(Zero moment for this load indicates free-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res p lbs/in
0.000	.996833	2.1521E-06	38000.0000	-.0168013	509.3379	-713.4696
1.050	.979193	41094.4253	37250.2556	-.0167973	757.3927	-714.6149
2.100	.961558	81400.2244	36499.3511	-.0167853	1000.6873	-715.6793
3.150	.943942	120915.	35747.3718	-.0167654	1239.2099	-716.6624
4.200	.926351	159638.	34994.4032	-.0167370	1472.9497	-717.5634
5.250	.908793	197567.	34240.5319	-.0167027	1701.8962	-718.3820
6.300	.891275	234700.	33485.8446	-.0166602	1926.0398	-719.1175
7.350	.873806	271036.	32730.4290	-.0166105	2145.3714	-719.7694
8.400	.856393	306574.	31974.3731	-.0165538	2359.8826	-720.3371
9.450	.839043	341311.	31217.7655	-.0164901	2569.5656	-720.8201
10.500	.821764	375248.	30460.6957	-.0164197	2774.4134	-721.2177
11.550	.804562	408382.	29703.2536	-.0163427	2974.4195	-721.5293
12.600	.787444	440713.	28945.5296	-.0162593	3169.5780	-721.7548
13.650	.770418	472240.	28187.6151	-.0161695	3359.8839	-721.8924
14.700	.753488	502963.	27429.6018	-.0160737	3545.3328	-721.9425
15.750	.736663	532881.	26671.5822	-.0159719	3725.9207	-721.9043
16.800	.719947	561992.	25913.6495	-.0158643	3901.6447	-721.7770
17.850	.703348	590298.	25155.8976	-.0157511	4072.5024	-721.5600
18.900	.686870	617797.	24398.4210	-.0156324	4238.4919	-721.2526
19.950	.670520	644489.	23641.3149	-.0155084	4399.6123	-720.8543
21.000	.654302	670374.	22884.6752	-.0153792	4555.8632	-720.3641
22.050	.638223	695453.	22128.5987	-.0152450	4707.2450	-719.7816
23.100	.622288	719726.	21373.1828	-.0151059	4853.7587	-719.1059
24.150	.606501	743192.	20618.5257	-.0149621	4995.4061	-718.3363
25.200	.590867	765852.	19864.7264	-.0148139	5132.1898	-717.4720
26.250	.575392	787708.	19111.8845	-.0146612	5264.1128	-716.5124
27.300	.560079	808758.	18360.1009	-.0145043	5391.1793	-715.4565
28.350	.544933	829005.	17609.4768	-.0143434	5513.3937	-714.3037
29.400	.529958	848449.	16860.1145	-.0141786	5630.7616	-713.0530
30.450	.515158	867091.	16112.1174	-.0140100	5743.2890	-711.7035
31.500	.500537	884933.	15365.5894	-.0138378	5850.9829	-710.2545
32.550	.486098	901974.	14620.6356	-.0136622	5953.8509	-708.7050
33.600	.471846	918218.	13877.3620	-.0134834	6051.9014	-707.0541
34.650	.457783	933665.	13135.8757	-.0133014	6145.1435	-705.3008
35.700	.443913	948317.	12396.2847	-.0131165	6233.5872	-703.4440
36.750	.430239	962176.	11658.6982	-.0129287	6317.2434	-701.4828
37.800	.416763	975244.	10923.2264	-.0127384	6396.1233	-699.4160
38.850	.403488	987523.	10189.9807	-.0125455	6470.2393	-697.2425
39.900	.390417	999014.	9459.0737	-.0123503	6539.6045	-694.9612
40.950	.377553	1009721.	8730.6194	-.0121529	6604.2328	-692.5708
42.000	.364896	1019645.	8004.7329	-.0119535	6664.1389	-690.0701
43.050	.352450	1028790.	7281.5309	-.0117522	6719.3383	-687.4576
44.100	.340217	1037158.	6561.1313	-.0115492	6769.8475	-684.7321
45.150	.328197	1044751.	5843.6537	-.0113446	6815.6834	-681.8919
46.200	.316393	1051574.	5129.2192	-.0111386	6856.8644	-678.9357
47.250	.304806	1057628.	4417.9506	-.0109314	6893.4092	-675.8616
48.300	.293437	1062917.	3710.3955	-.0107230	6925.3376	-671.8623
49.350	.282288	1067446.	3008.3395	-.0105136	6952.6756	-665.3874
50.400	.271358	1071222.	2313.1141	-.0103035	6975.4659	-658.8514
51.450	.260650	1074251.	1624.7841	-.0100927	6993.7515	-652.2534
52.500	.250164	1076541.	943.4154	-.0098813	7007.5759	-645.5918
53.550	.239900	1078100.	269.0754	-.0096696	7016.9833	-638.8653
54.600	.229858	1078934.	-398.1668	-.0094576	7022.0182	-632.0724
55.650	.220038	1079051.	-1058.2408	-.0092456	7022.7258	-625.2113
56.700	.210442	1078459.	-1711.0738	-.0090336	7019.1517	-618.2802
57.750	.201068	1077165.	-2356.5914	-.0088218	7011.3421	-611.2771
58.800	.191916	1075178.	-2994.7166	-.0086103	6999.3437	-604.1996
59.850	.182986	1072504.	-3625.3702	-.0083992	6983.2038	-597.0454
60.900	.174278	1069152.	-4248.4702	-.0081888	6962.9705	-589.8116
61.950	.165790	1065130.	-4863.9313	-.0079791	6938.6921	-582.4954
63.000	.157522	1060446.	-5471.6653	-.0077702	6910.4179	-575.0932
64.050	.149473	1055108.	-6071.5801	-.0075623	6878.1976	-567.6016
65.100	.141641	1049125.	-6663.5795	-.0073555	6842.0816	-560.0163
66.150	.134026	1042504.	-7247.5627	-.0071500	6802.1212	-552.3327
67.200	.126626	1035256.	-7823.4240	-.0069458	6758.3681	-544.5459
68.250	.119440	1027388.	-8391.0518	-.0067431	6710.8751	-536.6500
69.300	.112465	1018909.	-8950.3283	-.0065421	6659.6956	-528.6386
70.350	.105701	1009829.	-9501.1285	-.0063427	6604.8838	-520.5048
71.400	.099146	1000156.	-10043.3191	-.0061452	6546.4948	-512.2395
72.450	.092796	989899.	-10576.7579	-.0059497	6484.5848	-503.8343
73.500	.086651	979069.	-11101.2918	-.0057562	6419.2109	-495.2781
74.550	.080708	967674.	-11616.7561	-.0055649	6350.4311	-486.5567
75.600	.074965	955726.	-12122.9719	-.0053759	6278.3049	-477.6620
76.650	.069419	943232.	-12619.7446	-.0051893	6202.8927	-468.5716
77.700	.064068	930205.	-13106.8604	-.0050052	6124.2565	-459.2681
78.750	.058908	916654.	-13584.0839	-.0048237	6042.4596	-449.7291
79.800	.053938	902590.	-14051.1536	-.0046449	5957.5670	-439.9274
80.850	.049154	888024.	-14507.7766	-.0044690	5869.6455	-429.8307
81.900	.044553	872968.	-14953.6225	-.0042960	5778.7640	-419.3996
82.950	.040132	857434.	-15388.3147	-.0041259	5684.9936	-408.5856
84.000	.035888	841433.	-15811.4195	-.0039590	5588.4079	-397.3203
85.050	.031818	824978.	-16222.4309	-.0037952	5489.0837	-385.5505
86.100	.027919	808083.	-16620.7499	-.0036348	5387.1012	-373.1523
87.150	.024185	790761.	-17005.6551	-.0034777	5282.5448	-360.0004
88.200	.020615	773028.	-17376.2588	-.0033240	5175.5040	-345.9115
89.250	.017205	754899.	-17731.4396	-.0031738	5066.0746	-330.6233
90.300	.013950	736392.	-18069.7306	-.0030273	4954.3602	-313.7401
91.350	.010848	717525.	-18389.1200	-.0028844	4840.4753	-294.6210
92.400	.007893	698320.	-18686.6558	-.0027453	4724.5454	-272.1138
93.450	.005083	678802.	-18957.4945	-.0026100	4606.7342	-243.7694
94.500	.002412	659003.	-19191.7110	-.0024785	4487.2207	-202.3573
95.550	-.000122	638968.	-19272.2124	-.0023510	4366.2866	49.0211
96.600	-.002525	618975.	-19139.0734	-.0022274	4245.6072	204.5771
97.650	-.004800	599197.	-18905.5423	-.0021077	4126.2197	240.2440
98.700	-.006951	579672.	-18641.0461	-.0019918	4008.3640	263.5504
99.750	-.008983	560427.	-18355.1467	-.0018798	3892.1972	281.0119
100.800	-.010899	541481.	-18052.7761	-.0017715	3777.8377	294.9320
101.850	-.012703	522851.	-17737.0512	-.0016669	3665.3802	306.4489
102.900	-.014399	504549.	-17410.1574	-.0015660	3554.9035	316.2058
103.950	-.015992	486586.	-17073.7302	-.00146B6	3446.4746	324.6079
105.000	-.017483	468971.	-16729.0407	-.0013747	3340.1514	331.9284
106.050	-.018878	451714.	-16377.1466	-.0012842	3235.9846	338.3614
107.100	-.020180	434822.	-16018.8804	-.0011973	3134.0289	344.0504
108.150	-.021392	418301.	-15654.9739	-.0011133	3034.2941	349.1049
109.200	-.022518	402157.	-15286.0403	-.0010327	2936.8456	353.6106
110.250	-.023561	386396.	-14912.6439	-.0009552	2841.7053	357.6358
111.300	-.024524	371021.	-14535.2362	-.0008807	2748.9018	361.2362
112.350	-.025410	356038.	-14154.2169	-.0008093	2658.4607	364.4578
113.400	-.026224	341450.	-13770.0535	-.0007408	2570.4051	367.3391

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 4 is silt with cohesion and friction
Distance from top of pile to top of layer = 213.000 in
Distance from top of pile to bottom of layer = 273.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 5 is silt with cohesion and friction
Distance from top of pile to top of layer = 273.000 in
Distance from top of pile to bottom of layer = 450.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

(Depth of lowest layer extends 240.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth is defined using 10 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-99.00	.07234
2	129.00	.07234
3	129.00	.03623
4	153.00	.03623
5	153.00	.03623
6	213.00	.03623
7	213.00	.03333
8	273.00	.03333
9	273.00	.03623
10	450.00	.03623

Shear Strength of Soils

Distribution of shear strength parameters with depth defined using 10 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-99.000	9.68000	.00	------	------
2	129.000	9.68000	.00	------	------
3	129.000	6.25000	.00	------	------
4	153.000	6.25000	.00	------	------
5	153.000	.00000	30.00	------	------
6	213.000	.00000	30.00	------	------
7	213.000	5.56000	25.00	------	------
8	273.000	5.56000	25.00	------	------
9	273.000	3.47000	32.00	------	------
10	450.000	3.47000	32.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 38000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 90000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

Computed Values of Load Distribution and Deflection for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 38000.000 lbs
Specified moment at pile head = .000 in-lbs
Specified axial load at pile head = 90000.000 lbs

LPILE Plus for Windows, Version 5.0 (5.0.11)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Youwei Zhou
Kleifelder

Path to file locations: U:\YZhou\Projects\75010\Analysis\LPILE\B2B3\
Name of input data file: B2stability.lpd
Name of output file: B2stability.lpo
Name of plot output file: B2stnbility.lpp
Name of runtime file: B2stability.lpr

Time and Date of Analysis

Date: May 30, 2007 Time: 12:56: 7

Problem Title

B2-B3 Stability

Program Options

Units Used in Computations - US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 200
- Maximum number of iterations allowed = 200
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+01 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 210.00 in
Depth of ground surface below top of pile = -99.00 in
Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	15.00000000	1242.5000	176.7000	4300000.
2	500.0000	15.00000000	1242.5000	176.7000	4300000.

Soil and Rock Layering Information

The soil profile is modelled using 5 layers

Layer 1 is stiff clay without free water
Distance from top of pile to top of layer = -99.000 in
Distance from top of pile to bottom of layer = 129.000 in

Layer 2 is stiff clay with water-induced erosion
Distance from top of pile to top of layer = 129.000 in
Distance from top of pile to bottom of layer = 153.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 153.000 in
Distance from top of pile to bottom of layer = 213.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

File: U:\YZhou\Projects\75010\Analysis\Appendix C\10 Alp25mm.lpo

Number of iterations = 20
Number of zero deflection points = 3

Summary of Pile-Head Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = pile-head moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = pile-head shear force lbs
Type 4 = Deflection and Moment, S = pile-head slope, radians
Type 5 = Deflection and Slope, R = rotational stiffness of pile-headin-lbs/rad

Load Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
4	y= 1.000000	M= 0.000	90000.0000	1.0000000	1149409.	41953.7834

Pile-head Deflection vs. Pile Length

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.00000 in
Moment = 0. in-lbs
Axial Load = 90000. lbs

Pile Length in	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
307.700	1.00000000	1149409.	41953.78342
292.215	1.00000000	1149412.	41955.13514
276.930	1.00000000	1149052.	41950.51519
261.545	1.00000000	1149141.	41951.38635
246.160	1.00000000	1148758.	41943.31770
230.775	1.00000000	1147827.	41923.65069
215.390	1.00000000	1147317.	41913.06536
200.005	1.00000000	1147468.	41912.40472
184.620	1.00000000	1146294.	41927.02608
169.235	1.00000000	1141277.	41798.45254

The analysis ended normally.

153.850	-.022392	2741.1023	-4373.5404	.0005500	525.8837	203.6736
155.388	-.021546	-3822.7523	-4061.6906	.0005498	532.4128	201.7213
156.927	-.020701	-9908.9844	-3752.8866	.0005479	569.1506	199.7142
158.465	-.019860	-15522.3015	-3447.2098	.0005442	603.0326	197.6557
160.004	-.019026	-20666.7520	-3144.7374	.0005390	634.0869	195.5486
161.542	-.018201	-25347.7186	-2845.5424	.0005324	662.3422	193.3952
163.081	-.017388	-29569.9114	-2549.6937	.0005244	687.8283	191.1983
164.619	-.016588	-33338.3621	-2257.2568	.0005154	710.5755	188.9602
166.158	-.015802	-36658.2180	-1968.2931	.0005053	730.6148	186.6832
167.696	-.015033	-39534.7364	-1682.8608	.0004943	747.9781	184.3694
169.235	-.014281	-41973.2792	-1401.0150	.0004826	762.6977	182.0209
170.773	-.013548	-43979.3083	-1122.8079	.0004702	774.8065	179.6393
172.312	-.012834	-45558.3807	-848.2990	.0004573	784.3381	177.2263
173.851	-.012141	-46716.1450	-577.5058	.0004441	791.3267	174.7831
175.389	-.011468	-47458.3301	-310.5039	.0004305	795.8067	172.3106
176.928	-.010816	-47790.7828	-140.5740	.0004168	797.8134	48.5928
178.466	-.010185	-48006.3037	-67.6921	.0004030	799.1143	46.1523
180.005	-.009576	-48110.6712	1.4710	.0003892	799.7443	43.7505
181.543	-.008988	-48109.5448	66.9823	.0003753	799.7375	41.4170
183.082	-.008421	-48008.4668	128.9526	.0003615	799.1274	39.1294
184.620	-.007876	-47812.8561	187.4364	.0003477	797.9467	36.8977
186.159	-.007351	-47528.0027	242.5316	.0003339	796.2272	34.7242
187.697	-.006849	-47159.0626	294.3290	.0003203	794.0002	32.6106
189.236	-.006366	-46711.0534	342.9219	.0003068	791.2959	30.5586
190.774	-.005904	-46188.8499	388.4064	.0002934	788.1438	28.5697
192.313	-.005463	-45597.1809	430.8802	.0002802	784.5724	26.6450
193.851	-.005042	-44940.6256	470.4433	.0002672	780.6092	24.7857
195.390	-.004641	-44223.6112	507.1967	.0002543	776.2812	22.9926
196.928	-.004260	-43450.4104	541.2430	.0002417	771.6140	21.2665
198.467	-.003897	-42625.1396	572.6857	.0002293	766.6325	19.6079
200.005	-.003554	-41751.7576	601.6289	.0002172	761.3605	18.0172
201.543	-.003229	-40834.0645	628.1771	.0002053	755.8211	16.4946
203.082	-.002922	-39875.7008	652.4351	.0001936	750.0363	15.0400
204.620	-.002633	-38880.1477	674.5076	.0001823	744.0269	13.6535
206.159	-.002361	-37850.7267	694.4990	.0001713	737.8131	12.3347
207.697	-.002106	-36790.6004	712.5133	.0001605	731.4139	11.0833
209.236	-.001868	-35702.7734	728.6536	.0001501	724.8476	9.8986
210.774	-.001645	-34590.0930	743.0220	.0001400	718.1312	8.7799
212.313	-.001437	-33455.2515	755.7196	.0001302	711.2810	7.7266
213.851	-.001244	-32300.7875	766.8461	.0001207	704.3124	6.7375
215.390	-.001066	-31129.0880	776.4995	.0001116	697.2398	5.8116
216.928	-.000901	-29942.3912	784.7762	.0001028	690.0766	4.9478
218.467	-.000749	-28742.7893	791.7706	9.4312E-05	682.8350	4.1447
220.005	-.000611	-27532.2309	797.5749	8.6210E-05	675.5284	3.4008
221.544	-.000486	-26312.5252	802.2793	7.8457E-05	668.1660	2.7147
223.083	-.000369	-25085.3447	805.9711	7.1057E-05	660.7585	2.0846
224.621	-.000265	-23852.2299	808.7354	6.4012E-05	653.3151	1.5089
226.160	-.000172	-22614.5923	810.6544	5.7320E-05	645.8445	.9857123
227.698	-8.90E-05	-21373.7200	811.8073	5.0987E-05	638.3543	.5130695
229.237	-1.53E-05	-20130.7809	812.2705	4.5011E-05	630.8516	.0889531
230.775	4.95E-05	-18886.8287	812.1160	3.9393E-05	623.3429	-.2887595
232.314	.000106	-17642.8069	811.4159	3.4134E-05	615.8337	-.6222781
233.852	.000154	-16399.5545	810.2342	2.9232E-05	608.3291	-.9138978
235.391	.000196	-15157.8115	808.6343	2.4689E-05	600.8337	-1.1660
236.929	.000230	-13918.2239	792.3487	2.0502E-05	593.3513	-20.0048
238.468	.000259	-12725.4323	762.8919	1.6666E-05	586.1513	-18.2881
240.006	.000282	-11575.4209	733.4240	1.3187E-05	579.2096	-20.0193
241.545	.000299	-10472.3332	701.5597	9.9929E-06	572.5511	-21.4033
243.083	.000312	-9419.4891	667.8113	7.1289E-06	566.1959	-22.4686
244.622	.000321	-8419.4521	632.6475	4.5604E-06	560.1595	-23.2431
246.160	.000327	-7474.0956	596.4951	2.2721E-06	554.4531	-23.7539
247.699	.000328	-6584.6660	559.7399	2.4787E-07	549.0843	-24.0266
249.237	.000327	-5751.8445	522.7291	-1.5283E-06	544.0572	-24.0863
250.775	.000324	-4975.8054	485.7722	-3.0729E-06	539.3729	-23.9564
252.314	.000318	-4256.2724	449.1438	-4.4021E-06	535.0296	-23.6593
253.852	.000310	-3592.5708	413.0868	-5.5322E-06	531.0234	-23.2162
255.391	.000302	-2983.6782	377.8049	-6.4791E-06	527.3480	-22.6467
256.930	.000290	-2428.2720	343.4841	-7.2583E-06	523.9954	-21.9692
258.468	.000278	-1924.7675	310.2756	-7.8850E-06	520.9562	-21.2008
260.007	.000266	-1471.3693	278.3071	-8.3740E-06	518.2194	-20.3573
261.545	.000253	-1066.0977	247.6831	-8.7394E-06	515.7731	-19.4529
263.084	.000239	-706.8202	218.4873	-8.9946E-06	513.6044	-18.5008
264.622	.000225	-391.3215	190.7839	-9.1527E-06	511.7000	-17.5127
266.161	.000211	-117.2516	164.6201	-9.2260E-06	510.0456	-16.4993
267.699	.000197	117.7695	140.0279	-9.2259E-06	510.0387	-15.4697
269.238	.000182	316.1693	117.0258	-9.1634E-06	511.2463	-14.4323
270.776	.000168	480.3955	95.6204	-9.0487E-06	512.2376	-13.3940
272.315	.000155	612.8990	75.8084	-8.8913E-06	513.0325	-12.3609
273.853	.000141	716.1202	57.5782	-8.7000E-06	513.6605	-11.3379
275.392	.000128	792.4763	40.9109	-8.4827E-06	514.1214	-10.3290
276.930	.000115	844.3522	25.7824	-8.2471E-06	514.4346	-9.3375
278.469	.000102	874.0928	12.1643	-7.9997E-06	514.6141	-8.3656
280.007	9.04E-05	883.9972	.0251206	-7.7465E-06	514.6739	-7.4149
281.546	7.86E-05	876.3153	-10.6684	-7.4931E-06	514.6275	-6.4863
283.084	6.73E-05	853.2455	-19.9504	-7.2441E-06	514.4882	-5.5800
284.623	5.64E-05	816.9341	-27.8548	-7.0036E-06	514.2691	-4.6955
286.161	4.58E-05	769.4759	-34.4146	-6.7752E-06	513.9826	-3.8321
287.700	3.55E-05	712.9165	-39.6613	-6.5617E-06	513.6412	-2.9884
289.238	2.56E-05	649.2552	-43.6238	-6.3656E-06	513.2569	-2.1620
290.777	1.59E-05	580.4488	-46.3284	-6.1886E-06	512.8416	-1.3532
292.315	6.52E-06	508.4164	-47.7981	-6.0310E-06	512.4068	-.5573028
293.854	-2.64E-06	435.0443	-48.0523	-5.8959E-06	511.9639	.2270110
295.392	-1.16E-05	362.1923	-47.1065	-5.7812E-06	511.5241	1.0025
296.930	-2.04E-05	291.6988	-45.2960	-5.6870E-06	511.0986	1.3510
298.469	-2.81E-05	224.3915	-42.4139	-5.6127E-06	510.6923	2.3956
300.007	-3.77E-05	162.7457	-38.1697	-5.5570E-06	510.3202	3.1217
301.546	-4.62E-05	108.4823	-32.8061	-5.5179E-06	509.9927	3.8508
303.084	-5.47E-05	63.3293	-26.3172	-5.4932E-06	509.7201	4.5847
304.623	-6.31E-05	29.0257	-18.6940	-5.4799E-06	509.5131	5.3251
306.161	-7.15E-05	7.3258	-9.9258	-5.4746E-06	509.3821	6.0733
307.700	-8.00E-05	0.0000	0.0000	-5.4736E-06	509.3379	6.0300

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	1.00000000 in
Computed slope at pile head	=	-.01743936
Maximum bending moment	=	1249409. lbs-in
Maximum shear force	=	41953.78343 lbs
Depth of maximum bending moment	=	50.77050000 in
Depth of maximum shear force	=	0.00000 in

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Displacement and Moment (BC Type 4)
Specified deflection at pile head = 1.000000 in
Specified moment at pile head = .000 in-lbs
Specified axial load at pile head = 90000.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res p lbs/in
0.000	1.000000	0.0000	41953.7834	-.0174394	509.3379	-636.6451
1.539	.973170	66207.1724	40960.5034	-.0174298	900.9787	-654.5866
3.077	.946368	130862.	39939.4304	-.0174014	1299.2512	-672.7751
4.615	.919625	193920.	38890.1843	-.0173547	1679.8798	-691.2107
6.154	.892968	255333.	37812.3851	-.0172900	2050.5860	-709.8932
7.692	.866424	315057.	36705.6527	-.0172079	2411.0880	-728.8228
9.231	.840019	373042.	35569.6072	-.0171088	2761.1011	-747.9995
10.770	.813780	429242.	34403.8684	-.0169933	3100.3373	-767.4231
12.308	.787731	483609.	33208.0563	-.0168619	3428.5055	-787.0938
13.846	.761896	536093.	31981.7908	-.0167150	3745.3116	-807.0115
15.385	.736299	586646.	30724.6920	-.0165534	4050.4584	-827.1762
16.924	.710961	635217.	29436.3797	-.0163775	4343.6456	-847.5879
18.462	.685905	681757.	28116.4739	-.0161878	4624.5700	-868.2467
20.000	.661151	726214.	26764.5946	-.0159851	4892.9251	-889.1525
21.539	.636719	768538.	25380.3617	-.0157699	5148.4015	-910.3053
23.078	.612627	808677.	23963.3952	-.0155428	5390.6868	-931.7051
24.616	.588894	846578.	22513.3151	-.0153045	5619.4657	-953.3519
26.154	.565535	882189.	21029.7413	-.0150556	5834.4197	-975.2458
27.693	.542568	915456.	19513.4244	-.0147968	6035.2275	-969.9176
29.232	.520006	946391.	18048.9154	-.0145287	6221.9570	-959.8959
30.770	.497863	975016.	16580.2611	-.0142521	6394.7442	-949.3069
32.309	.476152	1001355.	15128.3073	-.0139675	6553.7334	-938.1860
33.847	.454885	1025433.	13693.8441	-.0136757	6698.0772	-926.5695
35.386	.434072	1047278.	12277.6855	-.0133773	6830.9356	-914.4946
36.924	.413723	1066916.	10880.2677	-.0130729	6949.4761	-901.9991
38.462	.393847	1084377.	9502.4481	-.0127631	7054.8723	-889.1216
40.001	.374451	1099690.	8144.7044	-.0124486	7147.3042	-875.9011
41.539	.355542	1112886.	6807.5338	-.0121301	7226.9568	-862.3772
43.078	.337127	1123996.	5491.3726	-.0118080	7294.0202	-848.5896
44.617	.319209	1133052.	4196.5957	-.0114830	7348.6889	-834.5783
46.155	.301794	1140089.	2923.5165	-.0111558	7391.1606	-820.3833
47.694	.284883	1145138.	1672.3866	-.0108267	7421.6367	-806.0448
49.232	.268480	1148233.	443.3963	-.0104965	7440.3207	-791.6027
50.770	.252585	1149409.	-763.3255	-.0101657	7447.4182	-777.0964
52.309	.237200	1148699.	-1947.5165	-.0098348	7443.1362	-762.3135
53.847	.222323	1146140.	-3108.4115	-.0095044	7427.6861	-746.8124
55.386	.207955	1141767.	-4244.9029	-.0091750	7401.2900	-730.5894
56.925	.194092	1135619.	-5355.8842	-.0088471	7364.1807	-713.6502
58.463	.180732	1127737.	-6440.2575	-.0085212	7316.6017	-695.9999
60.002	.167872	1118162.	-7493.1711	-.0081979	7258.8071	-672.7536
61.540	.155507	1106950.	-8494.6855	-.0078775	7191.1313	-629.1827
63.078	.143633	1094205.	-9429.9753	-.0075606	7114.2996	-586.6637
64.617	.132243	1080028.	-10300.6844	-.0072475	7028.6226	-545.2299
66.156	.121332	1064517.	-11108.5053	-.0069388	6934.9955	-504.9111
67.694	.110893	1047769.	-11855.1737	-.0066346	6833.8983	-465.7336
69.233	.100918	1029876.	-12542.4633	-.0063355	6725.8947	-427.7205
70.771	.091398	1010930.	-13172.1806	-.0060416	6611.5321	-390.8914
72.310	.082327	991019.	-13746.1596	-.0057534	6491.3412	-355.2627
73.848	.073695	970227.	-14266.2576	-.0054710	6365.8360	-320.8477
75.386	.065493	948636.	-14734.3494	-.0051947	6235.5132	-287.6565
76.925	.057711	926328.	-15152.3238	-.0049248	6100.8521	-255.6965
78.463	.050340	903376.	-15522.0780	-.0046614	5962.3147	-224.9719
80.002	.043368	879857.	-15845.5139	-.0044046	5820.3456	-195.4843
81.540	.036787	855840.	-16124.5337	-.0041547	5675.3718	-167.2324
83.079	.030584	831392.	-16361.0357	-.0039118	5527.8026	-140.2125
84.617	.024750	806580.	-16556.9103	-.0036758	5378.0300	-114.4182
86.156	.019273	781465.	-16714.0366	-.0034473	5226.4285	-89.8408
87.695	.014143	756106.	-16834.2781	-.0032259	5073.3553	-66.4693
89.233	.009347	730559.	-16919.4800	-.0030118	4919.1505	-44.2903
90.772	.004875	704878.	-16971.4649	-.0028052	4764.1370	-23.2885
92.310	.000716	679115.	-17055.2480	-.0026059	4608.6222	-85.6267
93.849	-.003143	653121.	-17025.1115	-.0024141	4451.7184	124.9031
95.387	-.006712	627397.	-16813.1269	-.0022297	4296.4417	150.7700
96.926	-.010004	602005.	-16569.0262	-.0020527	4143.1681	166.5329
98.464	-.013029	576982.	-16304.0499	-.0018830	3992.1292	177.9077
100.003	-.015798	552358.	-16023.5914	-.0017206	3843.4933	186.6791
101.541	-.018322	528154.	-15730.9688	-.0015648	3697.3918	193.7208
103.080	-.020613	504388.	-15428.4794	-.0014161	3553.9309	199.5055
104.618	-.022680	481073.	-15117.8323	-.0012742	3413.1990	204.3257
106.156	-.024534	458223.	-14800.3614	-.0011390	3275.2707	208.3762
107.695	-.026184	435848.	-14477.1451	-.0010103	3140.2093	211.7944
109.233	-.027642	413956.	-14149.0790	-.0008879	3008.0691	214.6809
110.772	-.028916	392557.	-13816.9221	-.0007718	2878.8965	217.1123
112.311	-.030017	371656.	-13481.3288	-.0006618	2752.7315	219.1480
113.849	-.030953	351258.	-13142.8714	-.0005577	2629.6081	220.8356
115.388	-.031733	331369.	-12802.0558	-.0004594	2509.5553	222.2136
116.926	-.032366	311993.	-12459.3339	-.0003668	2392.5978	223.3137
118.465	-.032861	293134.	-12115.1127	-.0002796	2278.7557	224.1626
120.003	-.033227	274793.	-11769.7615	-.0001979	2168.0459	224.7827
121.542	-.033470	256973.	-11423.6174	-.0001213	2060.4815	225.1934
123.080	-.033600	239676.	-11076.9809	-4.9794E-05	1956.0728	225.4111
124.619	-.033623	222903.	-10730.1645	1.6808E-05	1854.8269	225.4506
126.157	-.033548	206654.	-10383.4058	7.8656E-05	1756.7486	225.3245
127.696	-.033381	190931.	-10036.9589	.0001359	1661.8399	225.0440
129.234	-.033130	175733.	-9691.0563	.0001887	1570.1006	224.6194
130.773	-.032801	161060.	-9345.9101	.0002372	1481.5282	224.0595
132.311	-.032400	146910.	-9001.7230	.0002815	1396.1184	223.3725
133.850	-.031935	133283.	-8658.6849	.0003219	1313.8646	222.5659
135.388	-.031410	120178.	-8316.9745	.0003584	1234.7580	221.6464
136.927	-.030832	107593.	-7976.7610	.0003912	1158.7908	220.6201
138.465	-.030206	95525.2451	-7638.2042	.0004204	1085.9490	219.4928
140.004	-.029538	83973.5206	-7301.4554	.0004462	1016.2203	218.2697
141.542	-.028833	72935.0883	-6966.6581	.0004688	949.5899	216.9558
143.081	-.028096	62407.2786	-6633.9488	.0004883	886.0418	215.5556
144.619	-.027331	52387.1965	-6303.4566	.0005049	825.5584	214.0735
146.158	-.026542	42871.7340	-5975.3045	.0005186	768.1210	212.5135
147.696	-.025735	33857.5777	-5649.6095	.0005296	713.7096	210.8795
149.235	-.024913	25341.2194	-5326.4826	.0005381	662.3030	209.1750
150.773	-.024079	17318.9642	-5006.0294	.0005443	613.8789	207.4037
152.312	-.023238	9786.9395	-4688.3502	.0005482	568.4140	205.5689

