051	75
3	4820	208.8083	-1.1751968	-41.18065	332.65963	162.24894	75
4	4820	210.2702	-2.435908	35.384249	447.62263	201.06209	0
5	4820	211.5774	-3.418849	94.613024	520.05615	207.50248	0
6	4820	212.8846	-4.290398	146.71889	582.00091	212.30123	0
7	4820	213.792	-4.8461	179.75334	620.25062	214.84488	0
8	4820	214.6801	-5.327773	208.13722	652.63152	197.90161	0
9	4820	215.9487	-5.959338	245.14086	686.75445	196.61904	0
10	4820	217.21725	-6.514393	277.30586	714.05219	194.45199	0
11	4820	218.4858	-6.997722	304.9676	734.84601	191.3942	0
12	4820	219.75435	-7.413169	328.35647	749.38186	187.45258	0
13	4820	221.0229	-7.7638195	347.66547	757.83673	182.62001	0
14	4820	222.2915	-8.0521345	363.06007	760.35038	176.88505	0
15	4820	223.56005	-8.280044	374.62839	757.00637	170.24564	0
16	4820	224.8286	-8.4490165	382.44314	747.84406	162.68697	0
17	4820	226.09715	-8.560111	386.60951	732.84871	154.15562	0
18	4820	227.3657	-8.61401	387.2905	711.98717	144.56427	0
19	4820	228.05	-8.626518	386.62691	736.76411	155.89112	0
20	4820	228.75285	-8.607435	384.04036	721.04693	150.04499	0
21	4820	230.0586	-8.5394705	377.13976	708.75607	147.64509	0
22	4820	231.36435	-8.410772	366.55917	689.69502	143.86935	0
23	4820	232.6701	-8.220499	352.21924	663.58144	138.62738	0
24	4820	233.97585	-7.9673785	333.96111	630.05388	131.829	0
25	4820	235.2816	-7.649663	311.6843	588.65646	123.31595	0
26	4820	236.58735	-7.265066	285.13774	538.82202	112.94752	0
27	4820	237.8931	-6.810671	254.13351	479.83796	100.4901	0
28	4820	239.19885	-6.2828085	218.53265	410.7475	85.579564	0
29	4820	240.4489	-5.7060975	179.88862	339.99746	78.090298	0
30	4820	241.64325	-5.082147	138.2142	261.96285	60.356247	0
31	4820	243.1202	-4.193461	78.879708	148.13994	33.780472	0
32	4820	244.42565	-3.3303105	20.907571	39.058992	8.8530396	0
33	4820	244.86865	-3.012899	0.50463711	52.373987	25.298372	75



Global Stability (Entry/Exit) through

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File Information

Created By: Liljegren, James
Revision Number: 335
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
Time: 11:12:34 AM
File Name: Reach 7s.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/21/2013
Last Solved Time: 11:13:12 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) through

Kind: SLOPE/W
Parent: Gap Analysis (Seepage)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of Movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 2 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

MARSH 1, MH, EL. -4 TO -8

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -12 TO -45

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -45 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1 Protected Toe MH, EL. -6 TO -10

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill ,EL -1 to -6 (Protected Side toe) EL. -1 to -6

Model: Mohr-Coulomb
Unit Weight: 96 pcf

Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Fill 2, EL. -1 TO -4

Model: Spatial Mohr-Coulomb
Weight Fn: fill
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2 Protected Toe MH, EL. -10 to -12

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

MARSH 2, MH, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -45 TO -70 (protected)

Model: Mohr-Coulomb
Unit Weight: 111 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

EMBANKMENT FILL 1 GCAT above water

Model: Mohr-Coulomb
Unit Weight: 105 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

protected side fill above water CCAT

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (195.36667, 2.7) ft
Left-Zone Right Coordinate: (200, 3.5) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (222.4, -0.01045) ft
Right-Zone Right Coordinate: (253.3, -3) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (102.6, -9.7) ft
Right Coordinate: (310, -3) ft

Tension Crack Line

X (ft)	Y (ft)
195.9	1.8
200	2

Unit Weight Functions

Marsh 3

Model: Spline Data Point Function
Function: Unit Weight vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (176.7, 96)
 Data Point: (200, 98)
 Data Point: (228, 96)

fill

Model: Spline Data Point Function
Function: Unit Weight vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 96
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (176.7, 96)
 Data Point: (200, 105)

Data Point: (228.1, 96)

Regions

	Material	Points	Area (ft²)
Region 1	Fill 2, EL. -1 TO -4	4,38,60,61	1.615
Region 2	Fill 2, EL. -1 TO -4	3,4,63,64,65,55	27.73
Region 3	Fill 2, EL. -1 TO -4	13,72,73,27,68,14	70.724
Region 4	Fill ,EL -1 to -6 (Protected Side toe) EL. -1 to -6	73,41,69,27	89.615
Region 5	EMBANKMENT FILL 1 GCAT above water	6,32,42,7,8,73,72,13	107.556
Region 6	BEACH SAND SP, EL. -12 TO -45	11,24,17,16,26,29,12,52,33,53	6337.72
Region 7	BAY SOUND CLAY CL, EL. -45 TO -70	53,33,52,59,35,58	1285
Region 8	MARSH 1, MH, EL. -4 TO -8	2,3,55,65,66,67,70,15,21,56	130.995
Region 9	BEACH SAND SP, EL. -12 TO -45	16,17,24,50,51,49,57,23	532.945
Region 10	MARSH 2, MH, EL. -8 TO -12	15,44,16,23,57,49,37,2,56,21	155.01
Region 11	MARSH 2 Protected Toe MH, EL. -10 to -12	45,46,29,26	164
Region 12	MARSH 1 Protected Toe MH, EL. -6 TO -10	25,28,46,45,54	328
Region 13	MARSH 2, MH, EL. -8 TO -12	45,26,16,44,15	84
Region 14		6,47,48,42,32	7.085
Region 15	BEACH SAND SP, EL. -12 TO -45	50,1,36,2,37,49,51	127.58
Region 16	MARSH 1, MH, EL. -4 TO -8	15,70,68,25,54,45	108.7
Region 17	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	31,11,53,58	1848.795
Region 18	BAY SOUND CLAY CL, EL. -45 TO -70 (protected)	59,52,12,30	2047.5
Region 19	EMBANKMENT FILL 1 GCAT above water	60,5,18,39,40,6,13,71,19,62,61	48.94
Region 20	Fill 2, EL. -1 TO -4	19,71,13,14,20,65,64,63	40.255
Region	MARSH 1, MH, EL. -4 TO -8	65,20,14,68,70,67,66	8.575

21			
Region 22	Fill 2, EL. -1 TO -4	68,27,25	11.7
Region 23	Fill ,EL -1 to -6 (Protected Side toe) EL. -1 to -6	25,27,69,28	94.3
Region 24	Fill 2, EL. -1 TO -4	4,61,62,19,63	10.54
Region 25	protected side fill above water CCAT	8,73,41	8.745
Region 26	protected side fill above water CCAT	41,9,10,69	66

Points

	X (ft)	Y (ft)
Point 1	102.6	-9.7
Point 2	161.5	-8.3
Point 3	170.9	-4
Point 4	176.7	-1.6
Point 5	186.2	1.4
Point 6	200	3.5
Point 7	208	3.5
Point 8	228.1	-1.4
Point 9	310	-3
Point 10	310	-4
Point 11	102.6	-45
Point 12	310	-45
Point 13	200	-1.5
Point 14	200	-4
Point 15	200	-8
Point 16	200	-12
Point 17	200	-17.2
Point 18	195.1	2.4
Point 19	195.1	-1.2
Point 20	195	-4
Point 21	195	-8
Point 22	195	-15

Point 23	195	-12
Point 24	102.6	-17.2
Point 25	228	-6
Point 26	228	-12
Point 27	228	-4.7
Point 28	310	-6
Point 29	310	-12
Point 30	310	-70
Point 31	102.6	-69.9
Point 32	201	3.53
Point 33	200	-45
Point 34	200	-53
Point 35	200	-70
Point 36	151.3	-9.2
Point 37	160.5	-9
Point 38	183.4	-0.2
Point 39	195.9	3.3
Point 40	199	3.5
Point 41	244	-3
Point 42	201	3.7
Point 43	102.6	-12
Point 44	200	-9.9
Point 45	228	-10
Point 46	310	-10
Point 47	200	12.9
Point 48	200.5	12.9
Point 49	157.3	-11.4
Point 50	102.6	-11.9
Point 51	151.3	-11.4
Point 52	228.1	-45
Point 53	176.7	-45
Point 54	228	-8
Point 55	176.7	-4
Point 56	176.7	-8
Point 57	176.7	-12
Point 58	176.7	-70

Point 59	228.1	-70
Point 60	184.4	0.4
Point 61	185.4	-0.1
Point 62	187.7	-0.6
Point 63	184.1	-1.4
Point 64	185.2	-3.4
Point 65	186.9	-4
Point 66	195	-4.4
Point 67	195.3	-4.7
Point 68	210	-4.7
Point 69	310	-5
Point 70	200	-4.7
Point 71	197.3	-1.4
Point 72	200.3	-1.62
Point 73	228.1	-2.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.89	(226.485, 24.816)	21.03275	(200, 3.5)	(247.218, -3)
2	20023	1.91	(226.485, 24.816)	33.998	(200, 3.5)	(246.032, -3)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	200.25	3.325469	-313.76679	-3.3577458	-1.6376821	75
2	Optimized	200.75	2.9764045	-294.00121	27.735623	13.527567	75
3	Optimized	201.8926	2.1787055	-244.48351	108.84407	53.086802	75
4	Optimized	203.45405	0.9969	-171.27231	193.55131	94.401282	75
5	Optimized	204.79175	-0.12038	-102.26651	282.05912	137.56943	75

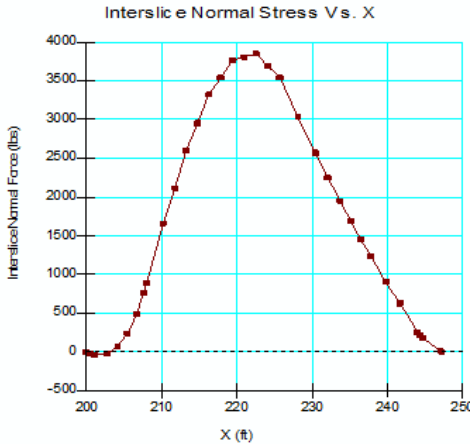
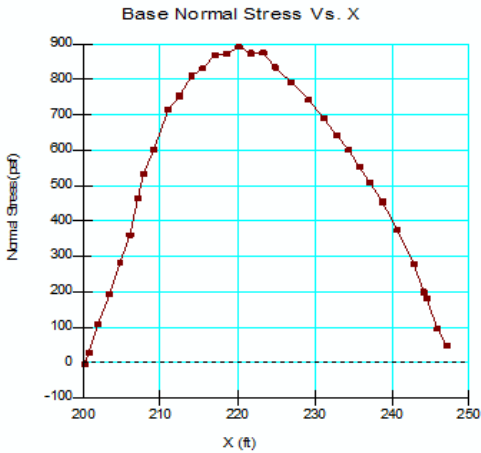
6	Optimized	206.07805	-1.250734	-32.750387	359.51808	175.34868	75
7	Optimized	207.13815	-2.232289	27.356351	463.80226	212.86889	0
8	Optimized	207.7904	-2.8058715	62.362652	532.58465	229.34259	0
9	Optimized	209.11135	-3.8378115	124.86953	601.44426	232.44103	0
10	Optimized	210.99125	-5.1534375	203.84354	713.3821	226.86118	0
11	Optimized	212.51845	-6.0425425	256.58536	753.25566	221.13186	0
12	Optimized	214.02255	-6.81042	301.7306	809.38324	226.02152	0
13	Optimized	215.51345	-7.46282	339.63127	830.09097	218.36673	0
14	Optimized	217.04225	-8.02018	371.49161	869.14626	221.57012	0
15	Optimized	218.6089	-8.4825	397.29602	871.35019	211.06252	0
16	Optimized	220.1758	-8.8347575	416.18031	891.75188	211.73811	0
17	Optimized	221.74295	-9.0769525	428.15567	873.65324	198.3483	0
18	Optimized	223.31465	-9.19985	432.61017	874.91412	196.9264	0
19	Optimized	224.8909	-9.20345	429.5206	833.42374	179.82926	0
20	Optimized	226.8895	-9.0172255	413.5915	792.16262	168.55072	0
21	Optimized	229.24915	-8.6507055	385.7832	741.53854	158.39248	0
22	Optimized	231.2218	-8.3315875	361.85313	688.9448	145.6306	0
23	Optimized	232.86875	-8.0503425	341.1806	641.06401	133.5167	0
24	Optimized	234.3848	-7.7674215	320.68136	599.37176	124.08096	0

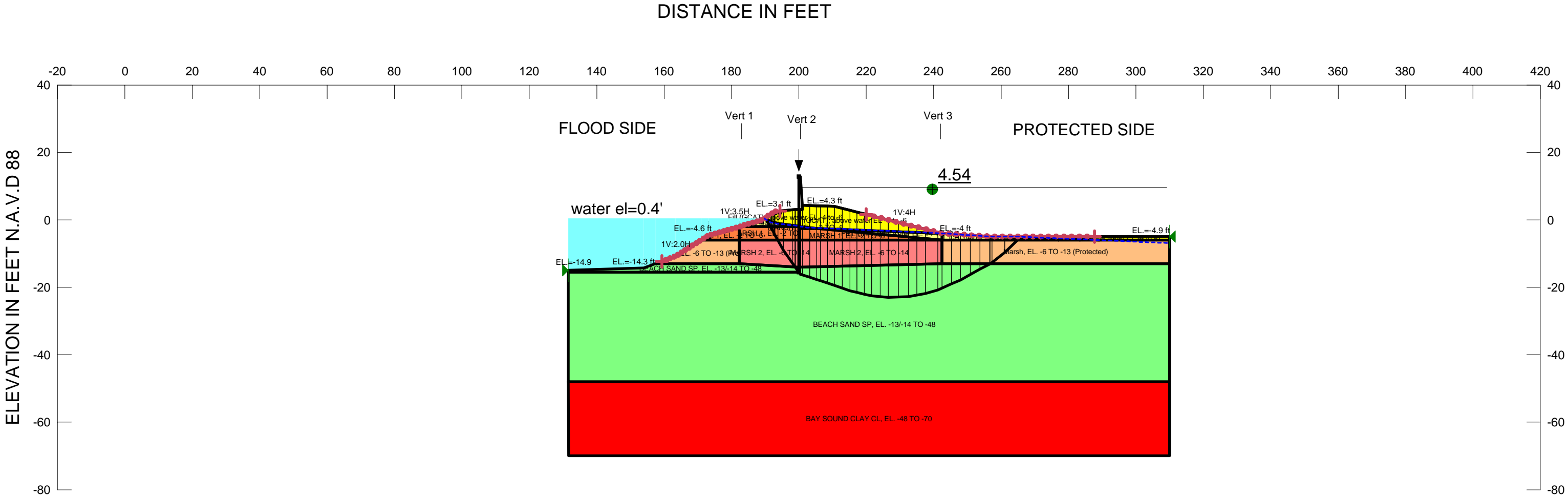
25	Optimized	235.77	-7.482825	300.35768	553.41366	112.66778	0
26	Optimized	237.1552	-7.1982285	279.836	507.46969	101.34905	0
27	Optimized	238.791	-6.7919475	251.19897	453.61709	90.122351	0
28	Optimized	240.70275	-6.2569025	213.82508	373.04425	70.888942	0
29	Optimized	242.83565	-5.446081	158.46616	278.35796	58.475138	0
30	Optimized	244.15815	-4.833008	117.18883	198.33699	39.578603	0
31	Optimized	244.51665	-4.666812	106.01244	180.45707	36.30907	0
32	Optimized	245.89335	-3.8334755	51.490172	95.062929	21.251854	0
33	Optimized	247.1436	-3.0465105	0.36455682	45.846493	22.183022	75

Slices of Slip Surface: 20023

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	20023	200.25	3.196627	-305.71631	-7.3764425	-3.5977314	75
2	20023	200.75	2.603608	-270.68929	39.713467	19.369552	75
3	20023	201.7176	1.5500323	-204.96562	136.64852	66.647935	75
4	20023	203.15285	0.1084312	-115.19459	256.28517	124.99863	75
5	20023	204.5881	-1.1738476	-35.775486	368.59818	179.77734	75
6	20023	205.9793	-2.2880445	32.514814	494.56261	225.35577	0
7	20023	207.32645	-3.2573075	91.364377	590.07616	243.23799	0
8	20023	208.807	-4.2084905	148.55839	669.92563	254.28779	0
9	20023	209.807	-4.808665	184.39125	714.43228	235.98947	0
10	20023	210.75	-5.309071	213.96451	742.24867	235.20726	0
11	20023	212.25	-6.0467385	257.32717	781.2377	233.26	0
12	20023	213.75	-6.6957655	295.07443	812.30611	230.28638	0
13	20023	215.25	-7.2615495	327.57561	835.75414	226.25566	0
14	20023	216.75	-7.748442	355.10529	851.9461	221.20778	0

15	20023	218.25	-8.1599465	377.88838	861.0246	215.1061	0
16	20023	219.75	-8.4988635	396.07409	863.20405	207.97966	0
17	20023	221.25	-8.7673955	409.82403	858.49886	199.76291	0
18	20023	222.75	-8.9672245	419.24568	846.97301	190.43648	0
19	20023	224.25	-9.0995675	424.39297	828.73608	180.02515	0
20	20023	225.75	-9.1652145	425.28715	803.5453	168.41138	0
21	20023	227.25	-9.1645525	422.09973	771.47123	155.55021	0
22	20023	228.05	-9.145364	419.2252	798.18313	168.72294	0
23	20023	228.89655	-9.086401	413.84699	776.77708	161.58689	0
24	20023	230.48965	-8.9352315	401.19382	752.99421	156.63163	0
25	20023	232.08275	-8.707716	383.87313	720.43157	149.84547	0
26	20023	233.6758	-8.402283	361.7702	678.65655	141.08689	0
27	20023	235.26885	-8.016753	334.68881	627.12463	130.20081	0
28	20023	236.86195	-7.5482555	302.31827	565.17383	117.03084	0
29	20023	238.45505	-6.993114	264.44775	491.85413	101.24784	0
30	20023	240.04815	-6.346684	220.81952	406.00609	82.450373	0
31	20023	241.44805	-5.7042075	177.64261	325.10392	71.921683	0
32	20023	242.6547	-5.0821185	135.97905	246.49574	53.902591	0
33	20023	243.629	-4.539158	99.585147	176.84138	37.680382	0
34	20023	244.974	-3.690763	43.391282	79.086264	17.409606	0
35	20023	245.99015	-3.029516	1.1538334	48.404246	23.045566	75





**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A, STA. 85+90 TO STA. 89+50
PROTECTED SIDE S-CASE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) around
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Name: Global Stability (Entry/Exit) around
File Name: Reach 12As.gsz Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Edited By: Schroeder, Danielle MVN

Global Stability (Entry/Exit) around

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File Information

Created By: Liljegren, James
Revision Number: 321
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
Time: 11:43:22 AM
File Name: Reach 12As.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/21/2013
Last Solved Time: 11:45:22 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) around

Kind: SLOPE/W
Parent: Global Analysis (Seepage)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill (GCAT), above water EL -4 to -6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (159.37055, -12.28453) ft
Left-Zone Right Coordinate: (194.39211, 2.64676) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (220, 1.625) ft
Right-Zone Right Coordinate: (287.76452, -4.9) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (131.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (200, -15.508) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, below water EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf

F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
173.3	-5.1
189	-0.5
192.9	2.1
194.4	2.3

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, below water EL. +4 TO -2/6	35,21,37,38,39,40,41,42,9	17.991
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	Fill (GCAT), above water EL -4 to -6	24,19,23,4,30,44,42,41	175.3035
Region 4	MARSH 1, EL. -2 TO -6	9,42,43,44,14,10	83.7625
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,32,33,36	124.17643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	6051.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	3923.7
Region 9	FILL CH, below water EL. +4 TO -2/6	31,45,14,30	39.785
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,45,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13		28,29,23,19,24	7.65
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11
Region 15	Fill (GCAT), above water EL -4 to -6	37,2,3,24,41,40,39,38	35.243
Region 16	MARSH 1, EL. -2 TO -6	43,44,42	1.25
Region 17	FILL CH, below water EL. +4 TO -2/6	44,30,14	37.2
Region 18	Fill (GCAT), above water EL -4 to -6	31,18,5,45	40.81

Points

	X (ft)	Y (ft)
Point 1	131.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	131.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	131.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3

Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13
Point 37	189.9	0.5
Point 38	191.8	-0.6
Point 39	192.6	-0.7
Point 40	193.8	-1
Point 41	200	-1.88
Point 42	200.15	-2
Point 43	200.3	-2.5
Point 44	205.3	-2.5
Point 45	289.2	-6
Point 46	310	-6.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	4.54	(226.223, 12.189)	34.19692	(190.083, 0.621838)	(265.982, -4.9)
2	17320	4.92	(226.223, 12.189)	38.185	(189.983, 0.55539)	(260.37, -4.9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimiz ed	190.7642	-0.88908115	26.260058	166.78266	68.537451	0
2	Optimiz ed	191.6228	2.2889005	77.059892	334.19568	114.48423	0
3	Optimiz ed	192.05225	2.9890305	116.47388	407.016	129.35769	0
4	Optimiz ed	192.45225	-	154.71243	468.88693	139.8795	0

	ed		3.6627045				
5	Optimiz ed	192.75	4.1915725	184.97308	521.77093	149.95206	0
6	Optimiz ed	193.35	5.2572655	246.31463	607.25556	160.70126	0
7	Optimiz ed	194.61665	7.5070675	376.11951	797.35413	187.54574	0
8	Optimiz ed	196.72725	10.886235	570.58021	1133.001	250.40586	0
9	Optimiz ed	198.4326	-13.37478	711.45554	1381.7486	298.43371	0
10	Optimiz ed	198.922	-14.04086	749.10645	1411.3061	446.65929	0
11	Optimiz ed	199.5	-14.8275	796.52494	1492.7441	469.60576	0
12	Optimiz ed	200.075	-15.61004	841.60564	1572.9183	493.27662	0
13	Optimiz ed	200.225	-15.81418	853.72444	1594.1953	499.45389	0
14	Optimiz ed	200.4	-16.052345	867.90573	1619.2222	506.76939	0
15	Optimiz ed	200.51415	-16.207665	877.18177	1635.5615	511.53357	0
16	Optimiz ed	200.76415	-16.299355	882.02784	1879.1495	672.56704	0
17	Optimiz ed	202.075	-16.70208	903.17601	2048.1741	772.31098	0
18	Optimiz ed	204.225	-17.362595	938.52232	2125.0023	800.29087	0
19	Optimiz ed	205.8752	-	965.61157	2183.9888	821.80585	0

	ed		17.869565				
20	Optimiz ed	207.4628	18.398415	994.22794	2232.045	834.91814	0
21	Optimiz ed	209.4876	-19.10268	1032.5715	2313.3968	863.92758	0
22	Optimiz ed	211.65125	-19.85524	1073.5578	2375.1509	877.93557	0
23	Optimiz ed	213.95375	-20.65609	1117.2451	2417.2383	876.85648	0
24	Optimiz ed	216.1852	-21.299345	1151.2467	2486.4725	900.62118	0
25	Optimiz ed	218.34565	-21.785	1175.6327	2494.7367	889.74684	0
26	Optimiz ed	220.50615	-22.270655	1200.0639	2502.9557	878.81157	0
27	Optimiz ed	222.82995	-22.625485	1215.8598	2541.6843	894.27995	0
28	Optimiz ed	225.31705	-22.849495	1223.0679	2510.3688	868.29537	0
29	Optimiz ed	228.0291	-22.899915	1218.8468	2501.6822	865.28344	0
30	Optimiz ed	230.9661	-22.776745	1203.1983	2415.5475	817.73989	0
31	Optimiz ed	233.7178	-22.50571	1178.8245	2358.7643	795.87941	0
32	Optimiz ed	236.2842	-22.08681	1145.7525	2242.4739	739.74791	0
33	Optimiz ed	239.40645	-21.312635	1088.9996	2114.1927	691.50145	0

34	Optimiz ed	241.87275	-20.47787	1030.2795	1982.1458	642.04196	0
35	Optimiz ed	243.879	-19.61418	970.97046	1842.0297	587.53688	0
36	Optimiz ed	246.63695	-18.42688	889.47622	1665.6531	523.53793	0
37	Optimiz ed	249.4466	17.03707 5	795.24824	1492.3769	470.2192	0
38	Optimiz ed	252.30795	-15.44477	688.21145	1256.9265	383.60313	0
39	Optimiz ed	255.1693	13.85246 5	581.17466	1021.4455	296.96645	0
40	Optimiz ed	256.6506	13.02815 5	525.76086	899.97202	252.40862	0
41	Optimiz ed	257.0199	-12.82264	511.84335	863.86074	156.72824	0
42	Optimiz ed	259.20305	-11.15708	401.25154	706.02582	135.69425	0
43	Optimiz ed	262.95795	-7.83444	183.24325	343.95596	71.553911	0
44	Optimiz ed	265.25755	-5.602966	38.24654	86.864399	23.712514	0
45	Optimiz ed	265.82435	-5.052966	2.6368678	40.814087	18.620274	75

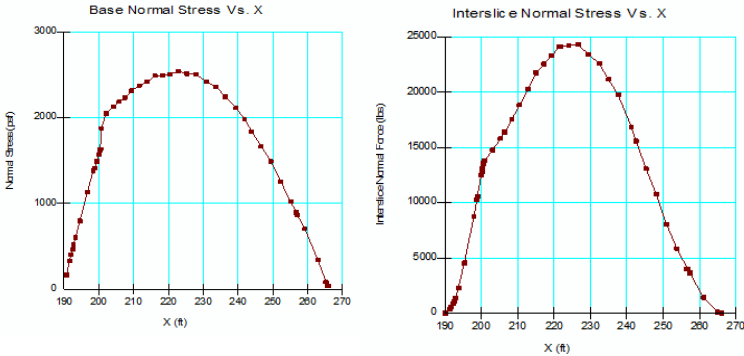
Slices of Slip Surface: 17320

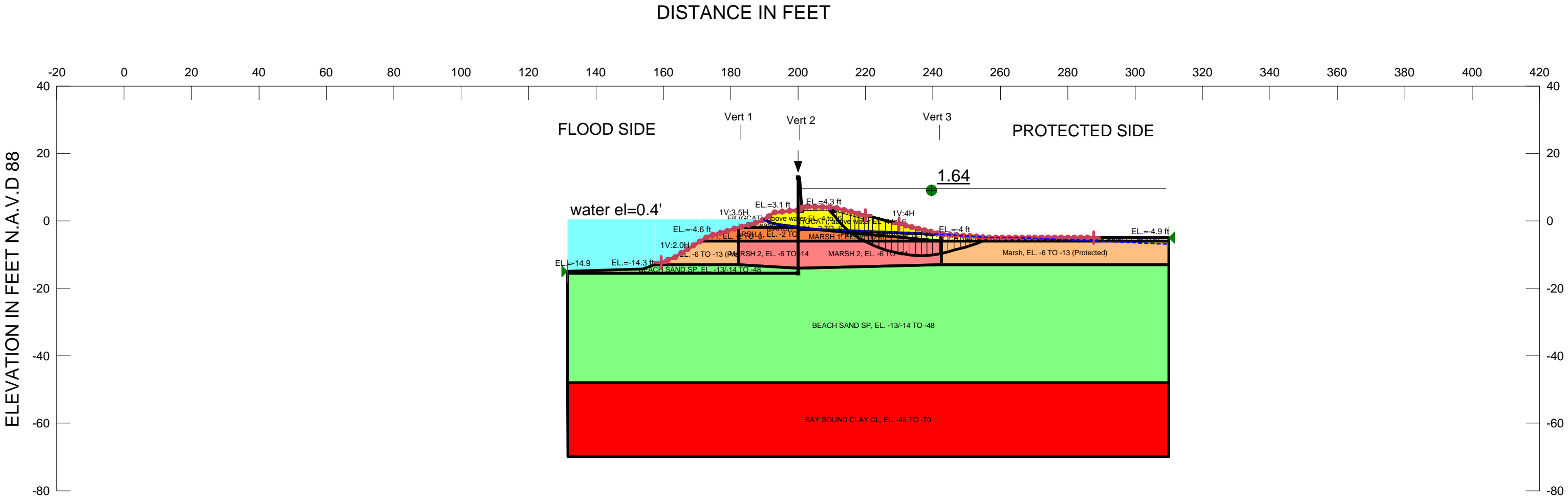
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	17320	190.3773	- 0.922304 9	35.783036	135.39115	48.582123	0
2	17320	191.28575	- 3.169784 5	131.6173	360.0743	101.71561	0

3	17320	192.2	- 5.125551	243.87935	555.76438	138.86016	0
4	17320	192.6239	- 5.955766 5	291.81399	642.80635	156.27187	0
5	17320	192.7739	- 6.229028	307.35861	676.0283	164.14232	0
6	17320	193.35	- 7.220197 5	363.61849	780.61093	185.657	0
7	17320	194.9364	- 9.613059 5	500.04515	1025.4221	233.91289	0
8	17320	197.2092	- 12.57515 5	667.87172	1339.8853	299.19973	0
9	17320	198.6728	- 14.24752 5	762.32519	1499.8937	497.49626	0
10	17320	199.4638	- 15.04426	809.60671	1598.683	532.23866	0
11	17320	199.9638	- 15.53426 5	837.35783	1657.8979	553.46124	0
12	17320	200.075	-15.639	843.43004	1670.73	558.02085	0
13	17320	200.225	- 15.77918 5	851.53654	1688.1801	564.32321	0
14	17320	200.4	-15.9407	860.91315	1708.5662	571.74919	0
15	17320	200.75	- 16.25637	879.3854	1748.4307	586.17845	0
16	17320	202.075	- 17.35876 5	944.41483	1997.8103	710.52422	0
17	17320	204.225	- 18.99559	1040.6001	2208.0683	787.46727	0
18	17320	206.6	- 20.53345	1129.915	2410.9691	864.08191	0
19	17320	209.2	-	1211.8339	2605.1074	939.77479	0

			21.96101				
20	17320	211.64285	-	1275.0177	2738.2051	986.93238	0
			23.08143				
21	17320	213.92855	-	1322.4807	2814.1958	1006.1746	0
			23.94271				
22	17320	216.21425	-	1359.8762	2870.5589	1018.9683	0
			24.64212				
23	17320	218.5	-	1387.7529	2908.1971	1025.5526	0
			25.18879				
24	17320	220.78575	25.58938 5	1406.51	2927.8185	1026.1356	0
			-				
25	17320	223.07145	25.84853 5	1416.4106	2929.789	1020.7866	0
			-				
26	17320	225.35715	25.96912 5	1417.748	2914.3569	1009.4755	0
			-				
27	17320	227.64285	25.95248 5	1410.4846	2881.521	992.22655	0
			-				
28	17320	229.92855	25.79843	1394.6475	2831.0965	968.8971	0
			-				
29	17320	232.21425	25.50526 5	1370.1542	2762.6467	939.24806	0
			-				
30	17320	234.5	-25.0697	1336.7831	2675.488	902.96789	0
			-				
31	17320	236.78575	24.48664	1294.2324	2568.7476	859.67133	0
			-				
32	17320	239.07145	23.74887 5	1242.0224	2441.0772	808.77267	0
			-				
33	17320	241.35715	22.84658	1179.5438	2290.7704	749.53187	0
			-				
34	17320	243.7421	21.71096	1102.2107	2130.2899	693.44815	0
			-				
35	17320	246.22635	20.30434 5	1007.7607	1954.848	638.81847	0

36	17320	248.7106	-	896.83168	1742.2189	570.22085	0
			18.63341				
37	17320	251.19485	16.65164 5	766.50436	1483.8013	483.82286	0
			-				
38	17320	253.6791	14.28806 5	612.3537	1165.414	373.04389	0
			-				
39	17320	255.7606	11.97387	461.74874	838.52485	167.75153	0
			-				
40	17320	258.1986	-8.47387	234.88859	443.3974	92.834106	0
			-				
41	17320	260.0523	5.512547 5	41.439494	84.747565	21.122757	0
			-				
42	17320	260.3388	4.962547 5	4.2200096	55.965158	25.237795	75





Name: FILL CH, below water EL. +4 TO -2/6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °
Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -6 TO -14 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 24 °
Name: Fill (GCAT), above water EL -4 to -6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °
Name: Marsh, EL. -6 TO -13 (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 24 °



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A, STA. 85+90 TO STA. 89+50
PROTECTED SIDE S-CASE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) in front
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Name: Global Stability (Entry/Exit) in front
File Name: Reach 12As.gsz Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Edited By: Schroeder, Danielle MVN

Global Stability (Entry/Exit) in front

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File Information

Created By: Liljegren, James
Revision Number: 321
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
Time: 11:43:22 AM
File Name: Reach 12As.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/21/2013
Last Solved Time: 11:45:52 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: SLOPE/W
Parent: Global Analysis (Seepage)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill (GCAT), above water EL -4 to -6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (159.37055, -12.28453) ft
Left-Zone Right Coordinate: (220, 1.625) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (230, -0.875) ft
Right-Zone Right Coordinate: (287.76452, -4.9) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (131.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, below water EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf

F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

	X (ft)	Y (ft)
	201	3.1
	210.5	3
	219.9	0.4

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, below water EL. +4 TO -2/6	35,21,37,38,39,40,41,42,9	17.991
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	Fill (GCAT), above water EL -4 to -6	24,19,23,4,30,44,42,41	175.3035
Region 4	MARSH 1, EL. -2 TO -6	9,42,43,44,14,10	83.7625
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,32,33,36	124.17643
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	6051.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	3923.7
Region 9	FILL CH, below water EL. +4 TO -2/6	31,45,14,30	39.785
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,45,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13		28,29,23,19,24	7.65
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11
Region 15	Fill (GCAT), above water EL -4 to -6	37,2,3,24,41,40,39,38	35.243
Region 16	MARSH 1, EL. -2 TO -6	43,44,42	1.25
Region 17	FILL CH, below water EL. +4 TO -2/6	44,30,14	37.2
Region 18	Fill (GCAT), above water EL -4 to -6	31,18,5,45	40.81

Points

	X (ft)	Y (ft)
Point 1	131.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	131.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	131.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3

Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13
Point 37	189.9	0.5
Point 38	191.8	-0.6
Point 39	192.6	-0.7
Point 40	193.8	-1
Point 41	200	-1.88
Point 42	200.15	-2
Point 43	200.3	-2.5
Point 44	205.3	-2.5
Point 45	289.2	-6
Point 46	310	-6.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.64	(237.025, 27.526)	21.642	(209.446, 4.03329)	(257.036, -4.9)
2	15928	1.65	(237.025, 27.526)	37.947	(208.047, 4.07747)	(256.736, -4.9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	209.97285	2.3546435	-306.98514	84.591356	41.257961	75
2	Optimized	210.9739	1.1080545	-231.69734	163.44265	79.716306	75
3	Optimized	212.2745	-0.326075	-145.59051	266.47791	129.96996	75
4	Optimized	213.92795	-2.014065	-44.742388	363.28432	177.1856	75
5	Optimized	215.1874	-3.164517	23.513492	507.85748	236.23035	0

6	Optimized	216.21905	-3.895203	66.280334	551.04524	215.83124	0
7	Optimized	217.417	-4.743661	115.96112	588.03454	210.18063	0
8	Optimized	218.8474	-5.583945	164.45962	657.89226	219.69037	0
9	Optimized	220.27405	-6.2978725	205.08637	685.91483	214.07862	0
10	Optimized	221.46455	-6.8936175	238.96446	715.51872	212.17563	0
11	Optimized	223.0331	-7.547025	275.38926	771.03394	220.67523	0
12	Optimized	224.9797	-8.258095	314.33904	795.30518	214.13992	0
13	Optimized	226.85425	-8.8462675	345.8153	834.01156	217.35898	0
14	Optimized	228.6567	-9.3115425	369.84451	837.87943	208.38258	0
15	Optimized	230.46105	-9.685675	388.17588	856.81564	208.65186	0
16	Optimized	232.2674	-9.968665	400.8427	842.04861	196.43753	0
17	Optimized	234.01955	-10.15674	407.76409	843.19154	193.86479	0
18	Optimized	235.71745	-10.249895	408.92261	810.90586	178.97447	0
19	Optimized	237.37045	-10.25178	404.48858	795.42922	174.05799	0
20	Optimized	238.9785	-10.1624	394.49216	744.82623	155.97878	0
21	Optimized	240.89725	-9.93885	375.24258	693.26654	141.59339	0
22	Optimized	242.256	-9.7010775	356.62505	647.01291	129.289	0
23	Optimized	243.48665	-9.4039275	334.51545	600.10414	118.2477	0
24	Optimized	245.39225	-8.923505	298.95704	536.50321	105.76237	0

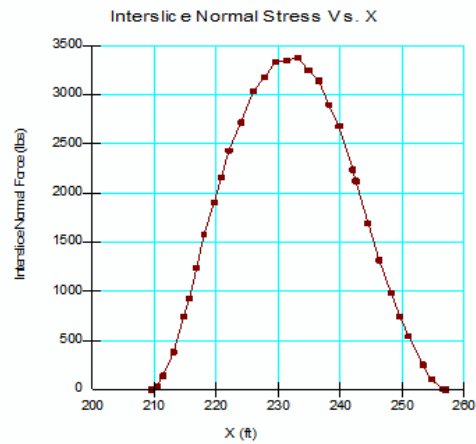
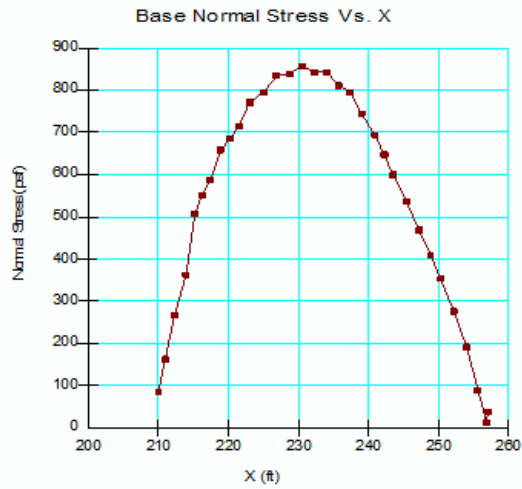
25	Optimized	247.2301	-8.439135	263.28486	468.90496	91.547969	0
26	Optimized	248.86575	-7.99176	230.43694	409.82886	79.870432	0
27	Optimized	250.2992	-7.58138	200.41756	353.08983	67.974073	0
28	Optimized	252.1775	-6.986745	157.45493	276.64398	53.066386	0
29	Optimized	253.98955	-6.29865	108.58175	192.30071	37.27408	0
30	Optimized	255.62	-5.550023	52.406829	88.710949	17.706702	0
31	Optimized	256.80295	-5.0068705	7.8352168	13.310375	2.6704129	0
32	Optimized	257.0208	-4.9068475	0.4832721	37.589861	18.098093	75

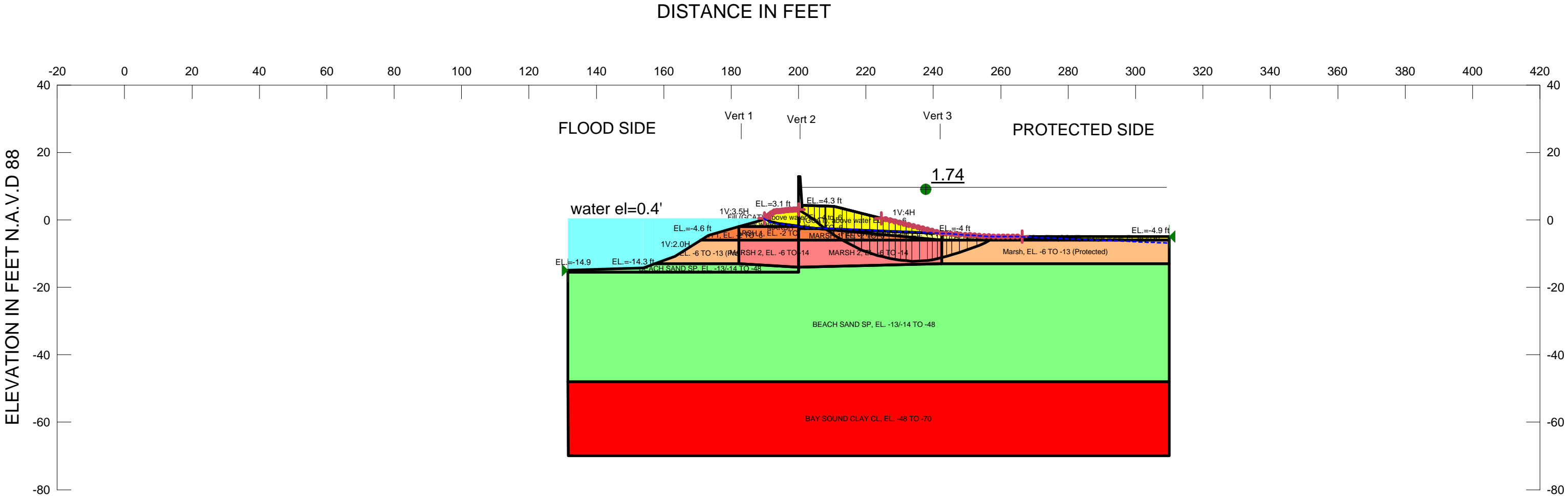
Slices of Slip Surface: 15928

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	15928	208.65995	2.33519	-302.98109	96.105596	46.873831	75
2	15928	209.88665	1.0166543	-223.61618	199.77693	97.43772	75
3	15928	211.44945	-0.4783512	-134.20277	308.11963	150.27999	75
4	15928	213.34835	-2.104135	-37.768948	418.0322	203.88793	75
5	15928	214.67895	-3.140551	23.307458	513.60376	239.13348	0
6	15928	215.7581	-3.8908	67.183444	565.83337	222.01325	0
7	15928	217.15415	-4.7924875	119.66552	613.91808	220.05542	0
8	15928	218.5502	-5.6108315	166.91442	655.5453	217.55248	0
9	1592	220.0786	-6.4146205	212.8588	701.48485	217.55034	0

	8	5					
10	1592 8	221.7395	-7.194822	256.95751	750.33422	219.66547	0
11	1592 8	223.4003 5	-7.879955	295.1007	790.36302	220.50499	0
12	1592 8	225.0612	-8.4754635	327.62484	821.81903	220.02943	0
13	1592 8	226.722	-8.9857455	354.83695	844.93543	218.2059	0
14	1592 8	228.3828 5	-9.4143415	376.96945	859.94928	215.03647	0
15	1592 8	230.0437	-9.7640745	394.18403	866.84386	210.44171	0
16	1592 8	231.7045 5	-10.037153	406.63163	865.73686	204.40682	0
17	1592 8	233.3654	-10.23524	414.4203	856.51616	196.83376	0
18	1592 8	235.0262	-10.359515	417.62945	839.1912	187.69138	0
19	1592 8	236.6870 5	-10.410715	416.24897	813.59259	176.90878	0
20	1592 8	238.3479	-10.389125	410.33161	779.49226	164.36091	0
21	1592 8	240.0087 5	-10.29462	399.86771	736.6142	149.9292	0
22	1592 8	241.6696	-10.126655	384.79673	684.58238	133.47317	0
23	1592 8	243.2688	-9.8959265	365.88026	640.58072	122.30453	0
24	1592 8	244.8064 5	-9.6065215	343.39608	605.71226	116.79069	0
25	1592 8	246.3441	-9.250574	316.71712	562.88385	109.60049	0
26	1592 8	247.8817 5	-8.826127	285.68847	511.55472	100.56214	0
27	1592 8	249.4194	-8.330743	250.11141	451.0377	89.458149	0
28	1592	250.957	-7.7614275	209.79922	380.49133	75.997023	0

	8						
29	1592 8	252.4946 5	-7.114527	164.57751	298.82857	59.772425	0
30	1592 8	254.0323	-6.3855895	113.95259	204.70425	40.40524	0
31	1592 8	255.7005 5	-5.491232	47.820447	83.726426	17.512516	0
32	1592 8	256.6645 5	-4.9434105	3.1931149	5.6913888	1.2184896	0
33	1592 8	256.7327	-4.9021785	0.15375534	49.817017	24.222391	75





Name: FILL CH, below water EL. +4 TO -2/6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH 1, EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °

Name: BEACH SAND SP, EL. -13/-14 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: BAY SOUND CLAY CL, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH 2, EL. -6 TO -14 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 24 °

Name: Fill (GCAT), above water EL -4 to -6 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

Name: Marsh, EL. -6 TO -13 (Protected) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 24 °



**US Army Corps
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New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 12A, STA. 85+90 TO STA. 89+50
PROTECTED SIDE S-CASE STABILITY ANALYSIS.
CASE: Global Stability (Entry/Exit) through
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Name: Global Stability (Entry/Exit) through
File Name: Reach 12As.gsz Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Edited By: Schroeder, Danielle MVN

Global Stability (Entry/Exit) through

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File Information

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Revision Number: 325
Last Edited By: Schroeder, Danielle MVN
Date: 6/21/2013
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Last Solved Date: 6/21/2013
Last Solved Time: 11:59:28 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) through

Kind: SLOPE/W
Parent: Global Analysis (Seepage)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of Movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Search for Tension Crack
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

FOS Calculation Option: Constant
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL CH, below water EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf

Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill (GCAT), above water EL -4 to -6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (189.9, 0.5) ft
Left-Zone Right Coordinate: (200, 3.1) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (224.5, 0.5) ft
Right-Zone Right Coordinate: (266.4, -4.9) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (131.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Regions

	Material	Points	Area (ft²)
Region 1	FILL CH, below water EL. +4 TO -2/6	35,21,37,38,39,40,41,42,9	17.991
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	Fill (GCAT), above water EL -4 to -6	24,19,23,4,30,44,42,41	175.3035
Region 4	MARSH 1, EL. -2 TO -6	9,42,43,44,14,10	83.7625
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,36,20,34	120.62857
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	27,12,13,1,32,33,36	124.17643

Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,1	6051.75
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	3923.7
Region 9	FILL CH, below water EL. +4 TO -2/6	31,45,14,30	39.785
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,45,5,6	472.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13		28,29,23,19,24	7.65
Region 14	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11
Region 15	Fill (GCAT), above water EL -4 to -6	37,2,3,24,41,40,39,38	35.243
Region 16	MARSH 1, EL. -2 TO -6	43,44,42	1.25
Region 17	FILL CH, below water EL. +4 TO -2/6	44,30,14	37.2
Region 18	Fill (GCAT), above water EL -4 to -6	31,18,5,45	40.81

Points

	X (ft)	Y (ft)
Point 1	131.6	-15.5
Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	131.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	131.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8

Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	157.42857	-13
Point 37	189.9	0.5
Point 38	191.8	-0.6
Point 39	192.6	-0.7
Point 40	193.8	-1
Point 41	200	-1.88
Point 42	200.15	-2
Point 43	200.3	-2.5
Point 44	205.3	-2.5
Point 45	289.2	-6
Point 46	310	-6.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.74	(234.339, 35.341)	25.45236	(200.5, 3.1)	(258.62, -4.9)
2	19413	1.76	(234.339, 35.341)	47.364	(200, 3.1)	(259.32, -4.9)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal	Frictional Strength	Cohesive
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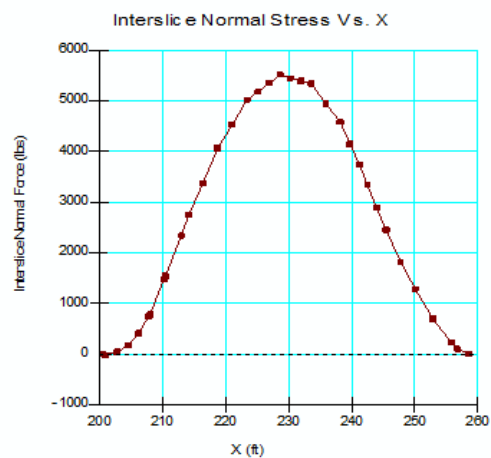
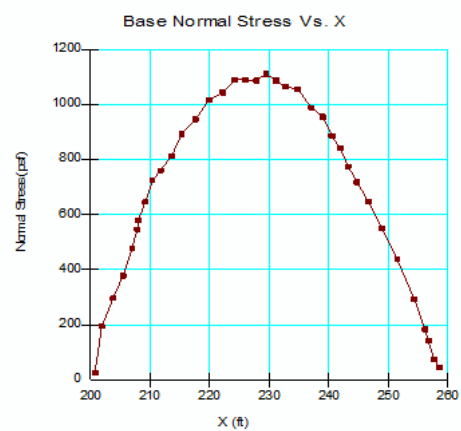
19	Optimized	229.47485	-11.84479	525.0048	1110.0935	260.49828	0
20	Optimized	231.1189	-12.006795	530.61005	1086.7282	247.59976	0
21	Optimized	232.76295	-12.1688	536.22135	1063.3629	234.69855	0
22	Optimized	234.7319	-12.206225	533.216	1055.8897	232.70931	0
23	Optimized	237.02575	-12.11907	521.54101	988.88916	208.0768	0
24	Optimized	238.943	-11.942105	505.36247	955.51728	200.42183	0
25	Optimized	240.4836	-11.675335	484.57645	885.99604	178.72352	0
26	Optimized	241.87695	-11.36593	461.50282	840.49319	168.73739	0
27	Optimized	243.2429	-10.98002	433.66494	775.07481	152.00546	0
28	Optimized	244.7287	-10.56024	403.2889	717.69064	139.98067	0
29	Optimized	246.61945	-9.9899175	362.2949	646.29171	126.44353	0
30	Optimized	248.91515	-9.2690525	310.51177	548.83469	106.1082	0
31	Optimized	251.47245	-8.39189	248.0275	438.48123	84.795465	0
32	Optimized	254.3185	-7.235415	166.82537	292.85531	56.112145	0
33	Optimized	256.17755	-6.3456615	105.46349	183.44576	34.719944	0
34	Optimized	256.6808	-6.0478265	85.277129	144.01697	26.152662	0
35	Optimized	257.63645	-5.4822465	42.028396	74.317336	15.748368	0
36	Optimized	258.5658	-4.9322465	2.2758448	46.793056	21.712495	75

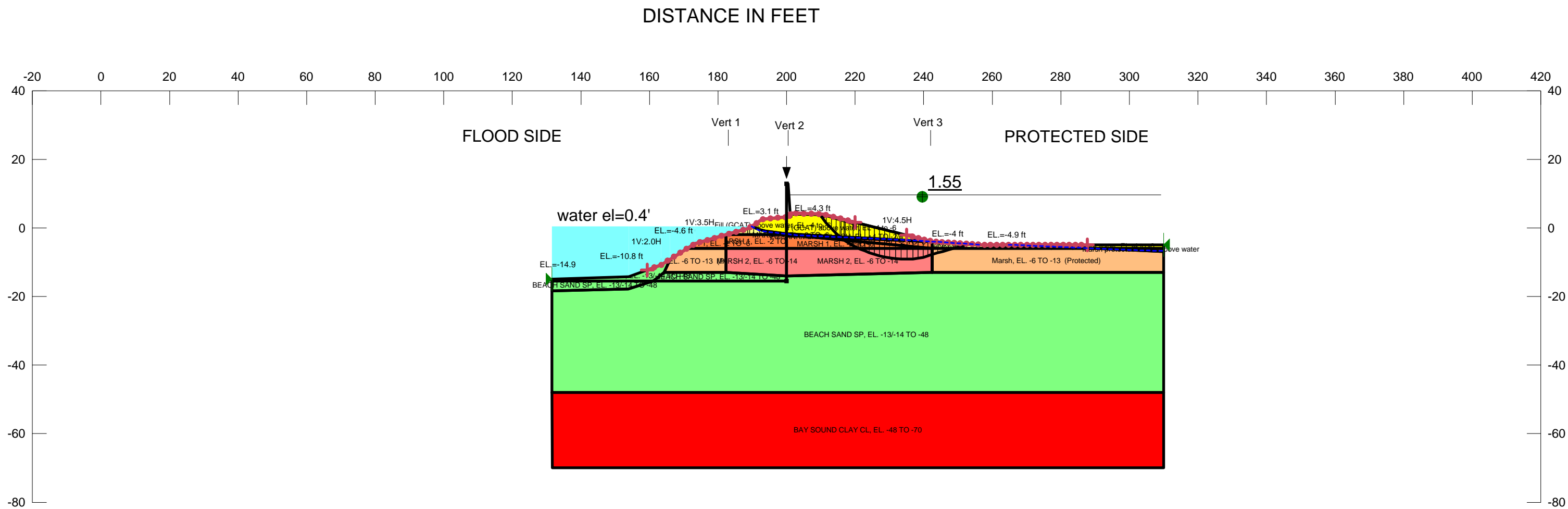
Slices of Slip Surface: **19413**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base	Frictional	Cohesive
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					Stress (psf)	(psf)	Strengt h (psf)
1	Optimized	200.75	2.5917425	-304.08232	25.079896	12.232283	75
2	Optimized	201.9213	1.8068675	-255.53318	194.35273	94.792162	75
3	Optimized	203.7639	0.5721625	-180.95345	296.18188	144.45756	75
4	Optimized	205.4605	-0.6647	-108.97204	378.11974	184.42132	75
5	Optimized	207.0111	-1.90372	-35.377498	476.94477	232.62151	75
6	Optimized	207.8434	-2.564043	3.788648	547.21033	265.04446	75
7	Optimized	208.0129	-2.685341	10.939522	578.23239	276.68722	0
8	Optimized	209.198	-3.533488	60.938905	646.27233	260.60723	0
9	Optimized	210.3853	-4.3724995	110.34128	724.30669	273.35501	0
10	Optimized	211.7508	-5.2219245	159.94116	760.68871	267.47004	0
11	Optimized	213.5906	-6.36637	226.61495	813.12358	261.13047	0
12	Optimized	215.3208	-7.28088	279.14745	892.12968	272.91727	0
13	Optimized	217.6032	-8.37716	341.45317	945.2096	268.80968	0
14	Optimized	219.90975	-9.33654	394.99994	1016.8435	276.86261	0
15	Optimized	222.24045	-10.15902	439.88234	1043.3449	268.67885	0
16	Optimized	224.2803	-10.76918	472.27277	1089.7101	274.90083	0
17	Optimized	226.0293	-11.167025	492.24837	1088.1491	265.3121	0
18	Optimized	227.7783	-11.56487	512.22398	1086.5881	255.72337	0

	Surface				Normal Stress (psf)	Strength (psf)	ve Strengt h (psf)
1	19413	200.25	2.459952	-287.44071	21.536532	10.504068	75
2	19413	200.75	1.949283	-263.30929	62.527848	30.496869	75
3	19413	202.22125	0.56973665	-176.62038	269.85833	131.6187	75
4	19413	204.66375	-1.5409584	-52.230232	452.54079	220.71889	75
5	19413	207.0507	-3.3458635	54.27748	636.53191	259.23637	0
6	19413	209.3582	-4.8773385	144.2002	762.32969	275.20898	0
7	19413	210.8622	-5.793269	197.61069	831.79198	282.3557	0
8	19413	212.2018	-6.5169	239.47852	876.0152	283.40439	0
9	19413	214.15655	-7.4943045	295.41848	938.80462	286.45396	0
10	19413	216.11125	-8.3624505	344.42104	991.34485	288.02904	0
11	19413	218.06595	-9.127756	386.9471	1034.1586	288.15711	0
12	19413	220.02065	-9.795465	423.24626	1067.4295	286.80884	0
13	19413	221.9754	-10.369865	453.69224	1091.5261	283.98194	0
14	19413	223.93015	-10.854445	478.52232	1106.5358	279.6096	0
15	19413	225.88485	-11.25201	497.9259	1112.5312	273.63989	0
16	19413	227.83955	-11.56478	512.0604	1109.6585	266.0678	0
17	19413	229.7943	-11.79445	521.03357	1097.8267	256.80485	0
18	19413	231.74905	-11.942225	524.914	1077.0545	245.82878	0
19	19413	233.70375	-12.008875	523.70992	1047.1641	233.0568	0
20	19413	235.65845	-11.994745	517.5706	1007.9356	218.32458	0
21	19413	237.6132	-11.899765	506.31516	959.1653	201.62187	0
22	19413	239.56795	-11.72344	490.05212	900.57201	182.77523	0
23	19413	241.52265	-11.46485	468.63615	831.66002	161.62864	0
24	19413	243.50715	-11.11609	441.42738	770.23674	146.39536	0
25	19413	245.52145	-10.67257	408.11591	716.38214	137.24897	0
26	19413	247.53575	-10.135548	368.86444	651.19246	125.70054	0
27	19413	249.55	-9.501654	323.27903	573.90232	111.58468	0
28	19413	251.56425	-8.766701	271.3785	483.34267	94.372526	0
29	19413	253.57855	-7.9255255	212.58267	378.21961	73.746315	0
30	19413	255.59285	-6.9717745	146.61141	256.69862	49.013983	0
31	19413	257.02685	-6.2329395	96.033631	164.27184	30.381609	0
32	19413	258.31625	-5.493508	42.064033	75.878413	16.492375	0
33	19413	259.2492	-4.943508	3.0706465	50.001058	22.889491	75





Name: EMBANKMENT FILL CH, EL. +4 TO -2/6	Model: Mohr-Coulomb	Unit Weight: 107 pcf	Cohesion: 0 psf	Phi: 26 °
Name: MARSH 1, EL. -2 TO -6	Model: Mohr-Coulomb	Unit Weight: 80 pcf	Cohesion: 0 psf	Phi: 24 °
Name: BEACH SAND SP, EL. -13/-14 TO -48	Model: Mohr-Coulomb	Unit Weight: 122 pcf	Cohesion: 0 psf	Phi: 34 °
Name: BAY SOUND CLAY CL, EL. -48 TO -70	Model: Mohr-Coulomb	Unit Weight: 108 pcf	Cohesion: 0 psf	Phi: 26 °
Name: MARSH 2, EL. -6 TO -14	Model: Mohr-Coulomb	Unit Weight: 101 pcf	Cohesion: 0 psf	Phi: 24 °
Name: Fill (GCAT) above water, EL -4 to -6	Model: Mohr-Coulomb	Unit Weight: 107 pcf	Cohesion: 75 psf	Phi: 26 °
Name: Marsh, EL. -6 TO -13 (Protected)	Model: Mohr-Coulomb	Unit Weight: 101 pcf	Cohesion: 0 psf	Phi: 24 °
Name: Marsh protected GCAT above water	Model: Mohr-Coulomb	Unit Weight: 101 pcf	Cohesion: 75 psf	Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

H_w=CANAL WATER LEVEL

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

LONDON AVE OUTFALL CANAL, REACH 12B
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) in front
STA. 89+50 TO 93+00
ORLEANS PARISH, LOUISIANA

Name: Global Stability (Entry/Exit) in front
File Name: Reach 12Bs.gsz Directory: G:\F&MHOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\GCAT S-Case Soil Strengths\protected side GCAT seepw parent\
Last Edited By: Middleton, Mark C MVN

Global Stability (Entry/Exit) in front

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File Information

Created By: Lijjegren, James
Revision Number: 288
Last Edited By: Middleton, Mark C MVN
Date: 8/21/2012
Time: 3:59:04 PM
File Name: Reach 12Bs.gsz
Directory: G:\F&M\HOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\GCAT S-Case Soil Strengths\protected side GCAT seepw parent\
Last Solved Date: 8/21/2012
Last Solved Time: 4:02:14 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: SLOPE/W
Parent: Global Analysis (Seepage)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +4 TO -2/6

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13/-14 TO -48

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -48 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -14

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill (GCAT) above water, EL -4 to -6

2/28/2013

2/28/2013

Global Stability (Entry/Exit) in front

Global Stability (Entry/Exit) in front

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Marsh, EL. -6 TO -13 (Protected)

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Marsh protected GCAT above water

Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (159.37055, -12.28453) ft
Left-Zone Right Coordinate: (220, 1.625) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (235, -2.125) ft
Right-Zone Right Coordinate: (287.7662, -4.9) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (131.6, -14.9) ft
Right Coordinate: (310, -4.9) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No

Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
201	3.7
210.5	3.5
219.9	0.8

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL CH, EL. +4 TO -2/6	35,21,41,42,43,44,9	18.98
Region 2	MARSH 1, EL. -2 TO -6	9,10,26,35	70.8
Region 3	Fill (GCAT) above water, EL -4 to -6	24,19,23,4,30,44	163.65
Region 4	MARSH 1, EL. -2 TO -6	9,45,46,47,14,10	84.805
Region 5	Marsh, EL. -6 TO -13 (Protected)	26,27,38,40,34	109.57536
Region 6	BEACH SAND SP, EL. -13/-14 TO -48	38,27,12,13,39	84.467862
Region 7	BEACH SAND SP, EL. -13/-14 TO -48	13,12,15,6,8,25,7,37,36,39	5985.635
Region 8	BAY SOUND CLAY CL, EL. -48 TO -70	7,25,8,16,17	3923.7
Region 9	EMBANKMENT FILL CH, EL. +4 TO -2/6	31,48,14,30	40.225
Region 10	Marsh, EL. -6 TO -13 (Protected)	15,14,48,49,6	463.5
Region 11	MARSH 2, EL. -6 TO -14	15,12,11,10,14	318.75
Region 12	MARSH 2, EL. -6 TO -14	26,27,12,11,10	132.75
Region 13		28,29,23,19,24	7.65
Region 14	BEACH SAND SP, EL. -13/-14 TO -48	1,32,33,20,40,38,39	50.761793
Region 15	MARSH 1, EL. -2 TO -6	34,22,35,26	26.11
Region 16	BEACH SAND SP, EL. -13/-14 TO -48	1,39,36,37	66.115
Region 17	MARSH 1, EL. -2 TO -6	45,46,47	0.45
Region 18	Fill (GCAT) above water, EL -4 to -6	41,2,3,24,44,43,42	34.245
Region 19	MARSH 1, EL. -2 TO -6	47,30,14	39.2
Region 20	Marsh protected GCAT above water	48,5,49	9
Region 21	Fill (GCAT) above water, EL -4 to -6	31,18,5,48	40.37
Region 22	EMBANKMENT FILL CH, EL. +4 TO -2/6	44,30,47,45,9	9.42

Points

	X (ft)	Y (ft)
Point 1	131.6	-15.5

2/28/2013

2/28/2013

Point 2	192.9	2.5
Point 3	199	3.1
Point 4	210.5	4
Point 5	310	-6
Point 6	310	-13
Point 7	131.6	-48
Point 8	310	-48
Point 9	200	-2
Point 10	200	-6
Point 11	200	-8.7
Point 12	200	-14
Point 13	200	-15.5
Point 14	242.5	-6
Point 15	242.5	-13
Point 16	310	-70
Point 17	131.7	-70
Point 18	310	-4.9
Point 19	201	3.1
Point 20	163.4	-10.8
Point 21	189	-0.1
Point 22	173.2	-4.6
Point 23	201	4.3
Point 24	200	3.1
Point 25	200	-48
Point 26	182.3	-6
Point 27	182.3	-13
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	242.5	-4
Point 31	256.6	-4.9
Point 32	131.6	-14.9
Point 33	153.9	-14.3
Point 34	171	-6
Point 35	182.3	-2
Point 36	153.8	-17.8
Point 37	131.6	-18.4
Point 38	164.24571	-13
Point 39	161.1	-15.5
Point 40	166	-9.15789
Point 41	189.75	0.4
Point 42	191.9	-0.5
Point 43	193.8	-0.9
Point 44	200	-1.7
Point 45	200.2	-2

	200.3	-2.3
Point 47	203.3	-2.3
Point 48	290	-6
Point 49	310	-6.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.55	(234.392, 20.925)	20.21921	(209.924, 4.01818)	(253.462, -4.69968)
2	16475	1.56	(234.392, 20.925)	30.201	(209.713, 4.02487)	(250.66, -4.52087)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	210.21225	3.146103	-346.55827	24.881189	12.135367	75
2	Optimized	211.06835	2.0571895	-281.35295	89.666471	43.73326	75
3	Optimized	212.34605	0.5963275	-194.37778	189.02413	92.193226	75
4	Optimized	213.76475	0.8795975	-106.8582	272.34285	132.83048	75
5	Optimized	215.0216	2.0800625	-35.915649	368.27441	179.61943	75
6	Optimized	215.74975	2.6951565	0.18429816	427.29431	208.31547	0
7	Optimized	216.35985	-3.210484	30.563895	460.07285	191.22971	0
8	Optimized	216.91905	-3.68286	58.465179	481.88821	188.52008	0
9	Optimized	217.64405	4.1491275	85.546022	539.61295	202.16362	0
10	Optimized	218.83455	4.8623825	126.71937	565.69037	195.44248	0
11	Optimized	220.23625	-5.609505	169.38891	610.59246	196.43648	0
12	Optimized	221.2547	-6.102665	197.29275	626.13753	190.934	0
13	Optimized	222.1319	6.4681125	217.60802	657.59192	195.89345	0
14	Optimized	223.4623	6.9936775	246.62755	676.20189	191.25882	0
15	Optimized	224.8719	7.4819125	273.07714	708.77535	193.98534	0
16	Optimized	226.36075	7.9328175	296.9644	716.48922	186.78448	0
17	Optimized	227.84615	8.3138475	316.51037	737.81535	187.57706	0
18	Optimized	229.32805	8.6250025	331.69991	731.87162	178.16792	0
19	Optimized	230.90905	-8.86718	342.26552	740.21756	177.17966	0
20	Optimized	232.5892	-9.04038	348.25688	714.64178	163.12507	0

2/28/2013

2/28/2013

21	Optimized	234.28545	9.1155625	348.11588	703.49622	158.22552	0
22	Optimized	235.99775	0.0927275	341.79744	655.26116	139.56304	0
23	Optimized	237.59315	8.9628625	329.10194	627.51022	132.85993	0
24	Optimized	239.0717	8.7259675	309.9952	559.64493	111.15122	0
25	Optimized	240.48325	8.3960445	285.27724	508.70859	99.478044	0
26	Optimized	241.82775	-7.973094	254.98219	419.22821	73.127039	0
27	Optimized	242.5521	7.7452295	238.66174	438.37959	88.920117	0
28	Optimized	243.3406	-7.511065	221.57445	402.96978	80.762402	0
29	Optimized	244.8134	-7.075515	189.66424	342.41135	68.007392	0
30	Optimized	246.3233	-6.643305	157.74956	280.19655	54.516915	0
31	Optimized	247.87025	-6.214435	125.89814	220.22518	41.997107	0
32	Optimized	248.8282	-5.948845	105.87347	183.87628	38.044517	0
33	Optimized	249.7542	5.6980225	85.660411	146.40924	29.629185	0
34	Optimized	251.2372	5.2986875	52.527881	87.665838	17.137927	0
35	Optimized	252.7202	-4.899352	17.972018	29.146417	5.4501187	0

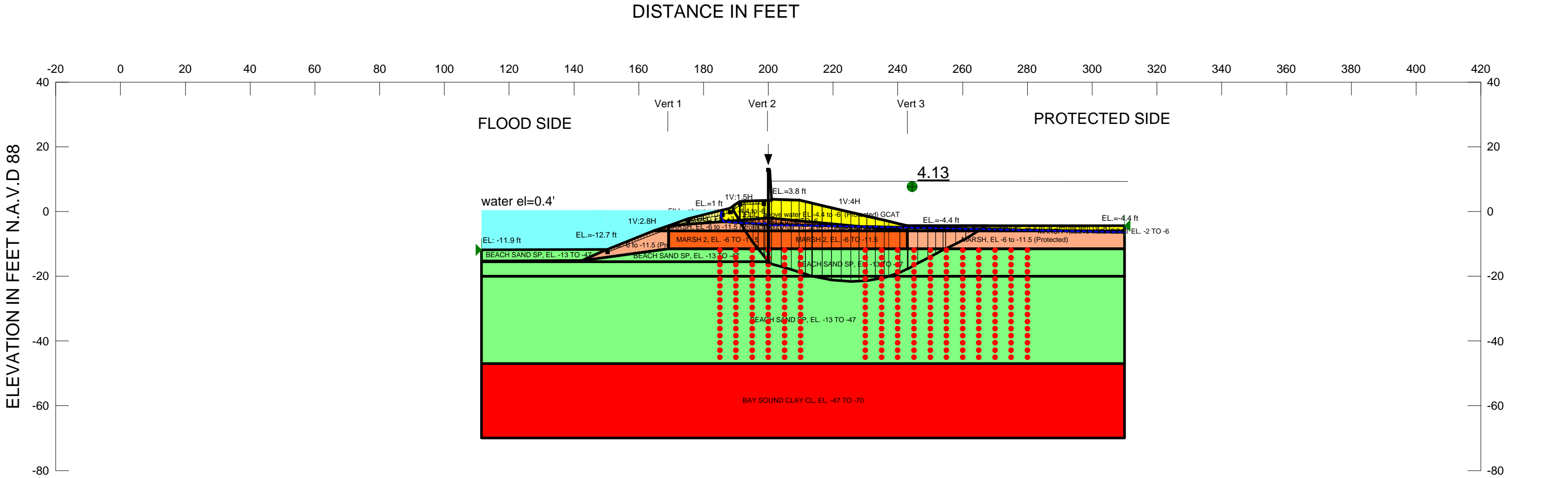
Slices of Slip Surface: **16475**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	16475	210.1063	2.9836205	336.20731	33.17326	16.17968	75
2	16475	211.1085	1.7132042	260.17684	117.20247	57.163466	75
3	16475	212.32545	0.32396185	-177.4998	207.23076	101.07319	75
4	16475	213.5424	0.90888435	104.46845	290.42455	141.64952	75
5	16475	214.75935	-2.010809	39.515657	367.05907	179.02667	75
6	16475	215.56115	-2.6858955	0.1148622	438.52618	213.82749	0
7	16475	216.23735	-3.2034105	30.453786	477.08891	198.85477	0
8	16475	217.38525	-4.02012	78.214005	522.75605	197.92287	0
9	16475	218.71535	-4.8776085	127.9982	568.84377	196.27709	0
10	16475	220.0454	-5.6408385	171.86359	607.58872	193.99733	0
11	16475	221.39135	-6.3248715	210.74885	645.64701	193.62913	0
12	16475	222.7532	-6.9342225	244.89793	682.89563	195.00914	0
13	16475	224.11505	-7.465197	274.16366	712.81999	195.30238	0
14	16475	225.4769	-7.9221365	298.78568	735.44113	194.41154	0

15	16475	226.83875	-8.308522	319.00939	751.18746	192.41807	0
16	16475	228.2006	-8.627128	335.01819	759.94472	189.18948	0
17	16475	229.56245	-8.880134	346.91663	761.88143	184.75423	0
18	16475	230.9243	-9.069203	354.80579	756.9375	179.04057	0
19	16475	232.28615	-9.195542	358.79728	745.10758	171.99643	0
20	16475	233.648	-9.259941	358.93269	726.2852	163.55588	0
21	16475	235.00985	-9.2627965	355.23723	700.26253	153.61516	0
22	16475	236.3717	-9.2041255	347.67432	666.82396	142.09457	0
23	16475	237.73355	-9.083567	336.24907	625.66775	128.8575	0
24	16475	239.0954	-8.9003695	320.84406	576.38633	113.77475	0
25	16475	240.45725	-8.653366	301.44233	518.4857	96.633933	0
26	16475	241.8191	-8.340937	277.98972	451.29735	77.16153	0
27	16475	243.19675	-7.9557235	249.82976	454.46433	91.109179	0
28	16475	244.5902	-7.4932815	216.56431	398.82903	81.149481	0
29	16475	245.98365	-6.953551	178.30815	332.4633	68.634293	0
30	16475	247.37715	-6.331926	134.85366	253.91879	53.01121	0
31	16475	248.7205	-5.651389	85.912279	164.70491	38.429732	0
32	16475	250.0137	-4.9118235	30.158774	58.225174	13.688898	0

2/28/2013

2/28/2013



Name: EMBANKMENT FILL, EL. +3.8 TO -2 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 1,above water GCAT EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 75 psf Phi: 24 °
Name: BEACH SAND SP, EL. -13 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -6 TO -11.5 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °
Name: FILL, above water EL -4.4 to -6 (Protected) GCAT Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °
Name: MARSH, EL -6 to -11.5 (Protected) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 14 STA. 96+00 TO 100+28
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Block) around
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Block) around

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File Information

Created By: Liljegren, James
Revision Number: 290
Last Edited By: Schroeder, Danielle MVN
Date: 6/25/2013
Time: 8:58:33 AM
File Name: Reach 14s.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/25/2013
Last Solved Time: 8:59:18 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Block) around

Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.8 TO -2

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1,above water GCAT EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -11.5

Model: Spatial Mohr-Coulomb

Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

FILL, above water EL -4.4 to -6 (Protected) GCAT

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH, EL -6 to -11.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (111.5, -11.9) ft
Right Coordinate: (310, -4.4) ft

Slip Surface Block

Left Grid
Upper Left: (185, -12) ft
Lower Left: (185, -45) ft
Lower Right: (210, -45) ft
X Increments: 5
Y Increments: 15
Starting Angle: 125 °
Ending Angle: 145 °
Angle Increments: 4
Right Grid
Upper Left: (230, -12) ft
Lower Left: (230, -45) ft
Lower Right: (280, -45) ft
X Increments: 10
Y Increments: 15
Starting Angle: 25 °
Ending Angle: 45 °
Angle Increments: 4

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (200, -15.506) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

	X (ft)	Y (ft)
	150.4	-12.5
	175.3	-3
	185.82623	-1
	188.3	-0.2
	191.4	2.2
	198.6	2.4

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (169.2, 80)
Data Point: (200, 109)
Data Point: (242.9, 80)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1,above water GCAT EL. -2 TO -6	3,28,34	3.76
Region 2	MARSH 1,above water GCAT EL. -2 TO -6	12,53,52,51	27.91
Region 3	BEACH SAND SP, EL. -13 TO -47	8,1,29,35,14,15	188.355
Region 4	BAY SOUND CLAY CL, EL. -47 TO -70	10,11,17,18	4565.5
Region 5	FILL, above water EL -4.4 to -6 (Protected) GCAT	27,25,19,7,55,54	81.595876
Region 6	BEACH SAND SP, EL. -13 TO -47	36,11,10,37	5359.5
Region 7	FILL, above water EL -4.4 to -6 (Protected) GCAT	48,23,4,26,5,31,12,50,49,57	73.939994
Region 8	FILL, above water EL -4.4 to -6 (Protected) GCAT	31,30,20,6,27,54,53,12	182.96371
Region 9	MARSH, EL -6 to -11.5 (Protected)	29,2,16,3,34,35	97.615
Region 10	BEACH SAND SP, EL. -13 TO -47	1,21,22,16,2,29	120.27
Region 11	MARSH, EL -6 to -11.5 (Protected)	51,13,34,28,50	72.087573
Region 12	MARSH, EL -6 to -11.5 (Protected)	32,55,56,9,33	365.35
Region 13	BEACH SAND SP, EL. -13 TO -47	15,14,33,9,36,37,8	1333.25
Region 14		31,44,45,20,30	7.225
Region 15	MARSH 2, EL. -6 TO -11.5	34,13,46,47,14,35	169.4
Region 16	MARSH 2, EL. -6 TO -11.5	13,32,33,14,47,46	235.95
Region 17	EMBANKMENT FILL, EL. +3.8 TO -2	28,24,48,57,49,50	32.026143
Region 18	MARSH, EL -6 to -11.5 (Protected)	51,52,53,32,13	58.12
Region 19	EMBANKMENT FILL, EL. +3.8 TO -2	53,54,32	7.897
Region 20	EMBANKMENT FILL, EL. +3.8 TO -2	54,55,32	25.758

Region 21	MARSH 1,above water GCAT EL. -2 TO -6	55,7,56	3.7
Region 22	MARSH 1,above water GCAT EL. -2 TO -6	50,12,51	14

Points

	X (ft)	Y (ft)
Point 1	111.5	-15.3
Point 2	148.1	-12.7
Point 3	164.5	-6
Point 4	191.1	3.1
Point 5	198.9	3.4
Point 6	209.5	3.5
Point 7	310	-6
Point 8	111.5	-15.5
Point 9	310	-11.5
Point 10	111.5	-47
Point 11	310	-47
Point 12	200	-2
Point 13	200	-6
Point 14	200	-11.5
Point 15	200	-15.5
Point 16	150.3	-11.7
Point 17	310	-70
Point 18	111.5	-70
Point 19	310	-4.4
Point 20	201	3.8
Point 21	111.5	-11.9
Point 22	146.3	-11.7
Point 23	188.1	1
Point 24	175.3	-2.2
Point 25	243.1	-4.4
Point 26	198.6	3.38846
Point 27	242.92268	-4.4
Point 28	169.20857	-4.4

Point 29	142.5	-15.2
Point 30	201	3.4
Point 31	200	3.4
Point 32	242.9	-6
Point 33	242.9	-11.5
Point 34	169.2	-6
Point 35	169.2	-11.5
Point 36	310	-20
Point 37	111.5	-20
Point 38	169.2	-47
Point 39	200	-47
Point 40	242.9	-47
Point 41	169.2	-70
Point 42	200	-70
Point 43	242.9	-70
Point 44	200	12.9
Point 45	200.5	12.9
Point 46	200	-6.9
Point 47	200	-10.3
Point 48	185.8	0.4
Point 49	185.6	-2.6
Point 50	186	-3.1
Point 51	200	-4
Point 52	200.3	-4
Point 53	228	-4.6
Point 54	242.9	-4.94
Point 55	291.5	-6
Point 56	310	-6.4
Point 57	185.4	-0.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	4.13	(227.831, -0.275)	34.44918	(189.194, 1.7655)	(267.472, -4.4)

2	7816	4.76	(227.831, -0.275)	36.466	(185.3, 0.276187)	(270.17, -4.4)
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Slices of Slip Surface: Optimized

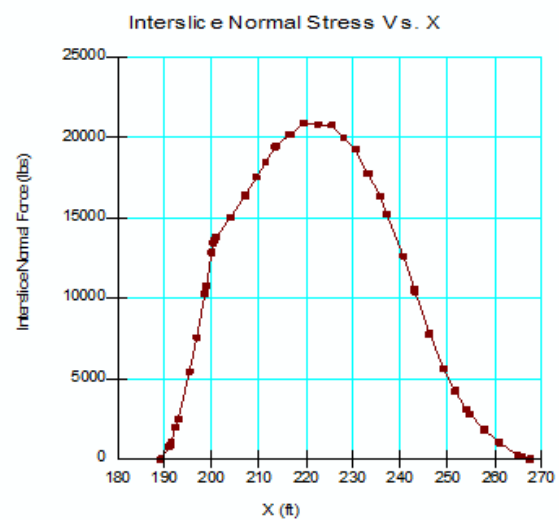
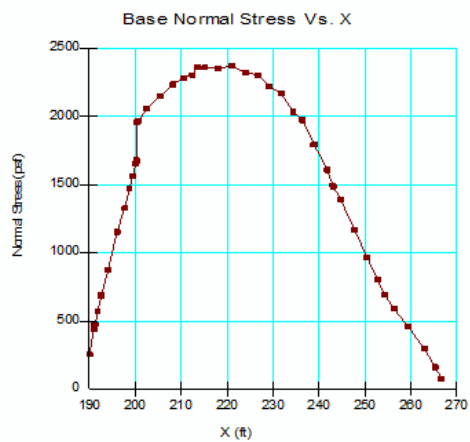
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	190.0821	1.1088262	-124.45223	253.20608	123.49686	75
2	Optimized	191.0353	2.8259915	-40.711645	445.00345	198.1283	75
3	Optimized	191.2397	3.194174	-18.895822	470.75386	209.59312	75
4	Optimized	191.86495	4.3205035	47.266361	569.01357	232.29683	0
5	Optimized	192.62525	5.597595	123.02482	686.94416	251.07307	0
6	Optimized	194.10585	7.766045	250.88294	873.18019	277.06459	0
7	Optimized	196.08395	10.516045	413.20794	1152.0015	328.93209	0
8	Optimized	197.7281	12.610915	539.6843	1326.1796	530.49775	0
9	Optimized	198.75	13.912945	619.52376	1465.7994	570.82014	0
10	Optimized	199.45	14.804825	673.64408	1559.6191	597.59768	0
11	Optimized	200.15	15.69671	726.51987	1652.2554	624.41652	0
12	Optimized	200.32715	15.92239	740.17921	1675.2418	630.70772	0

13	Optimize d	200.42715	- 15.97895 5	743.52275	1950.762	814.29314	0
14	Optimize d	200.75	- 16.07644	748.94858	1961.7371	818.03621	0
15	Optimize d	202.5159	-16.6096	779.39096	2057.0516	861.79295	0
16	Optimize d	205.5477	- 17.52496	832.72286	2149.8219	888.39453	0
17	Optimize d	208.2818	- 18.35880 5	881.35753	2231.8652	910.92892	0
18	Optimize d	210.4816	- 19.03807 5	920.92692	2281	917.38088	0
19	Optimize d	212.4448	- 19.64428 5	956.21241	2302.8527	908.32033	0
20	Optimize d	213.5608	- 19.97369 5	975.29019	2358.6189	933.06699	0
21	Optimize d	215.1602	- 20.28679	992.71948	2354.8744	918.78507	0
22	Optimize d	218.0902	- 20.86037 5	1024.6055	2348.0416	892.66897	0
23	Optimize d	221.0309	- 21.26309	1045.8432	2367.5537	891.50496	0
24	Optimize d	223.9823	- 21.49493	1056.382	2317.8996	850.90433	0
25	Optimize d	226.729	- 21.55278 5	1056.3252	2301.5549	839.91806	0
26	Optimize d	229.22775	- 21.43863	1045.8844	2219.5906	791.67479	0
27	Optimize d	231.781	- 21.15130 5	1024.5384	2163.3479	768.13673	0
28	Optimize	234.43195	-	992.17085	2030.5704	700.40935	0

	d		20.68883 5				
29	Optimize d	236.4502	-20.2288	960.80966	1970.4136	680.98649	0
30	Optimize d	238.9063	- 19.41765	906.89968	1793.1745	597.79994	0
31	Optimize d	241.79615	- 18.28815	832.57577	1606.7028	522.15525	0
32	Optimize d	243.01135	- 17.69794	794.10252	1493.3429	471.6436	0
33	Optimize d	243.1115	- 17.64929	790.96482	1486.8201	469.36028	0
34	Optimize d	244.6549	16.82007 5	737.15385	1389.2139	439.82005	0
35	Optimize d	247.71865	- 15.17282 5	630.29788	1166.4176	361.61733	0
36	Optimize d	250.42885	13.73618 5	537.0558	969.01173	291.35795	0
37	Optimize d	252.78555	- 12.51015	457.40275	803.758	233.61957	0
38	Optimize d	254.36155	11.69856 5	404.66333	691.8042	193.67896	0
39	Optimize d	256.3086	- 10.72631 2	341.40315	589.66748	110.5344	0
40	Optimize d	259.4074	9.178937 5	240.72603	458.44741	96.935803	0
41	Optimize d	262.91315	- 7.202625	112.73852	296.58634	81.854325	0
42	Optimize d	265.32575	- 5.719536 5	16.982319	161.44873	70.460979	0
43	Optimize d	266.6272	- 4.919536	-34.66967	78.859767	38.462478	75

			5				
Slices of Slip Surface: 7816							
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	7816	185.35	- 1.149993 5	1.3752848	90.72411	43.578334	0
2	7816	185.42	-1.22	0.32010725	144.17378	70.162122	0
3	7816	185.62	-1.42	-2.7355211	151.94546	74.108751	75
4	7816	186.50265	- 2.302649	-15.52185	250.952	122.39747	75
5	7816	187.2973	- 3.097305 5	-5.1622274	342.5	152.49082	75
6	7816	187.74465	- 3.544656 5	18.370988	396.98009	168.56763	0
7	7816	189.15	-4.95	95.105877	572.72291	212.64881	0
8	7816	190.65	-6.45	179.70729	783.60015	268.87042	0
9	7816	192.25	-8.05	271.29537	960.80445	306.98922	0
10	7816	194.55	-10.35	405.01849	1183.6353	346.66255	0
11	7816	197.15	-12.95	561.27215	1432.5253	587.66767	0
12	7816	198.75	-14.55	658.74063	1614.0182	644.34289	0
13	7816	199.3	-15.1	691.64757	1674.959	663.25191	0
14	7816	199.85	-15.65	724.19514	1735.4049	682.0696	0
15	7816	200.15	-15.95	742.22636	1767.8611	691.79937	0
16	7816	200.4	-16.2	757.3114	1794.4957	699.58963	0
17	7816	200.75	-16.55	778.48212	1831.6894	710.39725	0
18	7816	202.6	-18.4	891.39656	2059.2056	787.69715	0
19	7816	204.6	-20.4	1013.8142	2266.0118	844.61792	0
20	7816	206.125	-20.8	1036.7556	2665.9556	1098.9093	0
21	7816	208.375	-20.8	1033.7778	2654.6667	1093.3034	0
22	7816	210.82145	-20.8	1030.5136	2613.611	1067.8127	0
23	7816	213.4643	-20.8	1026.9947	2542.8164	1022.4346	0