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 4 is silt with cohesion and friction
Distance from top of pile to top of layer = 235.700 in
Distance from top of pile to bottom of layer = 295.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 5 is silt with cohesion and friction
Distance from top of pile to top of layer = 295.700 in
Distance from top of pile to bottom of layer = 381.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 6 is silt with cohesion and friction
Distance from top of pile to top of layer = 381.700 in
Distance from top of pile to bottom of layer = 450.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

(Depth of lowest layer extends 142.30 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth is defined using 12 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-100.30	.07234
2	91.70	.07234
3	91.70	.07234
4	175.70	.07234
5	175.70	.07234
6	235.70	.07234
7	235.70	.06940
8	295.70	.06940
9	295.70	.07234
10	381.70	.07234
11	381.70	.03623
12	450.00	.03623

Shear Strength of Soils

Distribution of shear strength parameters with depth defined using 12 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-100.300	.00000	30.00	------	------
2	91.700	.00000	30.00	------	------
3	91.700	6.25000	.00	------	------
4	175.700	6.25000	.00	------	------
5	175.700	.00000	30.00	------	------
6	235.700	.00000	30.00	------	------
7	235.700	5.56000	25.00	------	------
8	295.700	5.56000	25.00	------	------
9	295.700	3.47000	32.00	------	------
10	381.700	3.47000	32.00	------	------
11	381.700	3.47000	32.00	------	------
12	450.000	3.47000	32.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Displacement and Moment (BC Type 4)
Deflection at pile head = 1.000 in
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 90000.000 lbs

LPILE Plus for Windows, Version 5.0 (5.0.11)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Youwei Zhou
Kleifelder

Path to file locations: U:\YZhou\Projects\75010\Analysis\LPILE\A1\
Name of input data file: Alp25mm.lpd
Name of output file: Alp25mm.lpo
Name of plot output file: Alp25mm.lpp
Name of runtime file: Alp25mm.lpr

Time and Date of Analysis

Date: May 30, 2007 Time: 12:53:42

Problem Title

A1 pinned head 1.0 inch

Program Options

Units Used in Computations = US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 200
- Maximum number of iterations allowed = 200
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+01 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 307.70 in
Depth of ground surface below top of pile = -100.30 in
Slope angle of ground surface = 25.00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	15.00000000	1242.5000	176.7000	4300000.
2	500.0000	15.00000000	1242.5000	176.7000	4300000.

Soil and Rock Layering Information

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -100.300 in
Distance from top of pile to bottom of layer = 91.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 2 is stiff clay without free water
Distance from top of pile to top of layer = 91.700 in
Distance from top of pile to bottom of layer = 175.700 in

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 175.700 in
Distance from top of pile to bottom of layer = 235.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

Number of iterations = 15
Number of zero deflection points = 3

Summary of Pile-Head Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacement in
Type 2 = Shear and Slope, M = pile-head moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = pile-head shear force lbs
Type 4 = Deflection and Moment, S = pile-head slope, radians
Type 5 = Deflection and Slope, R = rotational stiffness of pile-headin-lbs/rad

Load Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
4	y= .250000	M= 0.000	90000.0000	.2500000	494372.	19230.6615

Pile-head Deflection vs. Pile Length

Boundary Condition Type 4, Deflection and Moment

Deflection = .25000 in
Moment = 0. in-lbs
Axial Load = 90000. lbs

Pile Length in	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
307.700	.25000000	494372.36186	19230.66154
292.315	.25000000	494403.97758	19231.50262
276.930	.25000000	494020.10108	19225.71530
261.545	.25000000	494109.13977	19227.30859
246.160	.25000000	494179.59867	19227.49728
230.775	.25000000	494140.75020	19225.82624
215.390	.25000000	494005.53172	19223.77017
200.005	.25000000	494200.83033	19225.23080
184.620	.25000000	494061.64904	19223.29597
169.235	.25000000	493173.19571	19208.99409

The analysis ended normally.

153.850	-.002555	4043.1650	-2186.5932	7.7468E-05	521.5406	118.5948
155.388	-.002436	808.6802	-2005.2138	7.7817E-05	511.7785	117.1926
156.927	-.002316	-2148.4279	-1826.0338	7.7721E-05	515.8220	115.7357
158.465	-.002196	-4831.5489	-1649.1347	7.7218E-05	523.9200	114.2274
160.004	-.002078	-7244.1993	-1474.5931	7.6349E-05	531.2016	112.6710
161.542	-.001961	-9390.0151	-1302.4808	7.5152E-05	537.6779	111.0694
163.081	-.001847	-11272.7444	-1132.8650	7.3664E-05	543.3602	109.4256
164.619	-.001735	-12896.2404	-965.8087	7.1924E-05	548.2601	107.7422
166.158	-.001626	-14264.4565	-801.3708	6.9969E-05	552.3895	106.0217
167.696	-.001519	-15381.4349	-639.6068	6.7835E-05	555.7607	104.2663
169.235	-.001417	-16251.3112	-480.5689	6.5557E-05	558.3861	102.4779
170.773	-.001318	-16878.3001	-324.3064	6.3172E-05	560.2764	100.6582
172.312	-.001222	-17266.6963	-170.8669	6.0714E-05	561.4506	98.8082
173.851	-.001131	-17420.8710	-20.2965	5.8217E-05	561.9159	96.9284
175.389	-.001043	-17345.2706	127.3587	5.5714E-05	561.6878	95.0185
176.928	-.000960	-17044.4172	203.7678	5.3239E-05	560.7798	4.3108
178.466	-.000880	-16733.0204	210.1495	5.0807E-05	559.8399	3.8852
180.005	-.000803	-16411.8572	216.0384	4.8421E-05	558.8706	3.6703
181.543	-.000731	-16081.6793	221.4513	4.6082E-05	557.8741	3.3663
183.082	-.000661	-15743.2129	226.4048	4.3791E-05	556.8526	3.0732
184.620	-.000596	-15397.1585	230.9160	4.1549E-05	555.8082	2.7912
186.159	-.000534	-15044.1904	235.0018	3.9357E-05	554.7429	2.5202
187.697	-.000475	-14684.9571	238.6792	3.7217E-05	553.6587	2.2603
189.236	-.000419	-14320.0809	241.9654	3.5129E-05	552.5574	2.0115
190.774	-.000367	-13950.1579	244.8772	3.3094E-05	551.4410	1.7738
192.313	-.000317	-13575.7583	247.4318	3.1112E-05	550.3110	1.5471
193.851	-.000271	-13197.4260	249.6461	2.9185E-05	549.1691	1.3314
195.390	-.000227	-12815.6792	251.5370	2.7312E-05	548.0170	1.1266
196.928	-.000187	-12431.0103	253.1211	2.5495E-05	546.8560	.9326535
198.467	-.000149	-12043.8858	254.4150	2.3733E-05	545.6876	.7494259
200.005	-.000114	-11654.7476	255.4352	2.2027E-05	544.5132	.5768121
201.543	-8.12E-05	-11264.0116	256.1979	2.0377E-05	543.3339	.4146797
203.082	-5.11E-05	-10872.0695	256.7191	1.8783E-05	542.1509	.2628810
204.620	-2.34E-05	-10479.2885	257.0146	1.7246E-05	540.9655	.1212539
206.159	1.99E-06	-10086.0115	257.0999	1.5765E-05	539.7795	-.0103782
207.697	2.51E-05	-9692.5580	256.9902	1.4342E-05	538.5911	-.1322060
209.236	4.62E-05	-9299.2242	256.7005	1.2974E-05	537.4039	-.2444336
210.774	6.50E-05	-8906.2835	256.2453	1.1664E-05	536.2180	-.3472783
212.313	8.20E-05	-8513.9873	255.6390	1.0410E-05	535.0340	-.4409706
213.851	9.71E-05	-8122.5652	254.8953	9.2120E-06	533.8526	-.5257534
215.390	.000110	-7732.2255	254.0279	8.0707E-06	532.6746	-.6018821
216.928	.000122	-7343.1564	253.0498	6.9854E-06	531.5003	-.6696240
218.467	.000132	-6955.5258	251.9737	5.9560E-06	530.3304	-.7292580
220.005	.000140	-6569.4828	250.8119	4.9823E-06	529.1653	-.7810749
221.544	.000147	-6185.1575	249.5761	4.0641E-06	528.0053	-.8253762
223.083	.000153	-5802.6626	248.2777	3.2011E-06	526.8509	-.8624750
224.621	.000157	-5422.0935	246.9276	2.3931E-06	525.7023	-.8926947
226.160	.000160	-5043.5292	245.5359	1.6396E-06	524.5598	-.9163695
227.698	.000162	-4667.0335	244.1127	9.4058E-07	523.4235	-.9338440
229.237	.000163	-4292.6551	242.6676	2.9557E-07	522.2936	-.9454731
230.775	.000163	-3920.4290	241.2077	-2.9569E-07	521.1701	-.9516216
232.314	.000162	-3550.3772	239.7428	-8.3351E-07	520.0533	-.9526645
233.852	.000160	-3182.5096	238.2799	-1.3182E-06	518.9430	-.9489865
235.391	.000158	-2816.8248	236.8261	-1.7501E-06	517.8393	-.9409821
236.929	.000155	-2453.3111	235.3879	-2.1295E-06	516.7422	-12.0902
238.468	.000151	-2118.3658	210.1020	-2.4586E-06	515.7313	-9.6191
240.006	.000147	-1806.1464	195.4512	-2.7411E-06	514.7890	-9.4264
241.545	.000143	-1516.2033	181.2193	-2.9803E-06	513.9139	-9.2046
243.083	.000138	-1248.0169	167.1484	-3.1793E-06	513.1045	-8.9572
244.622	.000133	-1001.0072	153.5749	-3.3412E-06	512.3590	-8.6879
246.160	.000128	-774.5416	140.4303	-3.4690E-06	511.6755	-8.3997
247.699	.000123	-567.9424	127.7413	-3.5657E-06	511.0520	-8.0957
249.237	.000117	-380.4943	115.5298	-3.6340E-06	510.4862	-7.7788
250.775	.000111	-211.4508	103.8139	-3.6766E-06	509.9760	-7.4516
252.314	.000106	-60.0409	92.6075	-3.6961E-06	509.5191	-7.1164
253.852	.000100	74.5259	81.9211	-3.6951E-06	509.5628	-6.7755
255.391	9.44E-05	193.0536	71.7620	-3.6758E-06	509.9205	-6.4310
256.930	8.87E-05	296.3555	62.1345	-3.6406E-06	510.2323	-6.0845
258.468	8.32E-05	385.2495	53.0401	-3.5915E-06	510.5006	-5.7379
260.007	7.77E-05	460.5544	44.4781	-3.5306E-06	510.7279	-5.3924
261.545	7.23E-05	523.0864	36.4457	-3.4598E-06	510.9166	-5.0494
263.084	6.70E-05	573.6560	28.9382	-3.3809E-06	511.0692	-4.7101
264.622	6.19E-05	613.0655	21.9494	-3.2954E-06	511.1882	-4.3752
266.161	5.69E-05	642.1068	15.4716	-3.2051E-06	511.2758	-4.0457
267.699	5.20E-05	661.5592	9.4963	-3.1112E-06	511.3345	-3.7221
269.238	4.73E-05	672.1884	4.0139	-3.0152E-06	511.3666	-3.4049
270.776	4.28E-05	674.7440	-.9850256	-2.9182E-06	511.3743	-3.0945
272.315	3.83E-05	669.9631	-5.5134	-2.8214E-06	511.3599	-2.7912
273.853	3.41E-05	658.5615	-9.5797	-2.7258E-06	511.3255	-2.4949
275.392	2.99E-05	641.2412	-13.1958	-2.6322E-06	511.2732	-2.2058
276.930	2.60E-05	618.6869	-16.3725	-2.5415E-06	511.2051	-1.9238
278.469	2.21E-05	591.5667	-19.1206	-2.4544E-06	511.1233	-1.6486
280.007	1.84E-05	560.5325	-21.4503	-2.3715E-06	511.0296	-1.3799
281.546	1.48E-05	526.2209	-23.3714	-2.2932E-06	510.9261	-1.1175
283.084	1.14E-05	489.2537	-24.8933	-2.2201E-06	510.8145	-.8608765
284.623	8.00E-06	450.2390	-26.0244	-2.1525E-06	510.6967	-.6095661
286.161	4.74E-06	409.7725	-26.7726	-2.0906E-06	510.5746	-.3630524
287.700	1.57E-06	368.4386	-27.1448	-2.0345E-06	510.4488	-.1207716
289.238	-1.52E-06	326.8114	-27.1470	-1.9845E-06	510.3242	.1178704
290.777	-4.54E-06	285.4566	-26.7845	-1.9404E-06	510.1994	.3534892
292.315	-7.49E-06	244.9329	-26.0612	-1.9022E-06	510.0771	.5867073
293.854	-1.04E-05	205.7931	-24.9805	-1.8698E-06	509.9580	.8181541
295.392	-1.32E-05	168.5657	-23.5446	-1.8428E-06	509.8467	1.0484
296.930	-1.61E-05	133.8566	-21.9596	-1.8211E-06	509.7419	1.0120
298.469	-1.88E-05	101.5202	-20.0441	-1.8041E-06	509.6443	1.4782
300.007	-2.16E-05	72.6806	-17.5945	-1.7916E-06	509.5572	1.7063
301.546	-2.44E-05	47.8782	-14.7927	-1.7829E-06	509.4824	1.9360
303.084	-2.71E-05	27.6572	-11.6260	-1.7775E-06	509.4213	2.1677
304.623	-2.98E-05	12.5665	-8.1209	-1.7746E-06	509.3758	2.4018
306.161	-3.26E-05	3.1606	-4.2436	-1.7734E-06	509.3474	2.6385
307.700	-3.53E-05	0.0000	0.0000	-1.7732E-06	509.3379	2.8781

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	.25000000 in
Computed slope at pile head	=	-.00405994
Maximum bending moment	=	494372.36211 lbs-in
Maximum shear force	=	19230.66255 lbs
Depth of maximum bending moment	=	52.30900000 in
Depth of maximum shear force	=	0.00000 in

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Displacement And Moment (BC Type 4)
Specified deflection at pile head = .250000 in
Specified moment at pile head = .000 in-lbs
Specified axial load at pile head = 90000.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res p lbs/in
0.000	.250000	0.0000	19230.6615	-.0040599	509.3379	-361.7302
1.539	.243754	29720.4278	18670.6655	-.0040578	599.0373	-366.2464
3.077	.237514	58573.3644	18103.8966	-.0040514	686.1186	-370.5348
4.615	.231287	86548.0839	17530.7103	-.0040410	770.5494	-374.5808
6.154	.225080	113634.	16951.4719	-.0040266	852.2989	-378.4023
7.692	.218898	139823.	16366.9561	-.0040083	931.3384	-381.9693
9.231	.212746	165104.	15776.3462	-.0039864	1007.6407	-385.2843
10.770	.206632	189471.	15181.2342	-.0039609	1081.1808	-388.3420
12.308	.200559	212914.	14581.6196	-.0039319	1151.9351	-391.1374
13.846	.194533	235427.	13977.9097	-.0038996	1219.8825	-393.6659
15.385	.188560	257004.	13370.5184	-.0038642	1285.0034	-395.9231
16.924	.182643	277638.	12759.8660	-.0038257	1347.2804	-397.9051
18.462	.176788	297325.	12146.3780	-.0037843	1406.6982	-399.6083
20.000	.170999	316061.	11530.4883	-.0037401	1463.2434	-401.0293
21.539	.165280	333840.	10912.6309	-.0036933	1516.9046	-402.1652
23.078	.159634	350662.	10293.2472	-.0036443	1567.6720	-403.0134
24.616	.154067	366522.	9672.7817	-.0035924	1615.5409	-403.5716
26.154	.148581	381420.	9051.6819	-.0035386	1660.5038	-403.8379
27.693	.143179	395354.	8430.3984	-.0034827	1702.5589	-403.8106
29.232	.137864	408324.	7809.3836	-.0034248	1741.7054	-403.4885
30.770	.132640	420332.	7189.0919	-.0033652	1777.9449	-402.8708
32.309	.127510	431377.	6569.9787	-.0033038	1811.2811	-401.9564
33.847	.122475	441463.	5952.5001	-.0032410	1841.7199	-400.7456
35.386	.117537	450591.	5337.5249	-.0031768	1869.2692	-399.2402
36.924	.112700	458766.	4733.4103	-.0031113	1893.9431	-397.4427
38.462	.107964	466017.	4147.0882	-.0030447	1915.8275	-395.3525
40.001	.103331	472372.	3580.9754	-.0029772	1935.0002	-392.9357
41.539	.098803	477860.	3032.6624	-.0029088	1951.5714	-390.3534
43.078	.094381	482509.	2502.9140	-.0028397	1965.6029	-387.6023
44.617	.090065	486348.	1991.6699	-.0027699	1977.1886	-384.6983
46.155	.085858	489405.	1498.8461	-.0026997	1986.4141	-381.6567
47.694	.081758	491707.	1024.3340	-.0026290	1993.3644	-378.4926
49.232	.077768	493285.	568.0059	-.0025581	1998.1241	-375.2203
50.770	.073887	494164.	129.7073	-.0024870	2000.7774	-371.8537
52.309	.070115	494372.	-290.7339	-.0024159	2001.4074	-368.4062
53.847	.066453	493938.	-693.5107	-.0023447	2000.0966	-364.8906
55.386	.062901	492888.	-1078.8355	-.0022737	1996.9267	-361.3191
56.925	.059457	491248.	-1446.9391	-.0022028	1991.9701	-357.7035
58.463	.056123	489046.	-1798.0698	-.0021323	1985.3305	-354.0550
60.002	.052896	486306.	-2132.4928	-.0020620	1977.0621	-350.3845
61.540	.049778	483055.	-2450.4890	-.0019923	1967.2501	-346.7027
63.078	.046766	479318.	-2752.3545	-.0019230	1955.9702	-343.0196
64.617	.043861	475118.	-3038.3995	-.0018543	1943.2870	-339.3446
66.156	.041061	470482.	-3308.9474	-.0017862	1929.3033	-335.6870
67.694	.038365	465431.	-3564.3343	-.0017188	1914.0606	-332.0557
69.233	.035772	459990.	-3804.9078	-.0016522	1897.6389	-328.4586
70.771	.033281	454181.	-4031.0263	-.0015864	1880.1064	-324.9036
72.310	.030890	448026.	-4243.0580	-.0015214	1861.5298	-321.3980
73.848	.028599	441547.	-4441.3806	-.0014574	1841.9739	-317.9484
75.386	.026406	434764.	-4626.3798	-.0013943	1821.5020	-314.5609
76.925	.024309	427698.	-4798.4490	-.0013322	1800.1754	-311.2409
78.463	.022307	420368.	-4957.9882	-.0012712	1778.0536	-307.9934
80.002	.020398	412794.	-5105.6035	-.0012112	1755.1948	-304.8227
81.540	.018580	404994.	-5241.1059	-.0011523	1731.6535	-301.7329
83.079	.016852	396986.	-5365.5113	-.0010946	1707.4848	-298.7276
84.617	.015212	388787.	-5479.0387	-.0010380	1682.7403	-295.8102
86.156	.013658	380414.	-5582.1105	-.0009826	1657.4701	-292.9837
87.695	.012188	371883.	-5675.1512	-.0009285	1631.7221	-290.2508
89.233	.010801	363209.	-5758.5866	-.0008756	1605.5426	-287.6139
90.772	.009494	354407.	-5832.8438	-.0008239	1578.9755	-285.0751
92.310	.008266	345490.	-5899.7930	-.0007735	1552.0632	-282.6364
93.849	.007114	336490.	-6229.4150	-.0007244	1523.9965	-280.2994
95.387	.006037	326522.	-6459.7978	-.0006767	1494.8179	-277.9657
96.926	.005032	316503.	-6680.4102	-.0006304	1464.5718	-275.6364
98.464	.004097	306141.	-6890.5756	-.0005856	1433.3057	-273.3128
100.003	.003230	295461.	-7089.3965	-.0005423	1401.0704	-270.9959
101.541	.002428	284477.	-7275.6175	-.0005006	1367.9217	-268.6866
103.080	.001690	273212.	-7447.3370	-.0004604	1333.9221	-266.3859
104.618	.001012	261689.	-7601.2632	-.0004219	1299.1452	-264.0946
106.156	.000392	249940.	-7729.7152	-.0003851	1263.6840	-261.8134
107.695	-.000173	238012.	-7755.4314	-.0003499	1227.6033	-259.5424
109.233	-.000685	226173.	-7650.8140	-.0003165	1191.9539	-257.2815
110.772	-.001147	214533.	-7518.1847	-.0002848	1156.8226	-255.0307
112.311	-.001561	203119.	-7362.7256	-.0002547	1122.3727	-252.7898
113.849	-.001931	191949.	-7196.9749	-.0002263	1088.6599	-250.5586
115.388	-.002258	181036.	-7023.4912	-.0001994	1055.7255	-248.3367
116.926	-.002545	170393.	-6843.9700	-.0001741	1023.6014	-246.1238
118.465	-.002794	160026.	-6659.6393	-.0001504	992.3130	-243.9194
120.003	-.003007	149943.	-6471.4416	-.0001280	961.8809	-241.7230
121.542	-.003188	140149.	-6280.1303	-.0001072	932.3226	-239.5341
123.080	-.003337	130648.	-6086.3256	-8.7658E-05	903.6466	-237.3521
124.619	-.003457	121445.	-5890.5502	-6.9509E-05	875.8728	-235.1763
126.157	-.003551	112542.	-5693.2529	-5.2665E-05	849.0028	-233.0060
127.696	-.003619	103942.	-5494.8250	-3.7080E-05	823.0452	-230.8404
129.234	-.003665	95645.0144	-5295.6116	-2.2712E-05	798.0049	-228.6788
130.773	-.003689	87653.3919	-5095.9204	-9.5160E-06	773.8853	-226.5202
132.311	-.003694	79967.5027	-4896.0280	2.5510E-06	750.6885	-224.3637
133.850	-.003681	72587.6072	-4696.1854	1.3533E-05	728.4151	-222.2084
135.388	-.003652	65513.5923	-4496.6212	2.3475E-05	707.0650	-220.0532
136.927	-.003609	58745.0025	-4297.5452	3.2421E-05	686.6367	-217.8971
138.465	-.003553	52281.0674	-4099.1506	4.0414E-05	667.1278	-215.7390
140.004	-.003485	46120.7245	-3901.5162	4.7498E-05	648.5352	-213.5778
141.542	-.003407	40262.6409	-3705.1080	5.3716E-05	630.8549	-211.4123
143.081	-.003319	34705.7316	-3509.7806	5.9113E-05	614.0820	-209.2413
144.619	-.003225	29446.6759	-3315.7783	6.3731E-05	598.2111	-207.0636
146.158	-.003123	24484.9327	-3123.2361	6.7614E-05	583.2360	-204.8779
147.696	-.003017	19817.7540	-2932.2806	7.0803E-05	569.1500	-202.6829
149.235	-.002906	15442.6977	-2743.0304	7.3342E-05	555.9456	-200.4772
150.773	-.002791	11357.1389	-2555.5970	7.5271E-05	543.6149	-198.2593
152.312	-.002674	7558.2808	-2370.0851	7.6633E-05	532.1496	-196.0277

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 4 is silt with cohesion and friction
Distance from top of pile to top of layer = 235.700 in
Distance from top of pile to bottom of layer = 295.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 5 is silt with cohesion and friction
Distance from top of pile to top of layer = 295.700 in
Distance from top of pile to bottom of layer = 381.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 6 is silt with cohesion and friction
Distance from top of pile to top of layer = 381.700 in
Distance from top of pile to bottom of layer = 450.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

(Depth of lowest layer extends 142.30 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth
is defined using 12 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-100.30	.07234
2	91.70	.07234
3	91.70	.07234
4	175.70	.07234
5	175.70	.07234
6	235.70	.07234
7	235.70	.06940
8	295.70	.06940
9	295.70	.07234
10	381.70	.07234
11	381.70	.03623
12	450.00	.03623

Shear Strength of Soils

Distribution of shear strength parameters with depth
defined using 12 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-100.300	.08000	30.00	------	------
2	91.700	.08000	30.00	------	------
3	91.700	6.25000	.00	------	------
4	175.700	6.25000	.00	------	------
5	175.700	.08000	30.00	------	------
6	235.700	.08000	30.00	------	------
7	235.700	5.56000	25.00	------	------
8	295.700	5.56000	25.00	------	------
9	295.700	3.47000	32.00	------	------
10	381.700	3.47000	32.00	------	------
11	381.700	3.47000	32.00	------	------
12	450.000	3.47000	32.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Displacement and Moment (BC Type 4)
Deflection at pile head = .250 in
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 90000.000 lbs

LPILE Plus for Windows, Version 5.0 (5.0.21)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Youwei Zhou
Kleifelder

Path to file locations: U:\Yzhou\Projects\75010\Analysis\LPILE\A1\
Name of input data file: Alp6mm.lpd
Name of output file: Alp6mm.lpo
Name of plot output file: Alp6mm.lpp
Name of runtime file: Alp6mm.lpc

Time and Date of Analysis

Date: May 30, 2007 Time: 12:52:30

Problem Title

A1 pinned head 0.25 inch

Program Options

Units Used in Computations - US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No Additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 200
- Maximum number of iterations allowed = 200
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+01 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 307.70 in
Depth of ground surface below top of pile = -100.30 in
Slope angle of ground surface = 25.00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	15.00000000	2485.0000	176.7000	4300000.
2	500.0000	15.00000000	2485.0000	176.7000	4300000.

Soil and Rock Layering Information

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -100.300 in
Distance from top of pile to bottom of layer = 91.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 2 is stiff clay without free water
Distance from top of pile to top of layer = 91.700 in
Distance from top of pile to bottom of layer = 175.700 in

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 175.700 in
Distance from top of pile to bottom of layer = 235.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

Number of iterations = 14
Number of zero deflection points = 3

Summary of Pile-Head Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = pile-head moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = pile-head shear force lbs
Type 4 = Deflection and Moment, S = pile-head slope, radians
Type 5 = Deflection and Slope, R = rotational stiffness of pile-headin-lbs/rad

Load Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
5	y= 1.000000	S= 0.000	90000.0000	1.0000000	-3217124.	88939.2961

Pile-head Deflection vs. Pile Length

Boundary Condition Type 5, Deflection and Slope

Deflection = 1.00000 in
Slope = .00000
Axial Load = 90000. lbs

Pile Length in	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
307.700	1.00000000	-3217124.	88939.29607
292.315	1.00000000	-3216711.	88927.94959
276.930	1.00000000	-3219069.	88974.93112
261.545	1.00000000	-3219627.	88978.44218
246.160	1.00000000	-3217266.	88918.77666
230.775	1.00000000	-3217618.	88922.61850
215.390	1.00000000	-3218486.	88940.50692
200.005	1.00000000	-3211881.	88802.24792
184.620	1.00000000	-3197454.	88411.09280
169.235	1.00000000	-3143411.	86546.91938

The analysis ended normally.

153.650	-.027135	207270.	-8901.9450	-.0001944	1760.4653	213.6889
155.388	-.027388	193850.	-8572.8030	-.0001366	1679.4594	214.1650
156.927	-.027556	180929.	-8243.0288	-8.2650E-05	1601.4672	214.5107
158.465	-.027643	168509.	-7912.8742	-3.2348E-05	1526.4962	214.6796
160.004	-.027655	156590.	-7582.5715	1.4460E-05	1454.5520	214.7023
161.542	-.027598	145174.	-7252.3358	5.7908E-05	1385.6376	214.5924
163.081	-.027477	134259.	-6922.3672	9.8161E-05	1319.7543	214.3560
164.619	-.027296	123846.	-6592.8526	.0001353	1256.9014	214.0024
166.158	-.027061	113935.	-6263.9665	.0001695	1197.0762	213.5388
167.696	-.026774	104525.	-5935.8731	.0002010	1140.2766	212.9720
169.235	-.026442	95614.9757	-5608.7267	.0002298	1086.4906	212.3077
170.773	-.026067	87203.4873	-5282.6732	.0002561	1035.7171	211.5513
172.312	-.025654	79289.2599	-4957.8507	.0002801	987.9451	210.7074
173.851	-.025205	71870.6117	-4634.2907	.0003019	943.1645	209.7801
175.389	-.024725	64945.6437	-4312.4185	.0003216	901.3639	208.7733
176.928	-.024216	58512.2489	-4068.1290	.0003393	862.5305	108.7950
178.466	-.023681	52334.0369	-3901.8964	.0003553	825.2375	107.3021
180.005	-.023123	46407.7203	-3738.0737	.0003695	789.4649	105.6620
181.543	-.022544	40729.6535	-3576.8802	.0003821	755.1909	103.8843
183.082	-.021947	35295.8551	-3418.5204	.0003930	722.3913	101.9782
184.620	-.021335	30102.0301	-3263.1848	.0004024	691.0403	99.9530
186.159	-.020709	25143.5917	-3111.0497	.0004104	661.1100	97.8176
187.697	-.020072	20415.6834	-2962.2778	.0004169	632.5710	95.5811
189.236	-.019426	15913.1990	-2817.0178	.0004222	605.3936	93.2521
190.774	-.018773	11630.8079	-2675.4054	.0004261	579.5439	90.8394
192.313	-.018115	7562.9674	-2537.5631	.0004289	554.9896	88.3512
193.851	-.017453	3703.9511	-2403.6003	.0004305	531.6957	85.7960
195.390	-.016790	47.8647	-2273.6142	.0004311	509.6268	83.1817
196.928	-.016127	-3411.3330	-2147.6894	.0004306	529.9294	80.5164
198.467	-.015465	-6679.8155	-2025.8987	.0004291	549.6587	77.8076
200.005	-.014806	-9763.8617	-1908.3031	.0004268	568.2747	75.0629
201.543	-.014152	-12669.8459	-1794.9521	.0004235	585.8150	72.2896
203.082	-.013503	-15406.2167	-1685.8843	.0004195	602.3211	69.4949
204.620	-.012861	-17973.4800	-1581.1273	.0004147	617.8297	66.6857
206.159	-.012227	-20384.1028	-1480.6984	.0004092	632.3812	63.8687
207.697	-.011602	-22642.8960	-1384.6044	.0004030	646.0153	61.0504
209.236	-.010987	-24756.2027	-1292.8424	.0003961	658.7717	58.2372
210.774	-.010383	-26730.6751	-1205.3998	.0003887	670.6900	55.4353
212.313	-.009791	-28572.8673	-1122.2547	.0003808	681.8099	52.6506
213.851	-.009212	-30289.2972	-1043.3763	.0003723	692.1706	49.8889
215.390	-.008646	-31886.4334	-968.7247	.0003633	701.8113	47.1558
216.928	-.008094	-33370.6812	-898.2517	.0003539	710.7705	44.4567
218.467	-.007557	-34748.3702	-831.9010	.0003441	719.0866	41.7970
220.005	-.007035	-36025.7409	-769.6081	.0003339	726.7971	39.1817
221.544	-.006529	-37208.9327	-711.3009	.0003234	733.9391	36.6158
223.083	-.006040	-38303.9720	-656.8997	.0003125	740.5490	34.1040
224.621	-.005567	-39316.7604	-606.3176	.0003013	746.6624	31.6511
226.160	-.005113	-40253.0636	-559.4605	.0002899	752.3141	29.2615
227.698	-.004675	-41118.5002	-516.2277	.0002782	757.5381	26.9397
229.237	-.004257	-41918.5814	-476.5115	.0002662	762.3672	24.6900
230.775	-.003856	-42658.4505	-440.1980	.0002540	766.8335	22.5164
232.314	-.003475	-43343.3728	-407.1667	.0002417	770.9679	20.4232
233.852	-.003113	-43978.2256	-377.2912	.0002291	774.8000	18.4141
235.391	-.002770	-44567.7390	-350.4386	.0002163	778.3584	16.4933
236.929	-.002447	-45116.4360	-170.4803	.0002034	781.6705	217.4467
238.468	-.002144	-45148.6416	116.0298	.0001904	781.8649	155.0072
240.006	-.001861	-44812.1479	339.3767	.0001775	779.8337	135.3365
241.545	-.001598	-44153.5203	533.3931	.0001647	775.8582	116.8785
243.083	-.001354	-43216.4989	699.9475	.0001521	770.2020	99.6368
244.622	-.001130	-42041.9078	840.9068	.0001398	763.1120	83.6057
246.160	-.000924	-40667.7471	958.1223	.0001279	754.8172	68.7706
247.699	-.000736	-39129.1861	1053.4177	.0001164	745.5301	55.1097
249.237	-.000566	-37458.6212	1128.5763	.0001054	735.4462	42.5946
250.775	-.000412	-35685.7421	1185.3359	9.4857E-05	724.7448	31.1911
252.314	-.000274	-33837.6114	1225.3767	8.4847E-05	713.5890	20.8607
253.852	-.000153	-31938.7546	1250.3168	7.5376E-05	702.1271	11.5606
255.391	-4.22E-05	-30011.2606	1261.7062	6.6457E-05	690.4924	3.2453
256.930	5.34E-05	-28074.8884	1261.0231	5.8093E-05	678.8040	-4.1334
258.468	.000137	-26147.1805	1249.6699	5.0286E-05	667.1679	-10.6254
260.007	.000208	-24243.5800	1228.9717	4.3031E-05	655.6774	-16.2816
261.545	.000269	-22377.5513	1200.1745	3.6319E-05	644.4136	-21.1530
263.084	.000320	-20560.7009	1164.4448	3.0136E-05	633.4467	-25.2936
264.622	.000362	-18802.9002	1122.8700	2.4469E-05	622.8363	-28.7524
266.161	.000395	-17112.4061	1076.4586	1.9298E-05	612.6321	-31.5809
267.699	.000421	-15495.9811	1026.1423	1.4603E-05	602.8750	-33.8287
269.238	.000440	-13959.0101	972.7774	1.0362E-05	593.5975	-35.5440
270.776	.000453	-12505.6145	917.1473	6.5515E-06	584.8245	-36.7733
272.315	.000460	-11130.7622	859.9653	3.1472E-06	576.5738	-37.5615
273.853	.000463	-9860.3730	801.8773	1.2371E-07	568.8572	-37.9510
275.392	.000461	-8671.4199	743.4656	-2.5445E-06	561.6804	-37.9823
276.930	.000455	-7572.0247	685.2519	-4.8832E-06	555.0442	-37.6936
278.469	.000446	-6561.5476	627.7011	-6.9182E-06	548.9448	-37.1205
280.007	.000434	-5638.6726	571.2251	-8.6748E-06	543.3741	-36.2963
281.546	.000419	-4801.4855	516.1868	-1.0178E-05	538.3207	-35.2527
283.084	.000402	-4047.5471	462.9036	-1.1452E-05	533.7697	-34.0248
284.623	.000384	-3373.9597	411.6515	-1.2521E-05	529.7038	-32.6213
286.161	.000364	-2777.4282	362.6688	-1.3406E-05	526.1030	-31.0646
287.700	.000342	-2254.3153	316.1601	-1.4131E-05	522.9454	-29.3952
289.238	.000320	-1800.6905	272.2997	-1.4715E-05	520.2072	-27.6218
290.777	.000297	-1412.3742	231.2355	-1.5177E-05	517.8633	-25.7604
292.315	.000274	-1084.9759	193.0920	-1.5537E-05	515.8870	-23.8250
293.854	.000249	-813.9276	157.9730	-1.5810E-05	514.2509	-21.8275
295.392	.000225	-594.5121	125.9690	-1.6013E-05	512.9265	-19.7778
296.930	.000200	-421.8866	100.3326	-1.6159E-05	511.8845	-13.5487
298.469	.000175	-281.3137	78.5610	-1.6261E-05	511.0359	-14.7537
300.007	.000150	-175.6513	57.4271	-1.6326E-05	510.3981	-12.7197
301.546	.000125	-100.0893	39.4478	-1.6366E-05	509.9420	-10.6528
303.084	9.97E-05	-49.7383	24.6715	-1.6388E-05	509.6381	-8.5558
304.623	7.45E-05	-19.6367	13.1433	-1.6398E-05	509.4564	-6.4305
306.161	4.93E-05	-4.7553	4.9057	-1.6401E-05	509.3666	-4.2781
307.700	2.40E-05	0.0000	0.0000	-1.6402E-05	509.3379	-2.0991

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	1.00000000 in
Computed slope at pile head	=	-.00001960
Maximum bending moment	=	-3217124. lbs-in
Maximum shear force	=	88939.29607 lbs
Depth of maximum bending moment	=	0.00000 in
Depth of maximum shear force	=	0.00000 in

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Displacement and Slope (BC Type 5)
Specified deflection at pile head = 1.000000 in
Specified slope at pile head = 0.000E+00 in/in
Specified axial load at pile head = 90000.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res p lbs/in
0.000	1.000000	-3217124.	88939.2961	0.0000	19928.5983	-636.6451
1.539	.999287	-3081002.	87932.1667	-.0009068	19106.9330	-654.5867
3.077	.997210	-2946306.	86911.1413	-.0017746	18293.0787	-672.7752
4.615	.993827	-2813085.	85861.8951	-.0026039	17489.7276	-691.2108
6.154	.989198	-2681387.	84784.0956	-.0033950	16694.7753	-709.8934
7.692	.983381	-2551264.	83677.3629	-.0041483	15909.3202	-728.8231
9.231	.976433	-2422763.	82541.3170	-.0048645	15133.6643	-747.9998
10.770	.968413	-2295937.	81375.5776	-.0055439	14368.1124	-767.4235
12.308	.959375	-2170835.	80179.7649	-.0061870	13612.9726	-787.0942
13.846	.949375	-2047510.	78953.4986	-.0067944	12868.5560	-807.0120
15.385	.938468	-1926014.	77696.3989	-.0073665	12135.1769	-827.1768
16.924	.926708	-1806399.	76408.0855	-.0079039	11413.1526	-847.5887
18.462	.914148	-1688717.	75088.1765	-.0084071	10702.8036	-868.2475
20.000	.900840	-1573024.	73736.2979	-.0088767	10004.4534	-889.1534
21.539	.886834	-1459373.	72352.0634	-.0093134	9318.4284	-910.3063
23.078	.872182	-1347818.	70935.0952	-.0097175	8645.0583	-931.7063
24.616	.856933	-1238414.	69485.0131	-.0100899	7984.6757	-953.3533
26.154	.841136	-1131218.	68001.4371	-.0104311	7337.6162	-975.2473
27.693	.824837	-1026285.	66483.9872	-.0107417	6704.2184	-997.3883
29.232	.808083	-923672.	64932.2832	-.0110225	6084.8239	-1019.7764
30.770	.790921	-823436.	63345.9452	-.0112740	5479.7772	-1042.4115
32.309	.773393	-725635.	61724.5930	-.0114971	4889.4259	-1065.2936
33.847	.755544	-630326.	60067.8468	-.0116923	4314.1205	-1088.4227
35.386	.737416	-537568.	58375.3263	-.0118604	3754.2144	-1111.7989
36.924	.719050	-447420.	56646.6516	-.0120023	3210.0638	-1135.4221
38.462	.700485	-359942.	54881.4426	-.0121185	2682.0281	-1159.2922
40.001	.681761	-275194.	53079.3193	-.0122100	2170.4692	-1183.4095
41.539	.662915	-193236.	51239.9017	-.0122774	1675.7522	-1207.7737
43.078	.643984	-114129.	49362.8097	-.0123217	1198.2449	-1232.3849
44.617	.625001	-37934.5797	47447.6633	-.0123435	738.3180	-1257.2432
46.155	.606002	35285.8196	45494.0824	-.0123439	722.3307	-1282.3484
47.694	.587018	105469.	43501.6871	-.0123237	1145.9736	-1307.7007
49.232	.568083	172553.	41470.0973	-.0122836	1550.9071	-1333.3000
50.770	.549222	236475.	39418.1133	-.0122247	1936.7494	-1334.2125
52.309	.530467	297228.	37373.3398	-.0123479	2303.4721	-1323.9266
53.847	.511843	354836.	35345.0573	-.0120540	2651.2074	-1312.7748
55.386	.493377	409323.	33334.5626	-.0119440	2980.1010	-1300.8030
56.925	.475092	460714.	31343.0808	-.0118187	3290.3107	-1288.0585
58.463	.457011	509039.	29371.7636	-.0116791	3582.0061	-1274.5898
60.002	.439155	554326.	27421.6872	-.0115260	3855.3682	-1260.4461
61.540	.421545	596607.	25493.8516	-.0113603	4110.5882	-1245.6777
63.078	.404200	635916.	23589.1785	-.0111828	4347.9667	-1230.3352
64.617	.387136	672288.	21708.5120	-.0109945	4567.4137	-1214.4701
66.156	.370370	705758.	19852.6164	-.0107961	4769.4470	-1198.1339
67.694	.353916	736364.	18022.1765	-.0105884	4954.1919	-1181.3784
69.233	.337789	764145.	16217.7976	-.0103724	5121.8805	-1164.2555
70.771	.322000	789139.	14440.0052	-.0101487	5272.7507	-1146.8168
72.310	.306561	811387.	12689.2458	-.0099183	5407.0458	-1129.1136
73.848	.291482	830930.	10965.8869	-.0096818	5525.0132	-1111.1968
75.386	.276770	847810.	9270.2188	-.0094401	5626.9043	-1093.1166
76.925	.262435	862069.	7602.4548	-.0091939	5712.9733	-1074.9224
78.463	.248481	873749.	5962.7366	-.0089440	5783.4767	-1056.6579
80.002	.234914	882893.	4351.4956	-.0086911	5838.6727	-1037.9031
81.540	.221736	889545.	2777.6650	-.0084359	5878.8270	-1008.0245
83.079	.208957	893776.	1265.3351	-.0081791	5904.3650	-957.9563
84.617	.196571	895704.	-170.6175	-.0079215	5916.0010	-908.7354
86.156	.184582	895445.	-1531.5337	-.0076636	5914.4377	-860.4115
87.695	.172990	893114.	-2818.0284	-.0074061	5900.3656	-813.0298
89.233	.161794	888822.	-4033.9826	-.0071495	5874.4624	-766.6312
90.772	.150991	882681.	-5178.5370	-.0068946	5837.3919	-721.2523
92.310	.140579	874797.	-5981.3119	-.0066414	5789.8040	-322.3209
93.849	.130555	866116.	-6472.6720	-.0063907	5737.4002	-316.4220
95.387	.120915	856651.	-6954.8622	-.0061427	5680.2670	-310.4109
96.926	.111654	846417.	-7427.7192	-.0058975	5618.4927	-304.2878
98.464	.102769	835429.	-7891.0623	-.0056553	5552.1671	-298.0433
100.003	.094253	823702.	-8344.6965	-.0054165	5481.3820	-291.6664
101.541	.086102	811252.	-8788.4079	-.0051811	5406.2315	-285.1441
103.080	.078311	798095.	-9221.9611	-.0049493	5326.8118	-278.4609
104.618	.070873	784247.	-9645.0939	-.0047215	5243.2214	-271.5981
106.156	.063783	769724.	-10057.5124	-.0044978	5155.5617	-264.5327
107.695	.057033	754545.	-10458.8833	-.0042783	5063.9373	-257.2364
109.233	.050618	738727.	-10848.8241	-.0040633	4968.4560	-249.6739
110.772	.044530	722289.	-11226.8902	-.0038530	4869.2296	-241.7987
112.311	.038763	705249.	-11592.5567	-.0036474	4766.3746	-233.5569
113.849	.033307	687629.	-11945.1926	-.0034469	4660.0130	-224.8603
115.388	.028157	669448.	-12284.0222	-.0032515	4550.2733	-215.6971
116.926	.023303	650731.	-12608.0657	-.0030614	4437.2916	-205.9389
118.465	.018737	631501.	-12916.0432	-.0028768	4321.2154	-194.7192
120.003	.014451	611785.	-13206.1897	-.0026978	4202.2052	-182.4645
121.542	.010436	591613.	-13475.9271	-.0025245	4080.4407	-168.1852
123.080	.006683	571019.	-13721.8122	-.0023571	3956.1308	-150.4175
124.619	.003183	550046.	-13932.7770	-.0021957	3829.5345	-124.8710
126.157	-7.34E-05	528756.	-14015.7905	-.0020404	3701.0216	16.9571
127.696	-.003095	507484.	-13907.0987	-.0018912	3572.6237	124.3387
129.234	-.005893	486487.	-13699.1746	-.0017481	3445.8802	145.9559
130.773	-.008474	465816.	-13463.9722	-.0016110	3321.1050	159.7995
132.311	-.010850	445505.	-13210.3021	-.0014797	3198.5008	169.9635
133.850	-.013027	425570.	-12942.7039	-.0013543	3078.2178	177.9055
135.388	-.015017	406055.	-12664.0528	-.0012346	2960.3742	184.3318
136.927	-.016826	386952.	-12375.3716	-.0011204	2845.0665	189.6443
138.465	-.018464	368283.	-12081.1795	-.0010117	2732.3753	194.0959
140.004	-.019939	350059.	-11779.6693	-.0009082	2622.3686	197.8575
141.542	-.021259	332289.	-11472.8091	-.0008100	2515.1045	201.0507
143.081	-.022432	314981.	-11161.4045	-.0007168	2410.6330	203.7652
144.619	-.023465	298144.	-10846.1388	-.0006285	2308.9970	206.0700
146.158	-.024365	281782.	-10527.6011	-.0005450	2210.2336	208.0187
147.696	-.025142	265901.	-10206.3060	-.0004662	2114.3743	209.6545
149.235	-.025800	250506.	-9882.7078	-.0003918	2021.4666	211.0126
150.773	-.026347	235600.	-9557.2116	-.0003218	1931.4734	212.1220
152.312	-.026790	221188.	-9230.1809	-.0002561	1844.4743	213.0072

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 4 is silt with cohesion and friction
Distance from top of pile to top of layer = 235.700 in
Distance from top of pile to bottom of layer = 295.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 5 is silt with cohesion and friction
Distance from top of pile to top of layer = 295.700 in
Distance from top of pile to bottom of layer = 381.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 6 is silt with cohesion and friction
Distance from top of pile to top of layer = 381.700 in
Distance from top of pile to bottom of layer = 450.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

(Depth of lowest layer extends 142.30 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth is defined using 12 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-100.30	.07234
2	91.70	.07234
3	91.70	.07234
4	175.70	.07234
5	175.70	.07234
6	235.70	.07234
7	235.70	.06940
8	295.70	.06940
9	295.70	.07234
10	381.70	.07234
11	381.70	.03623
12	450.00	.03623

Shear Strength of Soils

Distribution of shear strength parameters with depth defined using 12 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-100.300	.00000	30.00	------	------
2	91.700	.00000	30.00	------	------
3	91.700	6.25000	.00	------	------
4	175.700	6.25000	.00	------	------
5	175.700	.00000	30.00	------	------
6	235.700	.00000	30.00	------	------
7	235.700	5.56000	25.00	------	------
8	295.700	5.56000	25.00	------	------
9	295.700	3.47000	32.00	------	------
10	381.700	3.47000	32.00	------	------
11	381.700	3.47000	32.00	------	------
12	450.000	3.47000	32.00	------	------

Notes:

(1) Cohesion = unixial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Displacement and Slope (BC Type 5)
Deflection at pile head = 1.000 in
Slope at pile head = .000 in/in
Axial load at pile head = 98000.000 lbs

LPILE Plus for Windows, Version 5.0 (5.0.11)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Youwei Zhou
Kleinfelder

Path to file locations: U:\YZhou\Projects\75010\Analysis\LPILE\A1\
Name of input data file: Alf25mm.lpd
Name of output file: Alf25mm.lpo
Name of plot output file: Alf25mm.lpp
Name of runtime file: Alf25mm.lpr

Time and Date of Analysis

Date: May 30, 2007 Time: 10:50:48

Problem Title

A1 fixed head 1.0 inch

Program Options

Units Used in Computations - US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 200
- Maximum number of iterations allowed = 200
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+01 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 307.70 in
Depth of ground surface below top of pile = -100.30 in
Slope angle of ground surface = 25.00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	15.00000000	1242.5000	176.7000	4300000.
2	500.0000	15.00000000	1242.5000	176.7000	4300000.

Soil and Rock Layering Information

The soil profile is modelled using 5 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -100.300 in
Distance from top of pile to bottom of layer = 91.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 2 is stiff clay without free water
Distance from top of pile to top of layer = 91.700 in
Distance from top of pile to bottom of layer = 175.700 in

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 175.700 in
Distance from top of pile to bottom of layer = 275.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

Number of iterations = 12
Number of zero deflection points = 2

Summary of Pile-Head Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = pile-head moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = pile-head shear force lbs
Type 4 = Deflection and Moment, S = pile-head slope, radians
Type 5 = Deflection and Slope, R = rotational stiffness of pile-headin-lbs/rad

Load Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
5	y= .250000	S= 0.000	90000.0000	.2500000	-1473368.	41521.2174

Pile-head Deflection vs. Pile Length

Boundary Condition Type 5, Deflection and Slope

Deflection = .25000 in
Slope = .00000
Axial Load = 90000. lbs

Pile Length in	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
307.700	.25000000	-1473368.	41521.21741
292.315	.25000000	-1473374.	41521.01359
276.930	.25000000	-1472982.	41510.06543
261.545	.25000000	-1472803.	41505.20486
246.160	.25000000	-1472810.	41502.00280
230.775	.25000000	-1472159.	41493.17699
215.390	.25000000	-1470519.	41463.75297
200.005	.25000000	-1466303.	41378.52072
184.620	.25000000	-1458222.	41196.60755
169.235	.25000000	-1439728.	40687.27099

The analysis ended normally.

153.850	-.004734	118536.	-4893.9903	-.0001347	867.0927	138.2206
155.388	-.004928	111188.	-4680.2698	-.0001181	844.9145	139.6091
156.927	-.005098	104168.	-4464.5743	-.0001026	823.7270	140.7882
158.465	-.005244	97478.6553	-4247.2064	-8.8095E-05	803.5390	141.7830
160.004	-.005369	91123.3537	-4028.4335	-7.4518E-05	784.3580	142.6146
161.542	-.005473	85103.8016	-3808.4935	-6.1831E-05	766.1904	143.3002
163.081	-.005559	79421.7420	-3587.5996	-4.9987E-05	749.0413	143.8547
164.619	-.005627	74078.6005	-3365.9441	-3.8936E-05	732.9151	144.2904
166.158	-.005679	69075.5148	-3143.7013	-2.8631E-05	717.8153	144.6180
167.696	-.005715	64413.3602	-2921.0305	-1.9021E-05	703.7444	144.8468
169.235	-.005737	60092.7712	-2698.0778	-1.0058E-05	690.7044	144.9846
170.773	-.005746	56114.1602	-2474.9777	-1.6918E-06	678.6965	145.0382
172.312	-.005743	52477.7333	-2251.8554	6.1258E-06	667.7214	145.0136
173.851	-.005727	49183.5048	-2028.8274	1.3444E-05	657.7790	144.9155
175.389	-.005701	46231.3082	-1806.0035	2.0313E-05	648.8690	144.7483
176.928	-.005665	43620.8066	-1675.0778	2.6782E-05	640.9902	25.4508
178.466	-.005619	41069.6771	-1635.9145	3.2879E-05	633.2906	25.4601
180.005	-.005564	38577.9925	-1596.7717	3.8612E-05	625.7704	25.4243
181.543	-.005500	36145.7177	-1557.7175	4.3992E-05	618.4296	25.3449
183.082	-.005428	33772.7132	-1518.8179	4.9025E-05	611.2676	25.2233
184.620	-.005349	31458.7385	-1480.1365	5.3721E-05	604.2838	25.0612
186.159	-.005263	29203.4562	-1441.7345	5.8088E-05	597.4771	24.8601
187.697	-.005171	27006.4351	-1403.6707	6.2135E-05	590.8462	24.6216
189.236	-.005072	24867.1545	-1366.0014	6.5869E-05	584.3896	24.3472
190.774	-.004968	22785.0076	-1328.7806	6.9300E-05	578.1055	24.0386
192.313	-.004859	20759.3054	-1292.0598	7.2435E-05	571.9917	23.6974
193.851	-.004745	18789.2805	-1255.8877	7.5282E-05	566.0460	23.3251
195.390	-.004627	16874.0911	-1220.3110	7.7849E-05	560.2657	22.9235
196.928	-.004505	15012.8248	-1185.3734	8.0145E-05	554.6482	22.4942
198.467	-.004380	13204.5026	-1151.1165	8.2176E-05	549.1905	22.0387
200.005	-.004253	11448.0823	-1117.5391	8.3951E-05	543.8894	21.5589
201.543	-.004122	9742.4632	-1084.7375	8.5476E-05	538.7417	21.0562
203.082	-.003990	8086.4896	-1052.8055	8.6760E-05	533.7438	20.5324
204.620	-.003855	6478.9545	-1021.6343	8.7808E-05	528.8920	19.9891
206.159	-.003719	4918.6040	-991.3127	8.8629E-05	524.1827	19.4280
207.697	-.003582	3404.1412	-961.8669	8.9228E-05	519.6119	18.8507
209.236	-.003445	1934.2297	-933.3204	8.9612E-05	515.1756	18.2588
210.774	-.003307	507.4979	-905.6944	8.9788E-05	510.8695	17.6541
212.313	-.003169	-877.4569	-879.0073	8.9761E-05	511.9861	17.0382
213.851	-.003031	-2222.0652	-853.2752	8.9538E-05	516.0443	16.4127
215.390	-.002893	-3527.7807	-829.5116	8.9124E-05	519.9852	15.7792
216.928	-.002756	-4796.0767	-804.7274	8.8525E-05	523.8129	15.1395
218.467	-.002621	-6028.4421	-781.9310	8.7746E-05	527.5324	14.4951
220.005	-.002486	-7226.3777	-760.1282	8.6792E-05	531.1479	13.8478
221.544	-.002354	-8391.3918	-739.3224	8.5667E-05	534.6640	13.1990
223.083	-.002223	-9524.9967	-719.5145	8.4378E-05	538.0853	12.5506
224.621	-.002094	-10628.7047	-700.7028	8.2927E-05	541.4164	11.9041
226.160	-.001968	-11704.0241	-682.8830	8.1319E-05	544.6619	11.2611
227.698	-.001844	-12752.4552	-666.0483	7.9558E-05	547.8262	10.6234
229.237	-.001723	-13775.4867	-650.1894	7.7649E-05	550.9138	9.9925
230.775	-.001605	-14774.5913	-635.2947	7.5593E-05	553.9292	9.3702
232.314	-.001490	-15751.2224	-621.3496	7.3396E-05	556.8760	8.7580
233.852	-.001379	-16706.8094	-608.3372	7.1059E-05	559.7608	8.1576
235.391	-.001271	-17642.7544	-596.2382	6.8586E-05	562.5856	7.5707
236.929	-.001168	-18560.4279	-585.0296	6.5980E-05	565.3552	103.7826
238.468	-.001068	-19232.0798	-574.7236	6.3259E-05	567.3824	77.2458
240.006	-.000973	-19720.5089	-565.3183	6.0455E-05	568.8565	70.7753
241.545	-.000882	-20061.0209	-556.8110	5.7593E-05	569.8238	64.5439
243.083	-.000796	-20208.3591	-549.1992	5.4695E-05	570.3289	58.5622
244.622	-.000714	-20236.6788	-542.4804	5.1783E-05	570.4144	52.8385
246.160	-.000637	-20139.5272	-536.6523	4.8877E-05	570.1211	47.3792
247.699	-.000564	-19929.8284	-531.7125	4.5992E-05	569.4882	42.1881
249.237	-.000495	-19619.8737	-527.6588	4.3145E-05	568.5528	37.2676
250.775	-.000431	-19221.9161	-524.4890	4.0349E-05	567.3499	32.6180
252.314	-.000371	-18745.1690	-522.2008	3.7616E-05	565.9128	28.2381
253.852	-.000315	-18201.8093	-520.7919	3.4956E-05	564.2729	24.1252
255.391	-.000263	-17600.9827	-520.2602	3.2378E-05	562.4595	20.2754
256.930	-.000216	-16951.8138	-520.6035	2.9891E-05	560.5003	16.6834
258.468	-.000172	-16262.8176	-521.8198	2.7500E-05	558.4208	13.3431
260.007	-.000131	-15541.9144	-523.9070	2.5210E-05	556.2450	10.2472
261.545	-9.39E-05	-14796.4465	-526.8633	2.3026E-05	553.9951	7.3878
263.084	-6.02E-05	-14033.1968	-530.6867	2.0951E-05	551.6916	4.7562
264.622	-2.95E-05	-13258.4096	-535.3753	1.8986E-05	549.3532	2.3430
266.161	-1.74E-06	-12477.8122	-540.9274	1.7133E-05	546.9973	.1386485
267.699	2.32E-05	-11696.6379	-547.3411	1.5393E-05	544.6386	-1.8672
269.238	4.56E-05	-10919.6499	-554.6147	1.3765E-05	542.2946	-3.6849
270.776	6.56E-05	-10151.1662	-562.7463	1.2248E-05	539.9752	-5.3252
272.315	8.33E-05	-9395.0847	-571.7341	1.0841E-05	537.6932	-6.7988
273.853	9.90E-05	-8654.9086	-581.5762	9.5412E-06	535.4593	-8.1168
275.392	.000113	-7933.7723	-592.2707	8.3469E-06	533.2828	-9.2899
276.930	.000125	-7234.4670	-603.8157	7.2550E-06	531.1723	-10.3290
278.469	.000135	-6559.4660	-616.2092	6.2620E-06	529.1350	-11.2447
280.007	.000144	-5910.9504	-629.4492	5.3642E-06	527.1778	-12.0476
281.546	.000152	-5290.0333	-643.5336	4.5578E-06	525.3062	-12.7478
283.084	.000158	-4700.7847	-658.4603	3.8385E-06	523.5253	-13.3553
284.623	.000163	-4142.2542	-674.2270	3.2019E-06	521.8396	-13.8798
286.161	.000168	-3616.4944	-690.8315	2.6433E-06	520.2528	-14.3305
287.700	.000171	-3124.5825	-708.2715	2.1580E-06	518.7682	-14.7162
289.238	.000174	-2667.4411	-726.5446	1.7411E-06	517.3885	-15.0452
290.777	.000177	-2245.8584	-745.6484	1.3874E-06	516.1161	-15.3256
292.315	.000179	-1860.5063	-765.5803	1.0917E-06	514.9531	-15.5647
293.854	.000180	-1511.9584	-786.3378	8.4896E-07	513.9011	-15.7692
295.392	.000181	-1200.7058	-807.9182	6.5368E-07	512.9617	-15.9456
296.930	.000182	-927.1724	-830.3187	5.0049E-07	512.1362	-16.0990
298.469	.000183	-689.0254	-853.5363	3.8457E-07	511.3993	-16.2313
300.007	.000183	-475.5797	-877.5679	3.0116E-07	510.7732	-16.3510
301.546	.000184	-305.1701	-902.4102	2.4496E-07	510.2589	-16.4621
303.084	.000184	-172.1104	-928.0599	2.1060E-07	509.8573	-16.5679
304.623	.000184	-76.7010	-954.5135	1.9269E-07	509.5694	-16.6707
306.161	.000185	-19.2345	-981.7675	1.8578E-07	509.3959	-16.7724
307.700	.000185	0.0000	-1009.8183	1.8439E-07	509.3379	-16.8749