24	7816	216.10715	-20.8	1023.4757	2472.0218	977.05663	0
25	7816	218.75	-20.8	1019.9568	2401.265	931.70413	0
26	7816	221.39285	-20.8	1016.4379	2330.4704	886.32611	0
27	7816	224.0357	-20.8	1012.919	2259.6758	840.9481	0
28	7816	226.67855	-20.8	1009.4379	2188.8812	795.54456	0
29	7816	229.75	-20.8	1005.3429	2106.6857	742.86514	0
30	7816	233.25	-20.8	1000.6857	2013.0571	682.85315	0
31	7816	235.8578	-20.4	972.23345	2040.8239	720.77334	0
32	7816	238.2617	- 19.27904	899.0985	1821.0877	621.88958	0
33	7816	241.36525	- 17.83183 5	804.68168	1537.4087	494.23062	0
34	7816	243.01135	- 17.06425	754.60897	1389.6683	428.35295	0
35	7816	244.5805	- 16.33254 5	706.83957	1293.1127	395.44621	0
36	7816	247.5415	- 14.95181 5	616.72847	1110.9315	333.34418	0
37	7816	250.50245	- 13.57109	526.64797	928.7504	271.22151	0
38	7816	253.4634	- 12.19036 5	436.53687	746.53865	209.09884	0
39	7816	256.41825	-10.8125	346.6392	590.09807	108.39487	0
40	7816	259.36695	-9.4375	256.91196	474.59265	96.917687	0
41	7816	262.31565	-8.0625	167.18779	359.05649	85.42545	0
42	7816	265.26435	-6.6875	77.463626	243.53263	73.938686	0
43	7816	267.2919	- 5.742035	15.770077	157.21748	68.988508	0
44	7816	269.0075	- 4.942035	-36.432866	73.337442	35.769061	75



Global Stability (Entry/Exit) in front

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File Information

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Last Solved Date: 6/25/2013
Last Solved Time: 8:31:33 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of Movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

FILL, above water EL -4.4 to -6 (Protected) GCAT

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH, EL -6 to -11.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (150, -11.7) ft
Left-Zone Right Coordinate: (215, 2.19998) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (225, -0.16368) ft
Right-Zone Right Coordinate: (270, -4.4) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (111.5, -11.9) ft
Right Coordinate: (310, -4.4) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.8 TO -2

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1,above water GCAT EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -11.5

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2

F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

	X (ft)	Y (ft)
	201	3.4
	209.5	3
	215.2	1.4

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (169.2, 80)
 Data Point: (200, 109)
 Data Point: (242.9, 80)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1,above water GCAT EL. -2 TO -6	3,28,34	3.76
Region 2	MARSH 1,above water GCAT EL. -2 TO -6	12,53,52,51	27.91
Region 3	BEACH SAND SP, EL. -13 TO -47	8,1,29,35,14,15	188.355
Region 4	BAY SOUND CLAY CL, EL. -47 TO -70	10,11,17,18	4565.5
Region 5	FILL, above water EL -4.4 to -6 (Protected) GCAT	27,25,19,7,55,54	81.595876
Region 6	BEACH SAND SP, EL. -13 TO -47	36,11,10,37	5359.5
Region 7	FILL, above water EL -4.4 to -6	48,23,4,26,5,31,12,50,49,57	73.939994

	(Protected) GCAT		
Region 8	FILL, above water EL -4.4 to -6 (Protected) GCAT	31,30,20,6,27,54,53,12	182.96371
Region 9	MARSH, EL -6 to -11.5 (Protected)	29,2,16,3,34,35	97.615
Region 10	BEACH SAND SP, EL -13 TO -47	1,21,22,16,2,29	120.27
Region 11	MARSH, EL -6 to -11.5 (Protected)	51,13,34,28,50	72.087573
Region 12	MARSH, EL -6 to -11.5 (Protected)	32,55,56,9,33	365.35
Region 13	BEACH SAND SP, EL -13 TO -47	15,14,33,9,36,37,8	1333.25
Region 14		31,44,45,20,30	7.225
Region 15	MARSH 2, EL -6 TO -11.5	34,13,46,47,14,35	169.4
Region 16	MARSH 2, EL -6 TO -11.5	13,32,33,14,47,46	235.95
Region 17	EMBANKMENT FILL, EL +3.8 TO -2	28,24,48,57,49,50	32.026143
Region 18	MARSH, EL -6 to -11.5 (Protected)	51,52,53,32,13	58.12
Region 19	EMBANKMENT FILL, EL +3.8 TO -2	53,54,32	7.897
Region 20	EMBANKMENT FILL, EL +3.8 TO -2	54,55,32	25.758
Region 21	MARSH 1,above water GCAT EL. -2 TO -6	55,7,56	3.7
Region 22	MARSH 1,above water GCAT EL. -2 TO -6	50,12,51	14

Points

	X (ft)	Y (ft)
Point 1	111.5	-15.3
Point 2	148.1	-12.7
Point 3	164.5	-6
Point 4	191.1	3.1

Point 5	198.9	3.4
Point 6	209.5	3.5
Point 7	310	-6
Point 8	111.5	-15.5
Point 9	310	-11.5
Point 10	111.5	-47
Point 11	310	-47
Point 12	200	-2
Point 13	200	-6
Point 14	200	-11.5
Point 15	200	-15.5
Point 16	150.3	-11.7
Point 17	310	-70
Point 18	111.5	-70
Point 19	310	-4.4
Point 20	201	3.8
Point 21	111.5	-11.9
Point 22	146.3	-11.7
Point 23	188.1	1
Point 24	175.3	-2.2
Point 25	243.1	-4.4
Point 26	198.6	3.38846
Point 27	242.92268	-4.4
Point 28	169.20857	-4.4
Point 29	142.5	-15.2
Point 30	201	3.4
Point 31	200	3.4
Point 32	242.9	-6
Point 33	242.9	-11.5
Point 34	169.2	-6
Point 35	169.2	-11.5
Point 36	310	-20
Point 37	111.5	-20
Point 38	169.2	-47
Point 39	200	-47
Point 40	242.9	-47

Point 41	169.2	-70
Point 42	200	-70
Point 43	242.9	-70
Point 44	200	12.9
Point 45	200.5	12.9
Point 46	200	-6.9
Point 47	200	-10.3
Point 48	185.8	0.4
Point 49	185.6	-2.6
Point 50	186	-3.1
Point 51	200	-4
Point 52	200.3	-4
Point 53	228	-4.6
Point 54	242.9	-4.94
Point 55	291.5	-6
Point 56	310	-6.4
Point 57	185.4	-0.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.81	(232.383, 19.367)	21.64305	(206.792, 3.59557)	(253.427, -4.4)
2	17316	1.83	(232.383, 19.367)	30.691	(206.326, 3.61202)	(251.803, -4.4)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimized	207.3756	2.449396	-419.53026	54.31471	26.491054	75
2	Optimized	208.54225	1.0933455	-335.68235	153.1165	74.679907	75
3	Optimized	209.3128	0.2209836	-281.75841	228.07867	111.2414	75

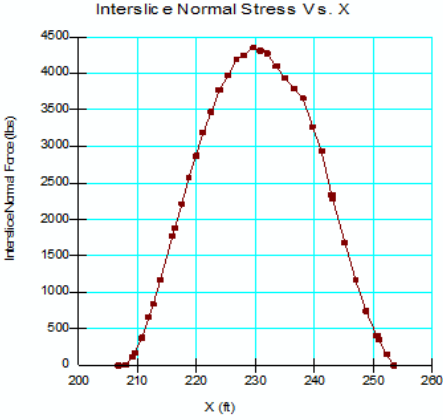
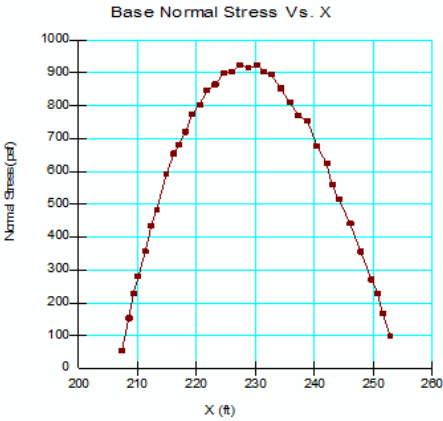
4	Optimized	210.1074	-0.6038819	-230.89505	280.5806	136.8483	75
5	Optimized	211.3222	-1.8649405	-153.17428	356.36535	173.81099	75
6	Optimized	212.3072	-2.836674	-93.41062	434.65147	211.99369	75
7	Optimized	213.28025	-3.715889	-39.577606	484.04684	215.51154	75
8	Optimized	214.88875	-4.992165	38.26408	592.92771	246.95216	0
9	Optimized	216.12285	-5.865215	91.297077	653.98416	250.52443	0
10	Optimized	216.93565	-6.3608025	121.24185	679.96003	248.75736	0
11	Optimized	218.11915	-7.0824075	164.81562	719.94113	247.1578	0
12	Optimized	219.31605	-7.747475	204.79302	774.89451	253.82554	0
13	Optimized	220.52635	-8.356005	241.20871	802.87251	250.06883	0
14	Optimized	221.81345	-8.9395075	275.92491	845.88386	253.76207	0
15	Optimized	223.17735	-9.4979825	308.961	864.33901	247.27022	0
16	Optimized	224.5914	-10.001755	338.50218	898.8026	249.46182	0
17	Optimized	226.0556	-10.45082	364.55538	903.30804	239.86814	0
18	Optimized	227.39385	-10.799025	384.47426	924.8169	240.57604	0
19	Optimized	228.825	-11.09102	400.76938	914.51049	228.73228	0
20	Optimized	230.23445	-11.316325	412.93063	922.95929	227.07939	0
21	Optimized	231.4034	-11.430295	418.47349	902.26934	215.39979	0
22	Optimized	232.7487	-11.487945	420.28277	893.69152	210.77516	0

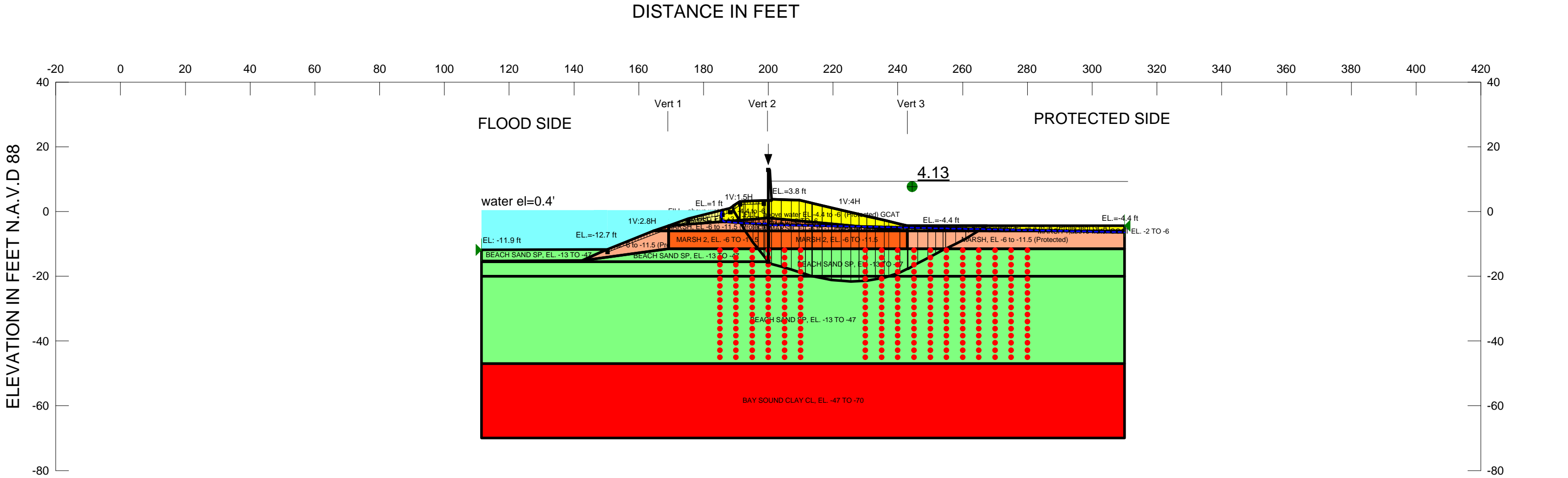
23	Optimiz ed	234.27035	-11.48927	418.33753	852.28953	193.20788	0
24	Optimiz ed	235.792	-11.490595	416.39887	810.95326	175.66693	0
25	Optimiz ed	237.31365	-11.49192	414.4602	769.61699	158.12599	0
26	Optimiz ed	238.8648	-11.3274	402.15018	752.44079	155.95942	0
27	Optimiz ed	240.4454	-10.99704	379.4593	677.63021	132.75425	0
28	Optimiz ed	242.0792	-10.4481	343.06492	623.83288	125.00595	0
29	Optimiz ed	243.01135	-10.024003	315.38006	559.31593	108.60725	0
30	Optimiz ed	244.1279	-9.516008	282.20536	514.48528	103.41768	0
31	Optimiz ed	246.05745	-8.57525	220.92247	440.93651	97.956559	0
32	Optimiz ed	247.86075	-7.62905	159.45309	355.9803	87.499552	0
33	Optimiz ed	249.66405	-6.68285	97.983708	271.02901	77.04473	0
34	Optimiz ed	250.7315	-6.104875	60.484991	228.81942	74.947317	0
35	Optimiz ed	251.57395	-5.5719715	26.105425	167.26481	68.848031	0
36	Optimiz ed	252.83865	-4.7719715	-25.506025	99.128218	48.348062	75

Slices of Slip Surface: 17316

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	17316	207.11965	1.9954066	-391.02569	75.006096	36.582918	75
2	17316	208.70655	-0.1224854	-259.85541	239.24671	116.68842	75
3	17316	210.4661	-2.073994	-139.32334	390.72495	190.56929	75
4	17316	212.1195	-3.6662335	-41.471063	505.37805	225.00881	75

5	17316	213.3816	-4.724272	23.197839	590.57675	252.61337	0
6	17316	214.5312	-5.588819	75.878224	644.19728	253.03195	0
7	17316	215.82235	-6.459346	128.7017	703.49958	255.9165	0
8	17316	217.255	-7.3246965	180.97102	766.16045	260.54312	0
9	17316	218.68765	-8.088036	226.81052	818.28675	263.34218	0
10	17316	220.12035	-8.7577075	266.76179	860.62716	264.4059	0
11	17316	221.553	-9.3402915	301.24109	893.7901	263.81982	0
12	17316	222.98565	-9.8410145	330.58538	918.3407	261.68553	0
13	17316	224.41835	-10.264045	355.0737	934.66701	258.05157	0
14	17316	225.851	-10.61268	374.90767	943.13437	252.99082	0
15	17316	227.28365	-10.88949	390.26123	944.06049	246.56732	0
16	17316	228.745	-11.099185	401.38319	937.43378	238.6651	0
17	17316	230.235	-11.24044	408.20398	923.09855	229.24583	0
18	17316	231.725	-11.30871	410.47598	901.20194	218.48527	0
19	17316	233.215	-11.304485	408.23912	871.8941	206.4325	0
20	17316	234.705	-11.22774	401.47629	835.24897	193.12804	0
21	17316	236.195	-11.07792	390.16165	791.20478	178.55591	0
22	17316	237.685	-10.853935	374.23063	739.70902	162.72147	0
23	17316	239.175	-10.55412	353.56887	680.6047	145.60573	0
24	17316	240.665	-10.176158	328.02543	613.70353	127.19208	0
25	17316	242.16635	-9.712849	297.13163	537.94722	107.21801	0
26	17316	243.01135	-9.4256645	278.08875	495.16124	96.646899	0
27	17316	243.92005	-9.060131	254.06588	468.45886	95.453905	0
28	17316	245.5601	-8.337291	206.76003	414.12025	92.322717	0
29	17316	247.20015	-7.494924	151.97948	348.05362	87.297831	0
30	17316	248.8402	-6.5212955	89.014557	268.28377	79.815797	0
31	17316	250.277	-5.557175	26.923001	172.76553	71.132152	0
32	17316	251.34815	-4.757175	-24.434199	115.75142	56.455737	75





Name: EMBANKMENT FILL, EL. +3.8 TO -2 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 1,above water GCAT EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 75 psf Phi: 24 °
Name: BEACH SAND SP, EL. -13 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -6 TO -11.5 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °
Name: FILL, above water EL -4.4 to -6 (Protected) GCAT Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °
Name: MARSH, EL -6 to -11.5 (Protected) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



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of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 14 STA. 96+00 TO 100+28
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Block) around
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Block) around

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Last Solved Date: 6/25/2013
Last Solved Time: 8:59:18 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Block) around

Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Block
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

FILL, above water EL -4.4 to -6 (Protected) GCAT
Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH, EL -6 to -11.5 (Protected)
Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (111.5, -11.9) ft
Right Coordinate: (310, -4.4) ft

Slip Surface Block

Left Grid
 Upper Left: (185, -12) ft
 Lower Left: (185, -45) ft
 Lower Right: (210, -45) ft
 X Increments: 5
 Y Increments: 15
 Starting Angle: 125 °
 Ending Angle: 145 °
 Angle Increments: 4
Right Grid
 Upper Left: (230, -12) ft
 Lower Left: (230, -45) ft
 Lower Right: (280, -45) ft
 X Increments: 10
 Y Increments: 15
 Starting Angle: 25 °
 Ending Angle: 45 °
 Angle Increments: 4

FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
 Number of Slices: 30
 Optimization Tolerance: 0.01
 Minimum Slip Surface Depth: 0.1 ft
 Optimization Maximum Iterations: 2000
 Optimization Convergence Tolerance: 1e-007
 Starting Optimization Points: 8
 Ending Optimization Points: 16
 Complete Passes per Insertion: 1
 Driving Side Maximum Convex Angle: 5 °
 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.8 TO -2
Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1,above water GCAT EL. -2 TO -6
Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13 TO -47
Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -47 TO -70
Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -11.5
Model: Spatial Mohr-Coulomb

Reinforcements

Reinforcement 1
Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (200, -15.506) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

	X (ft)	Y (ft)
	150.4	-12.5
	175.3	-3
	185.82623	-1
	188.3	-0.2
	191.4	2.2
	198.6	2.4

Unit Weight Functions

Marsh 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
 Curve Fit to Data: 100 %
 Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (169.2, 80)
 Data Point: (200, 109)
 Data Point: (242.9, 80)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1,above water GCAT EL. -2 TO -6	3,28,34	3.76
Region 2	MARSH 1,above water GCAT EL. -2 TO -6	12,53,52,51	27.91
Region 3	BEACH SAND SP, EL. -13 TO -47	8,1,29,35,14,15	188.355
Region 4	BAY SOUND CLAY CL, EL. -47 TO -70	10,11,17,18	4565.5
Region 5	FILL, above water EL -4.4 to -6 (Protected) GCAT	27,25,19,7,55,54	81.595876
Region 6	BEACH SAND SP, EL. -13 TO -47	36,11,10,37	5359.5
Region 7	FILL, above water EL -4.4 to -6 (Protected) GCAT	48,23,4,26,5,31,12,50,49,57	73.939994
Region 8	FILL, above water EL -4.4 to -6 (Protected) GCAT	31,30,20,6,27,54,53,12	182.96371
Region 9	MARSH, EL -6 to -11.5 (Protected)	29,2,16,3,34,35	97.615
Region 10	BEACH SAND SP, EL. -13 TO -47	1,21,22,16,2,29	120.27
Region 11	MARSH, EL -6 to -11.5 (Protected)	51,13,34,28,50	72.087573
Region 12	MARSH, EL -6 to -11.5 (Protected)	32,55,56,9,33	365.35
Region 13	BEACH SAND SP, EL. -13 TO -47	15,14,33,9,36,37,8	1333.25
Region 14		31,44,45,20,30	7.225
Region 15	MARSH 2, EL. -6 TO -11.5	34,13,46,47,14,35	169.4
Region 16	MARSH 2, EL. -6 TO -11.5	13,32,33,14,47,46	235.95
Region 17	EMBANKMENT FILL, EL. +3.8 TO -2	28,24,48,57,49,50	32.026143
Region 18	MARSH, EL -6 to -11.5 (Protected)	51,52,53,32,13	58.12
Region 19	EMBANKMENT FILL, EL. +3.8 TO -2	53,54,32	7.897
Region 20	EMBANKMENT FILL, EL. +3.8 TO -2	54,55,32	25.758

Region 21	MARSH 1,above water GCAT EL. -2 TO -6	55,7,56	3.7
Region 22	MARSH 1,above water GCAT EL. -2 TO -6	50,12,51	14

Points

	X (ft)	Y (ft)
Point 1	111.5	-15.3
Point 2	148.1	-12.7
Point 3	164.5	-6
Point 4	191.1	3.1
Point 5	198.9	3.4
Point 6	209.5	3.5
Point 7	310	-6
Point 8	111.5	-15.5
Point 9	310	-11.5
Point 10	111.5	-47
Point 11	310	-47
Point 12	200	-2
Point 13	200	-6
Point 14	200	-11.5
Point 15	200	-15.5
Point 16	150.3	-11.7
Point 17	310	-70
Point 18	111.5	-70
Point 19	310	-4.4
Point 20	201	3.8
Point 21	111.5	-11.9
Point 22	146.3	-11.7
Point 23	188.1	1
Point 24	175.3	-2.2
Point 25	243.1	-4.4
Point 26	198.6	3.38846
Point 27	242.92268	-4.4
Point 28	169.20857	-4.4

Point 29	142.5	-15.2
Point 30	201	3.4
Point 31	200	3.4
Point 32	242.9	-6
Point 33	242.9	-11.5
Point 34	169.2	-6
Point 35	169.2	-11.5
Point 36	310	-20
Point 37	111.5	-20
Point 38	169.2	-47
Point 39	200	-47
Point 40	242.9	-47
Point 41	169.2	-70
Point 42	200	-70
Point 43	242.9	-70
Point 44	200	12.9
Point 45	200.5	12.9
Point 46	200	-6.9
Point 47	200	-10.3
Point 48	185.8	0.4
Point 49	185.6	-2.6
Point 50	186	-3.1
Point 51	200	-4
Point 52	200.3	-4
Point 53	228	-4.6
Point 54	242.9	-4.94
Point 55	291.5	-6
Point 56	310	-6.4
Point 57	185.4	-0.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	4.13	(227.831, -0.275)	34.44918	(189.194, 1.7655)	(267.472, -4.4)

2	7816	4.76	(227.831, -0.275)	36.466	(185.3, 0.276187)	(270.17, -4.4)
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Slices of Slip Surface: Optimized

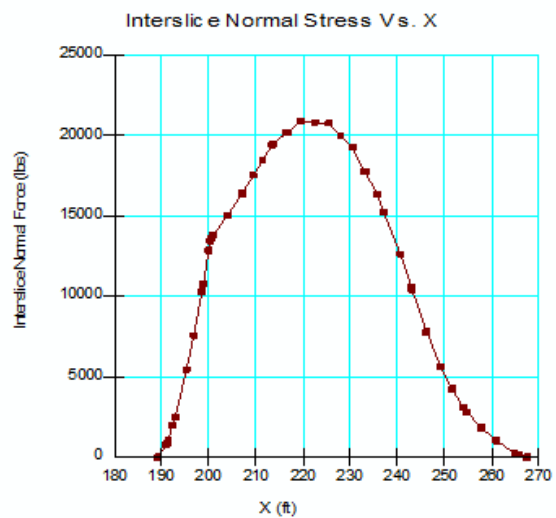
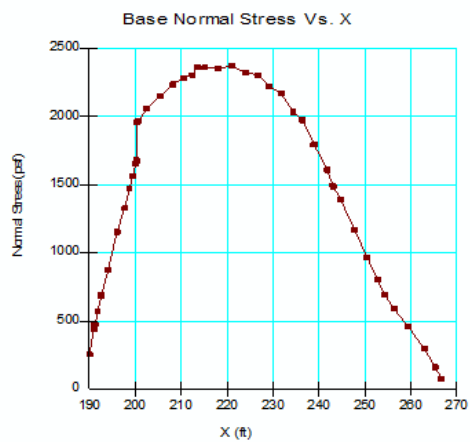
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	190.0821	1.1088262	-124.45223	253.20608	123.49686	75
2	Optimized	191.0353	2.8259915	-40.711645	445.00345	198.1283	75
3	Optimized	191.2397	3.194174	-18.895822	470.75386	209.59312	75
4	Optimized	191.86495	4.3205035	47.266361	569.01357	232.29683	0
5	Optimized	192.62525	5.597595	123.02482	686.94416	251.07307	0
6	Optimized	194.10585	7.766045	250.88294	873.18019	277.06459	0
7	Optimized	196.08395	10.516045	413.20794	1152.0015	328.93209	0
8	Optimized	197.7281	12.610915	539.6843	1326.1796	530.49775	0
9	Optimized	198.75	13.912945	619.52376	1465.7994	570.82014	0
10	Optimized	199.45	14.804825	673.64408	1559.6191	597.59768	0
11	Optimized	200.15	15.69671	726.51987	1652.2554	624.41652	0
12	Optimized	200.32715	15.92239	740.17921	1675.2418	630.70772	0

13	Optimize d	200.42715	- 15.97895 5	743.52275	1950.762	814.29314	0
14	Optimize d	200.75	- 16.07644	748.94858	1961.7371	818.03621	0
15	Optimize d	202.5159	-16.6096	779.39096	2057.0516	861.79295	0
16	Optimize d	205.5477	- 17.52496	832.72286	2149.8219	888.39453	0
17	Optimize d	208.2818	- 18.35880 5	881.35753	2231.8652	910.92892	0
18	Optimize d	210.4816	- 19.03807 5	920.92692	2281	917.38088	0
19	Optimize d	212.4448	- 19.64428 5	956.21241	2302.8527	908.32033	0
20	Optimize d	213.5608	- 19.97369 5	975.29019	2358.6189	933.06699	0
21	Optimize d	215.1602	- 20.28679	992.71948	2354.8744	918.78507	0
22	Optimize d	218.0902	- 20.86037 5	1024.6055	2348.0416	892.66897	0
23	Optimize d	221.0309	- 21.26309	1045.8432	2367.5537	891.50496	0
24	Optimize d	223.9823	- 21.49493	1056.382	2317.8996	850.90433	0
25	Optimize d	226.729	- 21.55278 5	1056.3252	2301.5549	839.91806	0
26	Optimize d	229.22775	- 21.43863	1045.8844	2219.5906	791.67479	0
27	Optimize d	231.781	- 21.15130 5	1024.5384	2163.3479	768.13673	0
28	Optimize	234.43195	-	992.17085	2030.5704	700.40935	0

	d		20.68883 5				
29	Optimize d	236.4502	-20.2288	960.80966	1970.4136	680.98649	0
30	Optimize d	238.9063	- 19.41765	906.89968	1793.1745	597.79994	0
31	Optimize d	241.79615	- 18.28815	832.57577	1606.7028	522.15525	0
32	Optimize d	243.01135	- 17.69794	794.10252	1493.3429	471.6436	0
33	Optimize d	243.1115	- 17.64929	790.96482	1486.8201	469.36028	0
34	Optimize d	244.6549	- 16.82007 5	737.15385	1389.2139	439.82005	0
35	Optimize d	247.71865	- 15.17282 5	630.29788	1166.4176	361.61733	0
36	Optimize d	250.42885	- 13.73618 5	537.0558	969.01173	291.35795	0
37	Optimize d	252.78555	- 12.51015	457.40275	803.758	233.61957	0
38	Optimize d	254.36155	- 11.69856 5	404.66333	691.8042	193.67896	0
39	Optimize d	256.3086	- 10.72631 2	341.40315	589.66748	110.5344	0
40	Optimize d	259.4074	- 9.178937 5	240.72603	458.44741	96.935803	0
41	Optimize d	262.91315	- 7.202625	112.73852	296.58634	81.854325	0
42	Optimize d	265.32575	- 5.719536 5	16.982319	161.44873	70.460979	0
43	Optimize d	266.6272	- 4.919536	-34.66967	78.859767	38.462478	75

			5				
Slices of Slip Surface: 7816							
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	7816	185.35	- 1.149993 5	1.3752848	90.72411	43.578334	0
2	7816	185.42	-1.22	0.32010725	144.17378	70.162122	0
3	7816	185.62	-1.42	-2.7355211	151.94546	74.108751	75
4	7816	186.50265	- 2.302649	-15.52185	250.952	122.39747	75
5	7816	187.2973	- 3.097305 5	-5.1622274	342.5	152.49082	75
6	7816	187.74465	- 3.544656 5	18.370988	396.98009	168.56763	0
7	7816	189.15	-4.95	95.105877	572.72291	212.64881	0
8	7816	190.65	-6.45	179.70729	783.60015	268.87042	0
9	7816	192.25	-8.05	271.29537	960.80445	306.98922	0
10	7816	194.55	-10.35	405.01849	1183.6353	346.66255	0
11	7816	197.15	-12.95	561.27215	1432.5253	587.66767	0
12	7816	198.75	-14.55	658.74063	1614.0182	644.34289	0
13	7816	199.3	-15.1	691.64757	1674.959	663.25191	0
14	7816	199.85	-15.65	724.19514	1735.4049	682.0696	0
15	7816	200.15	-15.95	742.22636	1767.8611	691.79937	0
16	7816	200.4	-16.2	757.3114	1794.4957	699.58963	0
17	7816	200.75	-16.55	778.48212	1831.6894	710.39725	0
18	7816	202.6	-18.4	891.39656	2059.2056	787.69715	0
19	7816	204.6	-20.4	1013.8142	2266.0118	844.61792	0
20	7816	206.125	-20.8	1036.7556	2665.9556	1098.9093	0
21	7816	208.375	-20.8	1033.7778	2654.6667	1093.3034	0
22	7816	210.82145	-20.8	1030.5136	2613.611	1067.8127	0
23	7816	213.4643	-20.8	1026.9947	2542.8164	1022.4346	0

24	7816	216.10715	-20.8	1023.4757	2472.0218	977.05663	0
25	7816	218.75	-20.8	1019.9568	2401.265	931.70413	0
26	7816	221.39285	-20.8	1016.4379	2330.4704	886.32611	0
27	7816	224.0357	-20.8	1012.919	2259.6758	840.9481	0
28	7816	226.67855	-20.8	1009.4379	2188.8812	795.54456	0
29	7816	229.75	-20.8	1005.3429	2106.6857	742.86514	0
30	7816	233.25	-20.8	1000.6857	2013.0571	682.85315	0
31	7816	235.8578	-20.4	972.23345	2040.8239	720.77334	0
32	7816	238.2617	- 19.27904	899.0985	1821.0877	621.88958	0
33	7816	241.36525	- 17.83183 5	804.68168	1537.4087	494.23062	0
34	7816	243.01135	- 17.06425	754.60897	1389.6683	428.35295	0
35	7816	244.5805	- 16.33254 5	706.83957	1293.1127	395.44621	0
36	7816	247.5415	- 14.95181 5	616.72847	1110.9315	333.34418	0
37	7816	250.50245	- 13.57109	526.64797	928.7504	271.22151	0
38	7816	253.4634	- 12.19036 5	436.53687	746.53865	209.09884	0
39	7816	256.41825	-10.8125	346.6392	590.09807	108.39487	0
40	7816	259.36695	-9.4375	256.91196	474.59265	96.917687	0
41	7816	262.31565	-8.0625	167.18779	359.05649	85.42545	0
42	7816	265.26435	-6.6875	77.463626	243.53263	73.938686	0
43	7816	267.2919	- 5.742035	15.770077	157.21748	68.988508	0
44	7816	269.0075	- 4.942035	-36.432866	73.337442	35.769061	75



Global Stability (Entry/Exit) in front

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File Information

Created By: Liljegren, James
Revision Number: 287
Last Edited By: Schroeder, Danielle MVN
Date: 8/25/2013
Time: 8:28:36 AM
File Name: Reach 14s.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/25/2013
Last Solved Time: 8:31:33 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of Movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

FILL, above water EL -4.4 to -6 (Protected) GCAT

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH, EL -6 to -11.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (150, -11.7) ft
Left-Zone Right Coordinate: (215, 2.19998) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (225, -0.16368) ft
Right-Zone Right Coordinate: (270, -4.4) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (111.5, -11.9) ft
Right Coordinate: (310, -4.4) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.8 TO -2

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1,above water GCAT EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -11.5

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2

F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

	X (ft)	Y (ft)
	201	3.4
	209.5	3
	215.2	1.4

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (169.2, 80)
 Data Point: (200, 109)
 Data Point: (242.9, 80)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1,above water GCAT EL. -2 TO -6	3,28,34	3.76
Region 2	MARSH 1,above water GCAT EL. -2 TO -6	12,53,52,51	27.91
Region 3	BEACH SAND SP, EL. -13 TO -47	8,1,29,35,14,15	188.355
Region 4	BAY SOUND CLAY CL, EL. -47 TO -70	10,11,17,18	4565.5
Region 5	FILL, above water EL -4.4 to -6 (Protected) GCAT	27,25,19,7,55,54	81.595876
Region 6	BEACH SAND SP, EL. -13 TO -47	36,11,10,37	5359.5
Region 7	FILL, above water EL -4.4 to -6	48,23,4,26,5,31,12,50,49,57	73.939994

	(Protected) GCAT		
Region 8	FILL, above water EL -4.4 to -6 (Protected) GCAT	31,30,20,6,27,54,53,12	182.96371
Region 9	MARSH, EL -6 to -11.5 (Protected)	29,2,16,3,34,35	97.615
Region 10	BEACH SAND SP, EL -13 TO -47	1,21,22,16,2,29	120.27
Region 11	MARSH, EL -6 to -11.5 (Protected)	51,13,34,28,50	72.087573
Region 12	MARSH, EL -6 to -11.5 (Protected)	32,55,56,9,33	365.35
Region 13	BEACH SAND SP, EL -13 TO -47	15,14,33,9,36,37,8	1333.25
Region 14		31,44,45,20,30	7.225
Region 15	MARSH 2, EL -6 TO -11.5	34,13,46,47,14,35	169.4
Region 16	MARSH 2, EL -6 TO -11.5	13,32,33,14,47,46	235.95
Region 17	EMBANKMENT FILL, EL +3.8 TO -2	28,24,48,57,49,50	32.026143
Region 18	MARSH, EL -6 to -11.5 (Protected)	51,52,53,32,13	58.12
Region 19	EMBANKMENT FILL, EL +3.8 TO -2	53,54,32	7.897
Region 20	EMBANKMENT FILL, EL +3.8 TO -2	54,55,32	25.758
Region 21	MARSH 1,above water GCAT EL. -2 TO -6	55,7,56	3.7
Region 22	MARSH 1,above water GCAT EL. -2 TO -6	50,12,51	14

Points

	X (ft)	Y (ft)
Point 1	111.5	-15.3
Point 2	148.1	-12.7
Point 3	164.5	-6
Point 4	191.1	3.1

Point 5	198.9	3.4
Point 6	209.5	3.5
Point 7	310	-6
Point 8	111.5	-15.5
Point 9	310	-11.5
Point 10	111.5	-47
Point 11	310	-47
Point 12	200	-2
Point 13	200	-6
Point 14	200	-11.5
Point 15	200	-15.5
Point 16	150.3	-11.7
Point 17	310	-70
Point 18	111.5	-70
Point 19	310	-4.4
Point 20	201	3.8
Point 21	111.5	-11.9
Point 22	146.3	-11.7
Point 23	188.1	1
Point 24	175.3	-2.2
Point 25	243.1	-4.4
Point 26	198.6	3.38846
Point 27	242.92268	-4.4
Point 28	169.20857	-4.4
Point 29	142.5	-15.2
Point 30	201	3.4
Point 31	200	3.4
Point 32	242.9	-6
Point 33	242.9	-11.5
Point 34	169.2	-6
Point 35	169.2	-11.5
Point 36	310	-20
Point 37	111.5	-20
Point 38	169.2	-47
Point 39	200	-47
Point 40	242.9	-47

Point 41	169.2	-70
Point 42	200	-70
Point 43	242.9	-70
Point 44	200	12.9
Point 45	200.5	12.9
Point 46	200	-6.9
Point 47	200	-10.3
Point 48	185.8	0.4
Point 49	185.6	-2.6
Point 50	186	-3.1
Point 51	200	-4
Point 52	200.3	-4
Point 53	228	-4.6
Point 54	242.9	-4.94
Point 55	291.5	-6
Point 56	310	-6.4
Point 57	185.4	-0.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.81	(232.383, 19.367)	21.64305	(206.792, 3.59557)	(253.427, -4.4)
2	17316	1.83	(232.383, 19.367)	30.691	(206.326, 3.61202)	(251.803, -4.4)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimized	207.3756	2.449396	-419.53026	54.31471	26.491054	75
2	Optimized	208.54225	1.0933455	-335.68235	153.1165	74.679907	75
3	Optimized	209.3128	0.2209836	-281.75841	228.07867	111.2414	75

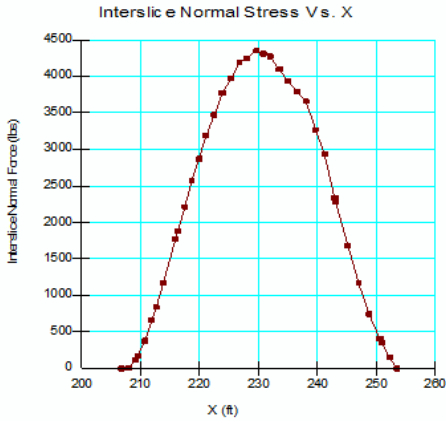
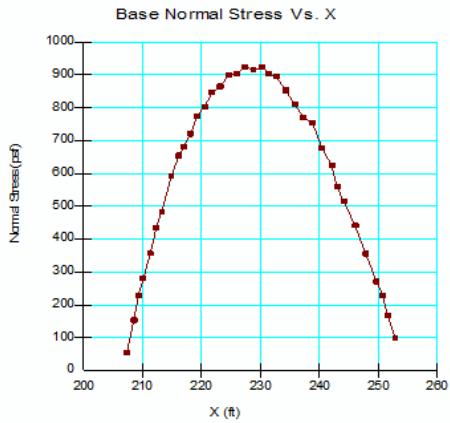
4	Optimized	210.1074	-0.6038819	-230.89505	280.5806	136.8483	75
5	Optimized	211.3222	-1.8649405	-153.17428	356.36535	173.81099	75
6	Optimized	212.3072	-2.836674	-93.41062	434.65147	211.99369	75
7	Optimized	213.28025	-3.715889	-39.577606	484.04684	215.51154	75
8	Optimized	214.88875	-4.992165	38.26408	592.92771	246.95216	0
9	Optimized	216.12285	-5.865215	91.297077	653.98416	250.52443	0
10	Optimized	216.93565	-6.3608025	121.24185	679.96003	248.75736	0
11	Optimized	218.11915	-7.0824075	164.81562	719.94113	247.1578	0
12	Optimized	219.31605	-7.747475	204.79302	774.89451	253.82554	0
13	Optimized	220.52635	-8.356005	241.20871	802.87251	250.06883	0
14	Optimized	221.81345	-8.9395075	275.92491	845.88386	253.76207	0
15	Optimized	223.17735	-9.4979825	308.961	864.33901	247.27022	0
16	Optimized	224.5914	-10.001755	338.50218	898.8026	249.46182	0
17	Optimized	226.0556	-10.45082	364.55538	903.30804	239.86814	0
18	Optimized	227.39385	-10.799025	384.47426	924.8169	240.57604	0
19	Optimized	228.825	-11.09102	400.76938	914.51049	228.73228	0
20	Optimized	230.23445	-11.316325	412.93063	922.95929	227.07939	0
21	Optimized	231.4034	-11.430295	418.47349	902.26934	215.39979	0
22	Optimized	232.7487	-11.487945	420.28277	893.69152	210.77516	0

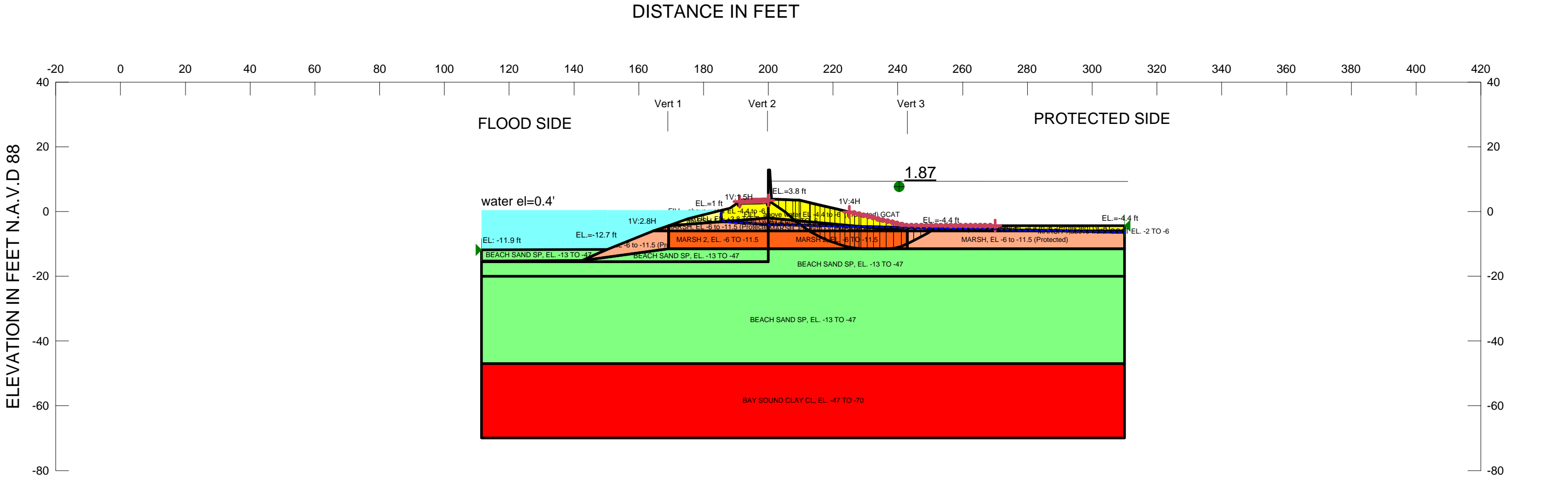
23	Optimiz ed	234.27035	-11.48927	418.33753	852.28953	193.20788	0
24	Optimiz ed	235.792	-11.490595	416.39887	810.95326	175.66693	0
25	Optimiz ed	237.31365	-11.49192	414.4602	769.61699	158.12599	0
26	Optimiz ed	238.8648	-11.3274	402.15018	752.44079	155.95942	0
27	Optimiz ed	240.4454	-10.99704	379.4593	677.63021	132.75425	0
28	Optimiz ed	242.0792	-10.4481	343.06492	623.83288	125.00595	0
29	Optimiz ed	243.01135	-10.024003	315.38006	559.31593	108.60725	0
30	Optimiz ed	244.1279	-9.516008	282.20536	514.48528	103.41768	0
31	Optimiz ed	246.05745	-8.57525	220.92247	440.93651	97.956559	0
32	Optimiz ed	247.86075	-7.62905	159.45309	355.9803	87.499552	0
33	Optimiz ed	249.66405	-6.68285	97.983708	271.02901	77.04473	0
34	Optimiz ed	250.7315	-6.104875	60.484991	228.81942	74.947317	0
35	Optimiz ed	251.57395	-5.5719715	26.105425	167.26481	68.848031	0
36	Optimiz ed	252.83865	-4.7719715	-25.506025	99.128218	48.348062	75