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	.25000000 in
Computed slope at pile head	=	-.00000457
Maximum bending moment	=	-1473348. lbs-in
Maximum shear force	=	41521.21741 lbs
Depth of maximum bending moment	=	0.00000 in
Depth of maximum shear force	=	0.00000 in

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Displacement and Slope (BC Type 5)
Specified deflection at pile head = .250000 in
Specified slope at pile head = 0.000E+00 in/in
Specified axial load at pile head = 90000.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res p lbs/in
0.000	.250000	-1473348.	41521.2174	0.0000	4956.0633	-361.7302
1.539	.249037	-1408893.	40949.1218	-.0002076	4764.5490	-371.7766
3.077	.249361	-1347290.	40369.6544	-.0004061	4575.6057	-381.6646
4.615	.248587	-1285563.	39774.9878	-.0005956	4389.3079	-391.3827
6.154	.247529	-1224737.	39165.5092	-.0007763	4205.7287	-400.9196
7.692	.246199	-1164836.	38541.5061	-.0009483	4024.9399	-410.2642
9.231	.244611	-1105883.	37903.2826	-.0011118	3847.0119	-419.4057
10.770	.242778	-1047900.	37251.1594	-.0012669	3672.0135	-428.3332
12.308	.240713	-990910.	36585.4737	-.0014136	3500.0119	-437.0365
13.846	.238428	-934935.	35906.5784	-.0015523	3331.0729	-445.5053
15.385	.235936	-879996.	35214.8419	-.0016829	3165.2602	-453.7297
16.924	.233250	-826113.	34510.6475	-.0018058	3002.6359	-461.7001
18.462	.230380	-773306.	33794.3934	-.0019209	2843.2602	-469.4070
20.000	.227339	-721595.	33066.4916	-.0020285	2687.1913	-476.8416
21.539	.224138	-670999.	32327.3680	-.0021288	2534.4866	-483.9950
23.078	.220789	-621535.	31577.4616	-.0022218	2385.1969	-490.8590
24.616	.217302	-573220.	30817.2239	-.0023078	2239.3774	-497.4253
26.154	.213688	-526071.	30047.1187	-.0023870	2097.0770	-503.6864
27.693	.209957	-480104.	29267.6213	-.0024594	1958.3432	-509.6349
29.232	.206120	-435333.	28479.2180	-.0025253	1823.2212	-515.2638
30.770	.202187	-391774.	27682.4055	-.0025848	1691.7540	-520.5666
32.309	.198166	-349439.	26877.6904	-.0026382	1563.9821	-525.5369
33.847	.194069	-308341.	26065.5886	-.0026856	1439.9434	-530.1690
35.386	.189903	-268491.	25246.6248	-.0027271	1319.6736	-534.4574
36.924	.185678	-229902.	24421.3315	-.0027630	1203.2058	-538.3970
38.462	.181401	-192582.	23590.2490	-.0027934	1090.5703	-541.9832
40.001	.177082	-156541.	22753.9243	-.0028185	981.7950	-545.2117
41.539	.172729	-121787.	21912.9109	-.0028385	876.9052	-548.0785
43.078	.168348	-88320.6911	21067.7678	-.0028537	775.9234	-550.5801
44.617	.163948	-56171.5225	20219.0592	-.0028641	678.8696	-552.7134
46.155	.159535	-25321.4970	19367.3540	-.0028699	585.7609	-554.4757
47.694	.155117	4216.5992	18513.2249	-.0028715	522.0640	-555.8645
49.232	.150700	32438.8901	17657.2479	-.0028688	607.2420	-556.8777
50.770	.146290	59342.4146	16803.8577	-.0028622	688.4397	-557.5019
52.309	.141893	84936.9938	15962.4096	-.0028519	765.6869	-557.3532
53.847	.137515	109249.	15138.3182	-.0028379	839.0617	-557.9388
55.386	.133161	132303.	14331.9745	-.0028205	908.6442	-558.2818
56.925	.128836	154129.	13543.7341	-.0027998	974.5161	-558.4051
58.463	.124546	174753.	12773.9177	-.0027762	1036.7611	-558.3312
60.002	.120294	194203.	12022.8116	-.0027496	1095.4642	-558.0824
61.540	.116085	212509.	11290.6679	-.0027203	1150.7110	-557.6806
63.078	.111923	229698.	10577.7056	-.0026885	1202.5912	-557.1473
64.617	.107813	245801.	9884.1107	-.0026543	1251.1910	-556.5036
66.156	.103756	260846.	9210.0370	-.0026178	1296.6006	-555.7703
67.694	.099758	274865.	8555.6069	-.0025792	1338.9100	-554.9676
69.233	.095820	287886.	7920.9118	-.0025387	1378.2099	-554.1156
70.771	.091946	299941.	7306.0131	-.0024964	1414.5912	-553.2330
72.310	.088139	311058.	6710.9425	-.0024524	1448.1452	-552.3393
73.848	.084400	321269.	6135.7035	-.0024069	1478.9635	-551.4528
75.386	.080733	330604.	5580.2712	-.0023600	1507.1375	-550.5912
76.925	.077139	339093.	5044.5939	-.0023117	1532.7584	-549.7719
78.463	.073619	346767.	4528.5935	-.0022624	1555.9174	-549.0119
80.002	.070177	353654.	4032.1663	-.0022119	1576.7051	-548.3274
81.540	.066813	359786.	3555.1839	-.0021606	1595.2127	-547.7342
83.079	.063529	365192.	3097.4941	-.0021084	1611.5269	-547.2476
84.617	.060326	369901.	2658.9216	-.0020555	1625.7395	-546.8824
86.156	.057204	373943.	2239.2687	-.0020019	1637.9376	-546.6527
87.695	.054166	377346.	1838.3164	-.0019478	1648.2082	-546.5722
89.233	.051211	380139.	1455.8251	-.0018933	1656.6375	-546.6540
90.772	.048340	382350.	1091.5353	-.0018384	1663.3105	-546.9108
92.310	.045554	384006.	726.8405	-.0017832	1668.3108	-547.3607
93.849	.042853	385080.	358.5450	-.0017279	1671.5509	-547.9914
95.387	.040237	385579.	-10.0333	-.0016724	1673.0569	-548.7405
96.926	.037707	385512.	-369.8101	-.0016169	1672.8555	-549.5497
98.464	.035262	384889.	-723.6978	-.0015614	1670.9739	-550.3929
100.003	.032903	383710.	-1071.6053	-.0015061	1667.4398	-551.2753
101.541	.030628	382009.	-1413.4362	-.0014510	1662.2810	-552.1938
103.080	.028438	379770.	-1749.0898	-.0013961	1655.5263	-553.1469
104.618	.026332	377013.	-2078.4592	-.0013416	1647.2046	-554.1245
106.156	.024310	373747.	-2401.4303	-.0012876	1637.3456	-555.1276
107.695	.022370	369983.	-2717.8814	-.0012341	1625.9794	-556.1485
109.233	.020513	365725.	-3027.6808	-.0011811	1613.1368	-557.1807
110.772	.018736	360993.	-3330.6858	-.0011288	1598.8493	-558.2159
112.311	.017039	355789.	-3626.7398	-.0010772	1583.1491	-559.2468
113.849	.015421	350130.	-3915.6706	-.0010264	1566.0691	-560.2557
115.388	.013881	344025.	-4197.2854	-.0009764	1547.6432	-561.2344
116.926	.012417	337486.	-4471.3675	-.0009273	1527.9062	-562.1756
118.465	.011028	330524.	-4737.6698	-.0008792	1506.8939	-563.0708
120.003	.009712	323151.	-4995.9064	-.0008322	1484.6436	-563.9135
121.542	.008467	315382.	-5245.7423	-.0007862	1461.1939	-564.6960
123.080	.007293	307228.	-5486.7768	-.0007414	1436.5850	-565.4107
124.619	.006186	298704.	-5718.5210	-.0006978	1410.8594	-566.0497
126.157	.005146	289825.	-5940.3619	-.0006554	1384.0619	-566.6063
127.696	.004169	280607.	-6151.5057	-.0006143	1356.2407	-567.0743
129.234	.003255	271067.	-6350.8777	-.0005746	1327.4480	-567.4482
130.773	.002401	261225.	-6536.9304	-.0005363	1297.7421	-567.7230
132.311	.001605	251102.	-6707.2114	-.0004994	1267.1896	-567.8945
133.850	.000865	240725.	-6857.0057	-.0004640	1235.8715	-567.9597
135.388	.000177	230131.	-6957.6434	-.0004301	1203.8976	-567.9475
136.927	-.000459	219435.	-6929.2495	-.0003977	1171.6113	-567.8580
138.465	-.001047	208820.	-6796.1879	-.0003669	1139.8801	-567.7170
140.004	-.001588	198625.	-6641.9392	-.0003376	1108.8097	-567.5403
141.542	-.002085	188576.	-6474.1261	-.0003097	1078.4804	-567.3502
143.081	-.002541	178790.	-6296.3053	-.0002832	1048.9452	-567.1610
144.619	-.002957	169281.	-6110.6363	-.0002582	1020.2451	-566.9527
146.158	-.003335	160059.	-5918.6005	-.0002345	992.4132	-566.6877
147.696	-.003678	151134.	-5721.2907	-.0002121	965.4767	-566.3066
149.235	-.003988	142513.	-5519.5533	-.0001909	939.4584	-565.8435
150.773	-.004266	134203.	-5314.0667	-.0001710	914.3777	-565.3824
152.312	-.004514	126209.	-5105.3894	-.0001523	890.2511	-564.8914

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 4 is silt with cohesion and friction
Distance from top of pile to top of layer = 235.700 in
Distance from top of pile to bottom of layer = 295.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 5 is silt with cohesion and friction
Distance from top of pile to top of layer = 295.700 in
Distance from top of pile to bottom of layer = 381.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 6 is silt with cohesion and friction
Distance from top of pile to top of layer = 381.700 in
Distance from top of pile to bottom of layer = 450.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

(Depth of lowest layer extends 142.30 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth
is defined using 12 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-100.30	.07234
2	91.70	.07234
3	91.70	.07234
4	175.70	.07234
5	175.70	.07234
6	235.70	.07234
7	235.70	.06940
8	295.70	.06940
9	295.70	.07234
10	381.70	.07234
11	381.70	.03623
12	450.00	.03623

Shear Strength of Soils

Distribution of shear strength parameters with depth
defined using 12 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-100.300	.00000	30.00	------	------
2	91.700	.00000	30.00	------	------
3	91.700	6.25000	.00	------	------
4	175.700	6.25000	.00	------	------
5	175.700	.00000	30.00	------	------
6	235.700	.00000	30.00	------	------
7	235.700	5.56000	25.00	------	------
8	295.700	5.56000	25.00	------	------
9	295.700	3.47000	32.00	------	------
10	381.700	3.47000	32.00	------	------
11	381.700	3.47000	32.00	------	------
12	450.000	3.47000	32.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Displacement and Slope (BC Type 5)
Deflection at pile head = .250 in
Slope at pile head = .000 in/in
Axial load at pile head = 90000.000 lbs

LPILE Plus for Windows, Version 5.0 (5.0.11)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Youwei Zhou
Kleifelder

Path to file locations: U:\YZhou\Projects\75010\Analysis\LPILE\A1\\
Name of input data file: Alf6mm.lpd
Name of output file: Alf6mm.lpo
Name of plot output file: Alf6mm.lpp
Name of runtime file: Alf6mm.lpr

Time and Date of Analysis

Date: May 30, 2007 Time: 12:46:14

Problem Title

A1 fixed head 0.25 inch

Program Options

Units Used in Computations = US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 200
- Maximum number of iterations allowed = 200
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+01 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 307.70 in
Depth of ground surface below top of pile = -100.30 in
Slope angle of ground surface = 25.00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	15.00000000	2485.0000	176.7000	4300000.
2	500.0000	15.00000000	2485.0000	176.7000	4300000.

Soil and Rock Layering Information

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -100.300 in
Distance from top of pile to bottom of layer = 91.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 2 is stiff clay without free water
Distance from top of pile to top of layer = 91.700 in
Distance from top of pile to bottom of layer = 175.700 in

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 175.700 in
Distance from top of pile to bottom of layer = 235.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

```
Maximum bending moment          =       1151293. lbs-in
Maximum shear force             =     42000.00000 lbs
Depth of maximum bending moment =     51.00000000 in
Depth of maximum shear force    =         0.00000 in
Number of iterations            =              23
Number of zero deflection points =              2
```

Summary of Pile-Head Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

```
Type 1 = Shear and Moment,          y = pile-head displacement in
Type 2 = Shear and Slope,           M = pile-head moment lbs-in
Type 3 = Shear and Rot. Stiffness,  V = pile-head shear force lbs
Type 4 = Deflection and Moment,     S = pile-head slope, radians
Type 5 = Deflection and Slope,      R = rotational stiffness of pile-headin-lbs/rad
```

Load Type	Boundary Condition 1	Boundary Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 42000.	M= 0.000	90000.0000	1.0041	1151293.	42000.0000

Pile-head Deflection vs. Pile Length

Boundary Condition Type 1, Shear and Moment

```
Shear      =          42000. lbs
Moment     =              0. in-lbs
Axial Load =          90000. lbs
```

Pile Length in	Pile Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
200.000	1.00410077	1151293.	42000.00000
190.000	1.00371538	1151322.	42000.00000
180.000	1.00327058	1151532.	42000.00000
170.000	1.00865826	1150257.	42000.00000
160.000	1.04092867	1144741.	42000.00000
150.000	1.13655668	1136726.	42000.00000
140.000	1.38300149	1138172.	42000.00000
130.000	2.15137770	1180271.	42000.00000

The analysis ended normally.

96.000	-.009841	621232.	-16374.7814	-.0022018	4259.2623	165.8218
97.000	-.011985	605139.	-16204.7740	-.0020870	4162.0856	174.1929
98.000	-.014015	589204.	-16027.1068	-.0019752	4065.8988	181.1414
99.000	-.015935	573440.	-15843.0118	-.0018664	3970.7455	187.0487
100.000	-.017748	557854.	-15653.4104	-.0017606	3876.6630	192.1542
101.000	-.019456	542450.	-15459.0236	-.0016576	3783.6836	196.6193
102.000	-.021063	527234.	-15260.4349	-.0015575	3691.8360	200.5582
103.000	-.022571	512209.	-15058.1283	-.0014602	3601.1453	204.0551
104.000	-.023984	497380.	-14852.5135	-.0013657	3511.6342	207.1744
105.000	-.025303	482750.	-14643.9434	-.0012740	3423.3232	209.9659
106.000	-.026532	468322.	-14432.7256	-.0011850	3336.2304	212.4697
107.000	-.027673	454098.	-14219.1316	-.0010987	3250.3726	214.7103
108.000	-.028729	440081.	-14003.4033	-.0010150	3165.7646	216.7082
109.000	-.029703	426274.	-13785.7503	-.0009339	3082.4202	218.5519
110.000	-.030597	412678.	-13566.3933	-.0008554	3000.3516	220.1781
111.000	-.031414	399295.	-13345.4877	-.0007794	2919.5702	221.6330
112.000	-.032156	386127.	-13123.2060	-.0007059	2840.0860	222.9304
113.000	-.032825	373176.	-12899.6997	-.0006348	2761.9081	224.0823
114.000	-.033425	360442.	-12675.1089	-.0005662	2685.0450	225.0993
115.000	-.033958	347928.	-12449.5640	-.0004999	2609.5039	225.9905
116.000	-.034425	335633.	-12223.1867	-.0004359	2535.2916	226.7641
117.000	-.034830	323560.	-11996.0910	-.0003742	2462.4139	227.4275
118.000	-.035174	311708.	-11768.3837	-.0003148	2390.8762	227.9870
119.000	-.035459	300079.	-11540.1660	-.0002575	2320.6829	228.4485
120.000	-.035689	288674.	-11311.5339	-.0002024	2251.8381	228.8174
121.000	-.035864	277493.	-11082.5752	-.0001494	2184.3451	229.0982
122.000	-.035988	266536.	-10853.3785	-9.8536E-05	2118.2068	229.2953
123.000	-.036061	255804.	-10624.0245	-6.9653E-05	2053.4254	229.4126
124.000	-.036087	245297.	-10394.5914	-2.7578E-06	1990.0029	229.4537
125.000	-.036067	235015.	-10165.1536	4.2192E-05	1927.9404	229.4218
126.000	-.036002	224959.	-9935.7827	8.5239E-05	1867.2389	229.3199
127.000	-.035896	215128.	-9706.5474	.0001264	1807.8987	229.1507
128.000	-.035750	205523.	-9477.5137	.0001658	1749.9199	228.9167
129.000	-.035565	196143.	-9248.7452	.0002034	1693.3019	228.6202
130.000	-.035343	186989.	-9020.3035	.0002392	1638.0440	228.2633
131.000	-.035086	178060.	-8792.2479	.0002734	1584.1450	227.8479
132.000	-.034796	169355.	-8564.6360	.0003059	1531.6031	227.3759
133.000	-.034474	160875.	-8337.5237	.0003368	1480.4166	226.8487
134.000	-.034122	152620.	-8110.9654	.0003662	1430.5830	226.2680
135.000	-.033742	144588.	-7885.0139	.0003940	1382.0996	225.6350
136.000	-.033334	136779.	-7659.7209	.0004203	1334.9636	224.9510
137.000	-.032901	129192.	-7435.1369	.0004452	1289.1715	224.2171
138.000	-.032444	121828.	-7211.3112	.0004687	1244.7197	223.4343
139.000	-.031964	114685.	-6988.2923	.0004908	1201.6042	222.6035
140.000	-.031462	107763.	-6766.1278	.0005116	1159.8207	221.7255
141.000	-.030941	101061.	-6544.8645	.0005312	1119.3646	220.8010
142.000	-.030400	94577.9829	-6324.5487	.0005495	1080.2311	219.8305
143.000	-.029842	88313.0991	-6105.2262	.0005666	1042.4149	218.8146
144.000	-.029267	82265.5422	-5886.9421	.0005820	1005.9106	217.7536
145.000	-.028677	76434.3532	-5669.7414	.0005974	970.7122	216.6478
146.000	-.028072	70819.5243	-5453.6688	.0006112	936.8139	215.4973
147.000	-.027454	65416.9998	-5238.7691	.0006239	904.2091	214.3022
148.000	-.026824	60228.6756	-5025.0867	.0006357	872.8912	213.0625
149.000	-.026183	55252.3993	-4812.6665	.0006465	842.8533	211.7780
150.000	-.025531	50486.9702	-4601.5533	.0006564	814.0882	210.4483
151.000	-.024870	45931.1390	-4391.7926	.0006654	786.5882	209.0732
152.000	-.024200	41583.6072	-4183.4301	.0006736	760.3456	207.6518
153.000	-.023523	37443.0268	-3976.5123	.0006810	735.3521	206.1837
154.000	-.022838	33507.9994	-3771.0866	.0006877	711.5994	204.6677
155.000	-.022147	29777.0751	-3567.2013	.0006936	689.0788	203.1030
156.000	-.021451	26248.7523	-3364.9057	.0006988	667.7810	201.4881
157.000	-.020750	22921.4154	-3164.2509	.0007034	647.6969	199.8216
158.000	-.020044	19793.6340	-2965.2892	.0007074	628.8165	198.1017
159.000	-.019335	16863.5608	-2768.0752	.0007109	611.1300	196.3264
160.000	-.018623	14129.5301	-2572.6652	.0007138	594.6268	194.4934
161.000	-.017907	11589.7547	-2379.1186	.0007162	579.2961	192.5999
162.000	-.017190	9242.3840	-2187.4972	.0007181	565.1269	190.6428
163.000	-.016471	7085.5004	-1997.8665	.0007196	552.1075	188.6186
164.000	-.015751	5117.3160	-1810.2957	.0007208	540.2259	186.5231
165.000	-.015030	3335.1685	-1624.8584	.0007216	529.4697	184.3515
166.000	-.014308	1737.5164	-1441.6335	.0007220	519.8259	182.0983
167.000	-.013586	321.9332	-1260.7057	.0007222	511.2811	179.7572
168.000	-.012863	-913.8981	-1082.1668	.0007222	514.8543	177.3207
169.000	-.012141	-1972.3934	-906.1165	.0007219	521.2437	174.7799
170.000	-.011419	-2856.0755	-732.6643	.0007215	526.5778	172.1246
171.000	-.010698	-3567.5850	-561.9307	.0007209	530.8726	169.3425
172.000	-.009978	-4109.6918	-394.0500	.0007201	534.1449	166.4189
173.000	-.009258	-4485.3104	-229.1725	.0007193	536.4122	163.3359
174.000	-.008539	-4697.5176	-67.4687	.0007185	537.6931	160.0717
175.000	-.007821	-4749.5740	90.8666	.0007176	538.0073	156.5989
176.000	-.007104	-4644.9514	185.0564	.0007167	537.3758	31.7808
177.000	-.006388	-4508.4698	215.3148	.0007159	536.5520	28.7360
178.000	-.005672	-4343.1763	242.5124	.0007150	535.5542	25.6593
179.000	-.004958	-4152.1503	266.6173	.0007142	534.4011	22.5505
180.000	-.004244	-3938.5039	287.5973	.0007135	533.1115	19.4095
181.000	-.003531	-3705.3817	305.4201	.0007128	531.7044	16.2362
182.000	-.002818	-3455.9610	320.0533	.0007121	530.1988	13.0304
183.000	-.002106	-3193.4516	331.4646	.0007115	528.6142	9.7920
184.000	-.001395	-2921.0964	339.6210	.0007109	526.9702	6.5209
185.000	-.000685	-2642.1711	344.4898	.0007104	525.2866	3.2167
186.000	2.55E-05	-2359.9046	346.0379	.0007099	523.5832	-.1206027
187.000	.000735	-2077.8789	344.2319	.0007095	521.8804	-3.4914
188.000	.001445	-1799.2295	339.0394	.0007091	520.1984	-6.8957
189.000	.002153	-1527.4456	330.4235	.0007088	518.5579	-10.3340
190.000	.002862	-1265.9699	318.3534	.0007086	516.9795	-13.8063
191.000	.003571	-1018.2791	302.7939	.0007083	515.4844	-17.3128
192.000	.004279	-787.0840	283.7105	.0007082	514.0937	-20.8539
193.000	.004987	-576.3296	261.0687	.0007080	512.8288	-24.4297
194.000	.005695	-393.1951	234.8337	.0007080	511.7113	-28.0401
195.000	.006403	-236.0943	204.9706	.0007079	510.7630	-31.6850
196.000	.007111	-110.6755	171.4442	.0007079	510.0059	-35.3668
197.000	.007819	-20.6216	134.2193	.0007079	509.4623	-39.0830
198.000	.008526	30.3496	93.2605	.0007079	509.1511	-42.8345
199.000	.009234	38.4858	48.5326	.0007079	509.1702	-46.6214
200.000	.009942	0.0000	0.0000	.0007079	509.3379	-50.4438

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 1.00410077 in
Computed slope at pile head = -.01751273

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 42000.000 lbs
Specified moment at pile head = .000 in-lbs
Specified axial load at pile head = 90000.000 lbs

(Zero Moment for this load indicates free-head conditions)

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Soil Res p lbs/in
0.000	1.004	3.4404E-05	42000.0000	-.0175127	509.3379	-636.6502
1.000	.986588	43257.8209	41357.5330	-.0175087	770.4515	-648.2839
2.000	.969083	85866.6293	40703.3801	-.0174966	1027.6475	-660.0219
3.000	.951595	127834.	40037.4369	-.0174766	1280.8508	-671.8644
4.000	.934130	169087.	39359.5992	-.0174488	1529.9655	-683.8112
5.000	.916697	209674.	38669.7624	-.0174134	1774.9754	-695.8624
6.000	.899303	249561.	37967.8222	-.0173704	2015.7436	-708.0179
7.000	.881956	288736.	37253.6744	-.0173200	2252.2127	-720.2778
8.000	.864663	327186.	36527.2144	-.0172624	2484.3047	-732.6421
9.000	.847432	364898.	35788.3379	-.0171976	2711.9410	-745.1108
10.000	.830268	401858.	35036.9406	-.0171259	2935.0426	-757.6838
11.000	.813180	438054.	34272.9181	-.0170472	3153.5298	-770.3612
12.000	.796174	473473.	33496.1660	-.0169619	3367.3223	-783.1430
13.000	.779256	508100.	32706.5800	-.0168701	3576.3395	-796.0291
14.000	.762434	541923.	31904.0556	-.0167718	3780.5001	-809.0196
15.000	.745712	574927.	31088.4886	-.0166673	3979.7221	-822.1145
16.000	.729099	607100.	30259.7745	-.0165567	4173.9231	-835.3137
17.000	.712599	638427.	29417.8090	-.0164401	4363.0204	-848.6173
18.000	.696219	668894.	28562.4877	-.0163176	4546.9302	-862.0253
19.000	.679964	698489.	27693.7062	-.0161898	4725.5687	-875.5377
20.000	.663839	727196.	26811.3602	-.0160564	4898.8512	-889.1544
21.000	.647851	755002.	25915.3453	-.0159177	5066.6926	-902.8755
22.000	.632004	781892.	25005.5571	-.0157738	5229.0074	-916.7009
23.000	.616303	807852.	24081.8910	-.0156251	5385.7092	-930.6307
24.000	.600754	832868.	23144.2434	-.0154715	5536.7114	-944.6649
25.000	.585360	856926.	22192.5092	-.0153134	5681.9266	-958.8035
26.000	.570127	880010.	21226.5842	-.0151508	5821.2673	-973.0464
27.000	.555058	902106.	20251.4441	-.0149840	5954.6449	-977.2338
28.000	.540159	923210.	19277.3720	-.0148132	6082.0319	-970.9104
29.000	.525432	943327.	18309.7501	-.0146385	6203.4645	-964.3335
30.000	.510882	962464.	17348.8270	-.0144602	6318.9803	-957.5127
31.000	.496512	980627.	16394.8410	-.0142784	6428.6184	-950.4576
32.000	.482325	997824.	15448.0241	-.0140932	6532.4196	-943.1778
33.000	.468325	1014060.	14508.5935	-.0139049	6630.4262	-935.6835
34.000	.454515	1029344.	13576.7594	-.0137137	6722.6816	-927.9847
35.000	.440898	1043682.	12652.7212	-.0135197	6809.2309	-920.0916
36.000	.427476	1057083.	11736.6680	-.0133231	6890.1202	-912.0147
37.000	.414252	1069554.	10828.7784	-.0131241	6965.3960	-903.7645
38.000	.401228	1081103.	9929.2203	-.0129228	7035.1094	-895.3516
39.000	.388406	1091738.	9038.1512	-.0127194	7099.3076	-886.7867
40.000	.375789	1101469.	8155.7176	-.0125142	7158.0418	-878.0806
41.000	.363378	1110302.	7282.0552	-.0123072	7211.3638	-869.2441
42.000	.351174	1118248.	6417.2091	-.0120987	7259.3260	-860.2882
43.000	.339180	1125315.	5561.5331	-.0118887	7301.9816	-851.2238
44.000	.327397	1131511.	4714.8901	-.0116775	7339.3845	-842.0620
45.000	.315825	1136846.	3877.4523	-.0114652	7371.5896	-832.8137
46.000	.304467	1141330.	3049.3005	-.0112520	7398.6520	-823.4899
47.000	.293321	1144970.	2230.5047	-.0110380	7420.6276	-814.1016
48.000	.282390	1147776.	1421.1240	-.0108235	7437.5726	-804.6599
49.000	.271674	1149761.	621.2063	-.0106085	7449.5439	-795.1755
50.000	.261174	1150929.	-169.2112	-.0103931	7456.5984	-785.6595
51.000	.250888	1151293.	-950.1022	-.0101777	7458.7935	-776.1225
52.000	.240818	1150861.	-1721.3870	-.0099622	7456.1866	-766.4471
53.000	.230964	1149644.	-2482.8404	-.0097470	7448.8363	-756.4598
54.000	.221324	1147650.	-3234.1506	-.0095320	7436.8029	-746.1610
55.000	.211900	1144891.	-3975.0072	-.0093174	7420.1489	-735.5519
56.000	.202689	1141377.	-4705.1001	-.0091035	7398.9385	-724.6339
57.000	.193693	1137119.	-5424.1211	-.0088902	7373.2379	-713.4081
58.000	.184909	1132129.	-6131.7630	-.0086779	7343.1155	-701.8756
59.000	.176337	1126418.	-6827.7193	-.0084665	7308.6413	-690.0370
60.000	.167976	1119998.	-7509.3198	-.0082563	7269.8873	-673.1640
61.000	.159825	1112885.	-8160.1483	-.0080473	7226.9561	-644.4927
62.000	.151881	1105110.	-8798.5240	-.0078397	7180.0214	-616.2590
63.000	.144145	1096700.	-9400.8898	-.0076337	7129.2545	-588.4726
64.000	.136614	1087682.	-9975.6973	-.0074292	7074.8233	-561.1425
65.000	.129287	1078085.	-10523.4071	-.0072266	7016.8956	-534.2772
66.000	.122161	1067936.	-11044.4879	-.0070257	6955.6326	-507.8844
67.000	.115235	1057261.	-11539.4157	-.0068268	6891.1959	-481.9713
68.000	.108507	1046086.	-12008.6737	-.0066300	6823.7412	-456.5446
69.000	.101975	1034437.	-12452.7510	-.0064353	6753.4250	-431.6101
70.000	.095637	1022339.	-12872.1428	-.0062428	6680.3983	-407.1734
71.000	.089490	1009817.	-13267.3491	-.0060526	6604.8098	-383.2392
72.000	.083531	996894.	-13638.8746	-.0058648	6526.8059	-359.8118
73.000	.077760	983594.	-13987.2280	-.0056795	6446.5276	-336.8949
74.000	.072172	969942.	-14312.9213	-.0054967	6364.1163	-314.4916
75.000	.066767	955958.	-14616.4694	-.0053164	6279.7081	-292.6046
76.000	.061540	941666.	-14898.3897	-.0051388	6193.4364	-271.2359
77.000	.056489	927086.	-15159.2012	-.0049640	6105.4317	-250.3871
78.000	.051612	912241.	-15399.4243	-.0047918	6015.9219	-230.0592
79.000	.046905	897150.	-15619.5803	-.0046225	5924.7296	-210.2528
80.000	.042367	881834.	-15820.1907	-.0044560	5832.2774	-190.9680
81.000	.037993	866312.	-16001.7768	-.0042924	5738.5829	-172.2044
82.000	.033782	850603.	-16164.8596	-.0041317	5643.7608	-153.9610
83.000	.029730	834726.	-16309.9585	-.0039740	5547.9229	-136.2367
84.000	.025834	818698.	-16437.5917	-.0038193	5451.1777	-119.0296
85.000	.022091	802538.	-16548.2753	-.0036676	5353.6308	-102.3376
86.000	.018499	786262.	-16642.5231	-.0035189	5255.3846	-86.1581
87.000	.015053	769886.	-16720.8462	-.0033732	5156.5384	-70.4880
88.000	.011752	753427.	-16783.7522	-.0032307	5057.1884	-55.3240
89.000	.008592	736900.	-16831.7454	-.0030912	4957.4278	-40.6624
90.000	.005570	720320.	-16865.3260	-.0029548	4857.3469	-26.4988
91.000	.002682	703701.	-16884.9899	-.0028216	4757.0328	-12.8290
92.000	-7.32E-05	687058.	-16882.9508	-.0026914	4656.5696	16.9073
93.000	-.002700	670420.	-16814.4743	-.0025644	4556.1387	120.0457
94.000	-.005202	653892.	-16683.7497	-.0024404	4456.3642	141.4034
95.000	-.007581	637492.	-16535.3702	-.0023196	4357.3768	155.3558

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 4 is silt with cohesion and friction
Distance from top of pile to top of layer = 235.700 in
Distance from top of pile to bottom of layer = 295.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 5 is silt with cohesion and friction
Distance from top of pile to top of layer = 295.700 in
Distance from top of pile to bottom of layer = 381.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 6 is silt with cohesion and friction
Distance from top of pile to top of layer = 381.700 in
Distance from top of pile to bottom of layer = 450.000 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

(Depth of lowest layer extends 250.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Distribution of effective unit weight of soil with depth is defined using 12 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	-100.30	.07234
2	91.70	.07234
3	91.70	.07234
4	175.70	.07234
5	175.70	.07234
6	235.70	.07234
7	235.70	.06940
8	295.70	.06940
9	295.70	.07234
10	381.70	.07234
11	381.70	.03623
12	450.00	.03623

Shear Strength of Soils

Distribution of shear strength parameters with depth defined using 12 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	-100.300	.00000	30.00	------	------
2	91.700	.00000	30.00	------	------
3	91.700	6.25000	.00	------	------
4	175.700	6.25000	.00	------	------
5	175.700	.00000	30.00	------	------
6	235.700	.00000	30.00	------	------
7	235.700	5.56000	25.00	------	------
8	295.700	5.56000	25.00	------	------
9	295.700	3.47000	32.00	------	------
10	381.700	3.47000	32.00	------	------
11	381.700	3.47000	32.00	------	------
12	450.000	3.47000	32.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 42000.000 lbs
Bending moment at pile head = .000 in-lbs
Axial load at pile head = 90000.000 lbs

(Zero moment at pile head for this load indicates a free-head condition)

LPILE Plus for Windows, Version 5.0 (5.0.11)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Youwei Zhou
Kleifelder

Path to file locations: U:\Y2hou\Projects\75010\Analysis\LPILE\A1\
Name of input data file: A1Stability.lpd
Name of output file: A1Stability.lpo
Name of plot output file: A1Stability.lpp
Name of runtime file: A1Stability.lpr

Time and Date of Analysis

Date: May 30, 2007 Time: 12:32:20

Problem Title

A1 Stability

Program Options

Units Used in Computations - US Customary Units, inches, pounds

Basic Program Options:

Analysis Type 1:
- Computation of Lateral Pile Response Using User-specified Constant EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis includes automatic computation of pile-top deflection vs. pile embedment length
- No computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 200
- Maximum number of iterations allowed = 200
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+01 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 1

Pile Structural Properties and Geometry

Pile Length = 200.00 in
Depth of ground surface below top of pile = -100.30 in
Slope angle of ground surface = 25.00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	15.00000000	1242.5000	176.7000	4300000.
2	500.0000	15.00000000	1242.5000	176.7000	4300000.

Soil and Rock Layering Information

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = -100.300 in
Distance from top of pile to bottom of layer = 91.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for the above soil layer.

Layer 2 is stiff clay without free water
Distance from top of pile to top of layer = 91.700 in
Distance from top of pile to bottom of layer = 175.700 in

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 175.700 in
Distance from top of pile to bottom of layer = 235.700 in
p-y subgrade modulus k for top of soil layer = .000 lbs/in**3
p-y subgrade modulus k for bottom of layer = .000 lbs/in**3

			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01
17	10	0.4652E+02		
			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01
18	10	0.4696E+02		
			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01
19	10	0.4700E+02		
			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01
20	10	0.5102E+02		
			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01
21	10	0.5496E+02		
			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.3791E+01	0.7500E-02
0.7582E+01	0.1500E-01
0.1516E+02	0.3000E-01
0.3033E+02	0.1950E+00
0.4549E+02	0.6300E+00
0.5459E+02	0.1095E+01
0.6066E+02	0.1500E+01
0.6066E+02	0.2250E+01
0.6066E+02	0.3000E+01

LOAD VERSUS SETTLEMENT CURVE

TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.2583E+00	0.2207E-03	0.5055E-01	0.1000E-03
0.2583E+01	0.2207E-02	0.5055E+00	0.1000E-02
0.1292E+02	0.1103E-01	0.2527E+01	0.5000E-02
0.2583E+02	0.2207E-01	0.5055E+01	0.1000E-01
0.1125E+03	0.1011E+00	0.1700E+02	0.5000E-01
0.1719E+03	0.1801E+00	0.2160E+02	0.1000E+00
0.1929E+03	0.5941E+00	0.4096E+02	0.5000E+00
0.2047E+03	0.1102E+01	0.5273E+02	0.1000E+01
0.2126E+03	0.2107E+01	0.6066E+02	0.2000E+01

			0.7013E+01	0.9000E-01
			0.7792E+01	0.1000E+00
			0.7792E+01	0.5000E+00
			0.7792E+01	0.2000E+01
6	10	0.2796E+02		
			0.0000E+00	0.0000E+00
			0.1123E+01	0.1000E-01
			0.2247E+01	0.2000E-01
			0.4493E+01	0.4000E-01
			0.6740E+01	0.6000E-01
			0.8986E+01	0.8000E-01
			0.1011E+02	0.9000E-01
			0.1123E+02	0.1000E+00
			0.1123E+02	0.5000E+00
			0.1123E+02	0.2000E+01
7	10	0.2800E+02		
			0.0000E+00	0.0000E+00
			0.2633E+01	0.2400E-01
			0.4388E+01	0.4650E-01
			0.6502E+01	0.8550E-01
			0.7898E+01	0.1200E+00
			0.8776E+01	0.1500E+00
			0.7898E+01	0.3000E+00
			0.7898E+01	0.4500E+00
			0.7898E+01	0.7500E+00
			0.7898E+01	0.3000E+01
8	10	0.3152E+02		
			0.0000E+00	0.0000E+00
			0.1875E+01	0.2400E-01
			0.3125E+01	0.4650E-01
			0.4687E+01	0.8550E-01
			0.5625E+01	0.1200E+00
			0.6250E+01	0.1500E+00
			0.5625E+01	0.3000E+00
			0.5625E+01	0.4500E+00
			0.5625E+01	0.7500E+00
			0.5625E+01	0.3000E+01
9	10	0.3496E+02		
			0.0000E+00	0.0000E+00
			0.1875E+01	0.2400E-01
			0.3125E+01	0.4650E-01
			0.4687E+01	0.8550E-01
			0.5625E+01	0.1200E+00
			0.6250E+01	0.1500E+00
			0.5625E+01	0.3000E+00
			0.5625E+01	0.4500E+00
			0.5625E+01	0.7500E+00
			0.5625E+01	0.3000E+01
10	10	0.3500E+02		
			0.0000E+00	0.0000E+00
			0.1875E+01	0.2400E-01
			0.3125E+01	0.4650E-01
			0.4687E+01	0.8550E-01
			0.5625E+01	0.1200E+00
			0.6250E+01	0.1500E+00
			0.5625E+01	0.3000E+00
			0.5625E+01	0.4500E+00
			0.5625E+01	0.7500E+00
			0.5625E+01	0.3000E+01
11	10	0.3602E+02		
			0.0000E+00	0.0000E+00
			0.1875E+01	0.2400E-01
			0.3125E+01	0.4650E-01
			0.4687E+01	0.8550E-01
			0.5625E+01	0.1200E+00
			0.6250E+01	0.1500E+00
			0.5625E+01	0.3000E+00
			0.5625E+01	0.4500E+00
			0.5625E+01	0.7500E+00
			0.5625E+01	0.3000E+01
12	10	0.3696E+02		
			0.0000E+00	0.0000E+00
			0.1875E+01	0.2400E-01
			0.3125E+01	0.4650E-01
			0.4687E+01	0.8550E-01
			0.5625E+01	0.1200E+00
			0.6250E+01	0.1500E+00
			0.5625E+01	0.3000E+00
			0.5625E+01	0.4500E+00
			0.5625E+01	0.7500E+00
			0.5625E+01	0.3000E+01
13	10	0.3700E+02		
			0.0000E+00	0.0000E+00
			0.1046E+01	0.1000E-01
			0.2092E+01	0.2000E-01
			0.4185E+01	0.4000E-01
			0.6277E+01	0.6000E-01
			0.8370E+01	0.8000E-01
			0.9416E+01	0.9000E-01
			0.1046E+02	0.1000E+00
			0.1046E+02	0.5000E+00
			0.1046E+02	0.2000E+01
14	10	0.3952E+02		
			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01
15	10	0.4196E+02		
			0.0000E+00	0.0000E+00
			0.1181E+01	0.1000E-01
			0.2361E+01	0.2000E-01
			0.4722E+01	0.4000E-01
			0.7083E+01	0.6000E-01
			0.9444E+01	0.8000E-01
			0.1062E+02	0.9000E-01
			0.1181E+02	0.1000E+00
			0.1181E+02	0.5000E+00
			0.1181E+02	0.2000E+01
16	10	0.4200E+02		

20.00	34.9	68.5	103.4
20.50	37.2	70.1	107.3
21.00	39.6	71.7	111.3
21.50	42.0	73.3	115.3
22.00	44.5	74.9	119.4
22.50	47.1	76.5	123.6
23.00	49.7	78.1	127.8
23.50	52.3	79.7	132.1
24.00	55.0	81.3	136.4
24.50	57.8	82.9	140.8
25.00	60.7	84.6	145.2
25.50	63.5	86.2	149.7
26.00	66.5	71.6	138.1
26.50	69.5	56.6	126.1
27.00	72.6	41.4	114.0
27.50	75.7	25.8	101.5
28.00	78.9	9.9	88.8
28.50	81.3	9.9	91.3
29.00	83.1	9.9	93.0
29.50	84.9	9.9	94.8
30.00	86.6	9.9	96.6
30.50	88.4	9.9	98.3
31.00	90.2	9.9	100.1
31.50	91.9	9.9	101.9
32.00	93.7	9.9	103.6
32.50	95.5	9.9	105.4
33.00	97.2	9.9	107.2
33.50	99.0	9.9	108.9
34.00	100.8	9.9	110.7
34.50	102.5	9.9	112.5
35.00	104.3	31.2	135.5
35.50	106.1	52.7	158.7
36.00	107.8	74.3	182.1
36.50	109.6	96.1	205.7
37.00	111.4	118.0	229.4
37.50	114.3	118.8	233.1
38.00	117.7	119.6	237.3
38.50	121.0	120.4	241.4
39.00	124.3	121.2	245.5
39.50	127.7	121.8	249.5
40.00	131.0	109.6	240.6
40.50	134.4	97.2	231.6
41.00	137.7	84.8	222.5
41.50	141.0	72.4	213.4
42.00	144.4	60.0	204.3
42.50	147.7	60.3	208.0
43.00	151.0	60.7	211.7

AN ASTERISK WILL BE PLACED IN THE END-BEARING COLUMN IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

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**********************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT *
* CURVES FOR AXIAL LOADING                      *
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T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
2	10	0.5025E+01		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
3	10	0.9958E+01		
			0.0000E+00	0.0000E+00
			0.2024E+00	0.1000E-01
			0.4048E+00	0.2000E-01
			0.8096E+00	0.4000E-01
			0.1214E+01	0.6000E-01
			0.1619E+01	0.8000E-01
			0.1822E+01	0.9000E-01
			0.2024E+01	0.1000E+00
			0.2024E+01	0.5000E+00
			0.2024E+01	0.2000E+01
4	10	0.1000E+02		
			0.0000E+00	0.0000E+00
			0.4149E+00	0.1000E-01
			0.8298E+00	0.2000E-01
			0.1660E+01	0.4000E-01
			0.2489E+01	0.6000E-01
			0.3319E+01	0.8000E-01
			0.3734E+01	0.9000E-01
			0.4149E+01	0.1000E+00
			0.4149E+01	0.5000E+00
			0.4149E+01	0.2000E+01
5	10	0.1902E+02		
			0.0000E+00	0.0000E+00
			0.7792E+00	0.1000E-01
			0.1558E+01	0.2000E-01
			0.3117E+01	0.4000E-01
			0.4675E+01	0.6000E-01
			0.6234E+01	0.8000E-01

11.0	2.9	16.3	19.2	3.5	41.6	45.1	9.3	39.5	48.8
11.5	4.2	16.3	20.5	5.0	42.2	47.1	10.6	41.1	51.7
12.0	5.5	16.3	21.8	6.5	42.3	48.9	11.9	42.7	54.6
12.5	6.8	16.3	23.2	8.2	42.3	50.5	13.3	44.3	57.6
13.0	8.3	16.3	24.6	9.8	42.3	52.2	14.7	45.9	60.6
13.5	9.7	16.3	26.1	11.5	42.3	53.8	16.1	47.5	63.6
14.0	11.3	16.3	27.6	13.2	42.3	55.5	17.6	49.1	66.8
14.5	12.9	16.3	29.2	14.8	42.3	57.2	19.2	50.7	69.9
15.0	14.5	16.3	30.8	16.5	42.3	58.8	20.7	52.3	73.1
15.5	16.2	16.3	32.5	18.2	42.3	60.5	22.3	54.0	76.3
16.0	18.0	16.3	34.3	19.8	42.3	62.2	24.0	55.6	79.6
16.5	19.8	16.3	36.1	21.5	42.3	63.8	25.7	57.2	82.9
17.0	21.6	16.3	38.0	23.2	42.3	65.5	27.4	58.8	86.2
17.5	23.6	16.3	39.9	24.8	42.3	67.2	29.2	60.4	89.6
18.0	25.5	16.3	41.9	26.5	42.3	68.8	31.0	62.0	93.0
18.5	27.6	16.3	43.9	28.2	42.3	70.5	46.7	63.6	110.3
19.0	29.7	16.3	46.0	29.8	42.3	72.2	49.2	65.2	114.4
19.5	31.8	16.3	48.2	31.5	42.3	73.8	51.7	66.8	118.5
20.0	34.0	16.3	50.4	33.1	42.3	75.5	54.3	68.5	122.7
20.5	36.3	16.3	52.6	34.8	42.3	77.2	56.9	70.1	127.0
21.0	38.6	16.3	54.9	36.5	42.3	78.8	59.5	71.7	131.2
21.5	41.0	16.3	57.3	38.1	42.3	80.5	62.2	73.3	135.5
22.0	43.4	16.3	59.7	39.8	42.3	82.1	64.9	74.9	139.8
22.5	45.9	16.3	62.2	41.5	42.3	83.8	67.7	76.5	144.2
23.0	48.4	16.3	64.7	43.1	42.3	85.5	70.5	78.1	148.6
23.5	51.0	16.3	67.3	44.8	42.3	87.1	73.3	79.7	153.0
24.0	53.6	16.3	70.0	46.5	42.3	88.8	76.2	81.3	157.5
24.5	56.3	16.3	72.7	48.1	42.3	90.5	79.0	82.9	162.0
25.0	59.1	16.3	75.5	49.8	42.3	92.1	82.0	84.6	166.5
25.5	61.9	16.3	78.3	51.5	42.3	93.8	84.9	86.2	171.1
26.0	64.8	15.1	79.9	53.1	35.9	89.0	87.9	71.8	159.4
26.5	67.7	13.8	81.5	54.8	29.4	84.2	90.9	56.6	147.5
27.0	70.7	12.5	83.2	56.5	22.9	79.4	93.9	41.4	135.3
27.5	73.9	11.2	85.0	58.1	16.4	74.6	97.0	25.8	122.8
28.0	76.8	9.9	86.8	59.8	9.9	69.7	100.1	9.9	110.0
28.5	79.2	9.9	89.2	61.3	9.9	71.3	102.3	9.9	112.3
29.0	80.9	9.9	90.9	62.8	9.9	72.7	104.6	9.9	114.6
29.5	82.7	9.9	92.6	64.2	9.9	74.1	106.9	9.9	116.9
30.0	84.4	9.9	94.4	65.6	9.9	75.5	109.2	9.9	119.2
30.5	86.2	9.9	96.1	67.0	9.9	76.9	111.5	9.9	121.5
31.0	87.9	9.9	97.9	68.4	9.9	78.3	113.9	9.9	123.8
31.5	89.7	9.9	99.6	69.8	9.9	79.8	116.2	9.9	126.2
32.0	91.4	9.9	101.3	71.2	9.9	81.2	118.6	9.9	128.5
32.5	93.2	9.9	103.1	72.7	9.9	82.6	121.0	9.9	130.9
33.0	94.9	9.9	104.8	74.1	9.9	84.0	123.4	9.9	133.3
33.5	96.6	9.9	106.6	75.5	9.9	85.4	125.8	9.9	135.7
34.0	98.4	9.9	108.3	76.9	9.9	86.8	128.2	9.9	138.2
34.5	100.1	9.9	110.1	78.3	9.9	88.2	130.7	9.9	140.6
35.0	101.9	11.2	113.1	79.7	16.4	96.1	133.1	31.2	164.3
35.5	103.6	12.5	116.1	81.1	22.9	104.0	102.3	52.7	154.9
36.0	105.4	13.8	119.2	82.5	29.4	111.9	104.3	74.3	178.5
36.5	107.1	15.1	122.2	84.0	35.9	119.8	106.3	96.1	202.3
37.0	108.9	16.3	125.2	85.6	42.3	128.0	108.3	118.0	226.2
37.5	111.8	16.3	128.1	87.3	42.3	129.6	111.2	118.8	230.0
38.0	115.1	16.3	131.4	89.0	42.3	131.3	114.2	119.6	233.8
38.5	118.4	16.3	134.8	90.6	42.3	133.0	117.2	120.4	237.6
39.0	121.8	16.3	138.1	92.3	42.3	134.6	157.3	121.2	278.4
39.5	125.1	16.3	141.5	94.0	42.3	136.3	160.8	121.8	282.6
40.0	128.5	16.3	144.8	95.6	39.5	135.1	164.4	109.6	273.9
40.5	131.8	16.3	148.1	97.3	36.6	133.9	167.9	97.2	265.2
41.0	135.1	16.3	151.5	99.0	33.7	132.7	171.5	84.8	256.3
41.5	138.5	16.3	154.8	100.6	30.9	131.5	175.0	72.4	247.4
42.0	141.8	16.3	158.1	102.3	28.0	130.3	178.6	60.0	238.5
42.5	145.1	16.3	161.5	103.9	28.0	131.9	181.8	60.3	242.1
43.0	147.9	16.3	164.2	105.6	28.0	133.6	185.0	60.7	245.7

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* API RP-2A (1994) *
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PILE PENETRATION FT.	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	4.0	4.0
0.50	0.0	5.6	5.6
1.00	0.0	7.2	7.2
1.50	0.0	8.9	8.9
2.00	0.0	10.5	10.5
2.50	0.0	12.1	12.1
3.00	0.0	13.7	13.7
3.50	0.0	15.3	15.3
4.00	0.0	16.9	16.9
4.50	0.0	18.5	18.5
5.00	0.0	20.1	20.1
5.50	0.0	21.7	21.7
6.00	0.0	23.4	23.4
6.50	0.0	25.0	25.0
7.00	0.0	26.6	26.6
7.50	0.0	28.2	28.2
8.00	0.0	29.8	29.8
8.50	0.0	31.4	31.4
9.00	0.0	33.0	33.0
9.50	0.0	34.6	34.6
10.00	0.6	36.2	36.8
10.50	1.7	37.9	39.6
11.00	3.0	39.5	42.4
11.50	4.3	41.1	45.3
12.00	5.6	42.7	48.3
12.50	7.0	44.3	51.3
13.00	8.5	45.9	54.4
13.50	10.0	47.5	57.5
14.00	11.6	49.1	60.7
14.50	13.2	50.7	63.9
15.00	14.9	52.3	67.2
15.50	16.6	54.0	70.6
16.00	18.4	55.6	74.0
16.50	20.3	57.2	77.5
17.00	22.2	58.8	81.0
17.50	24.2	60.4	84.6
18.00	26.2	62.0	88.2
18.50	28.3	63.6	91.9
19.00	30.4	65.2	95.7
19.50	32.6	66.8	99.5

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AXIALLY LOADING PILE ANALYSIS PROGRAM - APILEplus
VERSION 4.0 - (C) COPYRIGHT ENSOFT, INC., 1987-2004.

A1, Ground Elevation 930 ft MSL

DESIGNER : Youwei Zhou

DATE : 05-04-07

PILE PROPERTIES :

PERIMETER OF PILE WITH NONCIRCULAR SECTION= 0.00 IN.
TIP AREA OF PILE WITH NONCIRCULAR SECTION = 0.00 SQF
OUTSIDE DIAMETER OF CIRCULAR PILE = 15.00 IN.
INTERNAL DIAMETER OF CIRCULAR PILE = 0.00 IN.
PILE LENGTH = 43.00 FT.
MODULUS OF ELASTICITY = 0.430E+07 PSI

LENGTH OF SURFACE SECTION WITH ZERO SKIN FRICTION = 10.00 FT.
INCREMENT OF PILE LENGTH USED IN COMPUTATION = 0.50 FT.