Slices of Slip Surface: 17316

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	17316	207.11965	1.9954066	-391.02569	75.006096	36.582918	75
2	17316	208.70655	-0.1224854	-259.85541	239.24671	116.68842	75
3	17316	210.4661	-2.073994	-139.32334	390.72495	190.56929	75
4	17316	212.1195	-3.6662335	-41.471063	505.37805	225.00881	75

5	17316	213.3816	-4.724272	23.197839	590.57675	252.61337	0
6	17316	214.5312	-5.588819	75.878224	644.19728	253.03195	0
7	17316	215.82235	-6.459346	128.7017	703.49958	255.9165	0
8	17316	217.255	-7.3246965	180.97102	766.16045	260.54312	0
9	17316	218.68765	-8.088036	226.81052	818.28675	263.34218	0
10	17316	220.12035	-8.7577075	266.76179	860.62716	264.4059	0
11	17316	221.553	-9.3402915	301.24109	893.7901	263.81982	0
12	17316	222.98565	-9.8410145	330.58538	918.3407	261.68553	0
13	17316	224.41835	-10.264045	355.0737	934.66701	258.05157	0
14	17316	225.851	-10.61268	374.90767	943.13437	252.99082	0
15	17316	227.28365	-10.88949	390.26123	944.06049	246.56732	0
16	17316	228.745	-11.099185	401.38319	937.43378	238.6651	0
17	17316	230.235	-11.24044	408.20398	923.09855	229.24583	0
18	17316	231.725	-11.30871	410.47598	901.20194	218.48527	0
19	17316	233.215	-11.304485	408.23912	871.8941	206.4325	0
20	17316	234.705	-11.22774	401.47629	835.24897	193.12804	0
21	17316	236.195	-11.07792	390.16165	791.20478	178.55591	0
22	17316	237.685	-10.853935	374.23063	739.70902	162.72147	0
23	17316	239.175	-10.55412	353.56887	680.6047	145.60573	0
24	17316	240.665	-10.176158	328.02543	613.70353	127.19208	0
25	17316	242.16635	-9.712849	297.13163	537.94722	107.21801	0
26	17316	243.01135	-9.4256645	278.08875	495.16124	96.646899	0
27	17316	243.92005	-9.060131	254.06588	468.45886	95.453905	0
28	17316	245.5601	-8.337291	206.76003	414.12025	92.322717	0
29	17316	247.20015	-7.494924	151.97948	348.05362	87.297831	0
30	17316	248.8402	-6.5212955	89.014557	268.28377	79.815797	0
31	17316	250.277	-5.557175	26.923001	172.76553	71.132152	0
32	17316	251.34815	-4.757175	-24.434199	115.75142	56.455737	75





Name: EMBANKMENT FILL, EL. +3.8 TO -2 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 1,above water GCAT EL. -2 TO -6 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 75 psf Phi: 24 °
Name: BEACH SAND SP, EL. -13 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -6 TO -11.5 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °
Name: FILL, above water EL -4.4 to -6 (Protected) GCAT Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °
Name: MARSH, EL -6 to -11.5 (Protected) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 14 STA. 96+00 TO 100+28
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) through
APRIL 2013

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Entry/Exit) through

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File Information

Created By: Liljegren, James
Revision Number: 289
Last Edited By: Schroeder, Danielle MVN
Date: 6/25/2013
Time: 8:45:24 AM
File Name: Reach 14s.gsz
Directory: c:\documents and settings\b2edfdvs\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/25/2013
Last Solved Time: 8:47:33 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) through

Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
 PWP Conditions Source: Parent Analysis
Slip Surface
 Direction of Movement: Left to Right
 Use Passive Mode: No
 Slip Surface Option: Entry and Exit
 Critical slip surfaces saved: 1
 Optimize Critical Slip Surface Location: Yes
 Tension Crack
 Tension Crack Option: Tension Crack Line
 Percentage Wet: 0
 Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

FILL, above water EL -4.4 to -6 (Protected) GCAT

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH, EL -6 to -11.5 (Protected)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (191.1, 3.1) ft
Left-Zone Right Coordinate: (200, 3.4) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (225, -0.16368) ft
Right-Zone Right Coordinate: (270, -4.4) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (111.5, -11.9) ft
Right Coordinate: (310, -4.4) ft

Tension Crack Line

X (ft)	Y (ft)
191	2.2
200	2.4

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +3.8 TO -2

Model: Mohr-Coulomb
Unit Weight: 107 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1,above water GCAT EL. -2 TO -6

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND SP, EL. -13 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -6 TO -11.5

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
 Data Point: (169.2, 80)
 Data Point: (200, 109)
 Data Point: (242.9, 80)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1,above water GCAT EL. -2 TO -6	3,28,34	3.76
Region 2	MARSH 1,above water GCAT EL. -2 TO -6	12,53,52,51	27.91
Region 3	BEACH SAND SP, EL. -13 TO -47	8,1,29,35,14,15	188.355
Region 4	BAY SOUND CLAY CL, EL. -47 TO -70	10,11,17,18	4565.5
Region 5	FILL, above water EL -4.4 to -6 (Protected) GCAT	27,25,19,7,55,54	81.595876
Region 6	BEACH SAND SP, EL. -13 TO -47	36,11,10,37	5359.5
Region 7	FILL, above water EL -4.4 to -6 (Protected) GCAT	48,23,4,26,5,31,12,50,49,57	73.939994
Region 8	FILL, above water EL -4.4 to -6 (Protected) GCAT	31,30,20,6,27,54,53,12	182.96371
Region 9	MARSH, EL -6 to -11.5 (Protected)	29,2,16,3,34,35	97.615
Region 10	BEACH SAND SP, EL. -13 TO -47	1,21,22,16,2,29	120.27
Region 11	MARSH, EL -6 to -11.5 (Protected)	51,13,34,28,50	72.087573
Region 12	MARSH, EL -6 to -11.5 (Protected)	32,55,56,9,33	365.35
Region 13	BEACH SAND SP, EL. -13 TO -47	15,14,33,9,36,37,8	1333.25
Region 14		31,44,45,20,30	7.225

Region 15	MARSH 2, EL. -6 TO -11.5	34,13,46,47,14,35	169.4
Region 16	MARSH 2, EL. -6 TO -11.5	13,32,33,14,47,46	235.95
Region 17	EMBANKMENT FILL, EL. +3.8 TO -2	28,24,48,57,49,50	32.026143
Region 18	MARSH, EL -6 to -11.5 (Protected)	51,52,53,32,13	58.12
Region 19	EMBANKMENT FILL, EL. +3.8 TO -2	53,54,32	7.897
Region 20	EMBANKMENT FILL, EL. +3.8 TO -2	54,55,32	25.758
Region 21	MARSH 1,above water GCAT EL. -2 TO -6	55,7,56	3.7
Region 22	MARSH 1,above water GCAT EL. -2 TO -6	50,12,51	14

Points

	X (ft)	Y (ft)
Point 1	111.5	-15.3
Point 2	148.1	-12.7
Point 3	164.5	-6
Point 4	191.1	3.1
Point 5	198.9	3.4
Point 6	209.5	3.5
Point 7	310	-6
Point 8	111.5	-15.5
Point 9	310	-11.5
Point 10	111.5	-47
Point 11	310	-47
Point 12	200	-2
Point 13	200	-6
Point 14	200	-11.5
Point 15	200	-15.5
Point 16	150.3	-11.7
Point 17	310	-70

Point 18	111.5	-70
Point 19	310	-4.4
Point 20	201	3.8
Point 21	111.5	-11.9
Point 22	146.3	-11.7
Point 23	188.1	1
Point 24	175.3	-2.2
Point 25	243.1	-4.4
Point 26	198.6	3.38846
Point 27	242.92268	-4.4
Point 28	169.20857	-4.4
Point 29	142.5	-15.2
Point 30	201	3.4
Point 31	200	3.4
Point 32	242.9	-6
Point 33	242.9	-11.5
Point 34	169.2	-6
Point 35	169.2	-11.5
Point 36	310	-20
Point 37	111.5	-20
Point 38	169.2	-47
Point 39	200	-47
Point 40	242.9	-47
Point 41	169.2	-70
Point 42	200	-70
Point 43	242.9	-70
Point 44	200	12.9
Point 45	200.5	12.9
Point 46	200	-6.9
Point 47	200	-10.3
Point 48	185.8	0.4
Point 49	185.6	-2.6
Point 50	186	-3.1
Point 51	200	-4
Point 52	200.3	-4
Point 53	228	-4.6

Point 54	242.9	-4.94
Point 55	291.5	-6
Point 56	310	-6.4
Point 57	185.4	-0.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.87	(230.851, 28.151)	23.78508	(200, 3.4)	(252.962, -4.4)
2	19939	1.91	(230.851, 28.151)	39.553	(200, 3.4)	(253.319, -4.4)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	200.25	3.2263005	-457.72281	-3.649234	-1.7798504	75
2	Optimized	200.75	2.8789	-442.61131	26.488023	12.919072	75
3	Optimized	202.08175	1.9535795	-385.61148	138.15056	67.38053	75
4	Optimized	204.2453	0.45034	-292.8924	261.93796	127.75568	75
5	Optimized	206.46765	-1.242445	-188.29174	382.3519	186.48548	75
6	Optimized	207.9596	-2.477674	-112.0234	478.94203	233.59564	75
7	Optimized	208.9055	-3.2692285	-63.340405	539.51027	240.20545	75
8	Optimized	209.7148	-3.9464595	-21.76062	577.69455	257.20619	75
9	Optimized	211.3014	-5.0631	46.475076	676.55382	280.52913	0
10	Optimized	212.8347	-6.1103	110.27118	725.46024	273.89981	0
11	Optimized	213.7284	-6.6192275	141.0761	781.87691	285.30291	0

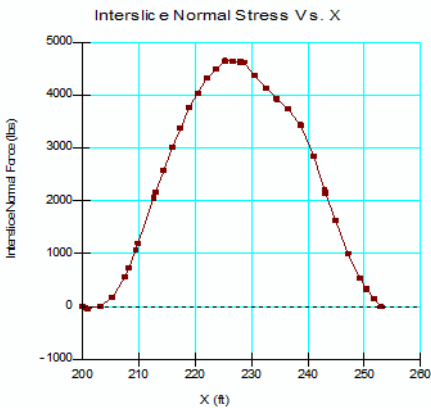
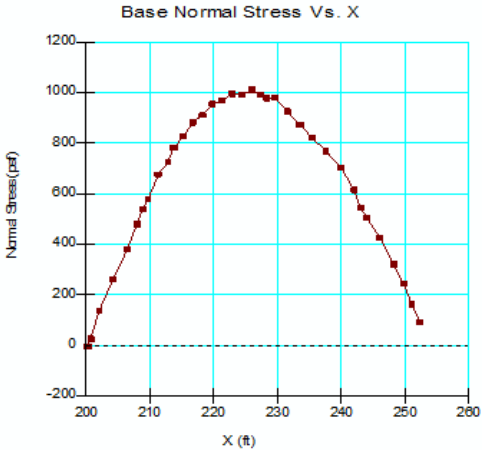
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12	Optimized	215.19285	-7.4164825	189.157	824.39825	282.82763	0
13	Optimized	216.6917	-8.157355	233.5983	881.67382	288.54181	0
14	Optimized	218.2249	-8.841845	274.40639	910.08225	283.02113	0
15	Optimized	219.76605	-9.4517475	310.4806	954.39561	286.68943	0
16	Optimized	221.3151	-9.9870625	341.86058	966.59859	278.15129	0
17	Optimized	222.89135	-10.454595	368.947	994.81534	278.65454	0
18	Optimized	224.49485	-10.854345	391.75392	991.30565	266.93763	0
19	Optimized	225.97245	-11.14318	407.79577	1009.7157	267.99204	0
20	Optimized	227.32415	-11.3211	417.08903	990.71848	255.39628	0
21	Optimized	228.30535	-11.45025	423.83482	976.69038	246.14715	0
22	Optimized	229.58825	-11.49144	424.69583	978.99716	246.79085	0
23	Optimized	231.5434	-11.493435	422.22545	925.95813	224.27624	0
24	Optimized	233.4986	-11.49543	419.74995	872.97025	201.78667	0
25	Optimized	235.45375	-11.49743	417.27446	819.98236	179.29711	0
26	Optimized	237.56265	-11.42445	409.92326	768.59232	159.68976	0
27	Optimized	239.88895	-11.06214	384.25916	703.35656	142.07132	0
28	Optimized	242.0033	-10.350654	337.09686	615.21634	123.82677	0
29	Optimized	243.01135	-9.88669	306.82283	545.13152	106.10187	0
30	Optimized	244.00685	-9.4284915	276.91214	504.8107	101.46698	0

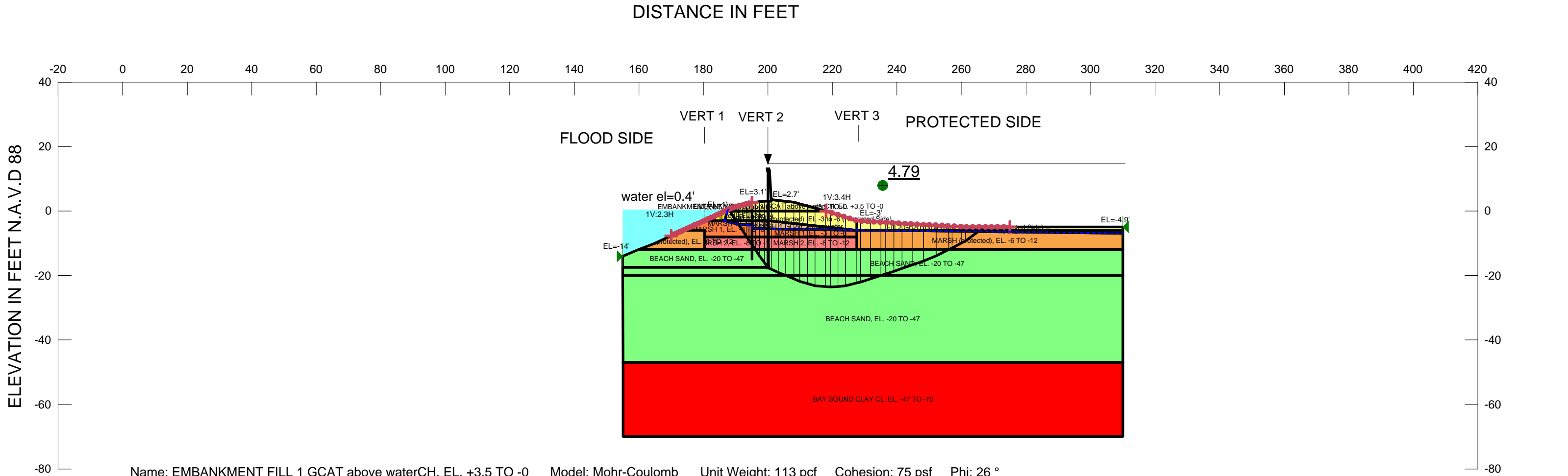
	ed						
31	Optimiz ed	246.00285	-8.418695	211.23338	426.55609	95.867846	0
32	Optimiz ed	248.1811	-7.233885	134.36698	320.15702	82.719055	0
33	Optimiz ed	249.79845	-6.32074	75.209626	243.80022	75.06137	0
34	Optimiz ed	251.0406	-5.566561	26.481895	162.43682	66.309646	0
35	Optimiz ed	252.3582	-4.766561	-25.200536	92.751678	45.238016	75

Slices of Slip Surface: 19939

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	19939	200.25	3.094683	-455.67579	-7.2780407	-3.5497376	75
2	19939	200.75	2.4960455	-418.72862	39.298945	19.167376	75
3	19939	201.81885	1.3168084	-345.73354	163.25132	79.622987	75
4	19939	203.45655	-0.35599655	-242.14092	302.11921	147.35338	75
5	19939	205.0943	-1.845982	-149.75053	432.73618	211.05954	75
6	19939	206.98165	-3.358476	-56.335853	563.39583	250.83999	75
7	19939	208.77505	-4.6556795	23.33381	684.21504	294.24328	0
8	19939	210.19935	-5.571743	79.325689	749.17351	298.23547	0
9	19939	211.75375	-6.4716335	133.992	806.59407	299.46173	0
10	19939	213.46385	-7.361901	187.74263	867.60331	302.69348	0
11	19939	215.174	-8.1498015	234.95389	917.38687	303.83874	0
12	19939	216.88415	-8.841897	276.07825	956.53078	302.95698	0
13	19939	218.59425	-9.4434935	311.46524	985.69875	300.1881	0
14	19939	220.3044	-9.9588905	341.41489	1005.2919	295.57709	0
15	19939	222.01455	-10.39155	366.16658	1015.7298	289.20419	0
16	19939	223.72465	-10.74424	385.90245	1017.4278	281.17321	0
17	19939	225.4348	-11.01913	400.77502	1010.6551	271.5361	0
18	19939	227.14495	-11.21785	410.89367	995.69481	260.37024	0
19	19939	228.93125	-11.3436	416.3621	971.41683	247.12629	0
20	19939	230.79375	-11.390205	416.78881	937.1802	231.69317	0

21	19939	232.65625	-11.348985	411.75278	893.83216	214.63557	0
22	19939	234.51875	-11.219665	401.22102	841.51045	196.02948	0
23	19939	236.38125	-11.00137	385.14845	780.22785	175.90068	0
24	19939	238.24375	-10.69259	363.43584	709.88795	154.25042	0
25	19939	240.10625	-10.29114	335.93636	630.46792	131.1339	0
26	19939	241.9801	-9.790447	302.21836	541.02451	106.32335	0
27	19939	243.01135	-9.485318	281.80374	491.42992	93.331588	0
28	19939	244.0629	-9.1153045	257.31168	463.69352	91.887116	0
29	19939	245.98865	-8.374884	208.52042	406.8518	88.302818	0
30	19939	247.9144	-7.51517	152.27627	338.50883	82.916075	0
31	19939	249.84015	-6.5272545	88.040798	257.19937	75.31425	0
32	19939	251.5028	-5.571448	26.167997	163.47534	66.969264	0
33	19939	252.76075	-4.771448	-25.434239	98.642041	48.110938	75





Name: EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1, EL. -3 TO -8 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 24 °

Name: BEACH SAND, EL. -20 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH 2, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °

Name: FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. 0 TO -3 Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH (protected), EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 24 °

Name: MARSH 1 GCAT above water Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 75 psf Phi: 24 °

Name: Embankment fill 1 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 15, STA. 100+28 TO STA. 104+00
PROTECTED SIDE S-CASE STABILITY ANALYSIS
CASE: Global Stability (Entry/Exit) around
MARCH 2012

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN HE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

Global Stability (Entry/Exit) around

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: [Liljegren, James](#)
Revision Number: 211
Last Edited By: [Serrano-Canals, Josinell M MVN](#)
Date: 6/24/2013
Time: 5:15:21 PM
File Name: [Reach 15s.gsz](#)
Directory: [c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443242\](#)
Last Solved Date: 6/24/2013
Last Solved Time: 5:18:28 PM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

Global Stability (Entry/Exit) around

Kind: [SLOPE/W](#)
Parent: [Gap Stability \(Seepage\)](#)
Method: [Spencer](#)
Settings
 PWP Conditions Source: [Parent Analysis](#)
Slip Surface
 Direction of movement: [Left to Right](#)
 Use Passive Mode: [No](#)
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: [1](#)
 Optimize Critical Slip Surface Location: [Yes](#)
 Tension Crack
 Tension Crack Option: [Search for Tension Crack](#)
 Percentage Wet: [1](#)
 Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution

Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side)

Model: [Mohr-Coulomb](#)
Unit Weight: [100 pcf](#)
Cohesion: [75 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

EMBANKMENT FILL 2, EL. 0 TO -3

Model: [Mohr-Coulomb](#)
Unit Weight: [100 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH (protected), EL. -6 TO -12

Model: [Mohr-Coulomb](#)
Unit Weight: [87 pcf](#)
Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

MARSH 1 GCAT above water

Model: [Mohr-Coulomb](#)
Unit Weight: [87 pcf](#)
Cohesion: [75 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

Embankment fill 1

Model: [Mohr-Coulomb](#)
Unit Weight: [113 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(170, -7.66415\) ft](#)
Left-Zone Right Coordinate: [\(195, 2.6\) ft](#)
Left-Zone Increment: [30](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(218, -0.06186\) ft](#)

FOS Calculation Option: [Constant](#)

Advanced

Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [2 ft](#)
Optimization Maximum Iterations: [2000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0

Model: [Mohr-Coulomb](#)
Unit Weight: [113 pcf](#)
Cohesion: [75 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH 1, EL. -3 TO -8

Model: [Mohr-Coulomb](#)
Unit Weight: [87 pcf](#)
Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

BEACH SAND, EL. -20 TO -47

Model: [Mohr-Coulomb](#)
Unit Weight: [122 pcf](#)
Cohesion: [0 psf](#)
Phi: [34 °](#)
Phi-B: [0 °](#)

BAY SOUND CLAY CL, EL. -47 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: [104 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH 2, EL. -8 TO -12

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 2](#)

Right-Zone Right Coordinate: [\(275, -4.9\) ft](#)
Right-Zone Increment: [30](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(155, -14\) ft](#)
Right Coordinate: [\(310, -4.9\) ft](#)

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: [\(200, 12.9\) ft](#)
Inside Point: [\(200, -17.5\) ft](#)
Slip Surface Intersection: [\(200, -17.528\) ft](#)
Total Length: [30.4 ft](#)
Reinforcement Direction: [90 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: [1 ft](#)
Shear Capacity: [99999 lbs](#)
Shear Safety Factor: [1](#)
Shear Load Used: [99999 lbs](#)
Shear Option: [Parallel to Slip](#)
Resisting Force Used: [0 lbs/ft](#)

Unit Weight Functions

Marsh 2

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [87](#)
Data Points: [X \(ft\), Unit Weight \(pcf\)](#)
 Data Point: [\(180.3, 87\)](#)
 Data Point: [\(200, 109\)](#)
 Data Point: [\(227.5, 87\)](#)

Regions

	Material	Points	Area (ft²)
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Region 1	EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0	51,50,36,3,41,4,28,20	26.3
Region 2	MARSH 1, EL. -3 TO -8	47,46,45,55,56,57,58,61,12,22,31	88.9675
Region 3	Fill 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	15,37,6,7,59,16	121.625
Region 4	MARSH 2, EL. -8 TO -12	31,22,12,13,23,48	78.8
Region 5	BEACH SAND, EL. -20 TO -47	27,24,13,17,8,34,33,32	992.5
Region 6	MARSH (protected), EL. -6 TO -12	16,59,60,8,17,44	461.925
Region 7	BEACH SAND, EL. -20 TO -47	13,24,27,1,19,49,48,23	242.55263
Region 8	Fill 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	21,11,28,20,51,52,53,54,55	39.105
Region 9	EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0	28,4,26,38,5,29	38.03
Region 10	Fill 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	11,28,29,15,16	109.2
Region 11	BEACH SAND, EL. -20 TO -47	9,32,33,34,10,18,14	4183.65
Region 12	BAY SOUND CLAY CL, EL. -47 TO -70	9,14,18,10,40,39	3562.7
Region 13	MARSH 2, EL. -8 TO -12	12,44,17,13	110
Region 14		4,42,43,38,26	7.45
Region 15	MARSH 1, EL. -3 TO -8	12,61,16,44	61.875
Region 16	MARSH (protected), EL. -6 TO -12	49,2,46,47,31,48	79.929867
Region 17	EMBANKMENT FILL 2, EL. 0 TO -3	45,35,30,51,52,53,54,55	10.07
Region 18	Embankment fill 1	30,51,50	0.09
Region 19	MARSH 1 GCAT above water	55,21,11,61,58,57,56	19.47

Region 20	MARSH 1 GCAT above water	11,61,16	34.375
Region 21	MARSH 1 GCAT above water	59,7,60	33.075

Points

	X (ft)	Y (ft)
Point 1	155	-15.1
Point 2	164.4	-10.2
Point 3	195	2.6
Point 4	200	3.1
Point 5	208	2.7
Point 6	310	-4.9
Point 7	310	-6
Point 8	310	-12
Point 9	155.1	-47
Point 10	310	-47
Point 11	200	-3
Point 12	200	-8
Point 13	200	-12
Point 14	200	-47
Point 15	227.5	-3
Point 16	227.5	-6
Point 17	227.5	-12
Point 18	231.5	-47
Point 19	155	-14
Point 20	195	0
Point 21	195	-3
Point 22	195	-8
Point 23	195	-12
Point 24	200	-17.5
Point 25	195	-15
Point 26	201	3.1
Point 27	155	-17.5
Point 28	200	0

Point 29	217.8	0
Point 30	186.8	0
Point 31	180.3	-8
Point 32	155	-20
Point 33	200	-20
Point 34	310	-20
Point 35	181.5	-2.5
Point 36	189	1
Point 37	260	-4.9
Point 38	201	3.5
Point 39	155.1	-70
Point 40	310	-70
Point 41	199	3.1
Point 42	200	12.9
Point 43	200.5	12.9
Point 44	227.5	-8
Point 45	180.3	-3
Point 46	173.675	-6
Point 47	180.3	-6
Point 48	180.3	-12
Point 49	159.94737	-12
Point 50	187.7	0.4
Point 51	187.25	0
Point 52	187.3	-0.4
Point 53	186.9	-1.7
Point 54	186.8	-2.4
Point 55	186.4	-3
Point 56	190.5	-4
Point 57	195	-4.3
Point 58	195.3	-5.47
Point 59	236.5	-6
Point 60	310	-6.9
Point 61	200	-5.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	4.79	(223.799, 17.097)	36.03251	(187.826, 0.458241)	(267.104, -4.9)
2	12845	5.22	(223.799, 17.097)	42.066	(185.617, -0.557947)	(259.667, -4.88055)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	187.97845	0.22912065	-29.344967	9.0659337	4.4217513	75
2	Optimized	188.56535	-0.6539705	-70.43823	106.26863	51.830676	75
3	Optimized	189.56225	-2.1539705	-67.845731	257.4584	125.57085	75
4	Optimized	190.46355	-3.510085	-28.651527	385.88454	171.80686	75
5	Optimized	191.21975	-4.64784	29.326044	505.22293	211.88295	0
6	Optimized	192.53975	-6.637755	131.07793	687.33001	247.65938	0
7	Optimized	193.8094	-8.553415	232.94414	870.03868	283.65276	0
8	Optimized	194.5881	-9.720915	293.43826	994.55927	312.15919	0
9	Optimized	195.15	-10.55864	317.89633	1079.7632	339.20498	0
10	Optimized	195.70835	-11.39114	369.17079	1162.8914	353.38719	0
11	Optimized	196.74145	-12.93144	464.75839	1286.4334	554.22678	0
12	Optimized	198.1831	-14.999755	593.10257	1538.1165	637.41992	0
13	Optimized	199.5	-16.832485	705.65498	1741.8177	698.90057	0

		ed					
14	Optimiz	200.0645	-17.618155	753.01504	1824.8499	722.96171	0
15	Optimiz	200.3145	-17.78759	763.28219	2095.1552	898.35971	0
16	Optimiz	200.75	-17.97453	774.43588	2116.0575	904.93521	0
17	Optimiz	202.1170	-18.561385	809.74274	2210.1243	944.56927	0
18	Optimiz	204.3511	-19.52046	868.14853	2290.6996	959.5228	0
19	Optimiz	206.7341	-20.543435	930.23425	2376.616	975.59683	0
20	Optimiz	208.9150	-21.47968	986.96351	2439.8425	979.97924	0
21	Optimiz	211.0275	-22.20463	1030.6018	2514.1163	1000.6432	0
22	Optimiz	213.4223	-22.86891	1070.2357	2517.3353	976.08102	0
23	Optimiz	216.2098	-23.338815	1097.3926	2556.0091	983.84926	0
24	Optimiz	218.575	-23.54372	1108.3787	2503.7505	941.1902	0
25	Optimiz	220.4963	-23.510625	1104.867	2502.4301	942.66821	0
26	Optimiz	222.7889	-23.310155	1090.5711	2400.4036	883.49316	0
27	Optimiz	225.7176	-22.766005	1054.3903	2290.5871	833.82525	0
28	Optimiz	228.1095	-22.170275	1015.401	2148.8422	764.51575	0
29	Optimiz	230.2795	-21.513845	972.77771	2076.0783	744.18561	0
30	Optimiz	233.4002	-20.504615	907.40959	1926.5304	687.40565	0
31	Optimiz	235.7303	-19.751085	858.59379	1814.9082	645.0422	0
32	Optimiz	237.7693	-19.09169	815.91853	1717.2182	607.93431	0

		ed					
33	Optimiz	240.3079	-18.27073	762.73334	1595.5557	561.74577	0
34	Optimiz	243.2262	-17.27176	698.18539	1456.3115	511.36253	0
35	Optimiz	246.5242	-16.09478	622.22428	1283.143	445.79533	0
36	Optimiz	250.1444	-14.687135	531.61511	1088.1303	375.37422	0
37	Optimiz	254.0643	-12.93399	419.22978	842.48528	285.48944	0
38	Optimiz	256.5234	-11.75548	343.81678	670.89563	145.62489	0
39	Optimiz	258.5168	-10.727282	278.13645	567.63514	128.89312	0
40	Optimiz	260.6001	-9.6264965	207.85944	456.71915	110.79948	0
41	Optimiz	263.1809	-7.830174	93.797519	301.14962	92.319105	0
42	Optimiz	265.3964	-6.175479	-11.149665	158.68077	70.64923	75
43	Optimiz	266.3678	-5.45	-57.161788	78.594738	38.333215	75

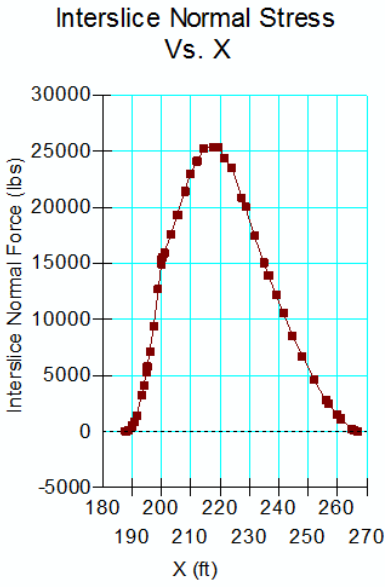
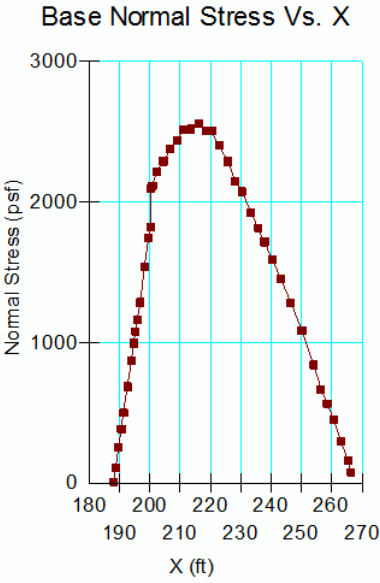
Slices of Slip Surface: 12845

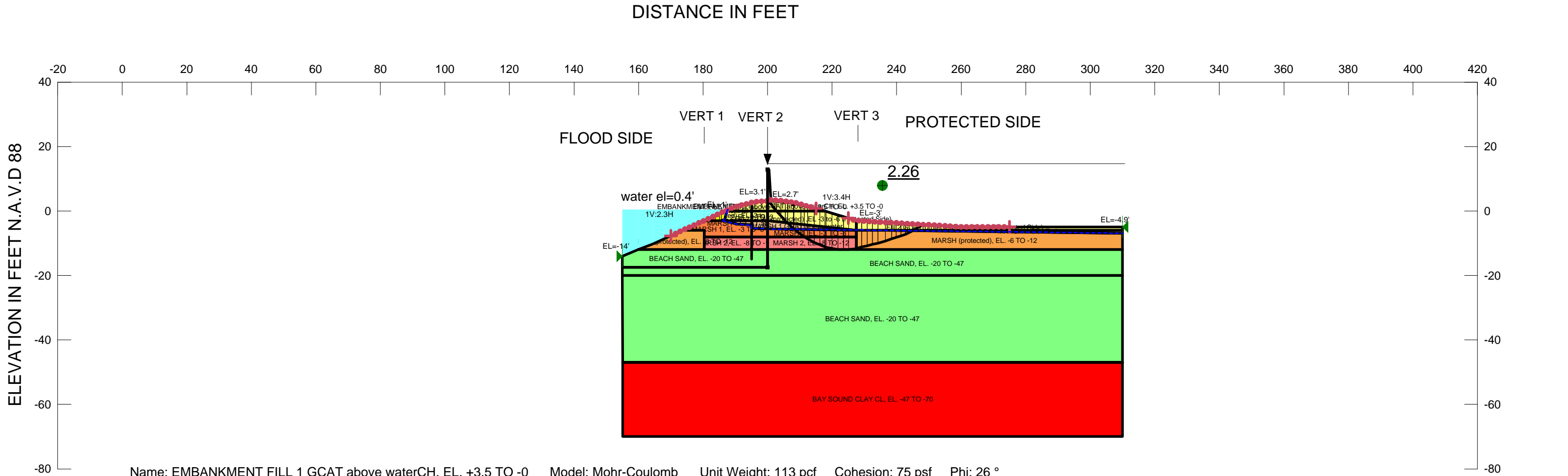
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	12845	186.13155	- 1.594546 3	28.689422	135.78424	52.233634	0
2	12845	186.72295	- 2.774903	-8.2720709	214.72008	104.72598	75
3	12845	186.82205	-2.95933	-10.240038	231.55853	112.93864	75
4	12845	186.87205	- 3.051210 5	-8.1111913	242.34066	107.89702	75
5	12845	187.075	-	8.7726643	294.00582	126.99398	0

			3.415731				
6	12845	187.275	- 3.772794	24.968323	325.87611	133.97278	0
7	12845	187.5	- 4.158109 5	42.341092	360.6029	141.69929	0
8	12845	188.35	- 5.518542 5	103.04484	501.13711	177.24209	0
9	12845	189.5198	- 7.268706 5	181.22381	685.74033	224.62523	0
10	12845	190.2698	- 8.303876	232.05255	794.37964	250.36415	0
11	12845	191.95965	- 10.30387 6	327.25128	1031.4024	313.50826	0
12	12845	194.20965	- 12.78267 5	459.81114	1329.0875	586.3343	0
13	12845	195.15	- 13.70486 5	513.53597	1466.3112	642.65498	0
14	12845	197.15	- 15.36320 5	616.20559	1703.8975	733.65749	0
15	12845	199.43485	- 17.19101 5	727.58034	1966.1344	835.41528	0
16	12845	199.93485	- 17.54489 5	748.59985	2013.4733	853.1679	0
17	12845	200.25	- 17.75869 5	761.55823	2040.8647	862.9031	0
18	12845	200.75	- 18.09135 5	781.74211	2083.0953	877.77379	0
19	12845	202.4826	-	844.93852	2239.9736	940.96303	0

			19.12755				
20	12845	204.9739	- 20.50500 5	929.20795	2390.5253	985.671	0
21	12845	206.9913	- 21.44984 5	986.61791	2492.5801	1015.7844	0
22	12845	209.225	- 22.34235 5	1040.5719	2566.5705	1029.2991	0
23	12845	211.675	- 23.16392 5	1089.9769	2609.3553	1024.8336	0
24	12845	214.125	- 23.82243 5	1129.198	2631.6971	1013.4484	0
25	12845	216.575	- 24.32568 5	1158.7151	2634.401	995.36275	0
26	12845	219.0125	- 24.67825	1178.8439	2618.4149	971.00293	0
27	12845	221.4375	- 24.88538	1189.913	2584.204	940.46116	0
28	12845	223.8625	- 24.95175	1192.2047	2531.667	903.4787	0
29	12845	226.2875	- 24.87803 5	1185.753	2460.6691	859.94173	0
30	12845	228.625	- 24.67618	1171.3642	2405.9081	832.71039	0
31	12845	230.875	- 24.35416 5	1149.5482	2369.1934	822.6611	0
32	12845	233.125	- 23.90624	1119.887	2316.6549	807.23013	0
33	12845	235.375	- 23.32820 5	1082.107	2247.4891	786.06018	0

34	12845	237.6888	- 22.58998 5	1034.2543	2157.7896	757.83412	0
35	12845	240.0664	- 21.67513 5	975.37384	2045.0699	721.51909	0
36	12845	242.444	- 20.58817 5	905.72109	1909.2673	676.90046	0
37	12845	244.95105	- 19.23248	819.23043	1737.4188	619.3259	0
38	12845	247.5875	- 17.56011 5	712.83405	1521.7342	545.61002	0
39	12845	250.22395	- 15.58955	587.8567	1262.1959	454.84752	0
40	12845	252.86045	- 13.26191 5	440.60564	947.10623	341.63896	0
41	12845	255.3281	- 10.69607 9	278.62524	621.99581	152.87843	0
42	12845	257.6269	- 7.832464	98.190364	339.28425	107.34191	0
43	12845	258.86665	- 6.136385	-8.5897745	194.11191	86.424191	75
44	12845	259.3122	- 5.440277	-52.351954	107.97732	52.664057	75





- Name: EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 °
- Name: MARSH 1, EL. -3 TO -8 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 24 °
- Name: BEACH SAND, EL. -20 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
- Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °
- Name: MARSH 2, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °
- Name: FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °
- Name: EMBANKMENT FILL 2, EL. 0 TO -3 Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °
- Name: MARSH (protected), EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 24 °
- Name: MARSH 1 GCAT above water Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 75 psf Phi: 24 °
- Name: Embankment fill 1 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN HE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District
LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 15, STA. 100+28 TO STA. 104+00
PROTECTED SIDE S-CASE STABILITY ANALYSIS
CASE: Global Stability (Entry/Exit) in front
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Entry/Exit) in front

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File Information

Created By: [Liljegren, James](#)
Revision Number: 211
Last Edited By: [Serrano-Canals, Josinell M MVN](#)
Date: 6/24/2013
Time: 5:15:21 PM
File Name: [Reach 15s.gsz](#)
Directory: [c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443242\](#)
Last Solved Date: 6/24/2013
Last Solved Time: 5:19:08 PM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: [SLOPE/W](#)
Parent: [Gap Stability \(See page\)](#)
Method: [Spencer](#)
Settings
 PWP Conditions Source: [Parent Analysis](#)
Slip Surface
 Direction of movement: [Left to Right](#)
 Use Passive Mode: [No](#)
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: [1](#)
 Optimize Critical Slip Surface Location: [Yes](#)
 Tension Crack
 Tension Crack Option: [Tension Crack Line](#)
 Percentage Wet: [0](#)
 Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution

Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side)

Model: [Mohr-Coulomb](#)
Unit Weight: [100 pcf](#)
Cohesion: [75 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

EMBANKMENT FILL 2, EL. 0 TO -3

Model: [Mohr-Coulomb](#)
Unit Weight: [100 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH (protected), EL. -6 TO -12

Model: [Mohr-Coulomb](#)
Unit Weight: [87 pcf](#)
Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

MARSH 1 GCAT above water

Model: [Mohr-Coulomb](#)
Unit Weight: [87 pcf](#)
Cohesion: [75 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

Embankment fill 1

Model: [Mohr-Coulomb](#)
Unit Weight: [113 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(170, -7.66415\) ft](#)
Left-Zone Right Coordinate: [\(215, 0.77143\) ft](#)
Left-Zone Increment: [30](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(225, -2.2268\) ft](#)

FOS Calculation Option: [Constant](#)
Advanced
Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [2 ft](#)
Optimization Maximum Iterations: [2000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0

Model: [Mohr-Coulomb](#)
Unit Weight: [113 pcf](#)
Cohesion: [75 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH 1, EL. -3 TO -8

Model: [Mohr-Coulomb](#)
Unit Weight: [87 pcf](#)
Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

BEACH SAND, EL. -20 TO -47

Model: [Mohr-Coulomb](#)
Unit Weight: [122 pcf](#)
Cohesion: [0 psf](#)
Phi: [34 °](#)
Phi-B: [0 °](#)

BAY SOUND CLAY CL, EL. -47 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: [104 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH 2, EL. -8 TO -12

Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 2](#)

Right-Zone Right Coordinate: [\(275, -4.9\) ft](#)
Right-Zone Increment: [30](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(155, -14\) ft](#)
Right Coordinate: [\(310, -4.9\) ft](#)

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: [\(200, 12.9\) ft](#)
Inside Point: [\(200, -17.5\) ft](#)
Slip Surface Intersection: [\(0, 0\) ft](#)
Total Length: [30.4 ft](#)
Reinforcement Direction: [90 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: [1 ft](#)
Shear Capacity: [99999 lbs](#)
Shear Safety Factor: [1](#)
Shear Load Used: [99999 lbs](#)
Shear Option: [Parallel to Slip](#)
Resisting Force Used: [0 lbs/ft](#)