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/CF	FRICTION ANGLE DEGREES	BEARING CAPACITY FACTOR
0.00	SAND	1.00	125.00	30.00	21.00
10.00	SAND	1.00	125.00	30.00	21.00
10.00	SAND	1.00	125.00	30.00	21.00
28.00	SAND	1.00	125.00	30.00	21.00
28.00	CLAY	0.00	125.00	0.00	0.00
35.00	CLAY	0.00	125.00	0.00	0.00
35.00	CLAY	0.00	62.60	0.00	0.00
37.00	CLAY	0.00	62.60	0.00	0.00
37.00	SAND	1.00	62.60	30.00	21.00
42.00	SAND	1.00	62.60	30.00	21.00
42.00	SAND	1.00	57.60	25.00	10.00
47.00	SAND	1.00	57.60	25.00	10.00
47.00	SAND	1.00	62.60	32.00	29.00
55.00	SAND	1.00	62.60	32.00	29.00

MAXIMUM UNIT FRICTION KSF	MAXIMUM UNIT BEARING KSF	UNDISTURB SHEAR STRENGTH KSF	REMOLDED SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00

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* COMPUTATION RESULT *

PILE PENETRATION FT.	FED. HWY. METHOD TOTAL SKIN FRIC KIP	FED. HWY. METHOD END BEARING KIP	FED. HWY. METHOD ULTIM CAPACITY KIP	ARMY CORPS METHOD TOTAL SKIN FRIC KIP	ARMY CORPS METHOD END BEARING KIP	ARMY CORPS METHOD ULTIM CAPACITY KIP	LAMBDA 2 METHOD TOTAL SKIN FRIC KIP	LAMBDA 2 METHOD END BEARING KIP	LAMBDA 2 METHOD ULTIM CAPACITY KIP
0.0	0.0	3.3	3.3	0.0	4.4	4.4	0.0	4.0	4.0
0.5	0.0	4.7	4.7	0.0	6.2	6.2	0.0	5.6	5.6
1.0	0.0	6.0	6.0	0.0	7.9	7.9	0.0	7.2	7.2
1.5	0.0	7.3	7.3	0.0	9.7	9.7	0.0	8.9	8.9
2.0	0.0	8.7	8.7	0.0	11.5	11.5	0.0	10.5	10.5
2.5	0.0	10.0	10.0	0.0	13.2	13.2	0.0	12.1	12.1
3.0	0.0	11.3	11.3	0.0	15.0	15.0	0.0	13.7	13.7
3.5	0.0	12.7	12.7	0.0	16.8	16.8	0.0	15.3	15.3
4.0	0.0	13.9	13.9	0.0	18.5	18.5	0.0	16.9	16.9
4.5	0.0	14.9	14.9	0.0	20.3	20.3	0.0	18.5	18.5
5.0	0.0	15.6	15.6	0.0	22.1	22.1	0.0	20.1	20.1
5.5	0.0	16.1	16.1	0.0	23.8	23.8	0.0	21.7	21.7
6.0	0.0	16.3	16.3	0.0	25.6	25.6	0.0	23.4	23.4
6.5	0.0	16.3	16.3	0.0	27.3	27.3	0.0	25.0	25.0
7.0	0.0	16.3	16.3	0.0	29.1	29.1	0.0	26.6	26.6
7.5	0.0	16.3	16.3	0.0	30.9	30.9	0.0	28.2	28.2
8.0	0.0	16.3	16.3	0.0	32.6	32.6	0.0	29.8	29.8
8.5	0.0	16.3	16.3	0.0	34.4	34.4	0.0	31.4	31.4
9.0	0.0	16.3	16.3	0.0	36.2	36.2	0.0	33.0	33.0
9.5	0.0	16.3	16.3	0.0	37.9	37.9	0.0	34.6	34.6
10.0	0.6	16.3	16.9	0.7	39.5	40.2	0.0	36.2	36.2
10.5	1.7	16.3	18.0	2.0	40.8	42.8	8.2	37.9	46.1

			0.7475E+01	0.2000E+01
15	10	0.3096E+02		
			0.0000E+00	0.0000E+00
			0.7766E+00	0.1000E-01
			0.1553E+01	0.2000E-01
			0.3106E+01	0.4000E-01
			0.4659E+01	0.6000E-01
			0.6213E+01	0.8000E-01
			0.6989E+01	0.9000E-01
			0.7766E+01	0.1000E+00
			0.7766E+01	0.5000E+00
			0.7766E+01	0.2000E+01
16	10	0.3100E+02		
			0.0000E+00	0.0000E+00
			0.9517E+00	0.1000E-01
			0.1903E+01	0.2000E-01
			0.3807E+01	0.4000E-01
			0.5710E+01	0.6000E-01
			0.7613E+01	0.8000E-01
			0.8565E+01	0.9000E-01
			0.9517E+01	0.1000E+00
			0.9517E+01	0.5000E+00
			0.9517E+01	0.2000E+01
17	10	0.3802E+02		
			0.0000E+00	0.0000E+00
			0.1219E+01	0.1000E-01
			0.2438E+01	0.2000E-01
			0.4877E+01	0.4000E-01
			0.7315E+01	0.6000E-01
			0.9753E+01	0.8000E-01
			0.1097E+02	0.9000E-01
			0.1219E+02	0.1000E+00
			0.1219E+02	0.5000E+00
			0.1219E+02	0.2000E+01
18	10	0.4496E+02		
			0.0000E+00	0.0000E+00
			0.1219E+01	0.1000E-01
			0.2438E+01	0.2000E-01
			0.4877E+01	0.4000E-01
			0.7315E+01	0.6000E-01
			0.9753E+01	0.8000E-01
			0.1097E+02	0.9000E-01
			0.1219E+02	0.1000E+00
			0.1219E+02	0.5000E+00
			0.1219E+02	0.2000E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.7907E+01	0.7500E-02
0.1581E+02	0.1500E-01
0.3163E+02	0.3000E-01
0.6326E+02	0.1950E+00
0.9489E+02	0.6300E+00
0.1139E+03	0.1095E+01
0.1265E+03	0.1500E+01
0.1265E+03	0.2250E+01
0.1265E+03	0.3000E+01

LOAD VERSUS SETTLEMENT CURVE

TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.2514E+00	0.2176E-03	0.1054E+00	0.1000E-03
0.2514E+01	0.2176E-02	0.1054E+01	0.1000E-02
0.1257E+02	0.1088E-01	0.5272E+01	0.5000E-02
0.2527E+02	0.2181E-01	0.1054E+02	0.1000E-01
0.1012E+03	0.9660E-01	0.3546E+02	0.5000E-01
0.1541E+03	0.1711E+00	0.4505E+02	0.1000E+00
0.1939E+03	0.5945E+00	0.8544E+02	0.5000E+00
0.2165E+03	0.1109E+01	0.1100E+03	0.1000E+01
0.2350E+03	0.2119E+01	0.1265E+03	0.2000E+01

			0.4829E+01	0.1200E+00
			0.5365E+01	0.1500E+00
			0.4829E+01	0.3000E+00
			0.4829E+01	0.4500E+00
			0.4829E+01	0.7500E+00
			0.4829E+01	0.3000E+01
5	10	0.1702E+02		
			0.0000E+00	0.0000E+00
			0.1461E+01	0.2400E-01
			0.2436E+01	0.4650E-01
			0.3654E+01	0.8550E-01
			0.4384E+01	0.1200E+00
			0.4871E+01	0.1500E+00
			0.4384E+01	0.3000E+00
			0.4384E+01	0.4500E+00
			0.4384E+02	0.7500E+00
			0.4384E+01	0.3000E+01
6	10	0.1896E+02		
			0.0000E+00	0.0000E+00
			0.1503E+01	0.2400E-01
			0.2504E+01	0.4650E-01
			0.3757E+01	0.8550E-01
			0.4508E+01	0.1200E+00
			0.5009E+01	0.1500E+00
			0.4508E+01	0.3000E+00
			0.4508E+01	0.4500E+00
			0.4508E+01	0.7500E+00
			0.4508E+01	0.3000E+01
7	10	0.1900E+02		
			0.0000E+00	0.0000E+00
			0.1533E+01	0.2400E-01
			0.2555E+01	0.4650E-01
			0.3832E+01	0.8550E-01
			0.4599E+01	0.1200E+00
			0.5110E+01	0.1500E+00
			0.4599E+01	0.3000E+00
			0.4599E+01	0.4500E+00
			0.4599E+01	0.7500E+00
			0.4599E+01	0.3000E+01
8	10	0.2002E+02		
			0.0000E+00	0.0000E+00
			0.1553E+01	0.2400E-01
			0.2588E+01	0.4650E-01
			0.3882E+01	0.8550E-01
			0.4658E+01	0.1200E+00
			0.5176E+01	0.1500E+00
			0.4658E+01	0.3000E+00
			0.4658E+01	0.4500E+00
			0.4658E+01	0.7500E+00
			0.4658E+01	0.3000E+01
9	10	0.2096E+02		
			0.0000E+00	0.0000E+00
			0.1553E+01	0.2400E-01
			0.2588E+01	0.4650E-01
			0.3882E+01	0.8550E-01
			0.4658E+01	0.1200E+00
			0.5176E+01	0.1500E+00
			0.4658E+01	0.3000E+00
			0.4658E+01	0.4500E+00
			0.4658E+01	0.7500E+00
			0.4658E+01	0.3000E+01
10	10	0.2100E+02		
			0.0000E+00	0.0000E+00
			0.6754E+00	0.1000E-01
			0.1351E+01	0.2000E-01
			0.2701E+01	0.4000E-01
			0.4052E+01	0.6000E-01
			0.5403E+01	0.8000E-01
			0.6078E+01	0.9000E-01
			0.6754E+01	0.1000E+00
			0.6754E+01	0.5000E+00
			0.6754E+01	0.2000E+01
11	10	0.2352E+02		
			0.0000E+00	0.0000E+00
			0.8603E+00	0.1000E-01
			0.1721E+01	0.2000E-01
			0.3441E+01	0.4000E-01
			0.5162E+01	0.6000E-01
			0.6882E+01	0.8000E-01
			0.7743E+01	0.9000E-01
			0.8603E+01	0.1000E+00
			0.8603E+01	0.5000E+00
			0.8603E+01	0.2000E+01
12	10	0.2596E+02		
			0.0000E+00	0.0000E+00
			0.9008E+00	0.1000E-01
			0.1802E+01	0.2000E-01
			0.3603E+01	0.4000E-01
			0.5405E+01	0.6000E-01
			0.7207E+01	0.8000E-01
			0.8108E+01	0.9000E-01
			0.9008E+01	0.1000E+00
			0.9008E+01	0.5000E+00
			0.9008E+01	0.2000E+01
13	10	0.2600E+02		
			0.0000E+00	0.0000E+00
			0.8183E+00	0.1000E-01
			0.1637E+01	0.2000E-01
			0.3273E+01	0.4000E-01
			0.4910E+01	0.6000E-01
			0.6546E+01	0.8000E-01
			0.7365E+01	0.9000E-01
			0.8183E+01	0.1000E+00
			0.8183E+01	0.5000E+00
			0.8183E+01	0.2000E+01
14	10	0.2852E+02		
			0.0000E+00	0.0000E+00
			0.7475E+00	0.1000E-01
			0.1495E+01	0.2000E-01
			0.2990E+01	0.4000E-01
			0.4485E+01	0.6000E-01
			0.5980E+01	0.8000E-01
			0.6727E+01	0.9000E-01
			0.7475E+01	0.1000E+00
			0.7475E+01	0.5000E+00

26.0	60.9	16.3	77.2	54.0	29.1	83.1	83.2	35.4	218.6
27.0	65.0	16.3	81.3	57.3	29.1	86.4	87.9	36.1	124.1
28.0	69.3	16.3	84.6	60.6	29.1	89.8	92.7	36.8	229.5
29.0	71.6	21.2	92.8	64.0	34.8	98.8	97.4	52.1	149.5
30.0	75.0	30.8	105.8	67.3	46.2	113.5	102.2	82.3	184.6
31.0	78.4	40.5	118.9	70.6	57.5	128.1	107.0	113.2	220.1
32.0	83.7	40.5	124.2	74.0	57.5	131.5	112.5	115.4	227.9
33.0	99.9	40.5	131.4	77.3	57.5	134.8	118.1	117.6	235.7
34.0	98.0	40.5	138.5	80.6	57.5	138.1	123.7	119.8	243.5
35.0	105.2	40.5	145.7	84.0	57.5	141.5	129.3	122.1	251.3
36.0	112.3	40.5	152.8	87.3	57.5	144.8	134.9	124.3	259.2
37.0	119.5	40.5	160.0	90.6	57.5	148.1	140.5	126.5	267.1

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**********************
*  API RP-2A (1994)  *
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PILE PENETRATION FT.	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	4.0	4.0
1.00	0.0	7.2	7.2
2.00	0.0	10.5	10.5
3.00	0.0	13.7	13.7
4.00	0.0	16.9	16.9
5.00	0.0	20.1	20.1
6.00	0.0	23.4	23.4
7.00	0.0	26.6	26.6
8.00	0.0	29.8	29.8
9.00	1.0	33.0	34.0
10.00	3.2	36.2	39.4
11.00	5.6	39.5	45.1
12.00	8.2	42.7	50.9
13.00	11.1	38.1	49.2
14.00	14.2	24.6	38.8
15.00	17.5	9.9	27.3
16.00	20.5	9.9	30.5
17.00	23.2	9.9	33.2
18.00	26.0	9.9	35.9
19.00	28.8	20.8	49.7
20.00	31.7	43.4	75.1
21.00	34.6	66.4	101.1
22.00	38.4	68.1	106.5
23.00	43.2	69.7	112.9
24.00	48.1	63.6	111.7
25.00	53.0	49.7	102.7
26.00	58.1	35.4	93.5
27.00	62.8	36.1	98.9
28.00	66.9	36.8	103.7
29.00	71.1	52.1	123.2
30.00	75.4	82.3	157.7
31.00	79.8	113.2	193.0
32.00	85.2	115.4	200.6
33.00	91.6	117.6	209.2
34.00	98.1	119.8	218.0
35.00	104.8	122.1	226.8
36.00	111.5	124.3	235.8
37.00	118.4	126.5	244.9

AN ASTERISK WILL BE PLACED IN THE END-BEARING COLUMN IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

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*********************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT *
* CURVES FOR AXIAL LOADING                      *
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T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
2	10	0.7525E+01		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
3	10	0.1496E+02		
			0.0000E+00	0.0000E+00
			0.5869E+00	0.1000E-01
			0.1174E+01	0.2000E-01
			0.2348E+01	0.4000E-01
			0.3522E+01	0.6000E-01
			0.4695E+01	0.8000E-01
			0.5282E+01	0.9000E-01
			0.5869E+01	0.1000E+00
			0.5869E+01	0.5000E+00
			0.5869E+01	0.2000E+01
4	10	0.1500E+02		
			0.0000E+00	0.0000E+00
			0.1610E+01	0.2400E-01
			0.2683E+01	0.4650E-01
			0.4024E+01	0.8550E-01

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AXIALLY LOADING PILE ANALYSIS PROGRAM - APILEplus
VERSION 4.0 - (C) COPYRIGHT ENSOFT,INC.,1987-2004.

Bent 4, Ground Elevation 916 ft MSL

DESIGNER : Youwei Zhou

DATE : 05-04-07

PILE PROPERTIES :

PERIMETER OF PILE WITH NONCIRCULAR SECTION= 0.00 IN.
TIP AREA OF PILE WITH NONCIRCULAR SECTION = 0.00 SQF
OUTSIDE DIAMETER OF CIRCULAR PILE = 15.00 IN.
INTERNAL DIAMETER OF CIRCULAR PILE = 0.00 IN.
PILE LENGTH = 37.00 FT.
MODULUS OF ELASTICITY = 0.430E+07 PSI

LENGTH OF SURFACE SECTION WITH ZERO SKIN FRICTION = 0.25 FT.
INCREMENT OF PILE LENGTH USED IN COMPUTATION = 1.00 FT.

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/CF	FRICTION ANGLE DEGREES	BEARING CAPACITY FACTOR
0.00	SAND	1.00	125.00	30.00	21.00
15.00	SAND	1.00	125.00	30.00	21.00
15.00	CLAY	0.00	125.00	0.00	0.00
19.00	CLAY	0.00	125.00	0.00	0.00
19.00	CLAY	0.00	62.60	0.00	0.00
21.00	CLAY	0.00	62.60	0.00	0.00
21.00	SAND	1.00	62.60	30.00	21.00
26.00	SAND	1.00	62.60	30.00	21.00
26.00	SAND	1.00	57.60	25.00	10.00
31.00	SAND	1.00	57.60	25.00	10.00
31.00	SAND	1.00	62.60	32.00	29.00
45.00	SAND	1.00	62.60	32.00	29.00

MAXIMUM UNIT FRICTION KSF	MAXIMUM UNIT BEARING KSF	UNDISTURB SHEAR STRENGTH KSF	REMOLDED SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00

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* COMPUTATION RESULT *
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* FED. HWY. METHOD * * ARMY CORPS METHOD * * LAMBDA 2 METHOD *
********************** ************************ **********************

PILE PENETRATION FT.	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP
0.0	0.0	3.3	3.3	0.0	4.4	4.4	0.0	4.0	4.0
1.0	0.0	6.0	6.0	0.0	7.9	7.9	0.0	7.2	7.2
2.0	0.0	8.7	8.7	0.0	11.5	11.5	0.0	10.5	10.5
3.0	0.0	11.3	11.3	0.0	15.0	15.0	0.0	13.7	13.7
4.0	0.0	13.9	13.9	0.0	18.5	18.5	0.0	16.9	16.9
5.0	0.0	15.6	15.6	0.0	22.1	22.1	0.0	20.1	20.1
6.0	0.0	16.3	16.3	0.0	25.6	25.6	0.0	23.4	23.4
7.0	0.0	16.3	16.3	0.0	29.1	29.1	0.0	26.6	26.6
8.0	0.0	16.3	16.3	0.0	32.6	32.6	0.0	29.8	29.8
9.0	1.0	16.3	17.3	1.2	36.2	37.4	6.6	33.0	39.7
10.0	3.1	16.3	19.5	3.7	39.9	43.6	8.9	36.2	45.1
11.0	5.5	16.3	21.8	6.5	42.7	49.2	11.3	39.5	50.8
12.0	8.0	16.3	24.4	9.6	44.1	53.7	13.9	42.7	56.6
13.0	10.8	15.1	25.9	12.9	37.3	50.2	16.7	38.1	54.7
14.0	13.8	12.5	26.3	16.3	23.6	39.9	19.6	24.6	44.2
15.0	17.1	9.9	27.0	19.6	9.9	29.5	32.8	9.9	42.8
16.0	20.4	9.9	30.4	22.7	9.9	32.6	36.8	9.9	46.8
17.0	23.9	9.9	33.8	25.5	9.9	35.4	40.9	9.9	50.8
18.0	27.3	9.9	37.3	28.3	9.9	38.3	45.0	9.9	54.9
19.0	30.8	11.2	42.0	31.2	16.8	47.9	49.1	20.9	70.1
20.0	34.2	13.8	48.0	34.0	30.4	64.4	53.3	43.4	96.7
21.0	37.7	16.3	54.0	37.3	44.1	81.4	57.5	66.4	123.9
22.0	41.7	16.3	58.0	40.6	44.1	84.7	62.6	68.1	130.7
23.0	46.3	16.3	62.7	44.0	44.1	88.1	67.7	69.7	137.4
24.0	51.1	16.3	67.4	47.3	41.1	88.4	72.9	63.6	136.5
25.0	55.9	16.3	72.3	50.6	35.1	85.8	78.0	49.7	127.7

			0.7475E+01	0.2000E+01
15	10	0.3096E+02		
			0.0000E+00	0.0000E+00
			0.7766E+00	0.1000E-01
			0.1553E+01	0.2000E-01
			0.3106E+01	0.4000E-01
			0.4659E+01	0.6000E-01
			0.6213E+01	0.8000E-01
			0.6989E+01	0.9000E-01
			0.7766E+01	0.1000E+00
			0.7766E+01	0.5000E+00
			0.7766E+01	0.2000E+01
16	10	0.3100E+02		
			0.0000E+00	0.0000E+00
			0.9517E+00	0.1000E-01
			0.1903E+01	0.2000E-01
			0.3807E+01	0.4000E-01
			0.5710E+01	0.6000E-01
			0.7613E+01	0.8000E-01
			0.8565E+01	0.9000E-01
			0.9517E+01	0.1000E+00
			0.9517E+01	0.5000E+00
			0.9517E+01	0.2000E+01
17	10	0.3802E+02		
			0.0000E+00	0.0000E+00
			0.1219E+01	0.1000E-01
			0.2438E+01	0.2000E-01
			0.4877E+01	0.4000E-01
			0.7315E+01	0.6000E-01
			0.9753E+01	0.8000E-01
			0.1097E+02	0.9000E-01
			0.1219E+02	0.1000E+00
			0.1219E+02	0.5000E+00
			0.1219E+02	0.2000E+01
18	10	0.4496E+02		
			0.0000E+00	0.0000E+00
			0.1219E+01	0.1000E-01
			0.2438E+01	0.2000E-01
			0.4877E+01	0.4000E-01
			0.7315E+01	0.6000E-01
			0.9753E+01	0.8000E-01
			0.1097E+02	0.9000E-01
			0.1219E+02	0.1000E+00
			0.1219E+02	0.5000E+00
			0.1219E+02	0.2000E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.7907E+01	0.7500E-02
0.1581E+02	0.1500E-01
0.3163E+02	0.3000E-01
0.6326E+02	0.1950E+00
0.9489E+02	0.6300E+00
0.1139E+03	0.1095E+01
0.1265E+03	0.1500E+01
0.1265E+03	0.2250E+01
0.1265E+03	0.3000E+01

LOAD VERSUS SETTLEMENT CURVE
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TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.2578E+00	0.2185E-03	0.1054E+00	0.1000E-03
0.2578E+01	0.2185E-02	0.1054E+01	0.1000E-02
0.1289E+02	0.1092E-01	0.5272E+01	0.5000E-02
0.2592E+02	0.2190E-01	0.1054E+02	0.1000E-01
0.1008E+03	0.9642E-01	0.3546E+02	0.5000E-01
0.1544E+03	0.1710E+00	0.4505E+02	0.1000E+00
0.1933E+03	0.5943E+00	0.8544E+02	0.5000E+00
0.2179E+03	0.1109E+01	0.1100E+03	0.1000E+01
0.2344E+03	0.2118E+01	0.1265E+03	0.2000E+01

			0.0000E+00	0.1200E+00
			0.0000E+00	0.1500E+00
			0.0000E+00	0.3000E+00
			0.0000E+00	0.4500E+00
			0.0000E+00	0.7500E+00
			0.0000E+00	0.3000E+01
5	10	0.1253E+02		
			0.0000E+00	0.0000E+00
			0.1235E+01	0.2400E-01
			0.2058E+01	0.4650E-01
			0.3088E+01	0.8550E-01
			0.3705E+01	0.1200E+00
			0.4117E+02	0.1500E+00
			0.3705E+01	0.3000E+00
			0.3705E+01	0.4500E+00
			0.3705E+01	0.7500E+00
			0.3705E+01	0.3000E+01
6	10	0.1896E+02		
			0.0000E+00	0.0000E+00
			0.1503E+01	0.2400E-01
			0.2504E+01	0.4650E-01
			0.3757E+01	0.8550E-01
			0.4508E+01	0.1200E+00
			0.5009E+01	0.1500E+00
			0.4508E+01	0.3000E+00
			0.4508E+01	0.4500E+00
			0.4508E+01	0.7500E+00
			0.4508E+01	0.3000E+01
7	10	0.1900E+02		
			0.0000E+00	0.0000E+00
			0.1533E+01	0.2400E-01
			0.2555E+01	0.4650E-01
			0.3832E+01	0.8550E-01
			0.4599E+01	0.1200E+00
			0.5110E+01	0.1500E+00
			0.4599E+01	0.3000E+00
			0.4599E+01	0.4500E+00
			0.4599E+01	0.7500E+00
			0.4599E+01	0.3000E+01
8	10	0.2002E+02		
			0.0000E+00	0.0000E+00
			0.1553E+01	0.2400E-01
			0.2588E+01	0.4650E-01
			0.3882E+01	0.8550E-01
			0.4658E+01	0.1200E+00
			0.5176E+01	0.1500E+00
			0.4658E+01	0.3000E+00
			0.4658E+01	0.4500E+00
			0.4658E+01	0.7500E+00
			0.4658E+01	0.3000E+01
9	10	0.2098E+02		
			0.0000E+00	0.0000E+00
			0.1552E+01	0.2400E-01
			0.2588E+01	0.4650E-01
			0.3882E+01	0.8550E-01
			0.4658E+01	0.1200E+00
			0.5176E+01	0.1500E+00
			0.4658E+01	0.3000E+00
			0.4658E+01	0.4500E+00
			0.4658E+01	0.7500E+00
			0.4658E+01	0.3000E+01
10	10	0.2100E+02		
			0.0000E+00	0.0000E+00
			0.6754E+00	0.1000E-01
			0.1351E+01	0.2000E-01
			0.2701E+01	0.4000E-01
			0.4052E+01	0.6000E-01
			0.5403E+01	0.8000E-01
			0.6078E+01	0.9000E-01
			0.6754E+01	0.1000E+00
			0.6754E+01	0.5000E+00
			0.6754E+01	0.2000E+01
11	10	0.2352E+02		
			0.0000E+00	0.0000E+00
			0.8603E+00	0.1000E-01
			0.1721E+01	0.2000E-01
			0.3441E+01	0.4000E-01
			0.5162E+01	0.6000E-01
			0.6882E+01	0.8000E-01
			0.7743E+01	0.9000E-01
			0.8603E+01	0.1000E+00
			0.8603E+01	0.5000E+00
			0.8603E+01	0.2000E+01
12	10	0.2596E+02		
			0.0000E+00	0.0000E+00
			0.9008E+00	0.1000E-01
			0.1802E+01	0.2000E-01
			0.3603E+01	0.4000E-01
			0.5405E+01	0.6000E-01
			0.7207E+01	0.8000E-01
			0.8108E+01	0.9000E-01
			0.9008E+01	0.1000E+00
			0.9008E+01	0.5000E+00
			0.9008E+01	0.2000E+01
13	10	0.2600E+02		
			0.0000E+00	0.0000E+00
			0.8183E+00	0.1000E-01
			0.1637E+01	0.2000E-01
			0.3273E+01	0.4000E-01
			0.4910E+01	0.6000E-01
			0.6546E+01	0.8000E-01
			0.7365E+01	0.9000E-01
			0.8183E+01	0.1000E+00
			0.8183E+01	0.5000E+00
			0.8183E+01	0.2000E+01
14	10	0.2852E+02		
			0.0000E+00	0.0000E+00
			0.7475E+00	0.1000E-01
			0.1495E+01	0.2000E-01
			0.2990E+01	0.4000E-01
			0.4485E+01	0.6000E-01
			0.5980E+01	0.8000E-01
			0.6727E+01	0.9000E-01
			0.7475E+01	0.1000E+00
			0.7475E+01	0.5000E+00

26.0	66.4	16.3	82.7	52.5	29.1	81.7	84.0	35.4	119.4
27.0	70.5	16.3	86.9	55.8	29.1	85.0	88.7	36.1	124.8
28.0	73.8	16.3	90.1	59.2	29.1	88.3	93.4	36.8	130.2
29.0	77.1	21.2	98.3	62.5	34.8	97.3	98.2	52.1	150.2
30.0	80.5	30.8	111.3	65.8	46.2	112.0	102.9	82.3	185.2
31.0	83.9	40.5	124.4	69.2	57.5	126.7	107.7	113.2	220.9
32.0	89.3	40.5	129.8	72.5	57.5	130.0	113.2	115.4	228.6
33.0	96.4	40.5	136.9	75.8	57.5	133.3	118.8	117.6	236.4
34.0	103.5	40.5	144.0	79.2	57.5	136.7	124.4	119.8	244.2
35.0	110.7	40.5	151.2	82.5	57.5	140.0	129.9	122.1	252.0
36.0	117.8	40.5	158.3	85.8	57.5	143.3	135.6	124.3	259.9
37.0	125.0	40.5	165.5	89.2	57.5	146.7	141.2	126.5	267.7

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**********************
*  API RP-2A (1994)  *
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PILE PENETRATION FT.	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	4.0	4.0
1.00	0.0	7.2	7.2
2.00	0.0	10.5	10.5
3.00	0.0	13.7	13.7
4.00	0.0	14.9	14.9
5.00	0.0	13.1	13.1
6.00	0.0	9.9	9.9
7.00	0.0	9.9	9.9
8.00	0.0	9.9	9.9
9.00	1.0	9.9	10.9
10.00	3.0	9.9	13.0
11.00	5.2	9.9	15.1
12.00	7.4	9.9	17.3
13.00	9.7	9.9	19.7
14.00	12.1	9.9	22.1
15.00	14.6	9.9	24.6
16.00	17.2	9.9	27.2
17.00	19.9	9.9	29.8
18.00	22.7	9.9	32.6
19.00	25.5	20.9	46.4
20.00	28.4	43.4	71.7
21.00	31.3	66.4	97.8
22.00	35.1	68.1	103.2
23.00	39.9	69.7	109.6
24.00	44.7	63.6	108.4
25.00	49.7	49.7	99.4
26.00	54.8	35.4	90.2
27.00	59.4	36.1	95.6
28.00	63.6	36.8	100.4
29.00	67.8	52.1	119.9
30.00	72.1	82.3	154.4
31.00	76.5	113.2	189.7
32.00	81.9	115.4	197.3
33.00	88.9	117.6	205.9
34.00	94.8	119.8	214.6
35.00	101.5	122.1	223.5
36.00	108.2	124.3	232.5
37.00	115.1	126.5	241.6

AN ASTERISK WILL BE PLACED IN THE END-BEARING COLUMN
IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION
OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

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*********************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT *
* CURVES FOR AXIAL LOADING                      *
*********************************************
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T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
2	10	0.3025E+01		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
3	10	0.5958E+01		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
4	10	0.6000E+01		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.2400E-01
			0.0000E+00	0.4650E-01
			0.0000E+00	0.6550E-01

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AXIALLY LOADING PILE ANALYSIS PROGRAM - APILEplus
VERSION 4.0 - (C) COPYRIGHT ENSOFT,INC.,1987-2004.

Bent 2 and 3, Ground Elevation 916 ft MSL

DESIGNER : Youwei Zhou

DATE : 05-04-07

PILE PROPERTIES :

PERIMETER OF PILE WITH NONCIRCULAR SECTION	=	0.00 IN.
TIP AREA OF PILE WITH NONCIRCULAR SECTION	=	0.00 SQF
OUTSIDE DIAMETER OF CIRCULAR PILE	=	15.00 IN.
INTERNAL DIAMETER OF CIRCULAR PILE	=	0.00 IN.
PILE LENGTH	=	37.00 FT.
MODULUS OF ELASTICITY	=	0.430E+07 PSI

LENGTH OF SURFACE SECTION WITH ZERO SKIN FRICTION = 8.25 FT.
INCREMENT OF PILE LENGTH USED IN COMPUTATION = 1.00 FT.