Tension Crack Line

	X (ft)	Y (ft)
	200.3	2.8
	208	2.2
	214.9	0.3

Unit Weight Functions

Marsh 2

Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [87](#)
Data Points: [X \(ft\), Unit Weight \(pcf\)](#)

Data Point: (180.3, 87)
Data Point: (200, 109)
Data Point: (227.5, 87)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0	51,50,36,3,41,4,28,20	26.3
Region 2	MARSH 1, EL. -3 TO -8	47,46,45,55,56,57,58,61,12,22,31	88.9675
Region 3	Fill 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	15,37,6,7,59,16	121.625
Region 4	MARSH 2, EL. -8 TO -12	31,22,12,13,23,48	78.8
Region 5	BEACH SAND, EL. -20 TO -47	27,24,13,17,8,34,33,32	992.5
Region 6	MARSH (protected), EL. -6 TO -12	16,59,60,8,17,44	461.925
Region 7	BEACH SAND, EL. -20 TO -47	13,24,27,1,19,49,48,23	242.55263
Region 8	Fill 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	21,11,28,20,51,52,53,54,55	39.105
Region 9	EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0	28,4,26,38,5,29	38.03
Region 10	Fill 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	11,28,29,15,16	109.2
Region 11	BEACH SAND, EL. -20 TO -47	9,32,33,34,10,18,14	4183.65
Region 12	BAY SOUND CLAY CL, EL. -47 TO -70	9,14,18,10,40,39	3562.7
Region 13	MARSH 2, EL. -8 TO -12	12,44,17,13	110
Region 14		4,42,43,38,26	7.45
Region 15	MARSH 1, EL. -3 TO -8	12,61,16,44	61.875
Region 16	MARSH (protected), EL. -6 TO -12	49,2,46,47,31,48	79.929867

Region 17	EMBANKMENT FILL 2, EL. 0 TO -3	45,35,30,51,52,53,54,55	10.07
Region 18	Embankment fill 1	30,51,50	0.09
Region 19	MARSH 1 GCAT above water	55,21,11,61,58,57,56	19.47
Region 20	MARSH 1 GCAT above water	11,61,16	34.375
Region 21	MARSH 1 GCAT above water	59,7,60	33.075

Points

	X (ft)	Y (ft)
Point 1	155	-15.1
Point 2	164.4	-10.2
Point 3	195	2.6
Point 4	200	3.1
Point 5	208	2.7
Point 6	310	-4.9
Point 7	310	-6
Point 8	310	-12
Point 9	155.1	-47
Point 10	310	-47
Point 11	200	-3
Point 12	200	-8
Point 13	200	-12
Point 14	200	-47
Point 15	227.5	-3
Point 16	227.5	-6
Point 17	227.5	-12
Point 18	231.5	-47
Point 19	155	-14
Point 20	195	0
Point 21	195	-3
Point 22	195	-8
Point 23	195	-12

Point 24	200	-17.5
Point 25	195	-15
Point 26	201	3.1
Point 27	155	-17.5
Point 28	200	0
Point 29	217.8	0
Point 30	186.8	0
Point 31	180.3	-8
Point 32	155	-20
Point 33	200	-20
Point 34	310	-20
Point 35	181.5	-2.5
Point 36	189	1
Point 37	260	-4.9
Point 38	201	3.5
Point 39	155.1	-70
Point 40	310	-70
Point 41	199	3.1
Point 42	200	12.9
Point 43	200.5	12.9
Point 44	227.5	-8
Point 45	180.3	-3
Point 46	173.675	-6
Point 47	180.3	-6
Point 48	180.3	-12
Point 49	159.94737	-12
Point 50	187.7	0.4
Point 51	187.25	0
Point 52	187.3	-0.4
Point 53	186.9	-1.7
Point 54	186.8	-2.4
Point 55	186.4	-3
Point 56	190.5	-4
Point 57	195	-4.3
Point 58	195.3	-5.47
Point 59	236.5	-6

Point 60	310	-6.9
Point 61	200	-5.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.26	(225.783, 16.297)	21.93575	(200.629, 3.1)	(248.19, -4.20957)
2	13936	2.31	(225.783, 16.297)	27.911	(201.399, 3.45438)	(244.922, -4.01854)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	200.8146	2.5219195	-506.48783	16.798314	8.193085	75
2	Optimized	201.64665	1.389007	-436.56046	132.43002	64.590438	75
3	Optimized	202.5222	0.25426	-366.64591	233.92327	114.092	75
4	Optimized	203.4472	-0.7730375	-303.40915	303.99076	148.2662	75
5	Optimized	204.83935	-2.3191125	-207.92537	405.752	197.89847	75
6	Optimized	205.83375	-3.380554	-142.18888	496.42606	242.12317	75
7	Optimized	207.06605	-4.571687	-68.411154	575.17413	256.08402	75
8	Optimized	208.05215	-5.524818	-9.397799	630.41988	280.68102	75
9	Optimized	209.1849	-6.435735	46.953795	723.20137	301.08482	0
10	Optimized	210.8097	-7.648125	121.7016	805.78897	304.57532	0
11	Optimized	211.85975	-8.32706	163.47421	836.62872	299.70769	0

12	Optimized	213.4129	-9.21593	217.96374	898.208	302.86426	0
13	Optimized	215.29515	-10.11012	272.49274	956.89867	304.71715	0
14	Optimized	216.96505	-10.77488	312.75715	968.91623	292.14085	0
15	Optimized	217.9488	-11.16649	336.4635	975.26648	284.41341	0
16	Optimized	219.03445	-11.411075	350.91412	1009.9788	293.43452	0
17	Optimized	220.90815	-11.781785	372.6257	985.0579	272.67238	0
18	Optimized	222.68005	-11.97363	383.24472	989.18666	269.78274	0
19	Optimized	224.3502	-11.98661	382.78967	934.70087	245.7267	0
20	Optimized	226.17295	-11.850245	372.90038	893.73439	231.89024	0
21	Optimized	227.3303	-11.665225	360.4787	858.60668	221.78087	0
22	Optimized	228.33805	-11.41484	344.09723	824.17042	213.74235	0
23	Optimized	230.01415	-10.998395	316.83719	775.12782	204.04414	0
24	Optimized	231.69025	-10.58195	289.57715	726.14312	194.3717	0
25	Optimized	233.36635	-10.165505	262.31131	677.15842	184.70183	0
26	Optimized	235.3522	-9.612708	226.29603	622.29532	176.31024	0
27	Optimized	237.4778	-8.974593	184.85442	549.26406	162.24563	0
28	Optimized	239.1665	-8.4339615	149.82973	494.78423	153.58364	0
29	Optimized	240.5883	-7.939785	117.90795	439.0789	142.99452	0
30	Optimized	242.0101	-7.4456085	85.986174	383.38021	132.40836	0

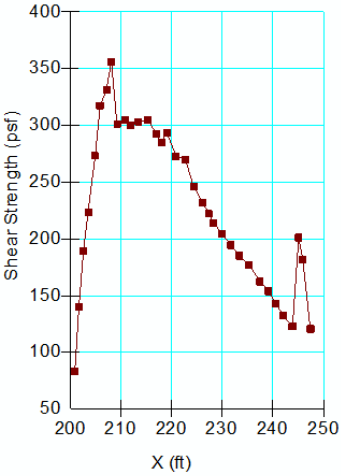
24	13936	235.75	-9.761746	235.28877	646.27045	182.98083	0
25	13936	237.24685	-9.138253	195.24584	588.86863	175.25216	0
26	13936	238.74055	-8.40994	148.65562	520.54665	165.57655	0
27	13936	240.23425	-7.5659505	94.854852	439.68579	153.52863	0
28	13936	241.7279	-6.5934075	33.028577	344.10719	138.50112	0
29	13936	242.5235	-6.03658	-2.323488	324.87512	144.64372	75
30	13936	243.1598	-5.5323155	-34.255108	266.21851	129.84344	75
31	13936	244.3348	-4.541584	-96.930009	128.3946	62.622231	75

31	Optimized	243.86795	-6.640055	34.302757	310.07196	122.78036	0
32	Optimized	245.08405	-6.040795	-4.0178252	282.51014	125.78162	75
33	Optimized	245.91245	-5.552393	-35.10664	219.169	106.89587	75
34	Optimized	247.4309	-4.6571795	-92.088199	93.035631	45.376509	75

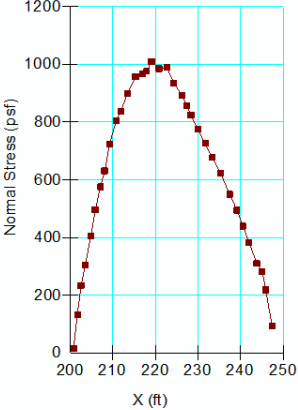
Slices of Slip Surface: **13936**

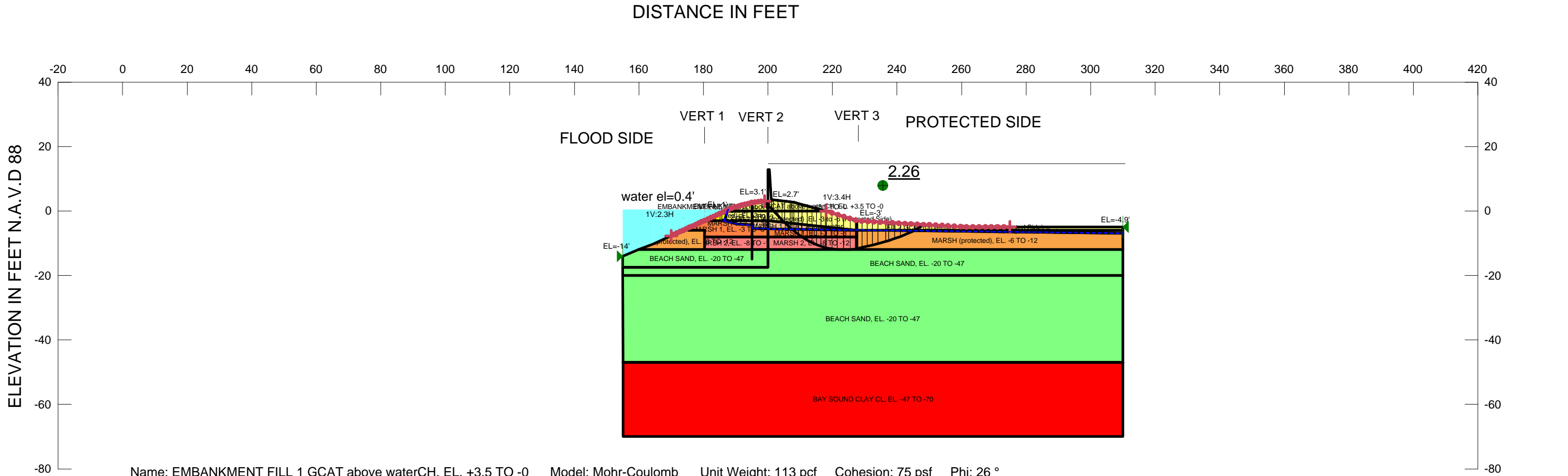
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	13936	202.2612	1.3571745	-435.03965	120.06584	58.560024	75
2	13936	203.91665	-1.0029185	-289.34658	303.66807	148.10881	75
3	13936	205.5036	-2.8463965	-175.35429	448.12906	218.56715	75
4	13936	207.14855	-4.451644	-75.937532	580.37753	258.40072	75
5	13936	208.27245	-5.435847	-15.048098	651.54121	290.08484	75
6	13936	209.4201	-6.2894045	37.682208	720.89794	304.18724	0
7	13936	211.1705	-7.4617235	109.85589	789.74581	302.7065	0
8	13936	212.765	-8.379453	166.16876	843.04808	301.36609	0
9	13936	214.2036	-9.087018	209.38187	883.13903	299.97601	0
10	13936	215.64215	-9.6957485	246.38383	912.20172	296.44122	0
11	13936	217.0807	-10.212484	277.59083	930.91667	290.8794	0
12	13936	218.49285	-10.63613	302.9864	940.04079	283.63489	0
13	13936	219.87855	-10.97367	323.00315	940.45855	274.90886	0
14	13936	221.26425	-11.237375	338.41577	932.66935	264.57874	0
15	13936	222.65	-11.429355	349.33609	917.08252	252.777	0
16	13936	224.03575	-11.551105	355.87473	893.95421	239.56842	0
17	13936	225.42145	-11.603545	358.08865	863.38151	224.97087	0
18	13936	226.80715	-11.58706	356.00213	825.51533	209.04074	0
19	13936	228.25	-11.49502	349.16661	799.25626	200.39282	0
20	13936	229.75	-11.3207	337.14575	784.67835	199.25435	0
21	13936	231.25	-11.06309	319.92814	762.52438	197.05654	0
22	13936	232.75	-10.7198	297.36398	732.43568	193.7064	0
23	13936	234.25	-10.2875	269.23966	693.91862	189.07925	0

Shear Strength Vs. X



Base Normal Stress Vs. X






- Name: EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 °
- Name: MARSH 1, EL. -3 TO -8 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 24 °
- Name: BEACH SAND, EL. -20 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
- Name: BAY SOUND CLAY CL, EL. -47 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °
- Name: MARSH 2, EL. -8 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °
- Name: FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °
- Name: EMBANKMENT FILL 2, EL. 0 TO -3 Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °
- Name: MARSH (protected), EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 0 psf Phi: 24 °
- Name: MARSH 1 GCAT above water Model: Mohr-Coulomb Unit Weight: 87 pcf Cohesion: 75 psf Phi: 24 °
- Name: Embankment fill 1 Model: Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN HE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District
LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 15, STA. 100+28 TO STA. 104+00
PROTECTED SIDE S-CASE STABILITY ANALYSIS
CASE: Global Stability (Entry/Exit) through
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Entry/Exit) through

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File Information

Created By: Lijegren, James
Revision Number: 211
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 5:15:21 PM
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Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/24/2013
Last Solved Time: 5:20:12 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) through
Kind: SLOPE/W
Parent: Gap Stability (See page)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side)

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

EMBANKMENT FILL 2, EL. 0 TO -3

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH (protected), EL. -6 TO -12

Model: Mohr-Coulomb
Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

MARSH 1 GCAT above water

Model: Mohr-Coulomb
Unit Weight: 87 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

Embankment fill 1

Model: Mohr-Coulomb
Unit Weight: 113 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (170, -7.66415) ft
Left-Zone Right Coordinate: (199, 3.1) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (218, -0.06186) ft

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0

Model: Mohr-Coulomb
Unit Weight: 113 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -3 TO -8

Model: Mohr-Coulomb
Unit Weight: 87 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND, EL. -20 TO -47

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -47 TO -70

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 2, EL. -8 TO -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2

Right-Zone Right Coordinate: (275, -4.9) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (155, -14) ft
Right Coordinate: (310, -4.9) ft

Unit Weight Functions

Marsh 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 87
Data Points: X (ft), Unit Weight (pcf)
Data Point: (180.3, 87)
Data Point: (200, 109)
Data Point: (227.5, 87)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0	51,50,36,3,41,4,28,20	26.3
Region 2	MARSH 1, EL. -3 TO -8	47,46,45,55,56,57,58,61,12,22,31	88.9675
Region 3	FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	15,37,6,7,59,16	121.625
Region 4	MARSH 2, EL. -8 TO -12	31,22,12,13,23,48	78.8
Region 5	BEACH SAND, EL. -20 TO -47	27,24,13,17,8,34,33,32	992.5
Region 6	MARSH (protected), EL. -6 TO -12	16,59,60,8,17,44	461.925
Region 7	BEACH SAND, EL. -20 TO -47	13,24,27,1,19,49,48,23	242.55263
Region 8	FILL 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	21,11,28,20,51,52,53,54,55	39.105

Region 9	EMBANKMENT FILL 1 GCAT above waterCH, EL. +3.5 TO -0	28,4,26,38,5,29	38.03
Region 10	Fill 2 GCAT(protected) ,EL -3 to -6 (Protected Side)	11,28,29,15,16	109.2
Region 11	BEACH SAND, EL. -20 TO -47	9,32,33,34,10,18,14	4183.65
Region 12	BAY SOUND CLAY CL, EL. -47 TO -70	9,14,18,10,40,39	3562.7
Region 13	MARSH 2, EL. -8 TO -12	12,44,17,13	110
Region 14		4,42,43,38,26	7.45
Region 15	MARSH 1, EL. -3 TO -8	12,61,16,44	61.875
Region 16	MARSH (protected), EL. -6 TO -12	49,2,46,47,31,48	79.929867
Region 17	EMBANKMENT FILL 2, EL. 0 TO -3	45,35,30,51,52,53,54,55	10.07
Region 18	Embankment fill 1	30,51,50	0.09
Region 19	MARSH 1 GCAT above water	55,21,11,61,58,57,56	19.47
Region 20	MARSH 1 GCAT above water	11,61,16	34.375
Region 21	MARSH 1 GCAT above water	59,7,60	33.075

Point 9	155.1	-47
Point 10	310	-47
Point 11	200	-3
Point 12	200	-8
Point 13	200	-12
Point 14	200	-47
Point 15	227.5	-3
Point 16	227.5	-6
Point 17	227.5	-12
Point 18	231.5	-47
Point 19	155	-14
Point 20	195	0
Point 21	195	-3
Point 22	195	-8
Point 23	195	-12
Point 24	200	-17.5
Point 25	195	-15
Point 26	201	3.1
Point 27	155	-17.5
Point 28	200	0
Point 29	217.8	0
Point 30	186.8	0
Point 31	180.3	-8
Point 32	155	-20
Point 33	200	-20
Point 34	310	-20
Point 35	181.5	-2.5
Point 36	189	1
Point 37	260	-4.9
Point 38	201	3.5
Point 39	155.1	-70
Point 40	310	-70
Point 41	199	3.1
Point 42	200	12.9
Point 43	200.5	12.9
Point 44	227.5	-8

Points

	X (ft)	Y (ft)
Point 1	155	-15.1
Point 2	164.4	-10.2
Point 3	195	2.6
Point 4	200	3.1
Point 5	208	2.7
Point 6	310	-4.9
Point 7	310	-6
Point 8	310	-12

Point 45	180.3	-3
Point 46	173.675	-6
Point 47	180.3	-6
Point 48	180.3	-12
Point 49	159.94737	-12
Point 50	187.7	0.4
Point 51	187.25	0
Point 52	187.3	-0.4
Point 53	186.9	-1.7
Point 54	186.8	-2.4
Point 55	186.4	-3
Point 56	190.5	-4
Point 57	195	-4.3
Point 58	195.3	-5.47
Point 59	236.5	-6
Point 60	310	-6.9
Point 61	200	-5.5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.26	(225.637, 19.203)	22.60764	(199, 3.1)	(248.448, -4.22466)
2	19857	2.30	(225.637, 19.203)	31.126	(199, 3.1)	(246.274, -4.09754)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimized	199.5	2.219248	-468.84959	55.73349	27.183039	75
2	Optimized	200.25	1.506979	-442.6512	118.26124	57.679859	75
3	Optimized	200.75	1.0321329	-413.61776	159.94496	78.01037	75

4	Optimized	201.015	0.7804549	-398.20717	217.00673	105.84125	75
5	Optimized	201.38435	0.3831	-373.84485	236.86039	115.52453	75
6	Optimized	202.3968	-0.7114875	-306.63962	313.05234	152.68583	75
7	Optimized	203.71295	-2.1344625	-218.96639	407.24148	198.62494	75
8	Optimized	204.7485	-3.2025745	-152.91724	497.62132	242.70613	75
9	Optimized	206.01755	-4.4014695	-78.570637	577.63054	257.17769	75
10	Optimized	207.1511	-5.4390795	-14.335989	664.29266	295.76215	75
11	Optimized	207.69655	-5.8793655	12.901676	710.62425	310.6461	0
12	Optimized	208.67395	-6.668286	61.714782	752.81642	307.69827	0
13	Optimized	209.95905	-7.60613	119.57819	825.33635	314.22378	0
14	Optimized	211.38125	-8.52267	175.97771	867.94391	308.0832	0
15	Optimized	212.90805	-9.390955	229.234	940.08588	316.49165	0
16	Optimized	214.33955	-10.082185	271.40702	963.48738	308.13403	0
17	Optimized	215.74145	-10.65729	306.30692	1008.9988	312.85859	0
18	Optimized	217.1138	-11.11627	333.94192	1010.1736	301.07775	0
19	Optimized	217.95915	-11.398995	350.95663	1010.4489	293.62486	0
20	Optimized	218.95815	-11.58848	362.03501	1037.2989	300.64686	0
21	Optimized	220.63785	-11.86098	377.76698	1009.0319	281.05726	0
22	Optimized	222.467	-11.995165	384.75029	1000.2861	274.05418	0

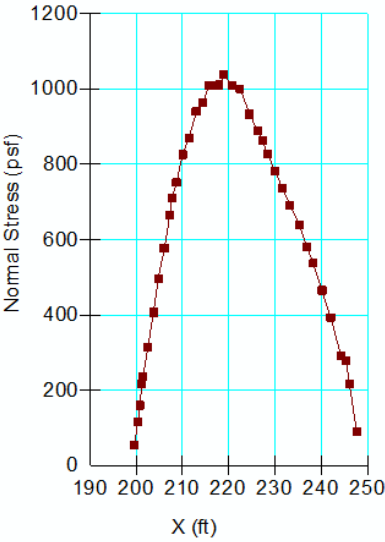
23	Optimized	224.4456	-11.99103	382.9915	933.72498	245.20235	0
24	Optimized	226.25565	-11.88931	375.27479	888.70208	228.59256	0
25	Optimized	227.2882	-11.74034	365.20771	862.62874	221.46611	0
26	Optimized	228.31995	-11.50008	349.42703	827.83728	213.00197	0
27	Optimized	229.95985	-11.118195	324.35257	782.46332	203.96404	0
28	Optimized	231.59975	-10.73631	299.27218	737.08936	194.92877	0
29	Optimized	233.23965	-10.354425	274.19178	691.71539	185.89349	0
30	Optimized	235.2798	-9.7983425	237.93484	638.91329	178.52711	0
31	Optimized	236.93365	-9.3034375	205.79039	582.29953	167.63267	0
32	Optimized	238.30255	-8.85491	176.75501	538.02265	160.84671	0
33	Optimized	240.173	-8.21739	135.54811	466.13448	147.18654	0
34	Optimized	242.1355	-7.4506585	86.203204	392.98703	136.58896	0
35	Optimized	244.23335	-6.5358635	27.522354	291.56074	117.55746	0
36	Optimized	245.36275	-6.03452	-4.6224076	278.37485	123.94047	75
37	Optimized	246.17825	-5.556165	-35.07492	216.47089	105.57991	75
38	Optimized	247.6915	-4.668495	-91.580332	91.882427	44.814054	75

Slices of Slip Surface: 19857

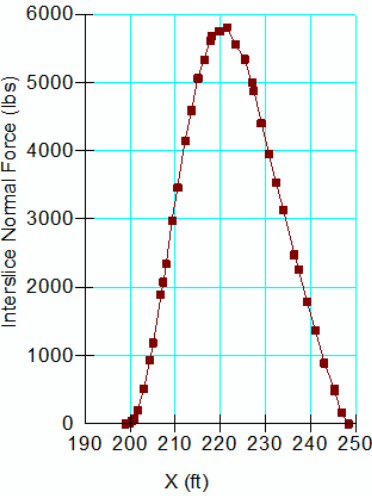
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	19857	199.5	2.3257045	-475.47932	27.495344	13.410375	75

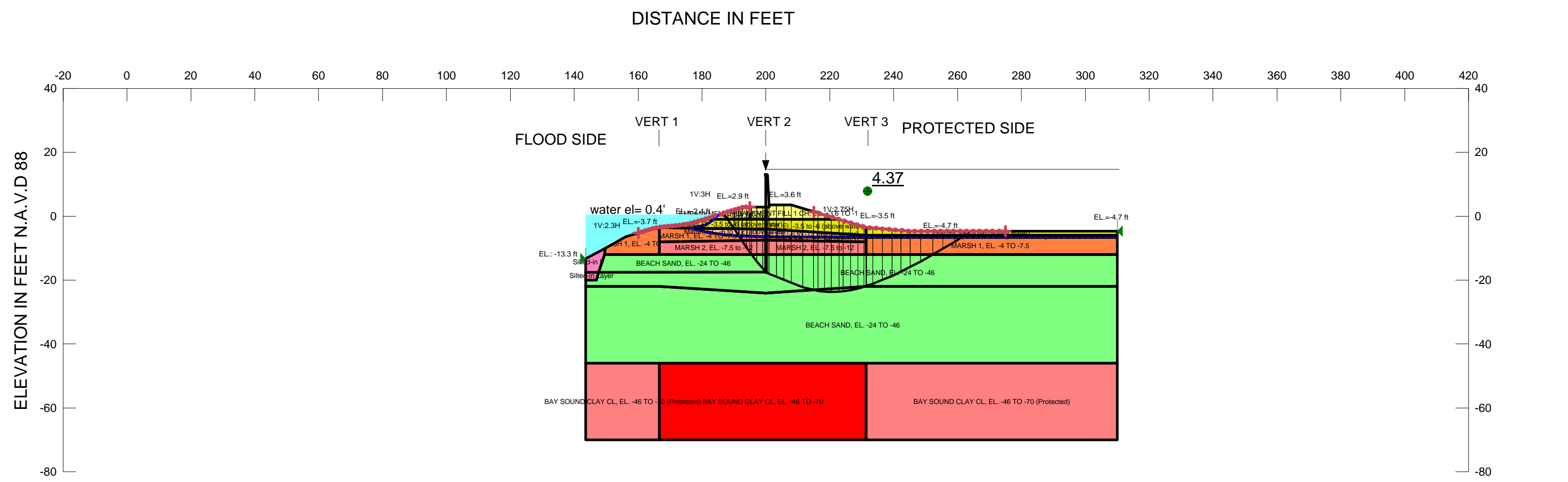
2	19857	200.25	1.1989048	-423.50403	120.4772	58.760658	75
3	19857	200.75	0.5135117	-381.39729	179.55314	87.573916	75
4	19857	201.07025	0.09031135	-355.40202	248.79102	121.34349	75
5	19857	201.93345	-0.933381	-292.59942	325.92925	158.96632	75
6	19857	203.51935	-2.6685975	-185.7147	460.93921	224.81508	75
7	19857	204.9504	-4.038347	-100.87772	573.53496	255.35422	75
8	19857	206.22655	-5.115536	-34.101836	653.85176	291.11356	75
9	19857	207.4323	-6.0343025	22.701412	742.7371	320.58054	0
10	19857	208.6276	-6.8534625	73.299002	799.23732	323.20856	0
11	19857	209.8828	-7.6315655	121.21004	842.32801	321.06241	0
12	19857	211.23935	-8.380479	167.18048	885.09458	319.63595	0
13	19857	212.69725	-9.094282	210.85213	925.38647	318.13118	0
14	19857	214.15515	-9.717003	248.74125	955.23576	314.55162	0
15	19857	215.6131	-10.25444	281.26962	975.31391	309.00843	0
16	19857	217.07105	-10.711121	308.70759	986.14192	301.6132	0
17	19857	218.60835	-11.10737	332.28727	988.09442	291.98415	0
18	19857	220.225	-11.43756	351.67505	980.57728	280.00532	0
19	19857	221.84165	-11.679645	365.55163	963.20908	266.09424	0
20	19857	223.45835	-11.8357	374.05524	936.48015	250.40771	0
21	19857	225.075	-11.90702	377.27669	900.59557	232.99658	0
22	19857	226.69165	-11.894185	375.24179	855.77557	213.94742	0
23	19857	228.25	-11.803545	368.40696	825.40644	203.46928	0
24	19857	229.75	-11.640305	357.07843	810.88707	202.04863	0
25	19857	231.25	-11.40272	341.11006	789.5629	199.66407	0
26	19857	232.75	-11.08904	320.39787	761.16155	196.24063	0
27	19857	234.25	-10.696865	294.77918	725.36882	191.71086	0
28	19857	235.75	-10.223047	264.07241	681.66429	185.92388	0
29	19857	237.2278	-9.6731365	228.63158	630.35781	178.86004	0
30	19857	238.6834	-9.04484	188.31586	570.94744	170.35856	0
31	19857	240.139	-8.325271	142.30655	501.87479	160.09009	0
32	19857	241.59465	-7.507023	90.138386	421.92951	147.72292	0
33	19857	243.0503	-6.580657	31.221961	329.46994	132.78856	0
34	19857	243.8399	-6.0445595	-2.831846	309.89988	137.97632	75
35	19857	244.4947	-5.548189	-34.285764	251.48438	122.65713	75
36	19857	245.6807	-4.596959	-94.506389	119.72271	58.392668	75

Base Normal Stress Vs. X



Interslice Normal Stress Vs. X





Name: EMBANKMENT FILL 1 CH, EL. +3.6 TO -1 Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °
Name: MARSH 1, EL. -4 TO -7.5 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °
Name: BEACH SAND, EL. -24 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY CL, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °
Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH 2, EL. -7.5 to -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °
Name: EMBANKMENT FILL 2, EL. -1 TO -4 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 26 °
Name: Fill, El. -3.5 to -6 (above water) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 75 psf Phi: 26 °
Name: Marsh, EL. -6 to -12 (above water) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 75 psf Phi: 24 °
Name: BAY SOUND CLAY CL, EL. -46 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °
Name: Emb Fill 1 CH 3.6 to -1 (above water) Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

LONDON AVE OUTFALL CANAL, REACH 16,
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) (around)
STA. 104+00 TO 112+50
ORLEANS PARISH, LOUISIANA

Global Stability (Entry/Exit) (around)

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File Information

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Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/24/2013
Last Solved Time: 5:21:16 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) (around)

Kind: SLOPE/W
Parent: Global Stability (Seepage)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

MARSH 2, EL. -7.5 to -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

EMBANKMENT FILL 2, EL. -1 TO -4

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Fill, EL. -3.5 to -6 (above water)

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Marsh, EL. -6 to -12 (above water)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Emb Fill 1 CH 3.6 to -1 (above water)

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.6 TO -1

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -4 TO -7.5

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND, EL. -24 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -46 TO -70

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (160.00573, -5.25375) ft
Left-Zone Right Coordinate: (195, 2.8) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (214.99944, 1.38608) ft
Right-Zone Right Coordinate: (275, -4.7) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (143.6, -13.3) ft
Right Coordinate: (310, -4.7) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -17.4) ft
Slip Surface Intersection: (200, -17.403) ft
Total Length: 30.3 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
176.2	-2.6
192.6	2.6
195	2.6

Unit Weight Functions

Marsh 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (166.7, 80)
Data Point: (200, 97)
Data Point: (231.4, 80)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	58,57,30,4,5,33,24,21,59	48.755
Region 2	MARSH 1, EL. -4 TO -7.5	25,3,8,28,35,41,42,43	100.17577
Region 3	Fill, EL. -3.5 to -6 (above water)	36,31,32,7,9,18	110.58019
Region 4	MARSH 1, EL. -4 TO -7.5	70,19,38,37,69	420.51
Region 5	Silted-in Layer	52,20,3,25,51	29.215
Region 6	EMBANKMENT FILL 2, EL. -1 TO -4	35,64,63,62,61,60,59,55,29	16.397273
Region 7	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	24,33,34,23,6,56	69.275
Region 8	Fill, EL. -3.5 to -6 (above water)	12,24,56,36,18	114.85463
Region 9	BEACH SAND, EL. -24 TO -46	10,26,44,39,40,27,11,47,17,45	3928.9
Region 10	MARSH 1, EL. -4 TO -7.5	35,64,65,66,67,68,13,42,41	91.854229
Region 11	MARSH 2, EL. -7.5 to -12	42,43,14,54,13	141.525
Region 12	BEACH SAND, EL. -24 TO -46	25,43,14,22,51	280.301
Region 13		33,49,50,23,34	7.675
Region 14	Marsh, EL. -6 to -12 (above water)	12,18,69,68	47.1
Region 15	MARSH 2, EL. -7.5 to -12	14,54,13,37,38	133.45
Region	BEACH SAND, EL. -24 TO -46	39,44,26,1,2,51,22,14,38,19,27,40	1411.969

16			
Region 17	Silted-in Layer	52,51,2,1	9.15
Region 18	BAY SOUND CLAY CL, EL. -46 TO -70	45,17,47,48,53,46	1552.8
Region 19	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	47,48,15,11	1886.4
Region 20	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	10,16,46,45	554.4
Region 21	Emb Fill 1 CH 3.6 to -1 (above water)	55,58,59	2.052274
Region 22	Fill, EL. -3.5 to -6 (above water)	64,63,62,61,60,59,21,24,12	54.345
Region 23	Marsh, EL. -6 to -12 (above water)	64,12,68,67,66,65	40.56
Region 24	MARSH 1, EL. -4 TO -7.5	68,69,37,13	39.25
Region 25	Marsh, EL. -6 to -12 (above water)	18,9,70,69	51.09

Points

	X (ft)	Y (ft)
Point 1	143.6	-20
Point 2	146.9	-20
Point 3	149.7	-10
Point 4	195	2.8
Point 5	199	2.9
Point 6	208	3.5
Point 7	310	-4.7
Point 8	156.1	-6.4
Point 9	310	-6
Point 10	143.6	-46
Point 11	310	-46
Point 12	200	-4
Point 13	200	-7.5
Point 14	200	-12

Point 15	310	-70
Point 16	143.6	-70
Point 17	200	-46
Point 18	231.4	-6
Point 19	310	-12
Point 20	143.6	-13.3
Point 21	195	-1
Point 22	200	-17.4
Point 23	201	3.6
Point 24	200	-1
Point 25	149.5	-12
Point 26	143.6	-22
Point 27	310	-22
Point 28	165.3	-3.7
Point 29	176.2	-2.4
Point 30	192.6	2.8
Point 31	231.5	-3.5
Point 32	245.2	-4.7
Point 33	200	2.9
Point 34	201	2.9
Point 35	166.66154	-3.5
Point 36	231.35185	-3.5
Point 37	231.4	-8
Point 38	231.4	-12
Point 39	200	-24
Point 40	231.4	-22
Point 41	166.7	-6
Point 42	166.7	-8
Point 43	166.7	-12
Point 44	166.7	-22
Point 45	166.7	-46
Point 46	166.7	-70
Point 47	231.4	-46
Point 48	231.4	-70
Point 49	200	12.9
Point 50	200.5	12.9

Point 51	147.62	-17.5
Point 52	143.6	-17.5
Point 53	200	-70
Point 54	200	-11.6
Point 55	180.71818	-1
Point 56	222.9	-1
Point 57	185.5	0.5
Point 58	185.2	0.4
Point 59	183.65	-1
Point 60	182.3	-2
Point 61	180.8	-2.8
Point 62	179.5	-3.1
Point 63	178.2	-3.4
Point 64	176.7	-3.7
Point 65	181.8	-5
Point 66	187.2	-5.8
Point 67	190.8	-6.1
Point 68	200	-6.4
Point 69	231.4	-6.6
Point 70	310	-6.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	4.37	(222.503, 14.852)	34.85289	(186.822, 0.928363)	(264.036, -4.7)
2	14778	4.63	(222.503, 14.852)	39.452	(185.778, 0.590069)	(256.77, -4.7)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	187.4325	-0.115970	-224.58139	96.99261	47.306457	75

			8				
2	Optimize d	189.03365	- 2.435781	-182.68696	329.22172	160.57216	75
3	Optimize d	190.1555	- 4.061166	-118.56421	481.85293	214.53475	75
4	Optimize d	190.90005	- 5.187022	-55.862329	568.8962	253.28891	75
5	Optimize d	192.00185	- 6.868018	41.326537	732.42303	307.69598	0
6	Optimize d	192.545	- 7.696657	89.233154	807.4449	319.76847	0
7	Optimize d	193.24335	- 8.762046	150.61223	894.89652	331.37672	0
8	Optimize d	194.44335	- 10.48289	251.31756	1061.1222	360.54824	0
9	Optimize d	195.2928	- 11.61112	318.22148	1156.4687	373.21171	0
10	Optimize d	196.3999	- 13.08155 5	408.83693	1262.3348	575.69159	0
11	Optimize d	198.1071	- 15.20146	540.79967	1523.1258	662.58736	0
12	Optimize d	199.5	- 16.82127	641.46783	1698.2581	712.81405	0
13	Optimize d	200.10425	- 17.52397 5	685.04758	1772.9503	733.79965	0
14	Optimize d	200.35425	- 17.70403 5	696.20354	2011.0461	886.87251	0
15	Optimize d	200.75	- 17.86373 5	706.07533	2028.8306	892.20968	0
16	Optimize d	202.16665	- 18.43542 5	741.48644	2166.6729	961.3004	0
17	Optimize d	204.5	- 19.37703 5	799.98824	2267.5011	989.8499	0

18	Optimize d	206.83335	- 20.31864 5	858.52978	2368.4882	1018.4798	0
19	Optimize d	209.7561	- 21.49811	931.8347	2439.9537	1017.2391	0
20	Optimize d	213.22735	- 22.62751	1001.9807	2513.842	1019.7633	0
21	Optimize d	215.6104	- 23.21209 5	1038.2897	2497.5371	984.27483	0
22	Optimize d	217.33815	- 23.46692 5	1054.0016	2531.6438	996.68224	0
23	Optimize d	219.45785	- 23.64889 5	1065.1884	2475.0518	950.96491	0
24	Optimize d	221.70885	- 23.66151	1065.7944	2455.1179	937.11051	0
25	Optimize d	223.54455	- 23.54073	1058.0811	2375.6315	888.69903	0
26	Optimize d	225.33975	- 23.29001	1042.2942	2338.3206	874.18082	0
27	Optimize d	227.641	- 22.87339 5	1016.083	2216.9277	809.98001	0
28	Optimize d	229.7282	- 22.35595 5	983.62467	2144.68	783.14169	0
29	Optimize d	231.00835	- 21.93345	957.17014	2050.2989	737.32465	0
30	Optimize d	231.37595	- 21.81213	949.57311	2023.8679	724.621	0
31	Optimize d	231.45	- 21.78768	948.03625	2020.6807	723.50779	0
32	Optimize d	232.48575	- 21.44583	926.60295	1967.797	702.29423	0
33	Optimize d	234.97605	- 20.51867 5	868.5494	1849.0114	661.32999	0

34	Optimize d	237.98515	- 19.31506 5	793.20045	1664.4343	587.65464	0
35	Optimize d	240.9173	- 17.99549 5	710.61047	1492.9735	527.71055	0
36	Optimize d	243.77245	- 16.55996 5	620.80237	1274.9933	441.25737	0
37	Optimize d	246.79385	- 15.04083	525.76822	1058.7395	359.49368	0
38	Optimize d	250.306	- 13.11973	405.59066	813.61243	275.21416	0
39	Optimize d	253.8101	- 11.07437	277.67044	569.41911	129.89487	0
40	Optimize d	257.2674	-9.08863	153.46782	398.36683	109.03607	0
41	Optimize d	260.16195	- 7.333207	43.687927	253.79258	93.544618	0
42	Optimize d	261.6543	- 6.318947	-19.726685	179.21974	79.793771	75
43	Optimize d	263.07995	-5.35	-80.309147	83.124053	40.54231	75

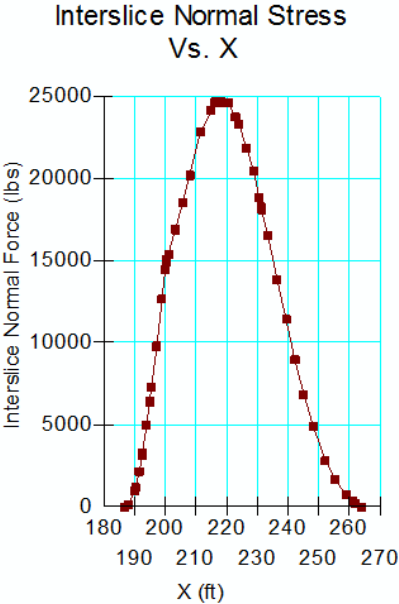
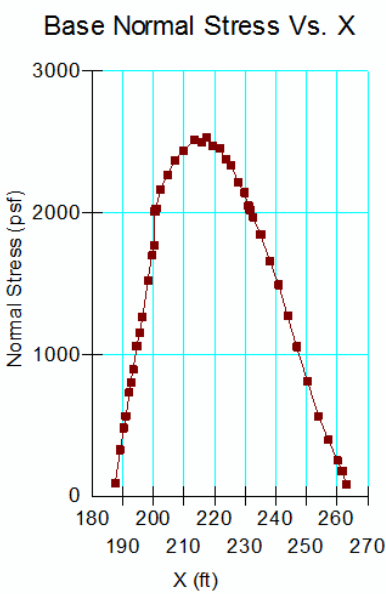
			6.798476				
5	14778	190.44785	- 8.139718 5	119.91825	807.91732	306.31692	0
6	14778	191.7	- 9.757241 5	211.275	996.67901	349.68439	0
7	14778	193.0991	- 11.44188	308.92559	1186.0178	390.50662	0
8	14778	194.2991	- 12.71705 5	386.37004	1291.6898	610.64591	0
9	14778	196	- 14.34193 5	487.44641	1497.1383	681.0458	0
10	14778	198	- 16.04286 5	593.22386	1720.0084	760.02575	0
11	14778	199.3904	- 17.11819 5	659.9359	1863.2446	811.64199	0
12	14778	199.8904	- 17.47709	682.17123	1910.8345	828.74381	0
13	14778	200.25	- 17.72453 5	697.49875	1942.7904	839.95983	0
14	14778	200.75	- 18.06054 5	718.3577	1985.8534	854.93666	0
15	14778	202.16665	- 18.92813 5	772.23111	2170.5965	943.2094	0
16	14778	204.5	- 20.22919 5	853.18545	2340.2355	1003.0279	0
17	14778	206.83335	- 21.33311 5	921.80996	2487.8919	1056.3356	0
18	14778	209.0435	-	976.7687	2576.4768	1079.0168	0