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/CF	FRICTION ANGLE DEGREES	BEARING CAPACITY FACTOR
0.00	SAND	1.00	125.00	30.00	21.00
6.00	SAND	1.00	125.00	30.00	21.00
6.00	CLAY	0.00	125.00	0.00	0.00
19.00	CLAY	0.00	125.00	0.00	0.00
19.00	CLAY	0.00	62.60	0.00	0.00
21.00	CLAY	0.00	62.60	0.00	0.00
21.00	SAND	1.00	62.60	30.00	21.00
26.00	SAND	1.00	62.60	30.00	21.00
26.00	SAND	1.00	57.60	25.00	10.00
31.00	SAND	1.00	57.60	25.00	10.00
31.00	SAND	1.00	62.60	32.00	29.00
45.00	SAND	1.00	62.60	32.00	29.00

MAXIMUM UNIT FRICTION KSF	MAXIMUM UNIT BEARING KSF	UNDISTURB SHEAR STRENGTH KSF	REMOLDED SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
9999.00	99999.00	0.90	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.82	140.80	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00

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* COMPUTATION RESULT *
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********** ********** **********
* FED. HWY. METHOD * * ARMY CORPS METHOD * * LAMBDA 2 METHOD *
********** ********** **********

PILE PENETRATION FT.	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP
0.0	0.0	3.3	3.3	0.0	4.4	4.4	0.0	4.0	4.0
1.0	0.0	6.0	6.0	0.0	7.9	7.9	0.0	7.2	7.2
2.0	0.0	8.7	8.7	0.0	11.5	11.5	0.0	10.5	10.5
3.0	0.0	11.3	11.3	0.0	15.0	15.0	0.0	13.7	13.7
4.0	0.0	12.7	12.7	0.0	16.1	16.1	0.0	14.9	14.9
5.0	0.0	11.8	11.8	0.0	13.7	13.7	0.0	13.1	13.1
6.0	0.0	9.9	9.9	0.0	9.9	9.9	0.0	9.9	9.9
7.0	0.0	9.9	9.9	0.0	9.9	9.9	0.0	9.9	9.9
8.0	0.0	9.9	9.9	0.0	9.9	9.9	0.0	9.9	9.9
9.0	1.7	9.9	11.7	1.4	9.9	11.4	7.1	9.9	17.0
10.0	5.2	9.9	15.1	4.2	9.9	14.2	9.7	9.9	19.6
11.0	8.6	9.9	18.6	7.1	9.9	17.0	12.5	9.9	22.3
12.0	12.1	9.9	22.0	9.9	9.9	19.8	15.0	9.9	24.9
13.0	15.5	9.9	25.5	12.7	9.9	22.7	26.0	9.9	35.9
14.0	19.0	9.9	28.9	15.6	9.9	25.5	29.9	9.9	39.8
15.0	22.5	9.9	32.4	18.4	9.9	28.3	33.8	9.9	43.7
16.0	25.9	9.9	35.9	21.2	9.9	31.1	37.8	9.9	47.7
17.0	29.4	9.9	39.3	24.0	9.9	34.0	41.8	9.9	51.7
18.0	32.9	9.9	42.8	26.9	9.9	36.8	45.9	9.9	55.8
19.0	36.3	11.2	47.5	29.7	16.8	46.5	50.0	20.9	71.0
20.0	39.7	13.8	53.5	32.5	30.4	63.0	54.2	43.4	97.6
21.0	43.2	16.3	59.5	35.8	44.1	79.9	58.3	66.4	124.8
22.0	47.2	16.3	63.5	39.2	44.1	83.3	63.4	68.1	131.5
23.0	51.9	16.3	68.2	42.5	44.1	86.6	68.5	69.7	138.2
24.0	56.6	16.3	72.9	45.8	41.1	87.0	73.7	63.6	137.3
25.0	61.4	16.3	77.8	49.2	35.1	84.3	78.8	49.7	128.5

			0.5056E+01	0.4000E-01
			0.7583E+01	0.6000E-01
			0.1011E+02	0.8000E-01
			0.1137E+02	0.9000E-01
			0.1264E+02	0.1000E+00
			0.1264E+02	0.5000E+00
			0.1264E+02	0.2000E+01
20	10	0.4552E+02		
			0.0000E+00	0.0000E+00
			0.1264E+01	0.1000E-01
			0.2528E+01	0.2000E-01
			0.5056E+01	0.4000E-01
			0.7583E+01	0.6000E-01
			0.1011E+02	0.8000E-01
			0.1137E+02	0.9000E-01
			0.1264E+02	0.1000E+00
			0.1264E+02	0.5000E+00
			0.1264E+02	0.2000E+01
21	10	0.4996E+02		
			0.0000E+00	0.0000E+00
			0.1264E+01	0.1000E-01
			0.2528E+01	0.2000E-01
			0.5056E+01	0.4000E-01
			0.7583E+01	0.6000E-01
			0.1011E+02	0.8000E-01
			0.1137E+02	0.9000E-01
			0.1264E+02	0.1000E+00
			0.1264E+02	0.5000E+00
			0.1264E+02	0.2000E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.9745E+01	0.7500E-02
0.1949E+02	0.1500E-01
0.3898E+02	0.3000E-01
0.7796E+02	0.1950E+00
0.1169E+03	0.6300E+00
0.1403E+03	0.1095E+01
0.1559E+03	0.1500E+01
0.1559E+03	0.2250E+01
0.1559E+03	0.3000E+01

LOAD VERSUS SETTLEMENT CURVE
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TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.2698E+00	0.2194E-03	0.1299E+00	0.1000E-03
0.2698E+01	0.2194E-02	0.1299E+01	0.1000E-02
0.1349E+02	0.1097E-01	0.6497E+01	0.5000E-02
0.2699E+02	0.2194E-01	0.1299E+02	0.1000E-01
0.1057E+03	0.9590E-01	0.4371E+02	0.5000E-01
0.1570E+03	0.1682E+00	0.5552E+02	0.1000E+00
0.2066E+03	0.5949E+00	0.1053E+03	0.5000E+00
0.2369E+03	0.1111E+01	0.1356E+03	0.1000E+01
0.2572E+03	0.2122E+01	0.1559E+03	0.2000E+01

			0.4658E+01	0.3000E+01
9	10	0.2296E+02		
			0.0000E+00	0.0000E+00
			0.1666E+01	0.2400E-01
			0.2777E+01	0.4650E-01
			0.4166E+01	0.8550E-01
			0.4999E+01	0.1200E+00
			0.5555E+01	0.1500E+00
			0.4999E+01	0.3000E+00
			0.4999E+01	0.4500E+00
			0.4999E+01	0.7500E+00
			0.4999E+01	0.3000E+01
10	10	0.2300E+02		
			0.0000E+00	0.0000E+00
			0.7549E+00	0.1000E-01
			0.1510E+01	0.2000E-01
			0.3020E+01	0.4000E-01
			0.4529E+01	0.6000E-01
			0.6039E+01	0.8000E-01
			0.6794E+01	0.9000E-01
			0.7549E+01	0.1000E+00
			0.7549E+01	0.5000E+00
			0.7549E+01	0.2000E+01
11	10	0.2552E+02		
			0.0000E+00	0.0000E+00
			0.1042E+01	0.1000E-01
			0.2085E+01	0.2000E-01
			0.4169E+01	0.4000E-01
			0.6254E+01	0.6000E-01
			0.8338E+01	0.8000E-01
			0.9381E+01	0.9000E-01
			0.1042E+02	0.1000E+00
			0.1042E+02	0.5000E+00
			0.1042E+02	0.2000E+01
12	10	0.2796E+02		
			0.0000E+00	0.0000E+00
			0.1123E+01	0.1000E-01
			0.2247E+01	0.2000E-01
			0.4493E+01	0.4000E-01
			0.6740E+01	0.6000E-01
			0.8986E+01	0.8000E-01
			0.1011E+02	0.9000E-01
			0.1123E+02	0.1000E+00
			0.1123E+02	0.5000E+00
			0.1123E+02	0.2000E+01
13	10	0.2800E+02		
			0.0000E+00	0.0000E+00
			0.1017E+01	0.1000E-01
			0.2033E+01	0.2000E-01
			0.4066E+01	0.4000E-01
			0.6100E+01	0.6000E-01
			0.8133E+01	0.8000E-01
			0.9149E+01	0.9000E-01
			0.1017E+02	0.1000E+00
			0.1017E+02	0.5000E+00
			0.1017E+02	0.2000E+01
14	10	0.3052E+02		
			0.0000E+00	0.0000E+00
			0.9681E+00	0.1000E-01
			0.1936E+01	0.2000E-01
			0.3872E+01	0.4000E-01
			0.5808E+01	0.6000E-01
			0.7744E+01	0.8000E-01
			0.8713E+01	0.9000E-01
			0.9681E+01	0.1000E+00
			0.9681E+01	0.5000E+00
			0.9681E+01	0.2000E+01
15	10	0.3296E+02		
			0.0000E+00	0.0000E+00
			0.1029E+01	0.1000E-01
			0.2057E+01	0.2000E-01
			0.4115E+01	0.4000E-01
			0.6172E+01	0.6000E-01
			0.8230E+01	0.8000E-01
			0.9258E+01	0.9000E-01
			0.1029E+02	0.1000E+00
			0.1029E+02	0.5000E+00
			0.1029E+02	0.2000E+01
16	10	0.3300E+02		
			0.0000E+00	0.0000E+00
			0.1255E+01	0.1000E-01
			0.2509E+01	0.2000E-01
			0.5018E+01	0.4000E-01
			0.7527E+01	0.6000E-01
			0.1004E+02	0.8000E-01
			0.1129E+02	0.9000E-01
			0.1255E+02	0.1000E+00
			0.1255E+02	0.5000E+00
			0.1255E+02	0.2000E+01
17	10	0.3702E+02		
			0.0000E+00	0.0000E+00
			0.1264E+01	0.1000E-01
			0.2528E+01	0.2000E-01
			0.5056E+01	0.4000E-01
			0.7583E+01	0.6000E-01
			0.1011E+02	0.8000E-01
			0.1137E+02	0.9000E-01
			0.1264E+02	0.1000E+00
			0.1264E+02	0.5000E+00
			0.1264E+02	0.2000E+01
18	10	0.4096E+02		
			0.0000E+00	0.0000E+00
			0.1264E+01	0.1000E-01
			0.2528E+01	0.2000E-01
			0.5056E+01	0.4000E-01
			0.7583E+01	0.6000E-01
			0.1011E+02	0.8000E-01
			0.1137E+02	0.9000E-01
			0.1264E+02	0.1000E+00
			0.1264E+02	0.5000E+00
			0.1264E+02	0.2000E+01
19	10	0.4100E+02		
			0.0000E+00	0.0000E+00
			0.1264E+01	0.1000E-01
			0.2528E+01	0.2000E-01

29.00	70.8	46.3	117.0
29.50	73.4	47.0	120.4
30.00	76.0	47.7	123.8
30.50	78.7	48.5	127.2
31.00	81.5	68.5	149.9
31.50	84.2	88.8	173.0
32.00	87.1	109.4	196.4
32.50	89.9	130.3	220.2
33.00	92.8	151.5	244.3
33.50	96.4	153.7	250.1
34.00	100.0	155.9	255.9

AN ASTERISK WILL BE PLACED IN THE END-BEARING COLUMN
IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION
OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