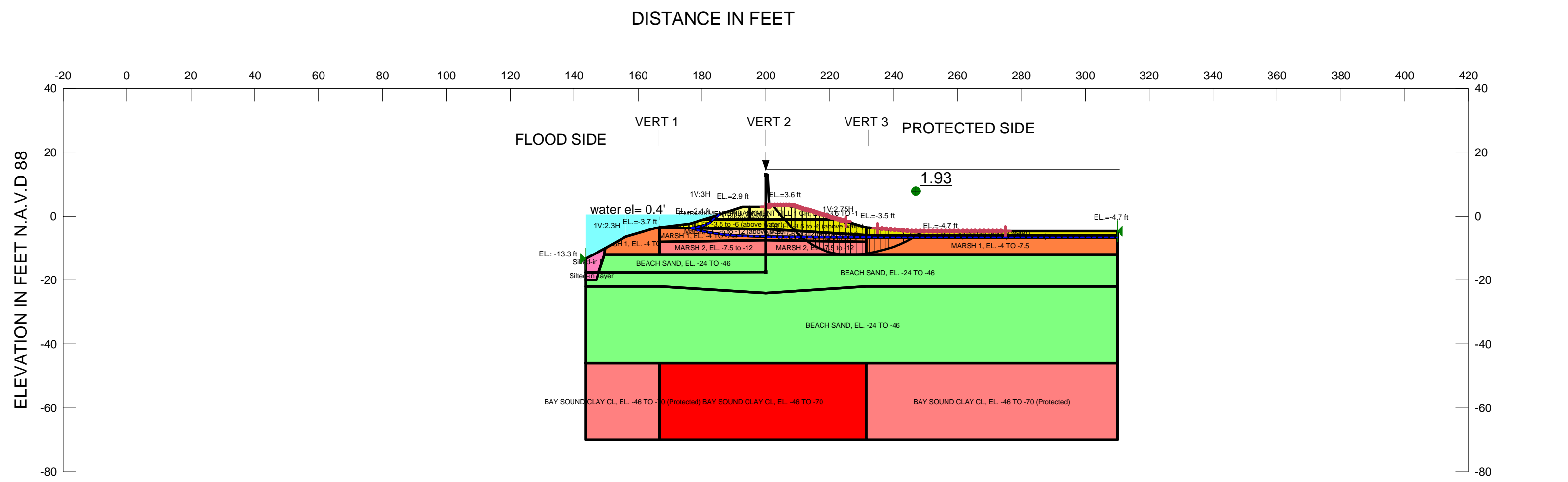
Slices of Slip Surface: 14778

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	14778	186.0765	- 0.281530 5	-124.06709	54.165357	26.41821	75
2	14778	187.0678	- 2.421205 5	-138.71992	246.78009	120.36269	75
3	14778	188.36975	- 4.895324 5	-59.674965	469.77902	209.15909	75
4	14778	189.5373	-	45.701567	667.80835	276.97979	0

			22.21720 5				
19	14778	211.13045	22.91033 5	1019.8403	2607.7318	1071.0463	0
20	14778	213.24655	23.48357 5	1055.3914	2622.9587	1057.3375	0
21	14778	215.3918	23.93919 5	1083.6517	2622.3327	1037.8534	0
22	14778	217.537	24.27196 5	1104.2248	2605.7819	1012.813	0
23	14778	219.6822	24.48501 5	1117.3473	2573.6045	982.25788	0
24	14778	221.8274	24.58029 5	1123.1278	2525.8608	946.15532	0
25	14778	223.9565	24.55969 5	1121.6426	2472.8067	911.37169	0
26	14778	226.06945	24.42479 5	1113.0457	2414.8118	878.05237	0
27	14778	228.1824	24.17511 5	1097.2635	2341.5375	839.27342	0
28	14778	230.2954	23.80840 5	1074.2492	2252.5133	794.74918	0
29	14778	231.37595	23.58989 5	1060.5063	2203.3341	770.84706	0
30	14778	231.45	-23.5727 5	1059.4574	2201.7001	770.45244	0
31	14778	232.77245	23.21780 5	1037.1638	2158.2098	756.15504	0
32	14778	235.3173	22.43727 5	988.23762	2060.609	723.32365	0
33	14778	237.666	21.55169 5	932.7859	1948.468	685.08622	0

			5				
34	14778	239.8186	20.57736 5	871.82233	1823.5311	641.93567	0
35	14778	241.97115	19.44031 5	800.6813	1675.7788	590.26073	0
36	14778	244.1237	18.12359 5	718.33666	1502.019	528.60044	0
37	14778	246.23455	16.63823 5	625.48607	1312.1853	463.1845	0
38	14778	248.3037	14.96326 5	520.80707	1102.3524	392.25729	0
39	14778	250.37285	13.03399 5	400.22	850.96317	304.0301	0
40	14778	252.45395	10.77697 9	259.22333	584.13156	144.65847	0
41	14778	254.547	8.092369 5	91.529177	355.19117	117.38988	0
42	14778	255.79405	6.315390 5	-19.458566	229.58299	102.21693	75
43	14778	256.3822	-5.35 5	-79.745291	123.6019	60.284673	75





Name: EMBANKMENT FILL 1 CH, EL. +3.6 TO -1 Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1, EL. -4 TO -7.5 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °

Name: BEACH SAND, EL. -24 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: BAY SOUND CLAY CL, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °

Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 34 °

Name: MARSH 2, EL. -7.5 to -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °

Name: EMBANKMENT FILL 2, EL. -1 TO -4 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 26 °

Name: Fill, El. -3.5 to -6 (above water) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 75 psf Phi: 26 °

Name: Marsh, EL. -6 to -12 (above water) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 75 psf Phi: 24 °

Name: BAY SOUND CLAY CL, EL. -46 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °

Name: Emb Fill 1 CH 3.6 to -1 (above water) Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL



**US Army Corps
of Engineers®**
New Orleans District

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

LONDON AVE OUTFALL CANAL, REACH 16,
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) (in front)
STA. 104+00 TO 112+50
ORLEANS PARISH, LOUISIANA

Global Stability (Entry/Exit) (in front)

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File Information

Created By: Lijegren, James
Revision Number: 254
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 5:19:35 PM
File Name: Reach 16s.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/24/2013
Last Solved Time: 5:21:50 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) (in front)

Kind: SLOPE/W
Parent: Global Stability (Seepage)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

MARSH 2, EL. -7.5 to -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

EMBANKMENT FILL 2, EL. -1 TO -4

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Fill, EL. -3.5 to -6 (above water)

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Marsh, EL. -6 to -12 (above water)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Emb Fill 1 CH 3.6 to -1 (above water)

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.6 TO -1

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -4 TO -7.5

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND, EL. -24 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -46 TO -70

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (200, 2.9) ft
Left-Zone Right Coordinate: (225, -1.62117) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (235, -3.80657) ft
Right-Zone Right Coordinate: (275, -4.7) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (143.6, -13.3) ft
Right Coordinate: (310, -4.7) ft

Reinforcements

Reinforcement 1

Type: Pile
Outside Point: (200, 12.9) ft
Inside Point: (200, -17.4) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 30.3 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Tension Crack Line

X (ft)	Y (ft)
201	3.2
208	3.2
225	-1.9

Unit Weight Functions

Marsh 2
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (166.7, 80)
Data Point: (200, 97)
Data Point: (231.4, 80)

Regions

	Material	Points	Area (ft ²)
Region 1	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	58,57,30,4,5,33,24,21,59	48.755
Region 2	MARSH 1, EL. -4 TO -7.5	25,3,8,28,35,41,42,43	100.17577
Region 3	Fill, EL. -3.5 to -6 (above water)	36,31,32,7,9,18	110.58019
Region 4	MARSH 1, EL. -4 TO -7.5	70,19,38,37,69	420.51
Region 5	Silted-in Layer	52,20,3,25,51	29.215
Region 6	EMBANKMENT FILL 2, EL. -1 TO -4	35,64,63,62,61,60,59,55,29	16.397273
Region 7	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	24,33,34,23,6,56	69.275
Region 8	Fill, EL. -3.5 to -6 (above water)	12,24,56,36,18	114.85463
Region 9	BEACH SAND, EL. -24 TO -46	10,26,44,39,40,27,11,47,17,45	3928.9
Region 10	MARSH 1, EL. -4 TO -7.5	35,64,65,66,67,68,13,42,41	91.854229
Region 11	MARSH 2, EL. -7.5 to -12	42,43,14,54,13	141.525
Region 12	BEACH SAND, EL. -24 TO -46	25,43,14,22,51	280.301
Region 13		33,49,50,23,34	7.675
Region 14	Marsh, EL. -6 to -12 (above water)	12,18,69,68	47.1
Region 15	MARSH 2, EL. -7.5 to -12	14,54,13,37,38	133.45
Region	BEACH SAND, EL. -24 TO -46	39,44,26,1,2,51,22,14,38,19,27,40	1411.969

16			
Region 17	Silted-in Layer	52,51,2,1	9.15
Region 18	BAY SOUND CLAY CL, EL. -46 TO -70	45,17,47,48,53,46	1552.8
Region 19	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	47,48,15,11	1886.4
Region 20	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	10,16,46,45	554.4
Region 21	Emb Fill 1 CH 3.6 to -1 (above water)	55,58,59	2.052274
Region 22	Fill, EL. -3.5 to -6 (above water)	64,63,62,61,60,59,21,24,12	54.345
Region 23	Marsh, EL. -6 to -12 (above water)	64,12,68,67,66,65	40.56
Region 24	MARSH 1, EL. -4 TO -7.5	68,69,37,13	39.25
Region 25	Marsh, EL. -6 to -12 (above water)	18,9,70,69	51.09

Points

	X (ft)	Y (ft)
Point 1	143.6	-20
Point 2	146.9	-20
Point 3	149.7	-10
Point 4	195	2.8
Point 5	199	2.9
Point 6	208	3.5
Point 7	310	-4.7
Point 8	156.1	-6.4
Point 9	310	-6
Point 10	143.6	-46
Point 11	310	-46
Point 12	200	-4
Point 13	200	-7.5
Point 14	200	-12

Point 15	310	-70
Point 16	143.6	-70
Point 17	200	-46
Point 18	231.4	-6
Point 19	310	-12
Point 20	143.6	-13.3
Point 21	195	-1
Point 22	200	-17.4
Point 23	201	3.6
Point 24	200	-1
Point 25	149.5	-12
Point 26	143.6	-22
Point 27	310	-22
Point 28	165.3	-3.7
Point 29	176.2	-2.4
Point 30	192.6	2.8
Point 31	231.5	-3.5
Point 32	245.2	-4.7
Point 33	200	2.9
Point 34	201	2.9
Point 35	166.66154	-3.5
Point 36	231.35185	-3.5
Point 37	231.4	-8
Point 38	231.4	-12
Point 39	200	-24
Point 40	231.4	-22
Point 41	166.7	-6
Point 42	166.7	-8
Point 43	166.7	-12
Point 44	166.7	-22
Point 45	166.7	-46
Point 46	166.7	-70
Point 47	231.4	-46
Point 48	231.4	-70
Point 49	200	12.9
Point 50	200.5	12.9

Point 51	147.62	-17.5
Point 52	143.6	-17.5
Point 53	200	-70
Point 54	200	-11.6
Point 55	180.71818	-1
Point 56	222.9	-1
Point 57	185.5	0.5
Point 58	185.2	0.4
Point 59	183.65	-1
Point 60	182.3	-2
Point 61	180.8	-2.8
Point 62	179.5	-3.1
Point 63	178.2	-3.4
Point 64	176.7	-3.7
Point 65	181.8	-5
Point 66	187.2	-5.8
Point 67	190.8	-6.1
Point 68	200	-6.4
Point 69	231.4	-6.6
Point 70	310	-6.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.93	(229.362, 19.984)	22.14087	(202.292, 3.58155)	(249.309, -4.7)
2	2196	1.95	(229.362, 19.984)	31.946	(202.18, 3.58314)	(249.642, -4.7)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	202.93265	2.4319475	-560.27715	65.054931	31.72941	75

2	Optimized	204.21435	0.8958425	-464.70164	189.9614	92.650364	75
3	Optimized	205.36075	-0.436105	-381.8455	307.44518	149.95103	75
4	Optimized	206.93315	-2.190031	-272.66945	429.47363	209.46828	75
5	Optimized	208.384	-3.808386	-171.89123	522.34908	254.76667	75
6	Optimized	208.9485	-4.409086	-134.47754	576.87607	281.36126	75
7	Optimized	210.11805	-5.526104	-64.871042	622.64502	277.21942	75
8	Optimized	211.24745	-6.604773	2.3468858	682.46854	302.80967	0
9	Optimized	212.11925	-7.2217145	40.776115	763.04046	321.5728	0
10	Optimized	213.50625	-8.137437	97.804149	792.50257	309.29967	0
11	Optimized	214.8174	-9.0030525	151.70909	823.11808	298.93054	0
12	Optimized	216.1475	-9.72667	196.74765	894.83966	310.81059	0
13	Optimized	217.49655	-10.30829	232.9197	898.85575	296.49383	0
14	Optimized	218.8456	-10.88991	269.09856	902.19115	281.87098	0
15	Optimized	220.3651	-11.360845	298.34974	944.32275	287.60572	0
16	Optimized	222.05505	-11.72109	320.68314	914.2285	264.26342	0
17	Optimized	223.0338	-11.92973	333.61491	897.68366	251.13959	0
18	Optimized	224.0102	-11.96455	335.70352	926.1012	262.86198	0
19	Optimized	225.6954	-11.977145	336.35032	878.09608	241.20075	0
20	Optimized	227.38055	-11.98974	336.99118	830.1503	219.56859	0

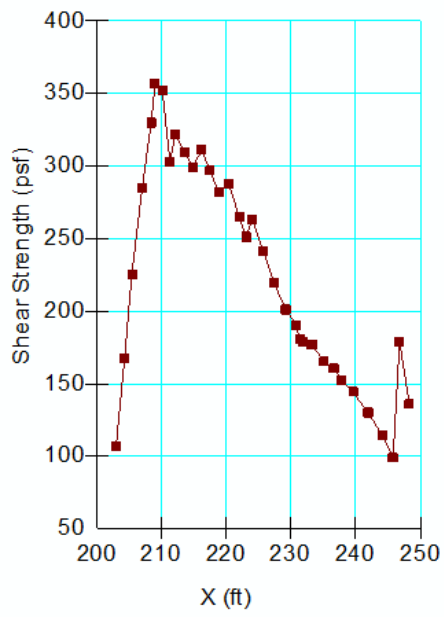
21	Optimized	229.1748	-11.95405	334.61542	786.4659	201.1768	0
22	Optimized	230.7392	-11.814055	325.74534	753.43216	190.41844	0
23	Optimized	231.37595	-11.7122	319.34612	726.01408	181.06024	0
24	Optimized	231.45	-11.700355	318.58977	724.98329	180.93805	0
25	Optimized	231.89845	-11.62862	314.08558	715.56446	178.74992	0
26	Optimized	233.2282	-11.359165	297.15428	694.15684	176.75693	0
27	Optimized	235.0908	-10.947735	271.32982	642.88538	165.42719	0
28	Optimized	236.6352	-10.57163	247.73049	608.18005	160.48248	0
29	Optimized	237.86135	-10.230855	226.36534	567.88564	152.05463	0
30	Optimized	239.6164	-9.66928	191.17754	514.77727	144.07588	0
31	Optimized	241.93135	-8.78677	135.91414	428.00235	130.04605	0
32	Optimized	244.15215	-7.745529	70.755644	328.00856	114.53638	0
33	Optimized	245.7716	-6.895629	17.587358	240.06984	99.055581	0
34	Optimized	246.8091	-6.297825	-19.802795	233.54476	103.98083	75
35	Optimized	248.2919	-5.35	-79.072442	124.04422	60.500409	75

Slices of Slip Surface: 2196

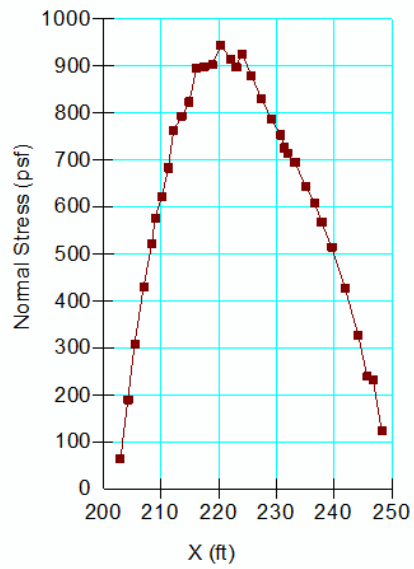
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	2196	202.9538	2.0603618	-537.12228	82.597616	40.285549	75
2	2196	204.5008	-0.03963825	-406.44868	263.49423	128.51472	75
3	2196	205.9557	-1.7343855	-300.9842	408.15807	199.07199	75

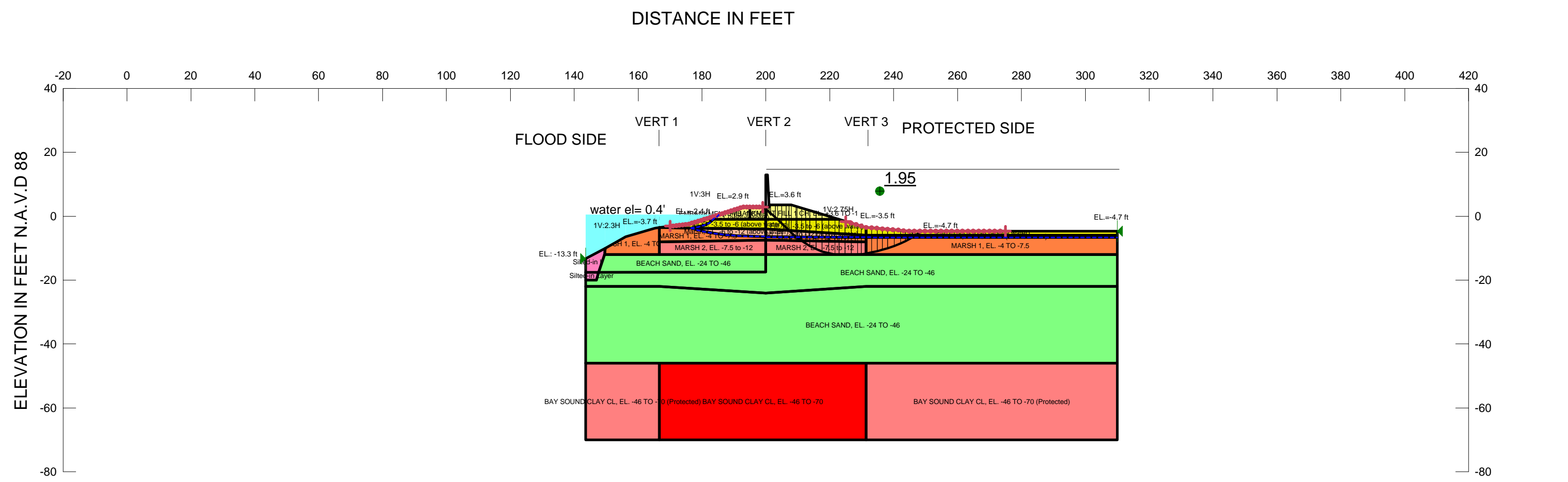
4	2196	207.31855	-3.118948	-214.7966	517.98359	252.63748	75
5	2196	208.4618	-4.168755	-149.42981	593.40469	289.4228	75
6	2196	209.55705	-5.06913	-93.342374	645.85443	287.55292	75
7	2196	210.82395	-6.021426	-34.018848	689.09266	306.80382	75
8	2196	212.451	-7.0935315	32.752411	753.32637	320.8202	0
9	2196	214.23255	-8.1380035	97.781886	799.7796	312.54952	0
10	2196	215.80845	-8.9312655	147.14687	832.14685	304.98164	0
11	2196	217.38435	-9.619424	189.95194	853.46607	295.41553	0
12	2196	218.96025	-10.209694	226.64414	864.59187	284.03263	0
13	2196	220.53615	-10.707745	257.58522	865.91518	270.84595	0
14	2196	222.11205	-11.11802	283.05128	858.07761	256.01822	0
15	2196	223.7452	-11.452715	303.79549	847.74585	242.1823	0
16	2196	225.43555	-11.70845	319.60387	834.96938	229.45551	0
17	2196	227.1259	-11.872505	329.69614	813.14583	215.24567	0
18	2196	228.8163	-11.946295	334.16202	782.43623	199.58454	0
19	2196	230.5067	-11.930445	333.03261	742.96937	182.51561	0
20	2196	231.37595	-11.89862	330.97092	720.80692	173.56617	0
21	2196	231.45	-11.893825	330.66172	720.84595	173.72121	0
22	2196	232.2611	-11.821185	326.0647	713.62635	172.55356	0
23	2196	233.7833	-11.645435	314.97313	695.82699	169.56706	0
24	2196	235.30555	-11.394895	299.21564	671.47147	165.73897	0
25	2196	236.8278	-11.06776	278.67343	640.3951	161.04886	0
26	2196	238.35	-10.661565	253.19999	602.07964	155.33123	0
27	2196	239.8722	-10.173102	222.59126	556.0315	148.45716	0
28	2196	241.39445	-9.5982895	186.59843	501.58369	140.24047	0
29	2196	242.9167	-8.931958	144.89426	437.86511	130.43903	0
30	2196	244.4389	-8.1675845	97.071411	363.73692	118.72713	0
31	2196	246.12415	-7.189943	35.923067	276.76662	107.23046	0
32	2196	247.4977	-6.3099545	-19.103409	241.7738	107.64463	75
33	2196	248.7945	-5.35	-79.114983	139.15698	67.871393	75

Shear Strength Vs. X



Base Normal Stress Vs. X





- Name: EMBANKMENT FILL 1 CH, EL. +3.6 TO -1 Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °
- Name: MARSH 1, EL. -4 TO -7.5 Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 0 psf Phi: 24 °
- Name: BEACH SAND, EL. -24 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
- Name: BAY SOUND CLAY CL, EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °
- Name: Silted-in Layer Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 34 °
- Name: MARSH 2, EL. -7.5 to -12 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °
- Name: EMBANKMENT FILL 2, EL. -1 TO -4 Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 26 °
- Name: Fill, EL. -3.5 to -6 (above water) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 75 psf Phi: 26 °
- Name: Marsh, EL. -6 to -12 (above water) Model: Mohr-Coulomb Unit Weight: 80 pcf Cohesion: 75 psf Phi: 24 °
- Name: BAY SOUND CLAY CL, EL. -46 TO -70 (Protected) Model: Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °
- Name: Emb Fill 1 CH 3.6 to -1 (above water) Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVEL

**US Army Corps
of Engineers®**
New Orleans District

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

LONDON AVE OUTFALL CANAL, REACH 16,
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) (through)
STA. 104+00 TO 112+50
ORLEANS PARISH, LOUISIANA

Global Stability (Entry/Exit) (through)

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: Liljegren, James
Revision Number: 254
Last Edited By: Serrano-Canals, Josinell M MVN
Date: 6/24/2013
Time: 5:19:35 PM
File Name: Reach 16s.gsz
Directory: c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443242\
Last Solved Date: 6/24/2013
Last Solved Time: 5:23:02 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) (through)

Kind: SLOPE/W
Parent: Global Stability (Seepage)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution

Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

MARSH 2, EL. -7.5 to -12

Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

EMBANKMENT FILL 2, EL. -1 TO -4

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Fill, EL. -3.5 to -6 (above water)

Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

Marsh, EL. -6 to -12 (above water)

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Emb Fill 1 CH 3.6 to -1 (above water)

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1 CH, EL. +3.6 TO -1

Model: Mohr-Coulomb
Unit Weight: 118 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -4 TO -7.5

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND, EL. -24 TO -46

Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -46 TO -70

Model: Mohr-Coulomb
Unit Weight: 104 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Silted-in Layer

Model: Mohr-Coulomb
Unit Weight: 90 pcf

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (170, -3.115) ft
Left-Zone Right Coordinate: (199, 2.9) ft
Left-Zone Increment: 30
Right Projection: Range
Right-Zone Left Coordinate: (225, -1.62117) ft
Right-Zone Right Coordinate: (275, -4.7) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (143.6, -13.3) ft
Right Coordinate: (310, -4.7) ft

Unit Weight Functions

Marsh 2

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 80
Data Points: X (ft), Unit Weight (pcf)
Data Point: (166.7, 80)
Data Point: (200, 97)
Data Point: (231.4, 80)

Regions

	Material	Points	Area (ft ²)
Region 1	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	58,57,30,4,5,33,24,21,59	48.755
Region 2	MARSH 1, EL. -4 TO -7.5	25,3,8,28,35,41,42,43	100.17577
Region 3	Fill, EL. -3.5 to -6 (above water)	36,31,32,7,9,18	110.58019
Region 4	MARSH 1, EL. -4 TO -7.5	70,19,38,37,69	420.51
Region 5	Silted-in Layer	52,20,3,25,51	29.215
Region 6	EMBANKMENT FILL 2, EL. -1 TO -4	35,64,63,62,61,60,59,55,29	16.397273
Region 7	EMBANKMENT FILL 1 CH, EL. +3.6 TO -1	24,33,34,23,6,56	69.275

Region 8	Fill, EL. -3.5 to -6 (above water)	12,24,56,36,18	114.85463
Region 9	BEACH SAND, EL. -24 TO -46	10,26,44,39,40,27,11,47,17,45	3928.9
Region 10	MARSH 1, EL. -4 TO -7.5	35,64,65,66,67,68,13,42,41	91.854229
Region 11	MARSH 2, EL. -7.5 to -12	42,43,14,54,13	141.525
Region 12	BEACH SAND, EL. -24 TO -46	25,43,14,22,51	280.301
Region 13		33,49,50,23,34	7.675
Region 14	Marsh, EL. -6 to -12 (above water)	12,18,69,68	47.1
Region 15	MARSH 2, EL. -7.5 to -12	14,54,13,37,38	133.45
Region 16	BEACH SAND, EL. -24 TO -46	39,44,26,1,2,51,22,14,38,19,27,40	1411.969
Region 17	Silted-in Layer	52,51,2,1	9.15
Region 18	BAY SOUND CLAY CL, EL. -46 TO -70	45,17,47,48,53,46	1552.8
Region 19	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	47,48,15,11	1886.4
Region 20	BAY SOUND CLAY CL, EL. -46 TO -70 (Protected)	10,16,46,45	554.4
Region 21	Emb Fill 1 CH 3.6 to -1 (above water)	55,58,59	2.052274
Region 22	Fill, EL. -3.5 to -6 (above water)	64,63,62,61,60,59,21,24,12	54.345
Region 23	Marsh, EL. -6 to -12 (above water)	64,12,68,67,66,65	40.56
Region 24	MARSH 1, EL. -4 TO -7.5	68,69,37,13	39.25
Region 25	Marsh, EL. -6 to -12 (above water)	18,9,70,69	51.09

Points

	X (ft)	Y (ft)
--	--------	--------

Point 1	143.6	-20
Point 2	146.9	-20
Point 3	149.7	-10
Point 4	195	2.8
Point 5	199	2.9
Point 6	208	3.5
Point 7	310	-4.7
Point 8	156.1	-6.4
Point 9	310	-6
Point 10	143.6	-46
Point 11	310	-46
Point 12	200	-4
Point 13	200	-7.5
Point 14	200	-12
Point 15	310	-70
Point 16	143.6	-70
Point 17	200	-46
Point 18	231.4	-6
Point 19	310	-12
Point 20	143.6	-13.3
Point 21	195	-1
Point 22	200	-17.4
Point 23	201	3.6
Point 24	200	-1
Point 25	149.5	-12
Point 26	143.6	-22
Point 27	310	-22
Point 28	165.3	-3.7
Point 29	176.2	-2.4
Point 30	192.6	2.8
Point 31	231.5	-3.5
Point 32	245.2	-4.7
Point 33	200	2.9
Point 34	201	2.9
Point 35	166.66154	-3.5
Point 36	231.35185	-3.5

Point 37	231.4	-8
Point 38	231.4	-12
Point 39	200	-24
Point 40	231.4	-22
Point 41	166.7	-6
Point 42	166.7	-8
Point 43	166.7	-12
Point 44	166.7	-22
Point 45	166.7	-46
Point 46	166.7	-70
Point 47	231.4	-46
Point 48	231.4	-70
Point 49	200	12.9
Point 50	200.5	12.9
Point 51	147.62	-17.5
Point 52	143.6	-17.5
Point 53	200	-70
Point 54	200	-11.6
Point 55	180.71818	-1
Point 56	222.9	-1
Point 57	185.5	0.5
Point 58	185.2	0.4
Point 59	183.65	-1
Point 60	182.3	-2
Point 61	180.8	-2.8
Point 62	179.5	-3.1
Point 63	178.2	-3.4
Point 64	176.7	-3.7
Point 65	181.8	-5
Point 66	187.2	-5.8
Point 67	190.8	-6.1
Point 68	200	-6.4
Point 69	231.4	-6.6
Point 70	310	-6.7

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.95	(227.198, 22.504)	22.8251	(199, 2.9)	(248.851, -4.7)
2	19835	2.00	(227.198, 22.504)	34.343	(199, 2.9)	(248.16, -4.7)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	199.5	2.492348	-531.04396	19.032889	9.2829604	75
2	Optimized	200.25	1.9220095	-522.45541	72.608534	35.413548	75
3	Optimized	200.75	1.541784	-504.21134	108.32616	52.834197	75
4	Optimized	201.22945	1.1771855	-481.63501	208.02567	101.4609	75
5	Optimized	202.23615	0.30809	-427.71599	273.23728	133.26673	75
6	Optimized	203.33215	-0.69326	-365.53828	353.17244	172.25371	75
7	Optimized	204.31395	-1.63817	-306.8074	422.17732	205.90964	75
8	Optimized	205.6401	-2.91451	-227.40942	506.68776	247.12813	75
9	Optimized	206.7994	-4.0086845	-159.29604	587.6221	286.60245	75
10	Optimized	207.6478	-4.7883595	-110.73841	645.97055	287.60462	75
11	Optimized	208.73355	-5.786165	-48.5473	687.36697	306.03549	75
12	Optimized	209.627	-6.60726	2.6247354	737.53199	327.20179	0
13	Optimized	210.48935	-7.2162165	40.557618	813.79285	344.26651	0
14	Optimized	211.8361	-8.1019625	95.727037	842.57169	332.51666	0

15	Optimiz ed	213.1247	-8.949461	148.50529	873.24013	322.67274	0
16	Optimiz ed	214.7286 5	-9.797925	201.31392	945.68088	331.41352	0
17	Optimiz ed	216.648	-10.64735	254.15084	953.58974	311.41026	0
18	Optimiz ed	218.6235 5	-11.301855	294.81952	997.94966	313.05371	0
19	Optimiz ed	220.6552 5	-11.76144	323.32071	964.58546	285.50946	0
20	Optimiz ed	222.2855 5	-11.991825	337.55649	984.73302	288.14156	0
21	Optimiz ed	223.8664	-11.993355	337.51251	933.12251	265.18266	0
22	Optimiz ed	225.7991 5	-11.995225	337.46594	877.03686	240.23245	0
23	Optimiz ed	227.7319	-11.997095	337.41938	821.00294	215.30527	0
24	Optimiz ed	229.3124 5	-11.95619	334.7366	786.32073	201.05821	0
25	Optimiz ed	230.4727	-11.84421	327.64762	755.0662	190.29901	0
26	Optimiz ed	231.1853 5	-11.739095	321.03828	741.67569	187.27984	0
27	Optimiz ed	231.3759 5	-11.699065	318.51574	733.06791	184.57052	0
28	Optimiz ed	231.45	-11.683515	317.54467	731.73166	184.40793	0
29	Optimiz ed	232.3324	-11.49823	305.90638	708.84546	179.40004	0
30	Optimiz ed	233.9971 5	-11.148655	283.95557	664.87329	169.5955	0
31	Optimiz ed	235.6643 5	-10.740555	258.35092	628.80312	164.93594	0
32	Optimiz ed	237.334	-10.273925	229.09407	573.94075	153.53563	0
33	Optimiz ed	239.1598	-9.668805	191.18543	521.55223	147.08878	0

34	Optimiz ed	241.1418 5	-8.925195	144.61844	438.14922	130.68833	0
35	Optimiz ed	242.8997	-8.166747	97.147978	372.7082	122.68732	0
36	Optimiz ed	244.4332 5	-7.3934605	48.764384	287.94463	106.4899	0
37	Optimiz ed	245.4958	-6.8576535	15.24171	232.16479	96.580379	0
38	Optimiz ed	245.8601 5	-6.663487	3.0944707	230.47252	101.23523	0
39	Optimiz ed	246.3997 5	-6.309242	-19.055673	233.7348	104.06544	75
40	Optimiz ed	247.8609	-5.35	-79.032445	123.43938	60.20541	75

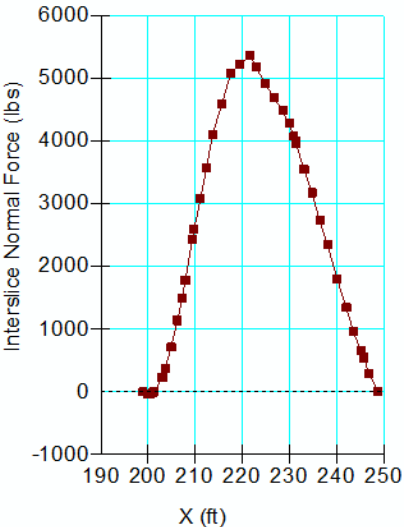
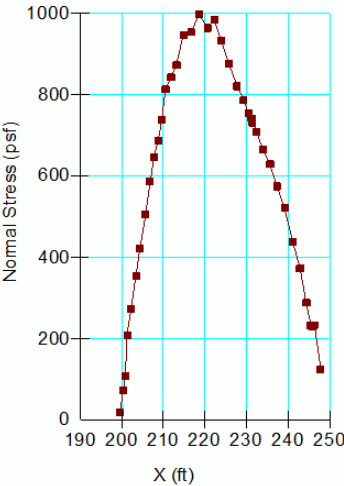
Slices of Slip Surface: 19835

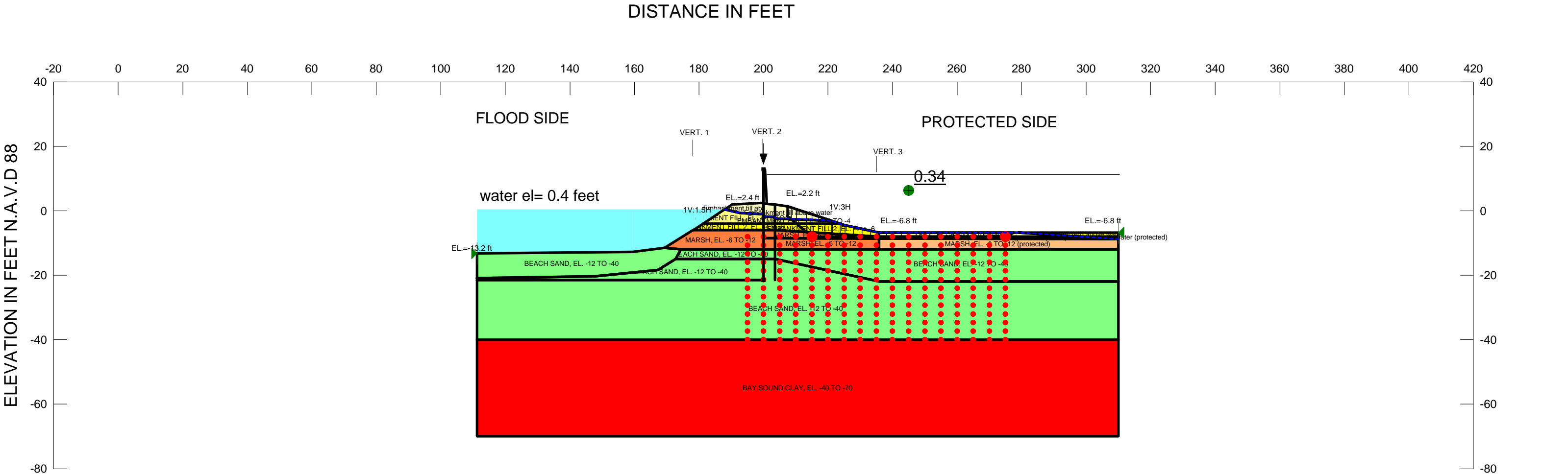
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	19835	199.5	2.2173305	-514.03349	23.039152	11.236945	75
2	19835	200.25	1.2181571	-478.77734	108.08658	52.717346	75
3	19835	200.75	0.5997911	-445.52192	162.73975	79.373481	75
4	19835	201.57895	-0.3510355	-386.53631	308.69666	150.56142	75
5	19835	203.0723	-1.903833	-290.11777	440.07087	214.63691	75
6	19835	204.9011	-3.589039	-185.34277	576.50185	281.17874	75
7	19835	206.90775	-5.171226	-86.795916	714.64223	318.17922	75
8	19835	208.3688	-6.2138465	-21.83802	790.96919	352.16217	75
9	19835	209.76935	-7.0638225	31.102941	842.2313	361.13761	0
10	19835	211.6653	-8.110469	96.266413	886.71593	351.9308	0
11	19835	213.3937	-8.9284905	147.17427	918.28313	343.31978	0
12	19835	215.1221	-9.632782	190.97486	937.70597	332.46611	0
13	19835	216.8505	-10.230714	228.13808	945.76211	319.5068	0
14	19835	218.57895	-10.72805	259.02102	943.04013	304.54493	0
15	19835	220.3074	-11.12926	283.90509	930.04565	287.68031	0
16	19835	222.0358	-11.437765	303.00361	907.11184	268.96631	0
17	19835	223.7452	-11.65465	316.39479	882.64464	252.11068	0

Interslice Normal Stress
Vs. X

18	19835	225.43555	-11.783545	324.28769	857.37817	237.34717	0
19	19835	227.1259	-11.82878	326.96906	823.84135	221.2218	0
20	19835	228.8163	-11.790685	324.4497	782.03575	203.73044	0
21	19835	230.5067	-11.66899	316.71586	732.09667	184.93945	0
22	19835	231.37595	-11.584215	311.35694	704.79965	175.17198	0
23	19835	231.45	-11.575025	310.7709	704.42926	175.26799	0
24	19835	232.35625	-11.438675	302.18935	691.04511	173.12974	0
25	19835	234.06875	-11.13367	283.01547	660.69554	168.154	0
26	19835	235.78125	-10.7377	258.16691	622.16523	162.06249	0
27	19835	237.49375	-10.24746	227.43352	574.94828	154.72354	0
28	19835	239.20625	-9.6586185	190.54574	518.34832	145.94711	0
29	19835	240.91875	-8.9656235	147.15895	451.44911	135.47871	0
30	19835	242.63125	-8.1613865	96.831638	373.06574	122.98735	0
31	19835	244.34375	-7.2368425	38.999014	281.56652	107.99801	0
32	19835	245.3011	-6.6805175	4.2041002	226.50525	98.974849	0
33	19835	245.87865	-6.308907	-19.0326	229.67677	102.25869	75
34	19835	247.2577	-5.35	-78.982479	128.94778	62.892032	75

Base Normal Stress Vs. X





Name: EMBANKMENT FILL, EL. +2.4 TO -4 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH, EL. -6 TO -12 Model: Mohr-Coulomb Unit Weight: 88 pcf Cohesion: 0 psf Phi: 24 °
Name: BEACH SAND, EL. -12 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Mohr-Coulomb Unit Weight: 88 pcf Cohesion: 0 psf Phi: 26 °
Name: FILL, EL. -6.8 to -8 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL 2, EL. -4 to -6 Model: Mohr-Coulomb Unit Weight: 88 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH, EL. -8 TO -12 (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 0 psf Phi: 24 °
Name: Marsh protected above water (protected) Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 75 psf Phi: 24 °
Name: Fill (protected) above water Model: Mohr-Coulomb Unit Weight: 96 pcf Cohesion: 75 psf Phi: 26 °
Name: Embankment fill above water Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 °



**US Army Corps
of Engineers®**
New Orleans District

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 35B, STA. 103+50 TO STA. 114+66
PROTECTED SIDE S-CASE STABILITY ANALYSIS,
CASE: Global Stability (Block) in front
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Block) in front

Report generated using GeoStudio 2007, version 7.19. Copyright © 1991-2012 GEO-SLOPE International Ltd.

File Information

Created By: [Liljegren, James](#)
Revision Number: 340
Last Edited By: [Middleton, Mark C MVN](#)
Date: 9/11/2012
Time: 1:58:41 PM
File Name: [Reach 35Bs - Open.gsz](#)
Directory: [G:\F&M\HOME\London Ave Reeevaluation 2011\London Ave S-Case slope stability files\GCAT S-Case Soil Strengths\protected side GCAT seepw parent\](#)
Last Solved Date: 9/11/2012
Last Solved Time: 2:00:04 PM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

Global Stability (Block) in front

Kind: [SLOPE/W](#)
Parent: [Gap Analysis \(Seepage\)](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Parent Analysis](#)
Slip Surface
Direction of movement: [Left to Right](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Block](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Search for Tension Crack](#)
Percentage Wet: [0](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Restrict Block Crossing: [Yes](#)

2/28/2013

EMBANKMENT FILL 2, EL. -4 to -6

Model: [Mohr-Coulomb](#)
Unit Weight: [88 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH, EL. -8 TO -12 (protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [96 pcf](#)
Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

Marsh protected above water (protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [96 pcf](#)
Cohesion: [75 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

Fill (protected) above water

Model: [Mohr-Coulomb](#)
Unit Weight: [96 pcf](#)
Cohesion: [75 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

Embankment fill above water

Model: [Mohr-Coulomb](#)
Unit Weight: [110 pcf](#)
Cohesion: [75 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

Slip Surface Limits

Left Coordinate: [\(111.2, -13.2\) ft](#)
Right Coordinate: [\(310, -6.8\) ft](#)

Slip Surface Block

Left Grid
Upper Left: [\(195, -8\) ft](#)
Lower Left: [\(195, -48\) ft](#)
Lower Right: [\(220, -48\) ft](#)
X Increments: [5](#)
Y Increments: [15](#)
Starting Angle: [125 °](#)

2/28/2013

Advanced
Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [0.1 ft](#)
Optimization Maximum Iterations: [2000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL, EL. +2.4 TO -4

Model: [Mohr-Coulomb](#)
Unit Weight: [110 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

MARSH, EL. -6 TO -12

Model: [Mohr-Coulomb](#)
Unit Weight: [88 pcf](#)
Cohesion: [0 psf](#)
Phi: [24 °](#)
Phi-B: [0 °](#)

BEACH SAND, EL. -12 TO -40

Model: [Mohr-Coulomb](#)
Unit Weight: [122 pcf](#)
Cohesion: [0 psf](#)
Phi: [34 °](#)
Phi-B: [0 °](#)

BAY SOUND CLAY, EL. -40 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: [88 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

FILL, EL. -6.8 to -8 (protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [96 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

2/28/2013

Ending Angle: [145 °](#)
Angle Increments: [4](#)
Right Grid
Upper Left: [\(225, -8\) ft](#)
Lower Left: [\(225, -48\) ft](#)
Lower Right: [\(275, -48\) ft](#)
X Increments: [10](#)
Y Increments: [15](#)
Starting Angle: [25 °](#)
Ending Angle: [45 °](#)
Angle Increments: [4](#)

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: [\(200, 12.9\) ft](#)
Inside Point: [\(200, -21.5\) ft](#)
Slip Surface Intersection: [\(0, 0\) ft](#)
Total Length: [34.4 ft](#)
Reinforcement Direction: [90 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: [1 ft](#)
Shear Capacity: [99999 lbs](#)
Shear Safety Factor: [1](#)
Shear Load Used: [99999 lbs](#)
Shear Option: [Parallel to Slip](#)
Resisting Force Used: [0 lbs/ft](#)

Regions

	Material	Points	Area (ft²)
Region 1	Embankment fill above water	50,49,4,40,35,15,59,51	30.825
Region 2	EMBANKMENT FILL 2, EL. -4 to -6	43,38,6,29,13,17,41,46	86.197883
Region 3	BEACH SAND, EL. -12 TO -40	1,2,28,16,21,11,14	278.58
Region 4	BEACH SAND, EL. -12 TO -40	14,11,21,25,19,23,8,7	3760.7
Region 5	BAY SOUND CLAY, EL. -40 TO -70	7,8,10,9	5964
Region 6	BEACH SAND, EL. -12 TO -40	21,20,24,18,22,23,19,25	962.1
Region 7	MARSH, EL. -6 TO -12	3,34,45,52,17,27,55,39,20	158.45
Region 8	MARSH, EL. -6 TO -12	20,39,55,56,57,18,24	123.57
Region 9	BEACH SAND, EL. -12 TO -40	16,3,20,21	79.2
Region 10	MARSH, EL. -8 TO -12 (protected)	18,57,58,22	244.86
Region 11	FILL, EL. -6.8 to -8 (protected)	6,29,65,64	63.24
Region 12	BEACH SAND, EL. -12 TO -40	1,32,33,34,3,16,28,2	437.325
Region 13		15,35,36,37,26	8.025

2/28/2013

Region 14	Embankment fill above water	59,15,26,48,47,5,53,62,61,60	56.725006
Region 15	EMBANKMENT FILL 2, EL. -4 to -6	45,42,44,41,17,52	40.5744
Region 16	MARSH, EL. -6 TO -12	17,13,29,57,56,55,27	58.93
Region 17	MARSH, EL. -8 TO -12 (protected)	29,57,58,66,65	47.56
Region 18	EMBANKMENT FILL, EL. +2.4 TO -4	44,50,51,59,41	56.0621
Region 19	EMBANKMENT FILL, EL. +2.4 TO -4	63,43,46,41,59,60,61,62,53	31.181612
Region 20	Marsh protected above water (protected)	65,30,66	4.38
Region 21	Fill (protected) above water	64,31,30,65	25.8

Points

	X (ft)	Y (ft)
Point 1	111.2	-20.9
Point 2	147.6	-20.3
Point 3	174.4	-12
Point 4	190.2	1.9
Point 5	207.5	1.4
Point 6	235.8	-6.8
Point 7	111.2	-40
Point 8	310	-40
Point 9	111.2	-70
Point 10	310	-70
Point 11	200	-21.5
Point 12	203.5	-21.5
Point 13	203.5	-6
Point 14	111.2	-21.5
Point 15	200	2.2
Point 16	172.8	-15
Point 17	200	-6
Point 18	235.8	-12
Point 19	235.9	-22
Point 20	200	-12
Point 21	200	-15
Point 22	310	-12
Point 23	310	-22
Point 24	203.5	-12
Point 25	203.5	-15
Point 26	201	2.2
Point 27	200	-7
Point 28	167.2	-18.4
Point 29	235.8	-8
Point 30	310	-8
Point 31	310	-6.8
Point 32	111.2	-13.2

Point 33	159.5	-12.8
Point 34	169.3	-11.5
Point 35	200	2.4
Point 36	200	12.9
Point 37	200.5	12.9
Point 38	225.3	-4.5
Point 39	200	-10
Point 40	199	2.4
Point 41	200	-4
Point 42	178.8	-5.6
Point 43	223.79153	-4
Point 44	181.232	-4
Point 45	178.2	-6
Point 46	203.5	-4
Point 47	203.5	1.89231
Point 48	201.9	2.08923
Point 49	188.1	0.5
Point 50	187.95	0.4
Point 51	192.7	-0.7
Point 52	184.2	-6
Point 53	221.1	-3.1
Point 54	191.7	-7.9
Point 55	200	-8.2
Point 56	200.3	-8.5
Point 57	235.8	-8.6
Point 58	310	-8.8
Point 59	200	-1
Point 60	200.3	-1.8
Point 61	203.5	-1.8
Point 62	203.8	-2.4
Point 63	221.3	-3.2
Point 64	279	-6.8
Point 65	298	-8
Point 66	310	-8.73

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.34	(242.814, -0.433)	26.08059	(207.5, 1.4)	(277.573, -6.8)
2	1316	0.34	(242.814, -0.433)	26.081	(207.5, 1.4)	(277.573, -6.8)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength
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2/28/2013

2/28/2013

							(psf)
1	Optimized	208.02775	-2.149586	-19.462903	90.887846	44.328964	75
2	Optimized	209.39425	-3.2962095	50.798997	230.75093	87.768422	0
3	Optimized	211.7879	-5.3047315	173.25093	341.63439	82.126101	0
4	Optimized	214.1714	-7.3047315	293.32147	451.07179	70.234966	0
5	Optimized	216.01665	-8	331.60333	670.22962	150.76614	0
6	Optimized	218.05	-8	324.54104	588.7378	117.62798	0
7	Optimized	220.08335	-8	316.69677	507.24598	84.837975	0
8	Optimized	221.2	-8	311.71	460.545	66.265611	0
9	Optimized	222.54575	-8	305.50706	406.17612	44.820756	0
10	Optimized	224.54575	-8	295.01415	333.93438	17.328403	0
11	Optimized	226.6125	-8	283.07429	282.65905	-0.18487591	0
12	Optimized	229.2375	-8	266.73524	228.20571	-17.154449	0
13	Optimized	231.8625	-8	248.50286	173.96571	-33.186074	0
14	Optimized	234.4875	-8	229.16952	119.84762	-48.673248	0
15	Optimized	236.95295	-8	213.63192	102.94109	-53.987527	0
16	Optimized	239.25885	-8	202.8161	104.28981	-48.054483	0
17	Optimized	241.5647	-8	194.61534	105.30894	-43.557637	0
18	Optimized	243.87055	-8	187.02171	106.25435	-39.392873	0
19	Optimized	246.17645	-8	179.63625	107.17374	-35.342328	0
20	Optimized	248.48235	-8	172.33753	108.08446	-31.338317	0
21	Optimized	250.78825	-8	165.06048	108.99083	-27.346996	0
22	Optimized	253.09415	-8	157.8615	109.88854	-23.397979	0
23	Optimized	255.4	-8	150.69722	110.77757	-19.470114	0
24	Optimized	257.70585	-8	143.52859	111.67094	-15.538018	0
25	Optimized	260.01175	-8	136.3513	112.5643	-11.601692	0
26	Optimized	262.31765	-8	129.20436	113.45767	-7.680172	0
27	Optimized	264.62355	-8	122.08777	114.34236	-3.7776886	0
28	Optimized	266.92945	-8	114.95384	115.2314	0.1353707	0
29	Optimized	269.2353	-8	107.81124	116.12043	4.0526603	0
30	Optimized	271.54115	-8	100.68598	117.00946	7.9614892	0
31	Optimized	273.84705	-8	93.517361	117.89849	11.89147	0
32	Optimized	276.2867	-7.4	41.839206	141.92577	48.81548	0

Slices of Slip Surface: 1316

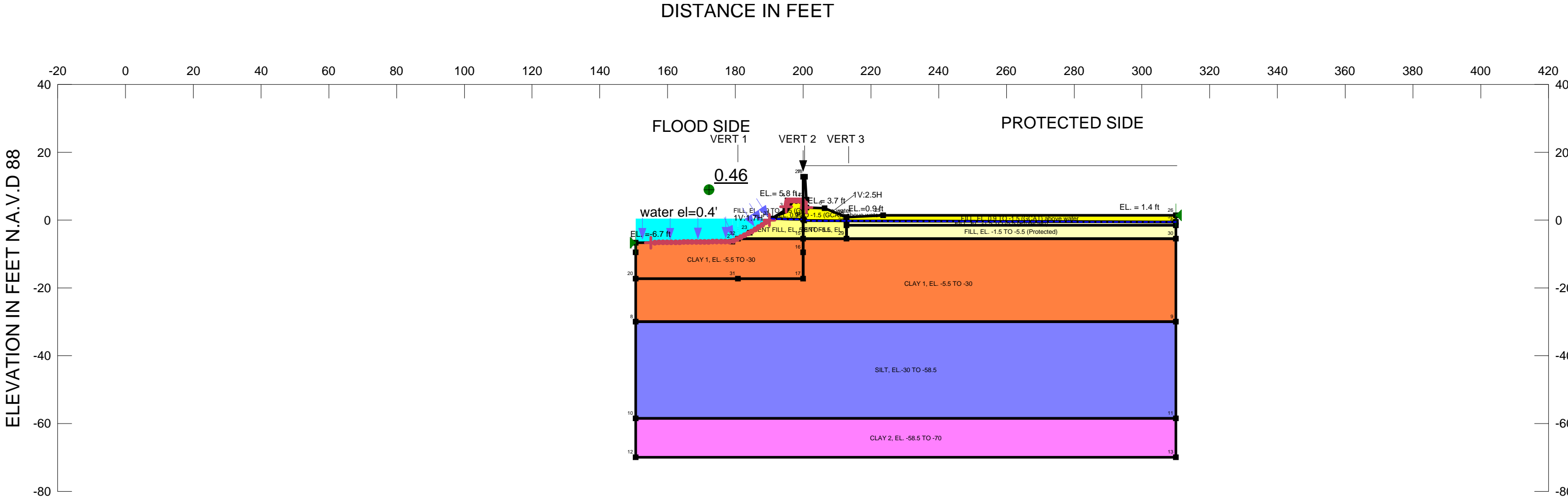
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1316	208.02775	-2.149586	-19.462903	90.887846	44.328964	75
2	1316	209.39425	-	50.798997	230.75093	87.768422	0

			3.2962095					
3	1316	211.7879	-5.3047315	173.25093	341.63439	82.126101	0	
4	1316	214.1714	-7.3047315	293.32147	451.07179	70.234966	0	
5	1316	216.01665	-8	331.60333	670.22962	150.76614	0	
6	1316	218.05	-8	324.54104	588.7378	117.62798	0	
7	1316	220.08335	-8	316.69677	507.24598	84.837975	0	
8	1316	221.2	-8	311.71	460.545	66.265611	0	
9	1316	222.54575	-8	305.50706	406.17612	44.820756	0	
10	1316	224.54575	-8	295.01415	333.93438	17.328403	0	
11	1316	226.6125	-8	283.07429	282.65905	-0.18487591	0	
12	1316	229.2375	-8	266.73524	228.20571	-17.154449	0	
13	1316	231.8625	-8	248.50286	173.96571	-33.186074	0	
14	1316	234.4875	-8	229.16952	119.84762	-48.673248	0	
15	1316	236.95295	-8	213.63192	102.94109	-53.987527	0	
16	1316	239.25885	-8	202.8161	104.28981	-48.054483	0	
17	1316	241.5647	-8	194.61534	105.30894	-43.557637	0	
18	1316	243.87055	-8	187.02171	106.25435	-39.392873	0	
19	1316	246.17645	-8	179.63625	107.17374	-35.342328	0	
20	1316	248.48235	-8	172.33753	108.08446	-31.338317	0	
21	1316	250.78825	-8	165.06048	108.99083	-27.346996	0	
22	1316	253.09415	-8	157.8615	109.88854	-23.397979	0	
23	1316	255.4	-8	150.69722	110.77757	-19.470114	0	
24	1316	257.70585	-8	143.52859	111.67094	-15.538018	0	
25	1316	260.01175	-8	136.3513	112.5643	-11.601692	0	
26	1316	262.31765	-8	129.20436	113.45767	-7.680172	0	
27	1316	264.62355	-8	122.08777	114.34236	-3.7776886	0	
28	1316	266.92945	-8	114.95384	115.2314	0.1353707	0	
29	1316	269.2353	-8	107.81124	116.12043	4.0526603	0	
30	1316	271.54115	-8	100.68598	117.00946	7.9614892	0	
31	1316	273.84705	-8	93.517361	117.89849	11.89147	0	
32	1316	276.2867	-7.4	41.839206	141.92577	48.81548	0	

2/28/2013

2/28/2013

APPENDIX K.3 S-CASE STABILITY ANALYSES FLOOD SIDE GCAT RESULTS



Name: EMBANKMENT FILL, EL. 5.8 TO -5.5 Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 23 °
Name: CLAY 1, EL. -5.5 TO -30 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 23 °
Name: SILT, EL.-30 TO -58.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 28 °
Name: CLAY 2, EL. -58.5 TO -70 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 °
Name: FILL, EL. 0.9 TO -1.5 (GCAT) above water Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 23 °
Name: FILL, EL. -1.5 TO -5.5 (Protected) Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 23 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALSWERE ASSUMED TO VARY LINEARLY
BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Hw = CANAL WATER LEVEL



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New Orleans District

LONDON AVE CANAL
OUTFALL CANAL REEVALUATION REPORT
REACH 2, STA. 10+00 TO 12+21
AND STA 13+88 TO 21+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Global Stability (Entry/Exit) in front
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Global Stability (Entry/Exit) in front

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File Information

Created By: Lijegren, James
Revision Number: 265
Last Edited By: Middleton, Mark C MVN
Date: 1/15/2013
Time: 10:43:12 AM
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Last Solved Date: 1/15/2013
Last Solved Time: 10:44:08 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: [SLOPE/W](#)
Parent: [Gap Analysis \(Seepage\)](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Parent Analysis](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Entry and Exit](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Search for Tension Crack](#)
Percentage Wet: [0](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. 5.8 TO -5.5

Model: [Mohr-Coulomb](#)
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

CLAY 1, EL. -5.5 TO -30

Model: [Mohr-Coulomb](#)
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

SILT, EL.-30 TO -58.5

Model: [Mohr-Coulomb](#)
Unit Weight: 117 pcf
Cohesion: 0 psf
Phi: 28 °
Phi-B: 0 °

CLAY 2, EL. -58.5 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FILL, EL. 0.9 TO -1.5 (GCAT) above water

Model: [Mohr-Coulomb](#)
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

FILL, EL. -1.5 TO -5.5 (Protected)

2/28/2013

2/28/2013

Model: [Mohr-Coulomb](#)
Unit Weight: 116 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: (155, -6.63825) ft
Left-Zone Right Coordinate: (190, -0.04844) ft
Left-Zone Increment: 30
Right Projection: [Range](#)
Right-Zone Left Coordinate: (195, 3.93333) ft
Right-Zone Right Coordinate: (201, 3.7) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (150.6, -6.7) ft
Right Coordinate: (310, 1.4) ft

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: (200, 12.9) ft
Inside Point: (200, -17.3) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 30.2 ft
Reinforcement Direction: 90 °
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: [Parallel to Slip](#)
Resisting Force Used: 0 lbs/ft

Regions

	Material	Points	Area (ft²)
Region 1	FILL, EL. 0.9 TO -1.5 (GCAT) above water	3,4,14,21,34,33	33.5
Region 2	EMBANKMENT FILL, EL. 5.8 TO -5.5	15,34,35,36,28,29	68.22
Region 3	SILT, EL.-30 TO -58.5	10,8,9,11	4542.9

Region 4		21,14,27,18,22,19	7.4
Region 5	FILL, EL. 0.9 TO -1.5 (GCAT) above water	37,36,24,25,26	172.26
Region 6	FILL, EL. -1.5 TO -5.5 (Protected)	29,28,6,30	388.8
Region 7	CLAY 1, EL. -5.5 TO -30	8,20,31,17,16,15,29,30,9	3322.38
Region 8	CLAY 1, EL. -5.5 TO -30	20,7,1,2,32,15,16,17,31	553.78
Region 9	CLAY 2, EL. -58.5 TO -70	12,10,11,13	1833.1
Region 10	EMBANKMENT FILL, EL. 5.8 TO -5.5	32,23,33,34,15	81.82
Region 11	FILL, EL. 0.9 TO -1.5 (GCAT) above water	21,19,5,24,36,35,34	39.26
Region 12	FILL, EL. -1.5 TO -5.5 (Protected)	36,37,6,28	106.92

Points

	X (ft)	Y (ft)
Point 1	150.6	-6.7
Point 2	179.1	-6.3
Point 3	194.8	3
Point 4	195.4	5.8
Point 5	206.3	3.5
Point 6	310	-1.5
Point 7	150.6	-9.5
Point 8	150.6	-30
Point 9	310	-30
Point 10	150.6	-58.5
Point 11	310	-58.5
Point 12	150.6	-70
Point 13	310	-70
Point 14	200	5.8
Point 15	200	-5.5
Point 16	200	-9.5
Point 17	200	-17.3
Point 18	200.5	12.8
Point 19	201	3.7
Point 20	150.6	-17.3
Point 21	200	3.7
Point 22	201	6
Point 23	184.3	-3.7
Point 24	212.8	0.9
Point 25	223.6	1.4
Point 26	310	1.4
Point 27	200	12.8
Point 28	212.8	-1.5
Point 29	212.8	-5.5
Point 30	310	-5.5
Point 31	180.7	-17.3

2/28/2013

2/28/2013

Point 32	180.7	-5.5
Point 33	190.7	0.4
Point 34	200	0.2
Point 35	200.3	-0.15
Point 36	212.8	-0.2
Point 37	310	-0.6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.46	(188.481, 9.38)	11.05648	(196.997, 5.8)	(184.4, -3.63574)
2	19794	0.52	(188.481, 9.38)	9.55	(197.335, 5.8)	(190, -0.0484382)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	184.60515	-3.508665	243.89713	246.73869	1.2061707	0
2	Optimized	185.01485	-3.254515	228.03002	230.85084	1.1973666	0
3	Optimized	185.42455	-3.000365	212.14217	214.96299	1.1973666	0
4	Optimized	185.83425	-2.746215	196.28336	199.06063	1.1788778	0
5	Optimized	186.24395	-2.492065	180.41211	183.16863	1.1700737	0
6	Optimized	186.65365	-2.237915	164.54085	167.27663	1.1612695	0
7	Optimized	187.06335	-1.983765	148.6696	151.38256	1.1515849	0
8	Optimized	187.47305	-1.729615	132.79835	135.49057	1.1427807	0
9	Optimized	187.88275	-1.475465	116.92709	119.59857	1.1339766	0
10	Optimized	188.29245	-1.221315	101.05376	103.70658	1.1260528	0
11	Optimized	188.70215	-0.96716505	85.180434	87.814581	1.1181291	0
12	Optimized	189.11185	-0.7130151	69.300883	71.922585	1.1128466	0
13	Optimized	189.52155	-0.45886505	53.419258	56.030589	1.1084445	0
14	Optimized	189.93125	-0.204715	37.535558	40.138593	1.1049228	0
15	Optimized	190.3848	0.09881	18.601585	19.703513	0.46774046	0
16	Optimized	190.66675	0.29642845	6.2927	7.896132	0.68061651	0
17	Optimized	190.7626	0.35745235	2.4152767	6.7549584	1.8420856	0
18	Optimized	190.98975	0.50208085	-7.3675663	6.8887668	2.924108	0
19	Optimized	191.31885	0.71162695	-21.669267	6.8167418	2.8935352	0
20	Optimized	191.68725	0.927425	-36.48926	9.3755062	3.9796663	0
21	Optimized	192.1288	1.16378	52.759073	13.855978	5.8815139	0
22	Optimized	192.52605	1.3691675	-66.155251	19.067603	8.0937171	0

23	Optimized	192.84515	1.5292825	-76.611578	23.332485	9.9040521	0
24	Optimized	193.23905	1.7041575	-88.091151	35.944069	15.257352	0
25	Optimized	193.7078	1.8937925	-100.47331	48.587284	20.624079	0
26	Optimized	194.2068	2.092005	-113.26739	63.945553	27.143277	0
27	Optimized	194.6357	2.2686165	-124.68872	68.943204	29.264654	0
28	Optimized	194.8823	2.3785115	-131.77987	110.53973	46.92133	0
29	Optimized	195.1823	2.6068835	-146.23831	141.39105	60.016938	0
30	Optimized	195.4022	2.8005185	-158.43502	194.78906	82.683051	0
31	Optimized	195.53425	3.04323	-173.66656	92.73159	39.362225	0
32	Optimized	195.90935	3.72456	-216.4221	71.904693	30.521731	0
33	Optimized	196.2454	4.333885	-254.60011	49.200598	20.884415	0
34	Optimized	196.4536	4.73384	-279.60183	33.899312	14.389404	0
35	Optimized	196.784	5.382515	-320.15198	13.33202	5.6591069	0

Slices of Slip Surface: **19794**

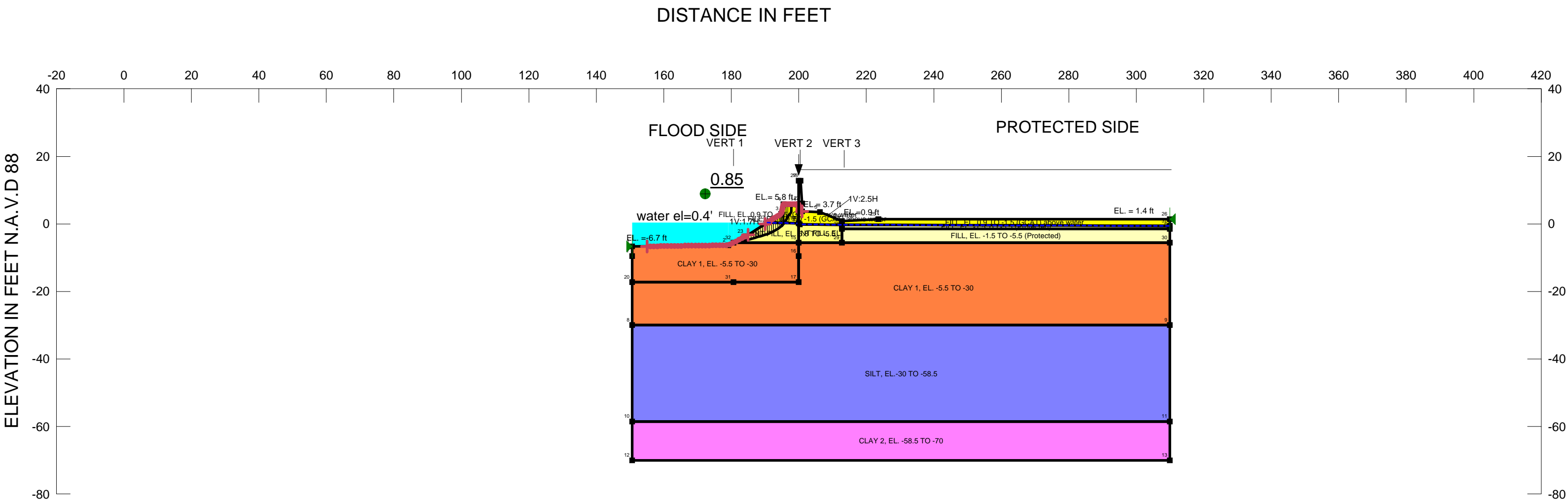
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	19794	190.11665	-0.028151323	26.615987	41.29371	6.2303238	0
2	19794	190.35	0.015423707	23.690735	39.935798	6.8956203	0
3	19794	190.58335	0.06504631	20.382585	37.764805	7.3783146	0
4	19794	190.82155	0.12211649	16.596954	43.402511	11.378284	0
5	19794	191.06465	0.18701955	11.933607	55.801304	18.620733	0
6	19794	191.3078	0.25886325	6.7917978	66.008559	25.136024	0
7	19794	191.55095	0.3378131	1.2144522	74.189044	30.975877	0
8	19794	191.7928	0.4235682	-4.8763942	79.126397	33.587163	0
9	19794	192.03335	0.51626125	-11.496905	82.285553	34.928145	0
10	19794	192.2739	0.61653795	-18.4663	84.219665	35.749127	0
11	19794	192.5145	0.72466215	-25.595863	85.030695	36.093388	0
12	19794	192.7551	0.84093215	-33.230249	84.821677	36.004666	0

2/28/2013

2/28/2013

13	19794	192.99565	0.9656861	-41.392147	83.670668	35.516091	0
14	19794	193.2362	1.099308	-50.106821	81.653824	34.659992	0
15	19794	193.4768	1.242235	-59.401641	78.831422	33.461953	0
16	19794	193.7174	1.3949675	-69.236109	75.263289	31.947371	0
17	19794	193.958	1.558081	-79.643984	70.998946	30.137265	0
18	19794	194.19855	1.732241	-90.72487	66.089466	28.053314	0
19	19794	194.4391	1.9182225	-102.53514	60.578461	25.714031	0
20	19794	194.6797	2.116935	-115.19339	54.501392	23.134468	0
21	19794	194.95	2.35778	-130.52643	85.527038	36.304074	0
22	19794	195.25	2.6467585	-148.75965	146.03039	61.986224	0
23	19794	195.5209	2.929512	-166.5478	160.07485	67.947742	0
24	19794	195.7627	3.204027	-183.79596	136.00467	57.730559	0
25	19794	196.00455	3.501323	-202.45839	112.58241	47.788397	0
26	19794	196.2464	3.825082	-222.8034	89.841711	38.135544	0
27	19794	196.4882	4.1802905	-245.04113	67.850266	28.800729	0
28	19794	196.73	4.5740025	-269.65451	46.729984	19.835701	0
29	19794	196.97185	5.0168085	-297.35482	26.692377	11.330242	0
30	19794	197.2137	5.5260455	-329.16998	8.1237228	3.4483157	0

2/28/2013



Name: EMBANKMENT FILL, EL. 5.8 TO -5.5 Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 26 °

Name: CLAY 1, EL. -5.5 TO -30 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 26 °

Name: SILT, EL.-30 TO -58.5 Model: Mohr-Coulomb Unit Weight: 117 pcf Cohesion: 0 psf Phi: 34 °

Name: CLAY 2, EL. -58.5 TO -70 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °

Name: FILL, EL. 0.9 TO -1.5 (GCAT) above water Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 75 psf Phi: 26 °

Name: FILL, EL. -1.5 TO -5.5 (Protected) Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 0 psf Phi: 26 °



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GENERAL NOTES

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SHEAR STRENGTHS AND UNIT WEIGHTS OF
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HURRICANE PROTECTION PROJECT

Global Stability (Entry/Exit) in front

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Date: 6/19/2013
Time: 2:50:16 PM
File Name: [Reach 2-Scase FS GCAT seepw.gsz](#)
Directory: [c:\documents and settings\b2edfjms\my documents\pw_working\cemvn\d0443243\](#)
Last Solved Date: 6/19/2013
Last Solved Time: 2:57:53 PM

Project Settings

Length(L) Units: [feet](#)
Time(t) Units: [Seconds](#)
Force(F) Units: [lbf](#)
Pressure(p) Units: [psf](#)
Strength Units: [psf](#)
Unit Weight of Water: [62.4 pcf](#)
View: [2D](#)

Analysis Settings

Global Stability (Entry/Exit) in front

Kind: [SLOPE/W](#)
Parent: [Gap Analysis \(Seepage\)](#)
Method: [Spencer](#)
Settings
 PWP Conditions Source: [Parent Analysis](#)
Slip Surface
 Direction of movement: [Right to Left](#)
 Use Passive Mode: [No](#)
 Slip Surface Option: [Entry and Exit](#)
 Critical slip surfaces saved: [1](#)
 Optimize Critical Slip Surface Location: [Yes](#)
 Tension Crack
 Tension Crack Option: [Search for Tension Crack](#)
 Percentage Wet: [0](#)
 Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution

Cohesion: [75 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

FILL, EL. -1.5 TO -5.5 (Protected)

Model: [Mohr-Coulomb](#)
Unit Weight: [116 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(155, -6.63825\) ft](#)
Left-Zone Right Coordinate: [\(185, -3.25156\) ft](#)
Left-Zone Increment: [30](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(190, -0.04844\) ft](#)
Right-Zone Right Coordinate: [\(201, 3.7\) ft](#)
Right-Zone Increment: [30](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(150.6, -6.7\) ft](#)
Right Coordinate: [\(310, 1.4\) ft](#)

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: [\(200, 12.9\) ft](#)
Inside Point: [\(200, -17.3\) ft](#)
Slip Surface Intersection: [\(0, 0\) ft](#)
Total Length: [30.2 ft](#)
Reinforcement Direction: [90 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: [1 ft](#)
Shear Capacity: [99999 lbs](#)
Shear Safety Factor: [1](#)
Shear Load Used: [99999 lbs](#)
Shear Option: [Parallel to Slip](#)
Resisting Force Used: [0 lbs/ft](#)

FOS Calculation Option: [Constant](#)
Advanced
Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [3 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL, EL. 5.8 TO -5.5

Model: [Mohr-Coulomb](#)
Unit Weight: [116 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

CLAY 1, EL. -5.5 TO -30

Model: [Mohr-Coulomb](#)
Unit Weight: [117 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

SILT, EL.-30 TO -58.5

Model: [Mohr-Coulomb](#)
Unit Weight: [117 pcf](#)
Cohesion: [0 psf](#)
Phi: [34 °](#)
Phi-B: [0 °](#)

CLAY 2, EL. -58.5 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: [105 pcf](#)
Cohesion: [0 psf](#)
Phi: [26 °](#)
Phi-B: [0 °](#)

FILL, EL. 0.9 TO -1.5 (GCAT) above water

Model: [Mohr-Coulomb](#)
Unit Weight: [116 pcf](#)

Regions

	Material	Points	Area (ft²)
Region 1	FILL, EL. 0.9 TO -1.5 (GCAT) above water	3,4,14,21,34,33	33.5
Region 2	EMBANKMENT FILL, EL. 5.8 TO -5.5	15,34,35,36,28,29	68.22
Region 3	SILT, EL.-30 TO -58.5	10,8,9,11	4542.9
Region 4		21,14,27,18,22,19	7.4
Region 5	FILL, EL. 0.9 TO -1.5 (GCAT) above water	37,36,24,25,26	172.26
Region 6	FILL, EL. -1.5 TO -5.5 (Protected)	29,28,6,30	388.8
Region 7	CLAY 1, EL. -5.5 TO -30	8,20,31,17,16,15,29,30,9	3322.38
Region 8	CLAY 1, EL. -5.5 TO -30	20,7,1,2,32,15,16,17,31	553.78
Region 9	CLAY 2, EL. -58.5 TO -70	12,10,11,13	1833.1
Region 10	EMBANKMENT FILL, EL. 5.8 TO -5.5	32,23,33,34,15	81.82
Region 11	FILL, EL. 0.9 TO -1.5 (GCAT) above water	21,19,5,24,36,35,34	39.26
Region 12	FILL, EL. -1.5 TO -5.5 (Protected)	36,37,6,28	106.92

Points

	X (ft)	Y (ft)
Point 1	150.6	-6.7
Point 2	179.1	-6.3
Point 3	194.8	3
Point 4	195.4	5.8
Point 5	206.3	3.5
Point 6	310	-1.5
Point 7	150.6	-9.5
Point 8	150.6	-30
Point 9	310	-30
Point 10	150.6	-58.5
Point 11	310	-58.5
Point 12	150.6	-70
Point 13	310	-70
Point 14	200	5.8
Point 15	200	-5.5
Point 16	200	-9.5
Point 17	200	-17.3
Point 18	200.5	12.8

Point 19	201	3.7
Point 20	150.6	-17.3
Point 21	200	3.7
Point 22	201	6
Point 23	184.3	-3.7
Point 24	212.8	0.9
Point 25	223.6	1.4
Point 26	310	1.4
Point 27	200	12.8
Point 28	212.8	-1.5
Point 29	212.8	-5.5
Point 30	310	-5.5
Point 31	180.7	-17.3
Point 32	180.7	-5.5
Point 33	190.7	0.4
Point 34	200	0.2
Point 35	200.3	-0.15
Point 36	212.8	-0.2
Point 37	310	-0.6

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.85	(182.545, 12.259)	12.6152	(197.804, 5.8)	(179.105, -6.29768)
2	17401	0.90	(182.545, 12.259)	17.46	(198.206, 5.8)	(181.377, -5.16165)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strengt h (psf)
1	Optimiz ed	179.3705	-6.221957	413.11037	432.02786	9.2266793	0
2	Optimiz	179.9023	-6.0705175	403.45268	427.19902	11.581864	0

	ed						
3	Optimiz ed	180.4341	-5.9190785	393.79499	422.37017	13.937049	0
4	Optimiz ed	180.9525	-5.7714545	384.42676	417.52727	16.144196	0
5	Optimiz ed	181.5794	-5.599775	373.52903	414.07587	19.776014	0
6	Optimiz ed	182.3226	-5.4017025	360.91006	408.58954	23.254835	0
7	Optimiz ed	183.06025	-5.2051075	348.37455	403.24524	26.762226	0
8	Optimiz ed	183.86455	-4.9967	335.06159	399.52906	31.442882	0
9	Optimiz ed	184.33515	-4.8777	327.44023	403.77446	37.230694	0
10	Optimiz ed	184.7317	-4.7659075	320.31118	398.55269	38.160936	0
11	Optimiz ed	185.4545	-4.5601025	307.17778	395.439	43.047872	0
12	Optimiz ed	186.20445	-4.342905	293.31255	390.66777	47.483316	0
13	Optimiz ed	186.98155	-4.114315	278.72038	386.48271	52.559201	0
14	Optimiz ed	187.6821	-3.9055985	265.30973	381.32137	56.582661	0
15	Optimiz ed	188.30605	-3.716755	253.19162	377.36382	60.562825	0
16	Optimiz ed	188.93	-3.5279115	241.05818	373.40626	64.550469	0
17	Optimiz ed	189.6065	-3.3171465	227.52357	366.19913	67.636588	0
18	Optimiz ed	190.3355	-3.08446	212.62627	360.22714	71.989754	0
19	Optimiz ed	190.9967	-2.8734135	199.00312	366.44444	81.666587	0
20	Optimiz ed	191.59945	-2.637985	183.88568	358.99936	85.408645	0
21	Optimiz	192.2116	-2.356535	165.88154	366.80659	97.997697	0

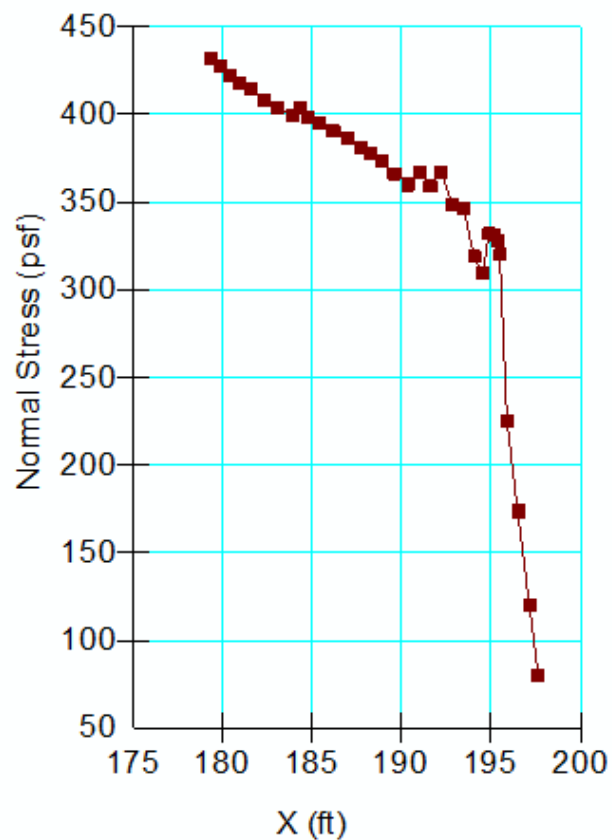
	ed						
22	Optimiz ed	192.8413	-2.0209125	144.44224	348.56469	99.55717	0
23	Optimiz ed	193.4885	-1.6311175	119.52321	346.07636	110.49735	0
24	Optimiz ed	194.05905	-1.251134	95.47726	319.34296	109.1866	0
25	Optimiz ed	194.553	-0.8809618	71.99797	309.78471	115.97634	0
26	Optimiz ed	194.8898	-0.6285678	55.988816	331.89679	134.56931	0
27	Optimiz ed	195.15155	-0.35507	38.750645	330.8686	142.47544	0
28	Optimiz ed	195.36175	-0.090476185	22.151806	327.66541	149.00894	0
29	Optimiz ed	195.5069	0.13112672	8.2754485	320.15725	152.11492	0
30	Optimiz ed	195.9167	0.7565694	-30.962506	225.46234	109.96533	75
31	Optimiz ed	196.52245	1.6810565	-88.940864	173.75412	84.745545	75
32	Optimiz ed	197.15935	2.650825	-149.71824	120.13502	58.593765	75
33	Optimiz ed	197.64855	3.39114	-196.0409	79.992694	39.015044	75

Slices of Slip Surface: 17401

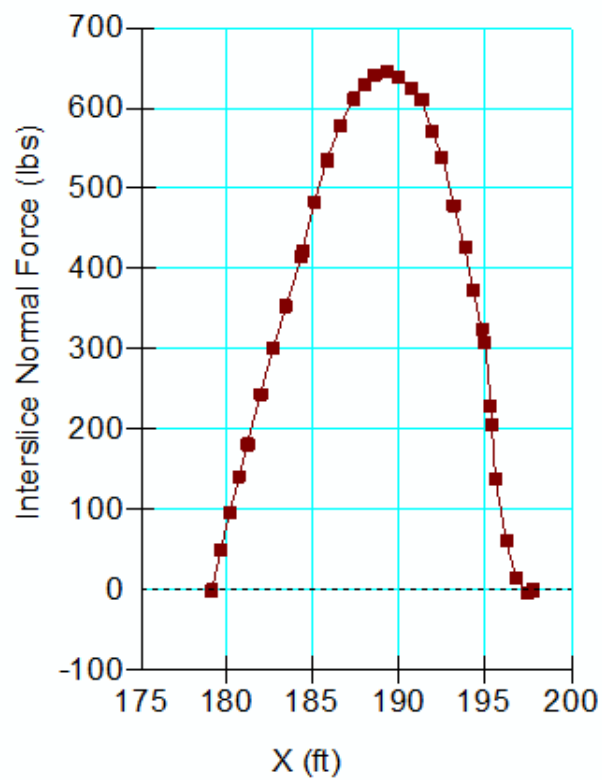
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	17401	181.66905	-5.176341	347.71299	396.02212	23.561937	0
2	17401	182.2537	-5.195923	348.4454	410.60977	30.319589	0
3	17401	182.83835	-5.1959055	347.9833	422.10163	36.149921	0
4	17401	183.423	-5.176288	346.32824	430.64689	41.124951	0
5	17401	184.00765	-5.1370045	343.48582	436.3751	45.30513	0
6	17401	184.5909	-5.078113	339.43651	447.53524	52.723275	0
7	17401	185.1727	-4.9995075	334.17675	451.063	57.009232	0

8	17401	185.75455	-4.9008205	327.688	451.91412	60.589128	0
9	17401	186.3364	-4.781703	319.96132	450.13697	63.490908	0
10	17401	186.9182	-4.641722	310.96084	445.77487	65.753199	0
11	17401	187.5	-4.4803535	300.55984	438.86647	67.456654	0
12	17401	188.0818	-4.2969715	288.79201	429.4308	68.594122	0
13	17401	188.6636	-4.090834	275.65167	417.46966	69.169254	0
14	17401	189.24545	-3.8610665	261.08194	402.97084	69.203844	0
15	17401	189.8273	-3.6066405	245.01266	385.91251	68.72145	0
16	17401	190.4091	-3.3263465	227.35081	366.25332	67.74728	0
17	17401	190.99285	-3.017632	207.86048	353.70048	71.130923	0
18	17401	191.57855	-2.678599	186.4043	347.3148	78.481293	0
19	17401	192.16425	-2.3081285	162.94797	336.96619	84.87436	0
20	17401	192.75	-1.9037465	137.33245	322.46295	90.294176	0
21	17401	193.33575	-1.4624445	109.30057	303.60227	94.767268	0
22	17401	193.92145	-0.98051715	78.804314	280.1629	98.209144	0
23	17401	194.50715	-0.4533226	45.467901	251.80366	100.63668	0
24	17401	195.03415	0.0619978	12.947163	288.80882	134.54672	0
25	17401	195.33415	0.3725926	-6.6529864	309.62651	151.01494	75
26	17401	195.68055	0.76401635	-31.28982	292.13613	142.48431	75
27	17401	196.24165	1.4397655	-73.749273	229.00619	111.69378	75
28	17401	196.8028	2.192276	-120.9665	164.20113	80.086243	75
29	17401	197.36395	3.0406175	-174.09755	97.723948	47.663154	75
30	17401	197.92505	4.0150025	-235.00181	29.718959	14.494905	75

Base Normal Stress Vs. X



Interslice Normal Stress
Vs. X



FS Slope Stability (Entry/Exit) In Front

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File Information

Created By: Lijjegren, James
Revision Number: 321
Last Edited By: Middleton, Mark C MVN
Date: 1/14/2013
Time: 4:54:27 PM
File Name: Reach 6A_Scse FS seepw.gsz
Directory: G:\F&M\HOME\Middleton\London Ave Canal\Scase Gcat 7-27-12\12-5-12 flood side\seepw parent\original phi23 seepw parent\
Last Solved Date: 1/14/2013
Last Solved Time: 4:55:28 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit) In Front

Kind: [SLOPE/W](#)
Parent: [Steady-State Seepage](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Parent Analysis](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Entry and Exit](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Search for Tension Crack](#)
Percentage Wet: [0](#)
Tension Crack Fluid Unit Weight: [62.4 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced

2/28/2013

FS Slope Stability (Entry/Exit) In Front

Model: [Mohr-Coulomb](#)
Unit Weight: [96 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

MARSH 3, EL. -7 TO -10
Model: [Spatial Mohr-Coulomb](#)
Weight Fn: [Marsh 3 \(protected\)](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

Fill, EL. -0.8 to -4 (Protected) (above)
Model: [Mohr-Coulomb](#)
Unit Weight: [109 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

EMBANKMENT FILL ABOVE, EL. +4 TO -0.8
Model: [Mohr-Coulomb](#)
Unit Weight: [108 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

MARSH 1, EL. -0.8 TO -4 (below)
Model: [Mohr-Coulomb](#)
Unit Weight: [101 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

MARSH 2, EL. -4 TO -7 (below)
Model: [Mohr-Coulomb](#)
Unit Weight: [96 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

MARSH, EL. -4 TO -8 (Protected Side) (below)
Model: [Mohr-Coulomb](#)
Unit Weight: [101 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

Slip Surface Entry and Exit

2/28/2013

FS Slope Stability (Entry/Exit) In Front

Number of Slices: [30](#)
Optimization Tolerance: [0.01](#)
Minimum Slip Surface Depth: [2 ft](#)
Optimization Maximum Iterations: [4000](#)
Optimization Convergence Tolerance: [1e-007](#)
Starting Optimization Points: [8](#)
Ending Optimization Points: [16](#)
Complete Passes per Insertion: [1](#)
Driving Side Maximum Convex Angle: [5 °](#)
Resisting Side Maximum Convex Angle: [1 °](#)

Materials

EMBANKMENT FILL BELOW, EL. +0 TO -0.8
Model: [Mohr-Coulomb](#)
Unit Weight: [108 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

MARSH 1, EL. -0.8 TO -4 (above)
Model: [Mohr-Coulomb](#)
Unit Weight: [101 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

BEACH SAND, EL. -8/-10 TO -44
Model: [Mohr-Coulomb](#)
Unit Weight: [122 pcf](#)
Cohesion: [0 psf](#)
Phi: [30 °](#)
Phi-B: [0 °](#)

BAY SOUND CLAY, EL. -44 TO 70
Model: [Mohr-Coulomb](#)
Unit Weight: [109 pcf](#)
Cohesion: [0 psf](#)
Phi: [23 °](#)
Phi-B: [0 °](#)

Silted-in Layer
Model: [Mohr-Coulomb](#)
Unit Weight: [90 pcf](#)
Cohesion: [0 psf](#)
Phi: [28 °](#)
Phi-B: [0 °](#)

MARSH 2, EL. -4 TO -7 (above)

2/28/2013

FS Slope Stability (Entry/Exit) In Front

Left Projection: [Range](#)
Left-Zone Left Coordinate: [\(155.9, -9\) ft](#)
Left-Zone Right Coordinate: [\(185, 1.09697\) ft](#)
Left-Zone Increment: [30](#)
Right Projection: [Range](#)
Right-Zone Left Coordinate: [\(191.2, 2.52667\) ft](#)
Right-Zone Right Coordinate: [\(199.9, 3.9\) ft](#)
Right-Zone Increment: [30](#)
Radius Increments: [20](#)

Slip Surface Limits

Left Coordinate: [\(100.5, -9.5\) ft](#)
Right Coordinate: [\(310, -3\) ft](#)

Reinforcements

Reinforcement 1
Type: [Pile](#)
Outside Point: [\(200, 3.9\) ft](#)
Inside Point: [\(200, -13.2\) ft](#)
Slip Surface Intersection: [\(0, 0\) ft](#)
Total Length: [17.1 ft](#)
Reinforcement Direction: [90 °](#)
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)
Pile Spacing: [1 ft](#)
Shear Capacity: [200000 lbs](#)
Shear Safety Factor: [1](#)
Shear Load Used: [200000 lbs](#)
Shear Option: [Parallel to Slip](#)
Resisting Force Used: [0 lbs/ft](#)

Unit Weight Functions

Marsh 3 (protected)
Model: [Spline Data Point Function](#)
Function: [Unit Weight vs. X](#)
Curve Fit to Data: [100 %](#)
Segment Curvature: [0 %](#)
Y-Intercept: [101](#)
Data Points: [X \(ft\), Unit Weight \(pcf\)](#)
Data Point: [\(179, 101\)](#)
Data Point: [\(200, 103\)](#)
Data Point: [\(227.4, 101\)](#)

2/28/2013

Regions

	Material	Points	Area (ft ²)
Region 1	MARSH, EL. -4 TO -8 (Protected Side) (below)	29,35,28,40,41,42,55	53.85
Region 2	Fill, EL. -0.8 to -4 (Protected) (above)	4,37,5,22,21	130.67
Region 3	MARSH 1, EL. -0.8 TO -4 (above)	9,21,25	43.84
Region 4	BAY SOUND CLAY, EL. -44 TO 70	13,7,8,14	5447
Region 5	MARSH, EL. -4 TO -8 (Protected Side) (below)	39,65,66,6,23	260.19
Region 6	BEACH SAND, EL. -8/-10 TO -44	11,10,23,6,8,7,12,20	6997.2
Region 7	BEACH SAND, EL. -8/-10 TO -44	42,55,54,53,15,16,12,20,11,10,19	293.97
Region 8	Silted-in Layer	16,27,26,34,29,55,54,53,15	133.855
Region 9	MARSH 2, EL. -4 TO -7 (below)	32,64,65,39	64.39
Region 10	MARSH 3, EL. -7 TO -10	10,52,32,39,23	54.8
Region 11	MARSH 1, EL. -0.8 TO -4 (above)	18,9,25,30,63,62,61,60	50.72
Region 12	MARSH 2, EL. -4 TO -7 (below)	40,63,64,32,31,41	60.06
Region 13	MARSH 3, EL. -7 TO -10	41,31,32,52,10,19,42	43.9
Region 14	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	60,57,58,59,9,18	18.14942
Region 15	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	57,36,1,17,33,2,59,58	39.330579
Region 16	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	9,59,4,21	54.048281
Region 17	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	59,2,24,38,3,4	76.051719
Region 18	MARSH 1, EL. -0.8 TO -4 (below)	63,40,28,49,60,61,62	30.08
Region 19	EMBANKMENT FILL BELOW, EL. +0 TO -0.8	49,56,57,60	0.98
Region 20	MARSH 2, EL. -4 TO -7 (above)	63,30,25,64	2.94
Region 21	MARSH 2, EL. -4 TO -7 (above)	64,25,21,65	17.81
Region 22	MARSH, EL. -4 TO -8 (Protected Side) (below)	65,21,22,66	70.21

Points

	X (ft)	Y (ft)
Point 1	192	2.7

Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	310	-3
Point 6	310	-8
Point 7	100.5	-44
Point 8	310	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2
Point 13	100.5	-70
Point 14	310	-70
Point 15	143.1	-11.2
Point 16	100.5	-11.7
Point 17	196	3.4
Point 18	196	-0.8
Point 19	196	-9.8
Point 20	196	-13.2
Point 21	227.4	-4
Point 22	310	-4
Point 23	227.4	-8
Point 24	201	3.9
Point 25	200	-4
Point 26	143	-9
Point 27	100.5	-9.5
Point 28	170.5	-4
Point 29	162.5	-7
Point 30	196	-4
Point 31	196	-7
Point 32	200	-7
Point 33	199	3.9
Point 34	156.8	-9
Point 35	164.3	-6.3
Point 36	186	1.4
Point 37	271.1	-3
Point 38	201	4.4
Point 39	227.4	-7
Point 40	179	-4
Point 41	179	-7
Point 42	179	-8
Point 43	179	-44
Point 44	200	-44
Point 45	227.4	-44

	227.4	-70
Point 47	200	-70
Point 48	179	-70
Point 49	179	-0.8
Point 50	200	12.9
Point 51	200.5	12.9
Point 52	200	-9
Point 53	156.8	-11.2
Point 54	159	-10
Point 55	163	-8
Point 56	180.1	-0.4
Point 57	182.7	0.4
Point 58	196	0.05077
Point 59	200	-0.05487
Point 60	180.5	-0.8
Point 61	181.2	-1.6
Point 62	183.3	-2.4
Point 63	190.2	-4
Point 64	200	-4.6
Point 65	227.4	-4.7
Point 66	310	-5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.03	(184.728, 13.886)	6.574689	(195.653, 3.33934)	(181.231, -0.0519077)
2	17164	2.06	(184.728, 13.886)	14.461	(194.38, 3.11642)	(181.064, -0.103346)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	181.45975	-0.10189565	10.440577	43.333322	13.962142	0
2	Optimized	181.8048	-0.1773918	-10.489256	58.976138	25.033885	0
3	Optimized	182.2694	-0.284775	-23.387742	79.922219	33.924969	0
4	Optimized	182.6587	-0.37417285	-34.169014	94.535304	40.127856	0
5	Optimized	183.05215	-0.44584285	-44.224271	117.05792	49.688139	0
6	Optimized	183.6271	-0.524995	-57.763476	140.47017	59.626049	0
7	Optimized	184.0727	-0.555005	-	159.69481	67.786423	0

				66.847374			
8	Optimized	184.55975	-0.563505	-75.677911	170.74538	72.477113	0
9	Optimized	185.08825	-0.550495	-84.258499	187.19718	79.460489	0
10	Optimized	185.67625	-0.5119237	-92.720166	196.44116	83.384325	0
11	Optimized	186.25955	-0.45414805	-100.23478	206.88722	87.818414	0
12	Optimized	186.7787	-0.40272935	-109.44531	213.5004	90.625544	0
13	Optimized	187.3345	-0.268725	-121.14642	190.59626	80.903311	0
14	Optimized	187.9269	-0.052135	-132.64371	182.00341	77.255866	0
15	Optimized	188.46395	0.14924375	-143.00006	172.3557	73.160653	0
16	Optimized	188.7879	0.27445875	-151.97084	167.04507	70.906423	0
17	Optimized	189.07145	0.386085	-166.99145	161.58174	68.58738	0
18	Optimized	189.47235	0.545075	-188.30798	154.64164	65.641481	0
19	Optimized	189.89375	0.7168175	-211.01875	145.75851	61.870818	0
20	Optimized	190.33565	0.9013125	-234.8458	137.28644	58.274636	0
21	Optimized	190.91335	1.15166	-265.99851	124.14844	52.697888	0
22	Optimized	191.45255	1.396388	-295.80922	110.76943	47.018832	0
23	Optimized	191.8175	1.569644	-316.45225	101.9652	43.281658	0
24	Optimized	192.23135	1.766086	-339.88541	91.081947	38.661993	0
25	Optimized	192.71305	1.9968	-367.28645	77.165584	32.754847	0
26	Optimized	193.21375	2.2386	-390.86343	62.796398	26.65549	0
27	Optimized	193.7076	2.47464	-411.61783	49.031384	20.812588	0
28	Optimized	194.19455	2.70492	-431.9648	35.462402	15.052896	0
29	Optimized	194.64055	2.906606	-450.10332	24.301811	10.315507	0
30	Optimized	195.04565	3.079698	-466.06088	14.581541	6.1894968	0
31	Optimized	195.4508	3.2527905	-482.01845	4.8605892	2.0631977	0

Slices of Slip Surface: **17164**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	17164	181.3107	-0.163327	11.572057	49.211437	15.976969	0
2	17164	181.74775	-0.263428	13.376316	68.587338	29.113598	0
3	17164	182.12865	-0.3383565	23.360364	82.407933	34.980092	0
4	17164	182.50955	-0.4027395	32.868496	94.607829	40.158641	0
5	17164	182.9357	-0.4617646	42.922041	111.559	47.353986	0
6	17164	183.40715	-0.51284395	53.399914	132.69498	56.325679	0
7	17164	183.8786	-0.5483498	63.179097	151.413	64.271004	0
8	17164	184.35	-0.568397	72.259787	167.83219	71.240539	0
9	17164	184.8214	-0.57304995	80.646821	182.05139	77.276232	0
10	17164	185.29285	-0.5623236	88.340488	194.16128	82.416573	0
11	17164	185.7643	-0.53618355	95.340438	204.23444	86.692377	0
12	17164	186.21655	-0.4968466	101.41216	210.05656	89.16372	0
13	17164	186.64965	-0.44540985	-106.8806	211.9144	89.952328	0
14	17164	187.08275	-0.3806429	116.52169	212.28736	90.110637	0
15	17164	187.51585	-0.30236305	125.98495	211.20441	89.650952	0
16	17164	187.94895	-0.21034495	135.26578	208.69147	88.584272	0
17	17164	188.38205	-0.1043172	144.36424	204.76529	86.917707	0
18	17164	188.81515	0.01604179	153.27078	199.44493	84.659349	0
19	17164	189.24825	0.15110919	161.98374	192.73731	81.812136	0
20	17164	189.67605	0.29930475	177.05983	184.77201	78.431065	0
21	17164	190.0986	0.46074695	199.11243	175.57834	74.528585	0
22	17164	190.52115	0.63762975	222.20102	165.08189	70.073106	0

2/28/2013

23	17164	190.94365	0.8305816	-246.03989	153.27811	65.062696	0
24	17164	191.3662	1.0403274	-270.55673	140.1626	59.495493	0
25	17164	191.78875	1.2677065	-296.21221	125.72806	53.368396	0
26	17164	192.23795	1.5305435	-324.842	107.982	45.835639	0
27	17164	192.71385	1.8328185	-356.71369	86.80839	36.847975	0
28	17164	193.18975	2.162204	-386.48141	63.984202	27.159682	0
29	17164	193.66565	2.5210655	-413.33937	39.495589	16.764883	0
30	17164	194.14155	2.912305	-441.87507	13.329297	5.657951	0

2/28/2013

FS Slope Stability (Entry/Exit) In Front

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File Information

Created By: Lijjegren, James
Revision Number: 322
Last Edited By: Middleton, Mark C MVN
Date: 1/25/2013
Time: 8:17:49 AM
File Name: Reach 6A_Scse FS GCAT seepw - Copy.gsz
Directory: G:\F&M\HOME\Middleton\London Ave Canal\Scase Gcat 7-27-12\12-5-12 flood side\seepw parent\GCAT seepw parent\
Last Solved Date: 1/25/2013
Last Solved Time: 8:34:06 AM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

FS Slope Stability (Entry/Exit) In Front

Kind: SLOPE/W
Parent: Steady-State Seepage
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: Search for Tension Crack
Percentage Wet: 0
Tension Crack Fluid Unit Weight: 62.4 pcf
FOS Distribution
FOS Calculation Option: Constant
Advanced

2/28/2013

FS Slope Stability (Entry/Exit) In Front

Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °
MARSH 3, EL. -7 TO -10
Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 3 (protected)
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Fill, EL. -0.8 to -4 (Protected) (above)
Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

EMBANKMENT FILL ABOVE, EL. +4 TO -0.8
Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 75 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -0.8 TO -4 (below)
Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

MARSH 2, EL. -4 TO -7 (below)
Model: Mohr-Coulomb
Unit Weight: 96 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

MARSH, EL. -4 TO -8 (Protected Side) (below)
Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 0 psf
Phi: 24 °
Phi-B: 0 °

Slip Surface Entry and Exit

2/28/2013

FS Slope Stability (Entry/Exit) In Front

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 2 ft
Optimization Maximum Iterations: 4000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL BELOW, EL. +0 TO -0.8
Model: Mohr-Coulomb
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

MARSH 1, EL. -0.8 TO -4 (above)
Model: Mohr-Coulomb
Unit Weight: 101 pcf
Cohesion: 75 psf
Phi: 24 °
Phi-B: 0 °

BEACH SAND, EL. -8/-10 TO -44
Model: Mohr-Coulomb
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

BAY SOUND CLAY, EL. -44 TO 70
Model: Mohr-Coulomb
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 26 °
Phi-B: 0 °

Silted-in Layer
Model: Mohr-Coulomb
Unit Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

MARSH 2, EL. -4 TO -7 (above)

2/28/2013

FS Slope Stability (Entry/Exit) In Front

Left Projection: Range
Left-Zone Left Coordinate: (155.9, -9) ft
Left-Zone Right Coordinate: (174.44139, -2.51618) ft
Left-Zone Increment: 20
Right Projection: Range
Right-Zone Left Coordinate: (191.2, 2.52667) ft
Right-Zone Right Coordinate: (199.9, 3.9) ft
Right-Zone Increment: 20
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (100.5, -9.5) ft
Right Coordinate: (310, -3) ft

Reinforcements

Reinforcement 1
Type: Pile
Outside Point: (200, 3.9) ft
Inside Point: (200, -13.2) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 17.1 ft
Reinforcement Direction: 90 °
Applied Load Option: Variable
F of S Dependent: No
Pile Spacing: 1 ft
Shear Capacity: 200000 lbs
Shear Safety Factor: 1
Shear Load Used: 200000 lbs
Shear Option: Parallel to Slip
Resisting Force Used: 0 lbs/ft

Unit Weight Functions

Marsh 3 (protected)
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (179, 101)
Data Point: (200, 103)
Data Point: (227.4, 101)

2/28/2013

Regions

	Material	Points	Area (ft ²)
Region 1	MARSH, EL. -4 TO -8 (Protected Side) (below)	29,35,28,40,41,42,55	53.85
Region 2	Fill, EL. -0.8 TO -4 (Protected) (above)	4,37,5,22,21	130.67
Region 3	MARSH 1, EL. -0.8 TO -4 (above)	9,21,25	43.84
Region 4	BAY SOUND CLAY, EL. -44 TO 70	13,7,8,14	5447
Region 5	MARSH, EL. -4 TO -8 (Protected Side) (below)	39,65,66,6,23	260.19
Region 6	BEACH SAND, EL. -8/-10 TO -44	11,10,23,6,8,7,12,20	6997.2
Region 7	BEACH SAND, EL. -8/-10 TO -44	42,55,54,53,15,16,12,20,11,10,19	293.97
Region 8	Silted-in Layer	16,27,26,34,29,55,54,53,15	133.855
Region 9	MARSH 2, EL. -4 TO -7 (below)	32,64,65,39	64.39
Region 10	MARSH 3, EL. -7 TO -10	10,52,32,39,23	54.8
Region 11	MARSH 1, EL. -0.8 TO -4 (above)	18,9,25,30,63,62,61,60	40.335
Region 12	MARSH 2, EL. -4 TO -7 (below)	40,63,64,32,31,41	60.78
Region 13	MARSH 3, EL. -7 TO -10	41,31,32,52,10,19,42	43.9
Region 14	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	60,57,58,59,9,18	16.229421
Region 15	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	57,36,1,17,33,2,59,58	39.330579
Region 16	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	9,59,4,21	54.048281
Region 17	EMBANKMENT FILL ABOVE, EL. +4 TO -0.8	59,2,24,38,3,4	76.051719
Region 18	MARSH 1, EL. -0.8 TO -4 (below)	63,40,28,49,60,61,62	40.465
Region 19	EMBANKMENT FILL BELOW, EL. +0 TO -0.8	49,56,57,60	2.9
Region 20	MARSH 2, EL. -4 TO -7 (above)	63,30,25,64	2.22
Region 21	MARSH 2, EL. -4 TO -7 (above)	64,25,21,65	17.81
Region 22	MARSH, EL. -4 TO -8 (Protected Side) (below)	65,21,22,66	70.21

Points

	X (ft)	Y (ft)
Point 1	192	2.7

2/28/2013

Point 2	200	3.9
Point 3	208	4
Point 4	227.4	-0.8
Point 5	310	-3
Point 6	310	-8
Point 7	100.5	-44
Point 8	310	-44
Point 9	200	-0.8
Point 10	200	-10
Point 11	200	-13.2
Point 12	100.5	-13.2
Point 13	100.5	-70
Point 14	310	-70
Point 15	143.1	-11.2
Point 16	100.5	-11.7
Point 17	196	3.4
Point 18	196	-0.8
Point 19	196	-9.8
Point 20	196	-13.2
Point 21	227.4	-4
Point 22	310	-4
Point 23	227.4	-8
Point 24	201	3.9
Point 25	200	-4
Point 26	143	-9
Point 27	100.5	-9.5
Point 28	170.5	-4
Point 29	162.5	-7
Point 30	196	-4
Point 31	196	-7
Point 32	200	-7
Point 33	199	3.9
Point 34	156.8	-9
Point 35	164.3	-6.3
Point 36	186	1.4
Point 37	271.1	-3
Point 38	201	4.4
Point 39	227.4	-7
Point 40	179	-4
Point 41	179	-7
Point 42	179	-8
Point 43	179	-44
Point 44	200	-44
Point 45	227.4	-44

2/28/2013

	227.4	-70
Point 47	200	-70
Point 48	179	-70
Point 49	179	-0.8
Point 50	200	12.9
Point 51	200.5	12.9
Point 52	200	-9
Point 53	156.8	-11.2
Point 54	159	-10
Point 55	163	-8
Point 56	180.1	-0.4
Point 57	182.7	0.4
Point 58	196	0.05077
Point 59	200	-0.05487
Point 60	183.7	-0.8
Point 61	185.7	-1.8
Point 62	190.6	-3.7
Point 63	192.6	-4
Point 64	200	-4.6
Point 65	227.4	-4.7
Point 66	310	-5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.80	(176.611, 22.028)	13.5007	(196, 3.4)	(168.415, -4.7736)
2	6875	2.86	(176.611, 22.028)	27.136	(196, 3.4)	(169.832, -4.24786)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	168.93595	-4.733331	306.42805	336.8165	13.529811	0
2	Optimized	169.97865	-4.6527825	278.69787	342.7259	28.507115	0
3	Optimized	170.97025	-4.576179	262.3756	348.54792	38.366391	0
4	Optimized	171.9932	-4.5366325	253.48096	362.63004	48.596298	0
5	Optimized	173.09855	-4.5301975	233.95807	377.5029	63.910274	0
6	Optimized	173.7591	-4.525635	222.16631	385.83585	72.870375	0
7	Optimized	174.3896	-4.51539	210.84562	393.27047	81.220774	0
8	Optimized	175.4348	-4.49759	192.077	406.06029	95.271499	0
9	Optimized	176.4645	-4.4748515	173.52333	417.21493	108.49849	0
10	Optimized	177.4787	-4.447175	155.20013	428.5006	121.68121	0
11	Optimized	178.4929	-4.4194985	136.86708	439.78627	134.86831	0
12	Optimized	179.55	-4.3906505	122.91782	450.55934	145.8754	0

2/28/2013

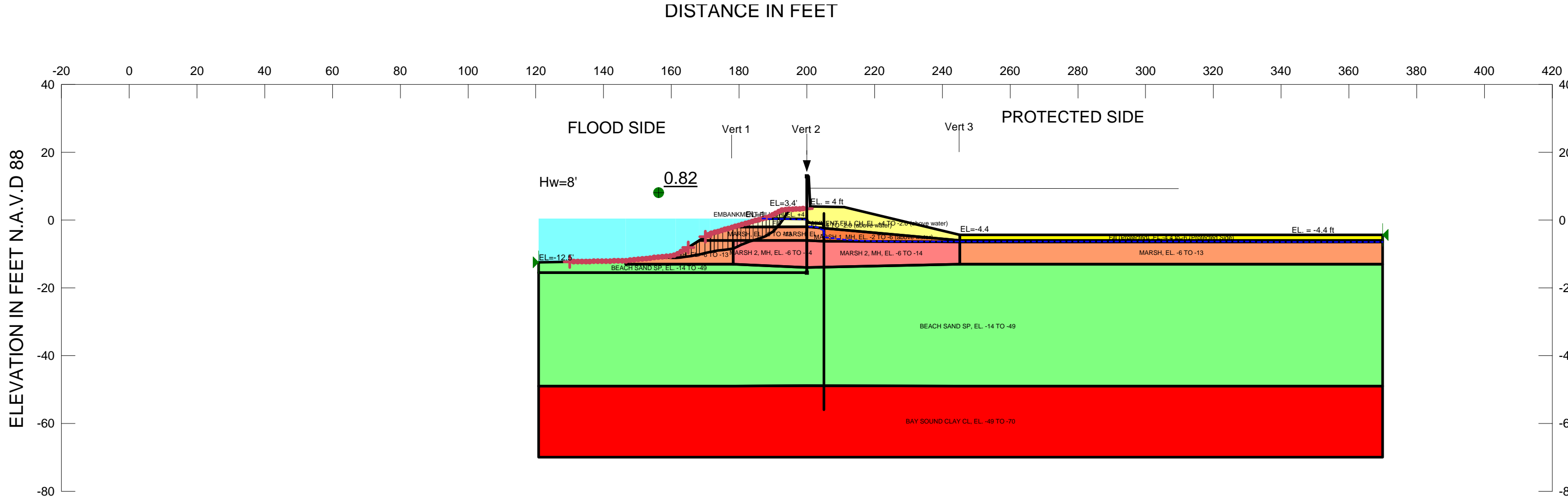
13	Optimized	180.27425	-4.3708855	116.55488	459.44499	152.66452	0
14	Optimized	181.0114	-4.3393685	109.85735	464.15861	157.74508	0
15	Optimized	182.13715	-4.2858455	99.360519	474.21178	166.89454	0
16	Optimized	183.00375	-4.244642	91.122042	487.87722	176.64679	0
17	Optimized	183.50375	-4.2011255	85.927611	487.97245	179.0019	0
18	Optimized	184.0796	-4.1158105	79.13487	498.36662	186.654	0
19	Optimized	184.57765	-4.029785	72.869751	493.65756	187.34681	0
20	Optimized	185.21145	-3.870435	61.840478	497.97591	194.18001	0
21	Optimized	185.8634	-3.6902555	50.590566	486.48207	194.0714	0
22	Optimized	186.52505	-3.4451305	37.759202	478.60708	196.27812	0
23	Optimized	187.57515	-3.05611	17.396344	464.26565	198.95904	0
24	Optimized	188.1723	-2.8240965	5.5248507	438.53275	192.78754	0
25	Optimized	188.5955	-2.6039515	-10.932027	417.64815	185.94894	75
26	Optimized	189.3486	-2.1920975	-43.561968	390.37004	173.80394	75
27	Optimized	190.1526	-1.7336725	-79.288444	366.22177	163.05244	75
28	Optimized	191.1362	-1.135365	-123.54694	326.64447	145.43149	75
29	Optimized	191.8589	-0.6672623	-156.41523	291.26276	142.05834	75
30	Optimized	192.4974	-0.21928715	-194.56719	261.10713	127.35046	75
31	Optimized	193.102	0.20490515	-234.53211	232.05459	113.18059	75
32	Optimized	193.6011	0.60421665	-272.62734	194.75629	94.988989	75
33	Optimized	194.3849	1.2523902	-330.52919	149.51832	72.924957	75
34	Optimized	195.1687	1.9005635	-379.17893	104.28035	50.860926	75
35	Optimized	195.7803	2.5165	-422.4154	43.092859	21.017792	75

Slices of Slip Surface: **6875**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	6875	170.16595	-4.3295495	279.13915	325.77865	20.765243	0
2	6875	170.925	-4.502327	263.76304	355.28464	40.748041	0
3	6875	171.775	-4.670398	254.11191	384.35714	57.988914	0
4	6875	172.625	-4.810502	244.16879	409.8456	73.764072	0
5	6875	173.475	-4.9230765	231.42676	431.97948	89.291823	0
6	6875	174.325	-5.008466	217.21314	450.81486	104.00619	0
7	6875	175.175	-5.066927	202.71548	466.40421	117.40179	0
8	6875	176.025	-5.098634	187.93263	478.82947	129.51562	0

2/28/2013

9	6875	176.875	-5.103681	172.87418	488.17691	140.38182	0
10	6875	177.725	-5.0820825	157.53764	494.52386	150.03593	0
11	6875	178.575	-5.0337755	141.90913	497.90228	158.49836	0
12	6875	179.55	-4.9429995	129.41579	494.34664	162.47768	0
13	6875	180.53335	-4.819759	120.5777	492.51781	165.59841	0
14	6875	181.4	-4.678747	111.82975	486.94466	167.01192	0
15	6875	182.26665	-4.508688	102.07178	478.60853	167.64496	0
16	6875	183.2	-4.291158	90.285693	475.65094	171.57566	0
17	6875	183.99355	-4.0829915	79.251276	477.59921	177.35593	0
18	6875	184.6403	-3.8905715	67.793943	476.38292	181.91554	0
19	6875	185.34675	-3.661022	54.652784	472.6202	186.09109	0
20	6875	185.85	-3.486585	45.216832	468.84216	188.61015	0
21	6875	186.4737	-3.2474285	32.9049	457.79533	189.17341	0
22	6875	187.4211	-2.856812	13.463786	436.48147	188.33961	0
23	6875	188.3183	-2.4484735	-13.509466	404.33607	180.02201	75
24	6875	189.1653	-2.0248675	-48.327053	378.66815	168.59392	75
25	6875	190.0123	-1.5632505	-84.949763	349.87587	155.77477	75
26	6875	190.8593	-1.0613385	-121.22154	317.86869	141.52426	75
27	6875	191.6414	-0.56138235	-157.82882	282.04197	137.56106	75
28	6875	192.32485	-0.0920108	-198.19511	247.3988	120.66446	75
29	6875	193.06845	0.4582795	-250.67652	205.22064	100.09279	75
30	6875	193.906	1.1243145	-313.46558	154.52049	75.36468	75
31	6875	194.7436	1.847103	-369.2106	100.03339	48.789545	75
32	6875	195.5812	2.633017	-426.33694	41.571074	20.275567	75



Name: EMBANKMENT FILL CH, EL. +4 TO -2.0 (above water) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 °

Name: MARSH 1, MH, EL. -2 TO -6 (above water) Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 0 psf Phi: 23 °

Name: BEACH SAND SP, EL. -14 TO -49 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY CL, EL. -49 TO -70 Model: Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 23 °

Name: MARSH 2, MH, EL. -6 TO -14 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 23 °

Name: Fill (Protected) ,EL -4.4 to -6 (Protected Side) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 °

Name: MARSH, EL. -6 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 0 psf Phi: 23 °

Name: Fill Model: Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 23 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Hw=CANAL WATER LEVELS



**US Army Corps
of Engineers®**
New Orleans District

LONDON AVE CANAL,
OUTFALL CANAL REEVALUATION REPORT
REACH 13, STA. 93+00 TO 96+00
PROTECTED SIDE STABILITY ANALYSIS,
CASE: Slope Stability (Entry/Exit) in front
MARCH 2012

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT

Slope Stability (Entry/Exit) in front

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File Information

Created By: Lijjegren, James
Revision Number: 397
Last Edited By: Middleton, Mark C MVN
Date: 1/16/2013
Time: 3:58:44 PM
File Name: Reach 13-Scase FS seepw.gsz
Directory: G:\F&M\HOME\Middleton\London Ave Canal\Scase Gcat 7-27-12\12-5-12 flood side\seepw parent\original phi23 seepw parent\
Last Solved Date: 1/16/2013
Last Solved Time: 4:25:00 PM

Project Settings

Length(L) Units: feet
Time(t) Units: Seconds
Force(F) Units: lbf
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D

Analysis Settings

Slope Stability (Entry/Exit) in front

Kind: [SLOPE/W](#)
Parent: [Gap Stability \(Seepage\)](#)
Method: [Spencer](#)
Settings
PWP Conditions Source: [Parent Analysis](#)
Slip Surface
Direction of movement: [Right to Left](#)
Use Passive Mode: [No](#)
Slip Surface Option: [Entry and Exit](#)
Critical slip surfaces saved: [1](#)
Optimize Critical Slip Surface Location: [Yes](#)
Tension Crack
Tension Crack Option: [Search for Tension Crack](#)
Percentage Wet: [0](#)
Tension Crack Fluid Unit Weight: [9.807 pcf](#)
FOS Distribution
FOS Calculation Option: [Constant](#)
Advanced

2/28/2013

Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 3 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL CH, EL. +4 TO -2.0 (above water)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

MARSH 1, MH, EL. -2 TO -6 (above water)

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 75 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

BEACH SAND SP, EL. -14 TO -49

Model: [Mohr-Coulomb](#)
Unit Weight: 122 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °

BAY SOUND CLAY CL, EL. -49 TO -70

Model: [Mohr-Coulomb](#)
Unit Weight: 108 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

MARSH 2, MH, EL. -6 TO -14

Model: [Mohr-Coulomb](#)
Unit Weight: 105 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

Fill (Protected) ,EL -4.4 to -6 (Protected Side)

2/28/2013

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

MARSH, EL. -6 TO -13

Model: [Spatial Mohr-Coulomb](#)
Unit Weight: 75 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

Fill

Model: [Mohr-Coulomb](#)
Unit Weight: 109 pcf
Cohesion: 0 psf
Phi: 23 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: [Range](#)
Left-Zone Left Coordinate: (130, -12.32101) ft
Left-Zone Right Coordinate: (165, -8.07843) ft
Left-Zone Increment: 30
Right Projection: [Range](#)
Right-Zone Left Coordinate: (170, -4.94118) ft
Right-Zone Right Coordinate: (200, 3.4) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (120.8, -12.5) ft
Right Coordinate: (370, -4.4) ft

Reinforcements

Reinforcement 1

Type: [Pile](#)
Outside Point: (200, 12.9) ft
Inside Point: (200, -15.5) ft
Slip Surface Intersection: (0, 0) ft
Total Length: 28.4 ft
Reinforcement Direction: 90 °
Applied Load Option: [Variable](#)
F of S Dependent: [No](#)

2/28/2013

Pile Spacing: 1 ft
Shear Capacity: 99999 lbs
Shear Safety Factor: 1
Shear Load Used: 99999 lbs
Shear Option: [Parallel to Slip](#)
Resisting Force Used: 0 lbs/ft

Regions

	Material	Points	Area (ft²)
Region 1	MARSH, EL. -6 TO -13	23,2,11,12,42,39	109.0625
Region 2	MARSH, EL. -6 TO -13	11,51,49,12	19.375
Region 3	BEACH SAND SP, EL. -14 TO -49	7,1,34,35,31,40,30,14,41,32,33	206.375
Region 4	BAY SOUND CLAY CL, EL. -49 TO -70	9,38,37,36,10,17,18	5236.55
Region 5	Fill (Protected) ,EL -4.4 to -6 (Protected Side)	24,19,6,15	199.68
Region 6	BEACH SAND SP, EL. -14 TO -49	14,16,8,10,36,37,38,9,7,33,32,41	8747.25
Region 7	EMBANKMENT FILL CH, EL. +4 TO -2.0 (above water)	45,22,3,27,4,46	27.845
Region 8	EMBANKMENT FILL CH, EL. +4 TO -2.0 (above water)	4,20,25,5,24,15,51,48,47,46	206.5725
Region 9	MARSH 2, MH, EL. -6 TO -14	12,49,52,16,14,21,13	326.44
Region 10		20,4,28,29,25	7.275
Region 11	MARSH, EL. -6 TO -13	30,40,31,35,26,39,42	129.5125
Region 12	MARSH 2, MH, EL. -6 TO -14	30,42,12,13,21,14	163.5
Region 13	MARSH 1, MH, EL. -2 TO -6 (above water)	52,15,6,50	49.92
Region 14	EMBANKMENT FILL CH, EL. +4 TO -2.0 (above water)	46,47,48,51,11	6.5375
Region 15	MARSH 1, MH, EL. -2 TO -6 (above water)	51,15,52,49	83.415
Region 16	MARSH, EL. -6 TO -13	16,52,50,8	823.68
Region 17	Fill	2,11,46,45	41.88

Points

	X (ft)	Y (ft)
Point 1	120.8	-13
Point 2	178.2	-2.1
Point 3	192.7	3
Point 4	200	3.4

2/28/2013

Point 5	211	3.8
Point 6	370	-6
Point 7	120.8	-15.5
Point 8	370	-13
Point 9	120.8	-49
Point 10	370	-49
Point 11	200	-2
Point 12	200	-6
Point 13	200	-7.9
Point 14	200	-14
Point 15	245.2	-6
Point 16	245.2	-13
Point 17	370	-70
Point 18	120.8	-70
Point 19	370	-4.4
Point 20	201	3.4
Point 21	200	-10.7
Point 22	189	1
Point 23	171.5	-4
Point 24	245.2	-4.4
Point 25	201	4
Point 26	161.3	-10.4
Point 27	199	3.4
Point 28	200	12.9
Point 29	200.5	12.9
Point 30	178.2	-13
Point 31	146.5	-13
Point 32	151.7	-15.5
Point 33	138.6	-15.5
Point 34	120.8	-12.5
Point 35	146.5	-12
Point 36	245.2	-49
Point 37	199.9	-48.9
Point 38	178.2	-49
Point 39	168.3125	-6
Point 40	154.61111	-13
Point 41	200	-15.5
Point 42	178.2	-6
Point 43	205	2
Point 44	205	-56
Point 45	186.9	0.4
Point 46	200	0.3
Point 47	200.3	-0.8
Point 48	204.8	-1.05

	205	-6.2
Point 50	370	-6.4
Point 51	205	-2.45
Point 52	245.2	-6.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	0.82	(164.344, 30.653)	21.32501	(194.914, 3.14058)	(155.662, -11.0095)
2	16178	0.86	(164.344, 30.653)	41.758	(195.808, 3.19732)	(158.533, -10.6992)

Slices of Slip Surface: **Optimized**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimized	156.22715	-11.022325	712.74778	720.16375	3.1478947	0
2	Optimized	157.35685	-11.048015	714.34956	723.6682	3.9555288	0
3	Optimized	158.48655	-11.073705	715.94249	727.1815	4.7706757	0
4	Optimized	159.61355	-11.10896	718.12957	732.40293	6.0586821	0
5	Optimized	160.73785	-11.15378	720.92025	737.37994	6.9867243	0
6	Optimized	161.3441	-11.17795	722.42544	764.83111	18.000139	0
7	Optimized	162.06645	-11.10101	717.62129	752.57345	14.83631	0
8	Optimized	163.42295	-10.94361	707.77933	749.13169	17.553036	0
9	Optimized	164.98745	-10.73245	694.60253	740.6899	19.562929	0
10	Optimized	166.6431	-10.454735	677.27427	727.27482	21.223971	0
11	Optimized	167.8625	-10.213405	662.18343	714.98468	22.412798	0
12	Optimized	169.1094	-9.9471955	645.59083	702.71896	24.249453	0
13	Optimized	170.70315	-9.606924	624.29817	687.01025	26.6197	0
14	Optimized	171.56885	-9.4220885	612.78484	672.54621	25.367195	0
15	Optimized	172.17045	-9.31058	605.82249	668.4094	26.566569	0
16	Optimized	173.23595	-9.11696	593.72617	657.4119	27.032993	0
17	Optimized	174.49015	-8.9291465	581.98464	651.50511	29.509687	0
18	Optimized	175.933	-8.74714	570.59731	642.5314	30.534208	0
19	Optimized	177.3758	-8.5651335	559.19623	633.55769	31.564566	0
20	Optimized	178.1486	-8.4494385	551.94355	604.51044	22.31332	0
21	Optimized	178.7927	-8.140083	532.61264	640.38989	45.74873	0
22	Optimized	179.9781	-7.5707545	497.01641	598.55805	43.10187	0
23	Optimized	181.25245	-7.018805	462.46907	565.72103	43.827856	0
24	Optimized	182.49825	-6.56364	433.94427	539.60283	44.849396	0
25	Optimized	183.62655	-6.18788	410.34874	515.32617	44.560275	0
26	Optimized	184.868	-5.7744235	384.35706	494.4415	46.728074	0
27	Optimized	186.22265	-5.3232705	355.96398	476.95321	51.356883	0
28	Optimized	187.43915	-4.918132	330.40008	469.64566	59.105937	0
29	Optimized	188.48915	-4.4033615	297.98861	433.09577	57.349586	0

2/28/2013

2/28/2013

30	Optimized	189.5261	-3.7229215	255.17785	420.21908	70.055846	0
31	Optimized	190.6548	-2.708897	191.44743	361.02246	71.980328	0
32	Optimized	191.63345	-1.622737	123.00827	314.5028	81.284606	0
33	Optimized	192.35475	-0.69194465	64.034743	234.02687	72.157378	0
34	Optimized	192.8787	0.08723875	14.566639	179.63768	70.0685	0
35	Optimized	193.3592	0.8018034	-30.77337	133.13525	56.512559	0
36	Optimized	194.28755	2.195593	-119.16406	53.439053	22.683532	0

Slices of Slip Surface: **16178**

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	16178	159.2245	-10.78465	697.91412	711.44893	5.7451854	0
2	16178	160.60815	-10.932285	707.10859	722.84387	6.6792296	0
3	16178	161.8844	-11.02893	713.12898	757.02264	18.631755	0
4	16178	163.05315	-11.081495	716.38036	766.75199	21.381488	0
5	16178	164.2219	-11.101285	717.60121	773.79776	23.854021	0
6	16178	165.39065	-11.08835	716.78882	778.20269	26.068641	0
7	16178	166.5594	-11.042655	713.91954	779.99108	28.045705	0
8	16178	167.72815	-10.964095	709.00992	779.17836	29.784734	0
9	16178	168.84375	-10.859	702.44582	776.05703	31.246108	0
10	16178	169.90625	-10.730015	694.39599	770.85669	32.455642	0
11	16178	170.96875	-10.573245	684.6013	763.53229	33.504215	0
12	16178	172.17	-10.360035	671.29168	745.06515	31.314981	0
13	16178	173.51	-10.081433	653.88961	726.06268	30.635651	0
14	16178	174.85	-9.7564865	633.59397	703.7686	29.787362	0
15	16178	176.19	-9.3840635	610.33146	678.11347	28.771755	0
16	16178	177.53	-8.962825	584.00058	649.03744	27.60651	0
17	16178	178.81525	-8.512492	555.8465	687.23658	55.771779	0
18	16178	180.04575	-8.035464	526.013	651.08924	53.091715	0
19	16178	181.27625	-7.512808	493.30286	610.76936	49.861572	0
20	16178	182.50675	-6.942618	457.60152	566.17898	46.088397	0
21	16178	183.7373	-6.322692	418.75137	517.1977	41.78799	0
22	16178	184.98945	-5.637697	375.79926	471.13777	40.468795	0
23	16178	186.26315	-4.8825645	328.4376	427.8469	42.196746	0
24	16178	187.425	-4.141476	281.88553	391.66994	46.600716	0
25	16178	188.475	-3.42142	236.66367	362.78326	53.534588	0
26	16178	189.65915	-2.547017	181.69612	338.28099	66.466334	0
27	16178	190.91375	-1.5531935	118.95369	305.28037	79.09098	0
28	16178	192.1046	-0.5319338	54.109148	254.17526	84.923025	0
29	16178	192.88935	0.17547125	8.9993856	210.24711	85.42459	0
30	16178	193.761	1.0303641	-45.486573	146.03877	61.989779	0

31	16178	195.12555	2.452607	-136.37243	48.540012	20.604013	0
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