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**********************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT *
* CURVES FOR AXIAL LOADING                      *
**********************************************
```

T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
2	10	0.5525E+01		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00
			0.0000E+00	0.5000E+00
			0.0000E+00	0.2000E+01
3	10	0.1096E+02		
			0.0000E+00	0.0000E+00
			0.2226E+00	0.1000E-01
			0.4453E+00	0.2000E-01
			0.8905E+00	0.4000E-01
			0.1336E+01	0.6000E-01
			0.1781E+01	0.8000E-01
			0.2004E+01	0.9000E-01
			0.2226E+01	0.1000E+00
			0.2226E+01	0.5000E+00
			0.2226E+01	0.2000E+01
4	10	0.1100E+02		
			0.0000E+00	0.0000E+00
			0.4554E+00	0.1000E-01
			0.9108E+00	0.2000E-01
			0.1822E+01	0.4000E-01
			0.2732E+01	0.6000E-01
			0.3643E+01	0.8000E-01
			0.4098E+01	0.9000E-01
			0.4554E+01	0.1000E+00
			0.4554E+01	0.5000E+00
			0.4554E+01	0.2000E+01
5	10	0.1353E+02		
			0.0000E+00	0.0000E+00
			0.5566E+00	0.1000E-01
			0.1113E+01	0.2000E-01
			0.2226E+01	0.4000E-01
			0.3339E+01	0.6000E-01
			0.4453E+01	0.8000E-01
			0.5009E+01	0.9000E-01
			0.5566E+01	0.1000E+00
			0.5566E+01	0.5000E+00
			0.5566E+01	0.2000E+01
6	10	0.1596E+02		
			0.0000E+00	0.0000E+00
			0.6375E+00	0.1000E-01
			0.1275E+01	0.2000E-01
			0.2550E+01	0.4000E-01
			0.3825E+01	0.6000E-01
			0.5100E+01	0.8000E-01
			0.5738E+01	0.9000E-01
			0.6375E+01	0.1000E+00
			0.6375E+01	0.5000E+00
			0.6375E+01	0.2000E+01
7	10	0.1600E+02		
			0.0000E+00	0.0000E+00
			0.1681E+01	0.2400E-01
			0.2802E+01	0.4650E-01
			0.4203E+01	0.8550E-01
			0.5043E+01	0.1200E+00
			0.5604E+01	0.1500E+00
			0.5043E+01	0.3000E+00
			0.5043E+01	0.4500E+00
			0.5043E+01	0.7500E+00
			0.5043E+01	0.3000E+01
8	10	0.1952E+02		
			0.0000E+00	0.0000E+00
			0.1553E+01	0.2400E-01
			0.2588E+01	0.4650E-01
			0.3882E+01	0.8550E-01
			0.4658E+01	0.1200E+00
			0.5176E+01	0.1500E+00
			0.4658E+01	0.3000E+00
			0.4658E+01	0.4500E+00
			0.4658E+01	0.7500E+00

13.0	0.6	16.3	17.0	0.7	41.6	42.4	0.0	39.5	39.5
13.5	1.9	16.3	18.2	2.2	42.2	44.4	9.7	41.1	50.8
12.0	3.2	16.3	19.5	3.8	42.3	46.1	10.9	42.7	53.5
12.5	4.5	16.3	20.9	5.4	42.3	47.8	12.2	44.3	56.5
13.0	6.0	16.3	22.3	7.1	42.3	49.4	13.6	45.9	59.5
13.5	7.4	16.3	23.8	8.8	42.3	51.1	15.0	47.5	62.5
14.0	9.0	15.1	24.0	10.4	35.9	46.3	16.5	40.6	57.2
14.5	10.6	13.8	24.3	12.1	29.4	41.5	18.0	33.5	51.5
15.0	12.2	12.5	24.7	13.8	22.9	36.7	19.6	25.9	45.6
15.5	13.9	11.2	25.1	15.4	16.4	31.8	21.2	18.1	39.3
16.0	15.7	9.9	25.6	17.1	9.9	27.0	22.9	9.9	32.8
16.5	17.4	9.9	27.4	18.6	9.9	28.6	24.4	9.9	34.3
17.0	19.1	9.9	29.1	20.0	9.9	30.0	25.9	9.9	35.8
17.5	20.9	9.9	30.8	21.5	9.9	31.4	27.4	9.9	37.4
18.0	22.6	9.9	32.5	22.9	9.9	32.8	29.0	9.9	38.9
18.5	24.3	9.9	34.2	24.3	9.9	34.2	30.5	9.9	40.5
19.0	26.0	9.9	35.9	25.7	9.9	35.6	32.1	9.9	42.0
19.5	27.7	9.9	37.7	27.1	9.9	37.1	33.7	9.9	43.6
20.0	29.4	9.9	39.4	28.5	9.9	38.5	35.3	9.9	45.2
20.5	31.2	9.9	41.1	29.9	9.9	39.9	36.9	9.9	46.8
21.0	32.9	11.2	44.1	31.4	16.4	47.8	38.5	22.9	61.4
21.5	34.6	12.5	47.1	32.8	22.9	55.7	40.1	36.2	76.4
22.0	36.3	13.8	50.1	34.2	29.4	63.6	41.8	49.9	91.7
22.5	38.0	15.1	53.1	35.6	35.9	71.5	43.4	63.8	107.3
23.0	39.8	16.3	56.1	37.3	42.3	78.6	45.1	78.1	123.2
23.5	41.9	16.3	58.3	38.9	42.3	81.3	47.3	79.7	127.1
24.0	44.6	16.3	60.9	40.6	42.3	82.9	49.6	81.3	130.9
24.5	47.3	16.3	63.6	42.3	42.3	84.6	51.8	82.9	134.8
25.0	50.0	16.3	66.4	43.9	42.3	86.3	54.1	84.6	138.7
25.5	52.9	16.3	69.2	45.6	42.3	87.9	56.5	86.2	142.6
26.0	55.7	16.3	72.1	47.3	39.5	86.7	58.8	78.2	137.1
26.5	58.7	16.3	75.0	48.9	36.6	85.5	61.2	70.1	131.4
27.0	61.6	16.3	78.0	50.6	33.7	84.3	87.2	61.9	149.1
27.5	64.7	16.3	81.0	52.3	30.9	83.1	90.3	53.4	143.7
28.0	67.8	16.3	84.1	53.9	28.0	81.9	93.5	44.8	138.3
28.5	70.3	16.3	86.7	55.6	28.0	83.6	96.4	45.5	141.9
29.0	72.3	16.3	88.7	57.3	28.0	85.2	99.3	46.3	145.5
29.5	74.4	16.3	90.7	58.9	28.0	86.9	102.2	47.0	149.2
30.0	76.5	16.3	92.8	60.6	28.0	88.6	105.2	47.7	152.9
30.5	78.6	16.3	94.9	62.2	28.0	90.2	108.1	48.5	156.6
31.0	80.7	21.2	101.9	63.9	33.4	97.3	111.1	68.5	179.6
31.5	82.9	26.0	108.9	65.6	38.9	104.5	114.2	88.8	202.9
32.0	85.1	30.8	116.0	67.2	44.3	111.6	117.2	109.4	226.6
32.5	87.4	35.7	123.1	68.9	49.8	118.7	120.3	130.3	250.6
33.0	89.7	40.5	130.2	70.6	55.2	125.8	123.4	151.5	274.9
33.5	93.2	40.5	133.7	72.2	55.2	127.5	127.0	153.7	280.7
34.0	96.8	40.5	137.3	73.9	55.2	129.1	130.6	155.9	286.5

****

* API RP-2A (1994) *

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PILE PENETRATION FT.	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	4.0	4.0
0.50	0.0	5.6	5.6
1.00	0.0	7.2	7.2
1.50	0.0	8.9	8.9
2.00	0.0	10.5	10.5
2.50	0.0	12.1	12.1
3.00	0.0	13.7	13.7
3.50	0.0	15.3	15.3
4.00	0.0	16.9	16.9
4.50	0.0	18.5	18.5
5.00	0.0	20.1	20.1
5.50	0.0	21.7	21.7
6.00	0.0	23.4	23.4
6.50	0.0	25.0	25.0
7.00	0.0	26.6	26.6
7.50	0.0	28.2	28.2
8.00	0.0	29.8	29.8
8.50	0.0	31.4	31.4
9.00	0.0	33.0	33.0
9.50	0.0	34.6	34.6
10.00	0.0	36.2	36.2
10.50	0.0	37.9	37.9
11.00	0.6	39.5	40.1
11.50	1.9	41.1	43.0
12.00	3.3	42.7	45.9
12.50	4.7	44.3	49.0
13.00	6.1	45.9	52.0
13.50	7.6	47.5	55.2
14.00	9.2	40.6	49.9
14.50	10.8	33.5	44.3
15.00	12.5	25.9	38.5
15.50	14.3	18.1	32.4
16.00	16.1	9.9	26.0
16.50	17.7	9.9	27.6
17.00	19.0	9.9	29.0
17.50	20.4	9.9	30.3
18.00	21.8	9.9	31.7
18.50	23.2	9.9	33.1
19.00	24.6	9.9	34.5
19.50	26.0	9.9	36.0
20.00	27.5	9.9	37.4
20.50	29.0	9.9	38.9
21.00	30.5	22.9	53.4
21.50	32.0	36.2	68.3
22.00	33.5	49.9	83.4
22.50	35.1	63.8	98.9
23.00	36.7	78.1	114.8
23.50	38.8	79.7	118.5
24.00	41.5	81.3	122.9
24.50	44.3	82.9	127.2
25.00	47.1	84.6	131.7
25.50	50.0	86.2	136.2
26.00	53.0	78.2	131.2
26.50	56.0	70.1	126.1
27.00	59.0	61.9	120.9
27.50	62.1	53.4	115.6
28.00	65.3	44.8	110.1
28.50	68.2	45.5	113.7

1

AXIALLY LOADING PILE ANALYSIS PROGRAM - APILEplus
VERSION 4.0 - (C) COPYRIGHT ENSOFT,INC.,1987-2004.

A1,Ground Elevation 916 ft MSL

DESIGNER : Youwei Zhou

DATE : 05-04-07

PILE PROPERTIES :

PERIMETER OF PILE WITH NONCIRCULAR SECTION	=	0.00 IN.
TIP AREA OF PILE WITH NONCIRCULAR SECTION	=	0.00 SQF
OUTSIDE DIAMETER OF CIRCULAR PILE	=	15.00 IN.
INTERNAL DIAMETER OF CIRCULAR PILE	=	0.00 IN.
PILE LENGTH	=	34.00 FT.
MODULUS OF ELASTICITY	=	0.430E+07 PSI

LENGTH OF SURFACE SECTION WITH ZERO SKIN FRICTION = 11.00 FT.
INCREMENT OF PILE LENGTH USED IN COMPUTATION = 0.50 FT.

SOIL INFORMATIONS :

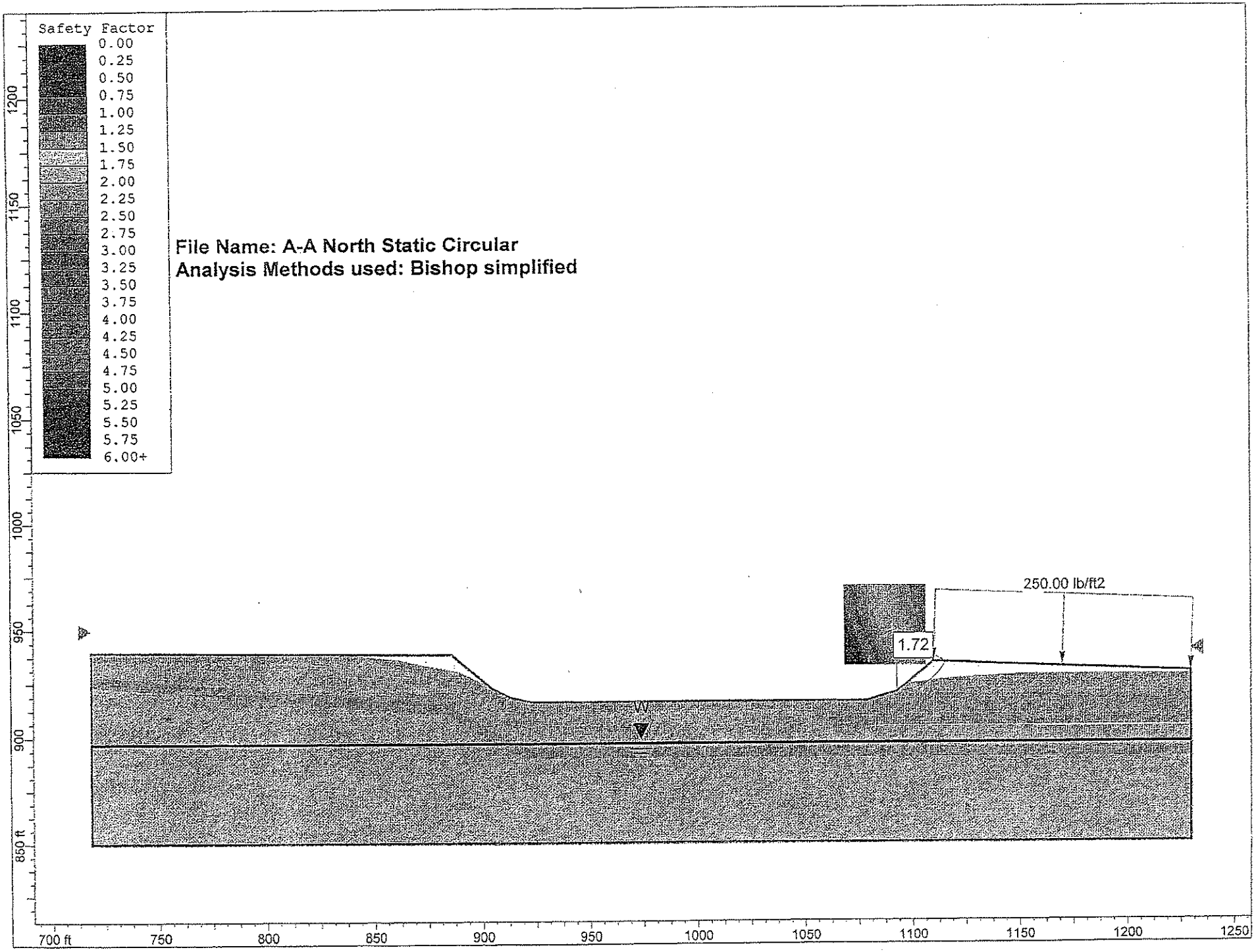
DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/CF	FRICTION ANGLE DEGREES	BEARING CAPACITY FACTOR
0.00	SAND	1.00	125.00	30.00	21.00
11.00	SAND	1.00	125.00	30.00	21.00
11.00	SAND	1.00	125.00	30.00	21.00
16.00	SAND	1.00	125.00	30.00	21.00
16.00	CLAY	0.00	125.00	0.00	0.00
23.00	CLAY	0.00	125.00	0.00	0.00
23.00	SAND	1.00	125.00	30.00	21.00
28.00	SAND	1.00	125.00	30.00	21.00
28.00	SAND	1.00	120.00	25.00	10.00
33.00	SAND	1.00	120.00	25.00	10.00
33.00	SAND	1.00	125.00	32.00	29.00
41.00	SAND	1.00	125.00	32.00	29.00
41.00	SAND	1.00	62.60	32.00	29.00
50.00	SAND	1.00	62.60	32.00	29.00

MAXIMUM UNIT FRICTION KSF	MAXIMUM UNIT BEARING KSF	UNDISTURB SHEAR STRENGTH KSF	REMOLDED SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.00	0.00	0.00	0.00	0.00
9999.00	99999.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.70	100.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00
1.82	140.00	0.00	0.00	0.00	0.00	0.00

1

COMPUTATION RESULT

	FED. HWY. METHOD			ARMY CORPS METHOD			LAMBDA 2 METHOD		
PILE PENETRATION FT.	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRIC KIP	END BEARING KIP	ULTIM CAPACITY KIP
0.0	0.0	3.3	3.3	0.0	4.4	4.4	0.0	4.0	4.0
0.5	0.0	4.7	4.7	0.0	6.2	6.2	0.0	5.6	5.6
1.0	0.0	6.0	6.0	0.0	7.9	7.9	0.0	7.2	7.2
1.5	0.0	7.3	7.3	0.0	9.7	9.7	0.0	8.9	8.9
2.0	0.0	8.7	8.7	0.0	11.5	11.5	0.0	10.5	10.5
2.5	0.0	10.0	10.0	0.0	13.2	13.2	0.0	12.1	12.1
3.0	0.0	11.3	11.3	0.0	15.0	15.0	0.0	13.7	13.7
3.5	0.0	12.7	12.7	0.0	16.8	16.8	0.0	15.3	15.3
4.0	0.0	13.9	13.9	0.0	16.5	18.5	0.0	16.9	16.9
4.5	0.0	14.9	14.9	0.0	20.3	20.3	0.0	18.5	18.5
5.0	0.0	15.6	15.6	0.0	22.1	22.1	0.0	20.1	20.1
5.5	0.0	16.1	16.1	0.0	23.8	23.8	0.0	21.7	21.7
6.0	0.0	16.3	16.3	0.0	25.6	25.6	0.0	23.4	23.4
6.5	0.0	16.3	16.3	0.0	27.3	27.3	0.0	25.0	25.0
7.0	0.0	16.3	16.3	0.0	29.1	29.1	0.0	26.6	26.6
7.5	0.0	16.3	16.3	0.0	30.9	30.9	0.0	28.2	28.2
8.0	0.0	16.3	16.3	0.0	32.6	32.6	0.0	29.8	29.8
8.5	0.0	16.3	16.3	0.0	34.4	34.4	0.0	31.4	31.4
9.0	0.0	16.3	16.3	0.0	36.2	36.2	0.0	33.0	33.0
9.5	0.0	16.3	16.3	0.0	37.9	37.9	0.0	34.6	34.6
10.0	0.0	16.3	16.3	0.0	39.5	39.5	0.0	36.2	36.2
10.5	0.0	16.3	16.3	0.0	40.8	40.8	0.0	37.9	37.9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1.50
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2.00
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2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25
5.50
5.75
6.00+
File Name: A-A North Static Circular
Analysis Methods used: Bishop simplified
250.00 lb/ft2
1.72
1200
1150
1100
1050
1000
950
900
850 ft
700 ft
750
800
850
900
950
1000
1050
1100
1150
1200
1250

Slide Analysis Information

Document Name

File Name: A-A North Static Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Right to Left
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Bishop simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Normal to boundary, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 900 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.716380
Center: 1093.172, 945.484
Radius: 25.466
Left Slip Surface Endpoint: 1093.023, 920.019
Right Slip Surface Endpoint: 1115.789, 933.780
Resisting Moment=342710 lb-ft
Driving Moment=199670 lb-ft

List of All Coordinates

Material Boundary
838.000 938.000
860.000 936.000
890.000 930.000
903.538 923.231

Material Boundary
1095.833 922.333
1100.000 924.000
1116.000 926.000
1150.000 928.000
1229.857 928.000

Material Boundary
884.000 910.000
918.000 890.000
1229.857 890.000

Material Boundary
718.096 923.525
884.000 910.000

Material Boundary
718.096 928.525
884.000 915.000
918.000 895.000
1229.857 895.000

Material Boundary
834.096 938.419
838.000 938.000

Material Boundary
718.096 935.000
850.000 935.000
884.012 925.045
918.000 911.000
932.000 911.000

Material Boundary
718.096 918.525
884.000 905.000
918.000 885.000
1229.857 885.000

Material Boundary
932.000 911.000
1050.000 912.000
1070.000 899.000
1084.000 904.500
1229.857 904.500

Material Boundary
1084.000 904.500
1229.857 903.808

External Boundary
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1229.857 850.000
1229.857 885.000
1229.857 890.000
1229.857 895.000
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Water Table
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Distributed Load
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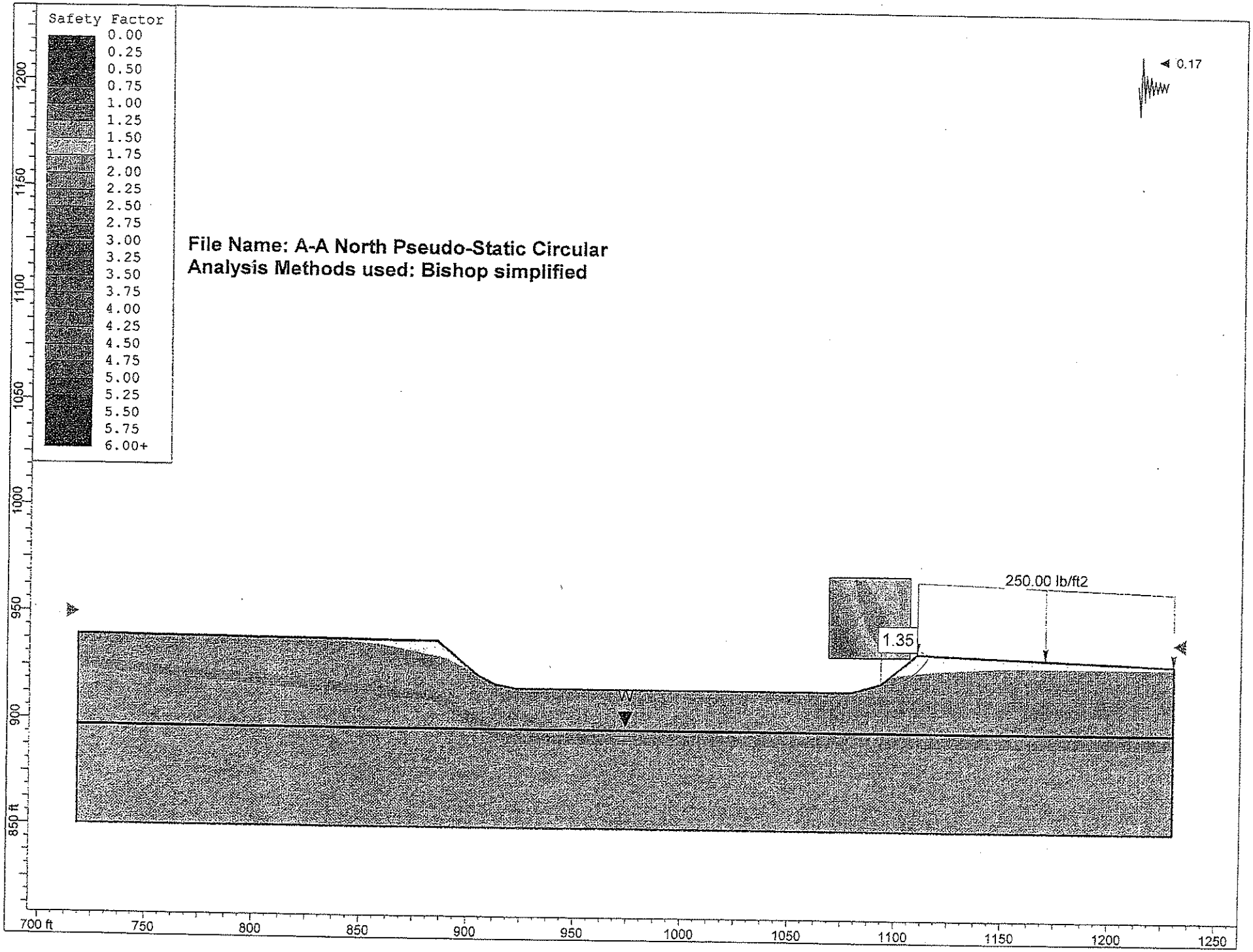
1110.000 934.000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1.50
1.75
2.00
2.25
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3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25
5.50
5.75
6.00+
0.17
File Name: A-A North Pseudo-Static Circular
Analysis Methods used: Bishop simplified
250.00 lb/ft2
1.35
W
1200
1150
1100
1050
1000
950
900
850 ft
700 ft
750
800
850
900
950
1000
1050
1100
1150
1200
1250

Slide Analysis Information

Document Name

File Name: A-A North Pseudo-Static Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Right to Left
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Bishop simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.17
1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 900 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 450 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified
FS: 1.350860
Center: 1093.172, 945.484
Radius: 25.466
Left Slip Surface Endpoint: 1093.023, 920.019
Right Slip Surface Endpoint: 1115.789, 933.780
Resisting Moment=327066 lb-ft
Driving Moment=242118 lb-ft

List of All Coordinates

Search Grid
1068.396 932.412
1106.512 932.412
1106.512 969.761
1068.396 969.761

Material Boundary
838.000 938.000
860.000 936.000
890.000 930.000
903.538 923.231

Material Boundary
1095.833 922.333
1100.000 924.000
1116.000 926.000
1150.000 928.000
1229.857 928.000

Material Boundary
884.000 910.000
918.000 890.000
1229.857 890.000

Material Boundary
718.096 923.525
884.000 910.000

Material Boundary
718.096 928.525
884.000 915.000
918.000 895.000
1229.857 895.000

Material Boundary
834.096 938.419
838.000 938.000

Material Boundary
718.096 935.000
850.000 935.000

884.012 925.045
918.000 911.000
932.000 911.000

Material Boundary
718.096 918.525
884.000 905.000
918.000 885.000
1229.857 885.000

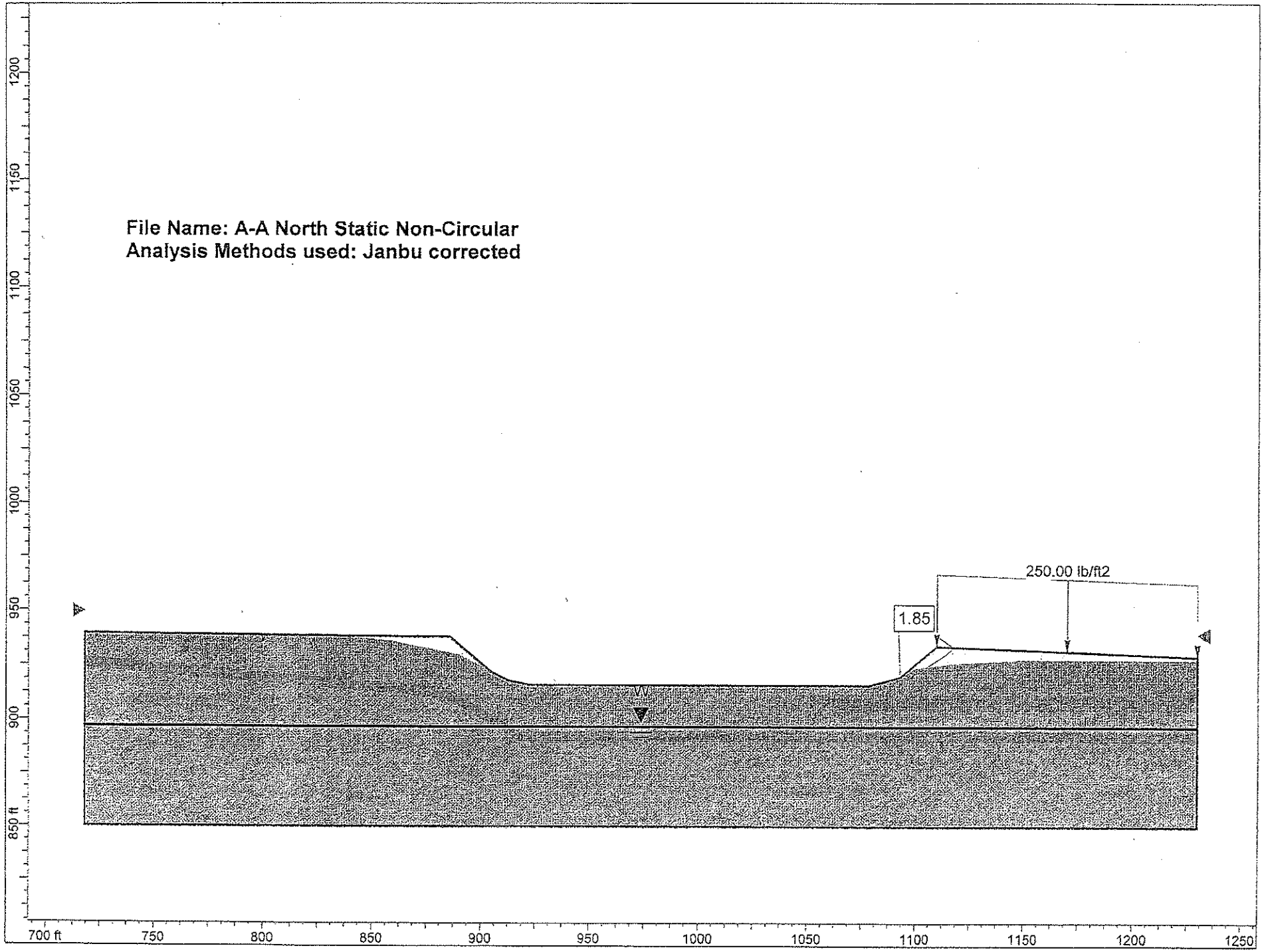
Material Boundary
932.000 911.000
1050.000 912.000
1070.000 899.000
1084.000 904.500
1229.857 904.500

External Boundary
718.096 850.000
1229.857 850.000
1229.857 885.000
1229.857 890.000
1229.857 895.000
1229.857 903.808
1229.857 904.500
1229.857 928.000
1229.857 929.454
1110.000 934.000
1095.833 922.333
1093.000 920.000
1079.000 916.000
933.000 916.000
923.000 916.000
913.000 918.000
905.000 922.000
903.538 923.231
866.000 938.000
834.096 938.419
718.096 939.354
718.096 935.000
718.096 928.525
718.096 923.525
718.096 918.525

Water Table
718.000 897.000
1229.857 897.000

Distributed Load
1110.000 934.000
1229.857 929.454

File Name: A-A North Static Non-Circular
Analysis Methods used: Janbu corrected



Slide Analysis Information

Document Name

File Name: A-A North Static Non-Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Right to Left
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Janbu corrected

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 115
Left Projection Angle (End Angle): 165
Right Projection Angle (Start Angle): 10
Right Projection Angle (End Angle): 45
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 600 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 1.845560
Axis Location: 1091.884, 951.526
Left Slip Surface Endpoint: 1093.157, 920.129
Right Slip Surface Endpoint: 1117.765, 933.705
Resisting Horizontal Force=11600.8 lb
Driving Horizontal Force=6285.78 lb

List of All Coordinates

Material Boundary

838.000	938.000
860.000	936.000
890.000	930.000
903.538	923.231

Material Boundary

1095.833	922.333
1100.000	924.000
1116.000	926.000
1150.000	928.000
1229.857	928.000

Material Boundary

884.000	910.000
918.000	890.000
1229.857	890.000

Material Boundary

718.096	923.525
884.000	910.000

Material Boundary

718.096	928.525
884.000	915.000
918.000	895.000
1229.857	895.000

Material Boundary

834.096	938.419
838.000	938.000

Material Boundary

718.096	935.000
850.000	935.000
884.012	925.045
918.000	911.000
932.000	911.000

Material Boundary

718.096	918.525
884.000	905.000
918.000	885.000
1229.857	885.000

Material Boundary

932.000	911.000
1050.000	912.000
1070.000	899.000
1084.000	904.500
1229.857	904.500

External Boundary

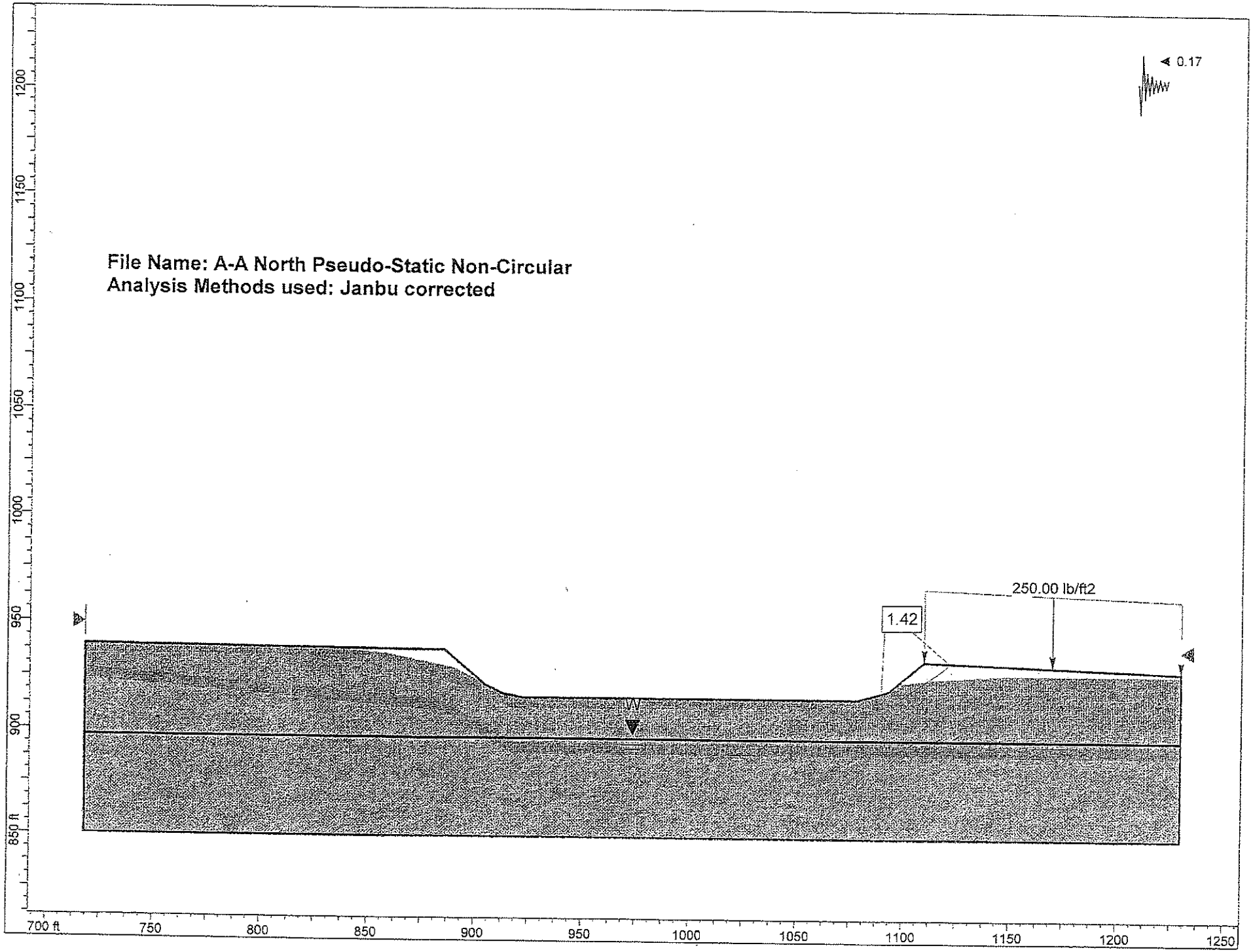
718.096	850.000
1229.857	850.000
1229.857	885.000
1229.857	890.000
1229.857	895.000
1229.857	903.808
1229.857	904.500
1229.857	928.000
1229.857	929.454
1110.000	934.000
1095.833	922.333
1093.000	920.000
1079.000	916.000
933.000	916.000
923.000	916.000
913.000	918.000
905.000	922.000
903.538	923.231
886.000	938.000
834.096	938.419
718.096	939.354
718.096	935.000
718.096	928.525
718.096	923.525
718.096	918.525

Water Table

718.000	897.000
1229.857	897.000

Distributed Load

1110.000	934.000
1229.857	929.454


0.17
File Name: A-A North Pseudo-Static Non-Circular
Analysis Methods used: Janbu corrected
250.00 lb/ft2
1.42
1200
1150
1100
1050
1000
950
900
850 ft
700 ft
750
800
850
900
950
1000
1050
1100
1150
1200
1250

Slide Analysis Information

Document Name

File Name: A-A North Pseudo-Static Non-Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Right to Left
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Janbu corrected

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 115
Left Projection Angle (End Angle): 165
Right Projection Angle (Start Angle): 10
Right Projection Angle (End Angle): 45
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.17
1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 900 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 1.415500
Axis Location: 1091.639, 958.651
Left Slip Surface Endpoint: 1089.899, 919.114
Right Slip Surface Endpoint: 1122.225, 933.536
Resisting Horizontal Force=19215.7 lb
Driving Horizontal Force=13575.3 lb

List of All Coordinates

Material Boundary
838.000 938.000
860.000 936.000
890.000 930.000
903.538 923.231

Material Boundary
1095.833 922.333
1100.000 924.000
1116.000 926.000
1150.000 928.000
1229.857 928.000

Material Boundary
884.000 910.000
918.000 890.000
1229.857 890.000

Material Boundary
718.096 923.525
884.000 910.000

Material Boundary
718.096 928.525
884.000 915.000
918.000 895.000
1229.857 895.000

Material Boundary
834.096 938.419
838.000 938.000

Material Boundary
718.096 935.000
850.000 935.000
884.012 925.045
918.000 911.000
932.000 911.000

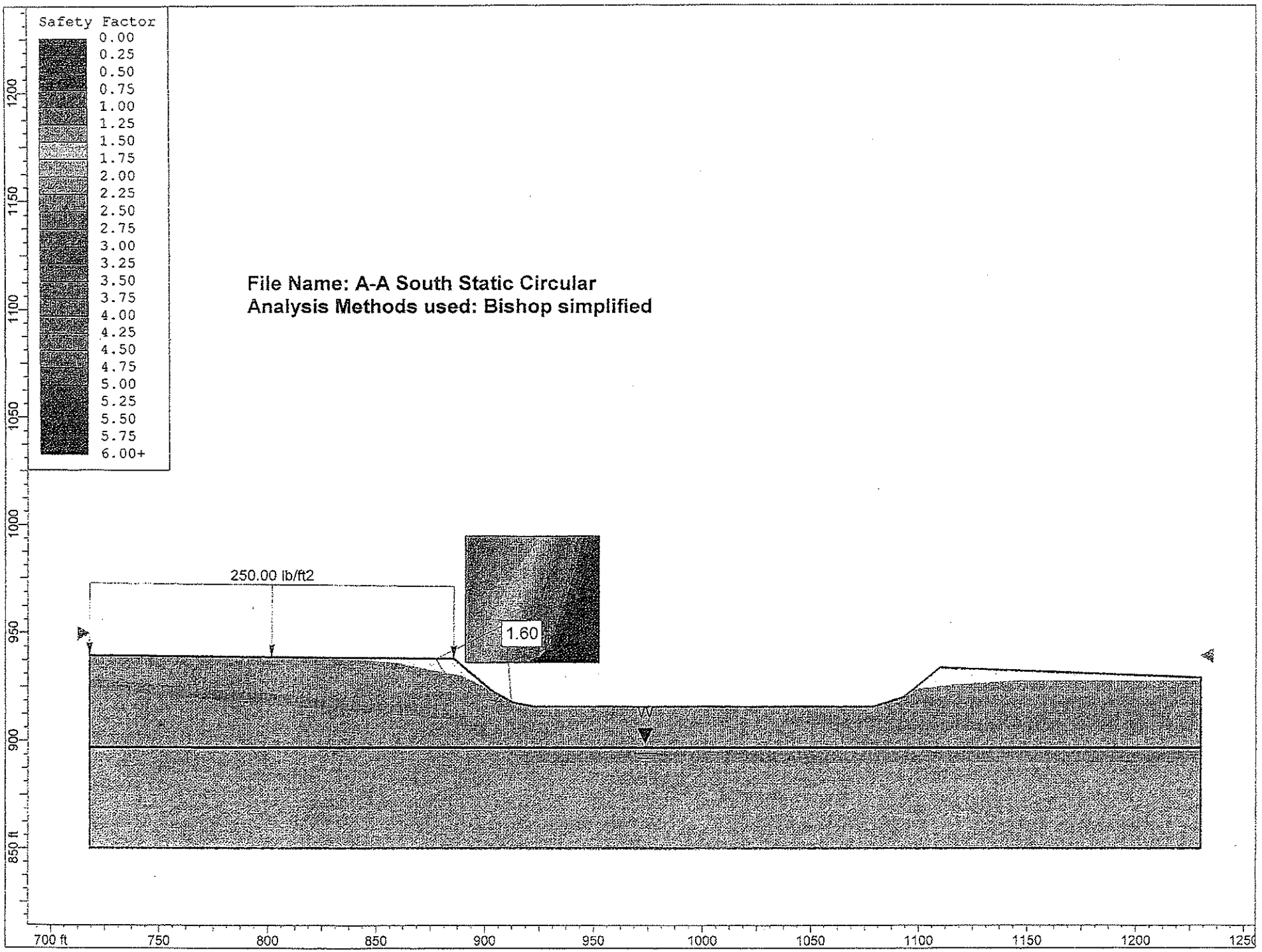
Material Boundary
718.096 918.525
884.000 905.000
918.000 885.000
1229.857 885.000

Material Boundary
932.000 911.000
1050.000 912.000
1070.000 899.000
1084.000 904.500
1229.857 904.500

External Boundary
718.096 650.000
1229.857 850.000
1229.857 885.000
1229.857 890.000
1229.857 895.000
1229.857 903.808
1229.857 904.500
1229.857 928.000
1229.857 929.454
1110.000 934.000
1095.833 922.333
1093.000 920.000
1079.000 916.000
933.000 916.000
923.000 916.000
913.000 918.000
905.000 922.000
903.538 923.231
886.000 938.000
834.096 938.419
718.096 939.354
718.096 935.000
718.096 928.525
718.096 923.525
718.096 918.525

Water Table
718.000 897.000
1229.857 897.000

Distributed Load
1110.000 934.000
1229.857 929.454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0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25
5.50
5.75
6.00+
File Name: A-A South Static Circular
Analysis Methods used: Bishop simplified
250.00 lb/ft2
1.60
1200
1150
1100
1050
1000
950
900
850 ft
700 ft
750
800
850
900
950
1000
1050
1100
1150
1200
1250

Slide Analysis Information

Document Name

File Name: A-A South Static Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Bishop simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Normal to boundary, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 600 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 450 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.601660
Center: 909.752, 953.827
Radius: 35.645
Left Slip Surface Endpoint: 877.780, 938.066
Right Slip Surface Endpoint: 912.435, 918.282
Resisting Moment=857573 lb-ft
Driving Moment=535428 lb-ft

List of All Coordinates

Search Grid
891.356 936.306
952.677 936.306
952.677 994.708
891.356 994.708

Material Boundary
838.000 938.000
860.000 936.000
880.000 930.000
903.538 923.231

Material Boundary
1095.833 922.333
1100.000 924.000
1116.000 926.000
1150.000 928.000
1229.857 928.000

Material Boundary
884.000 910.000
918.000 890.000
1229.857 890.000

Material Boundary
718.096 923.525
884.000 910.000

Material Boundary
718.096 928.525
884.000 915.000
918.000 895.000
1229.857 895.000

Material Boundary
834.096 938.419
838.000 938.000

Material Boundary
718.096 935.000
850.000 935.000
884.012 925.045
918.000 911.000
932.000 911.000

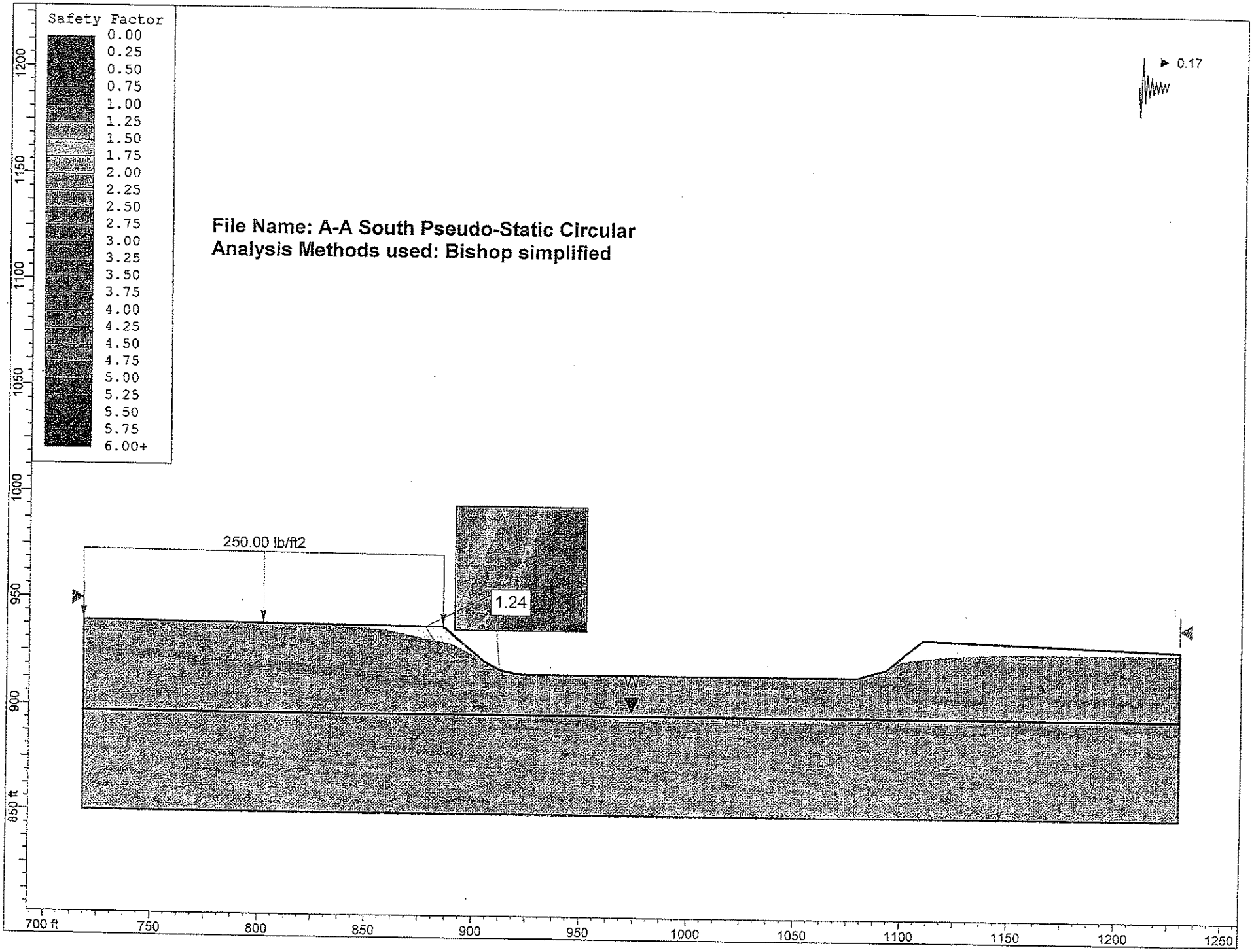
Material Boundary
718.096 918.525
884.000 905.000
918.000 885.000
1229.857 885.000

Material Boundary
932.000 911.000
1050.000 912.000
1070.000 899.000
1084.000 904.500
1229.857 904.500

External Boundary
718.096 850.000
1229.857 850.000
1229.857 885.000
1229.857 890.000
1229.857 895.000
1229.857 903.808
1229.857 904.500
1229.857 928.000
1229.857 929.454
1110.000 934.000
1095.833 922.333
1093.000 920.000
1079.000 916.000
933.000 916.000
923.000 916.000
913.000 918.000
905.000 922.000
903.538 923.231
886.000 936.000
834.096 938.419
718.096 939.354
718.096 935.000
718.096 928.525
718.096 923.525
718.096 918.525

Water Table
718.000 897.000
1229.857 897.000

Distributed Load
886.000 936.000
834.096 938.419
718.096 939.354


Safety Factor
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25
5.50
5.75
6.00+
0.17
File Name: A-A South Pseudo-Static Circular
Analysis Methods used: Bishop simplified
250.00 lb/ft2
1.24
1200
1150
1100
1050
1000
950
900
850 ft
700 ft
750
800
850
900
950
1000
1050
1100
1150
1200
1250

Slide Analysis Information

Document Name

File Name: A-A South Pseudo-Static Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Bishop simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.17
1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New-Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 900 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified
FS: 1.240350
Center: 909.752, 953.827
Radius: 35.645
Left Slip Surface Endpoint: 877.780, 938.066
Right Slip Surface Endpoint: 912.435, 918.282
Resisting Moment=815041 lb-ft
Driving Moment=657105 lb-ft

List of All Coordinates

Search Grid
891.356 936.306
952.677 936.306
952.677 994.708
891.356 994.708

Material Boundary
838.000 938.000
860.000 936.000
890.000 930.000
903.538 923.231

Material Boundary
1095.833 922.333
1100.000 924.000
1116.000 926.000
1150.000 928.000
1229.857 928.000

Material Boundary
884.000 910.000
918.000 890.000
1229.857 890.000

Material Boundary
718.096 923.525
884.000 910.000

Material Boundary
718.096 928.525
884.000 915.000
918.000 895.000
1229.857 895.000

Material Boundary
834.096 938.419
838.000 938.000

Material Boundary
718.096 935.000
850.000 935.000
884.012 925.045
918.000 911.000
932.000 911.000

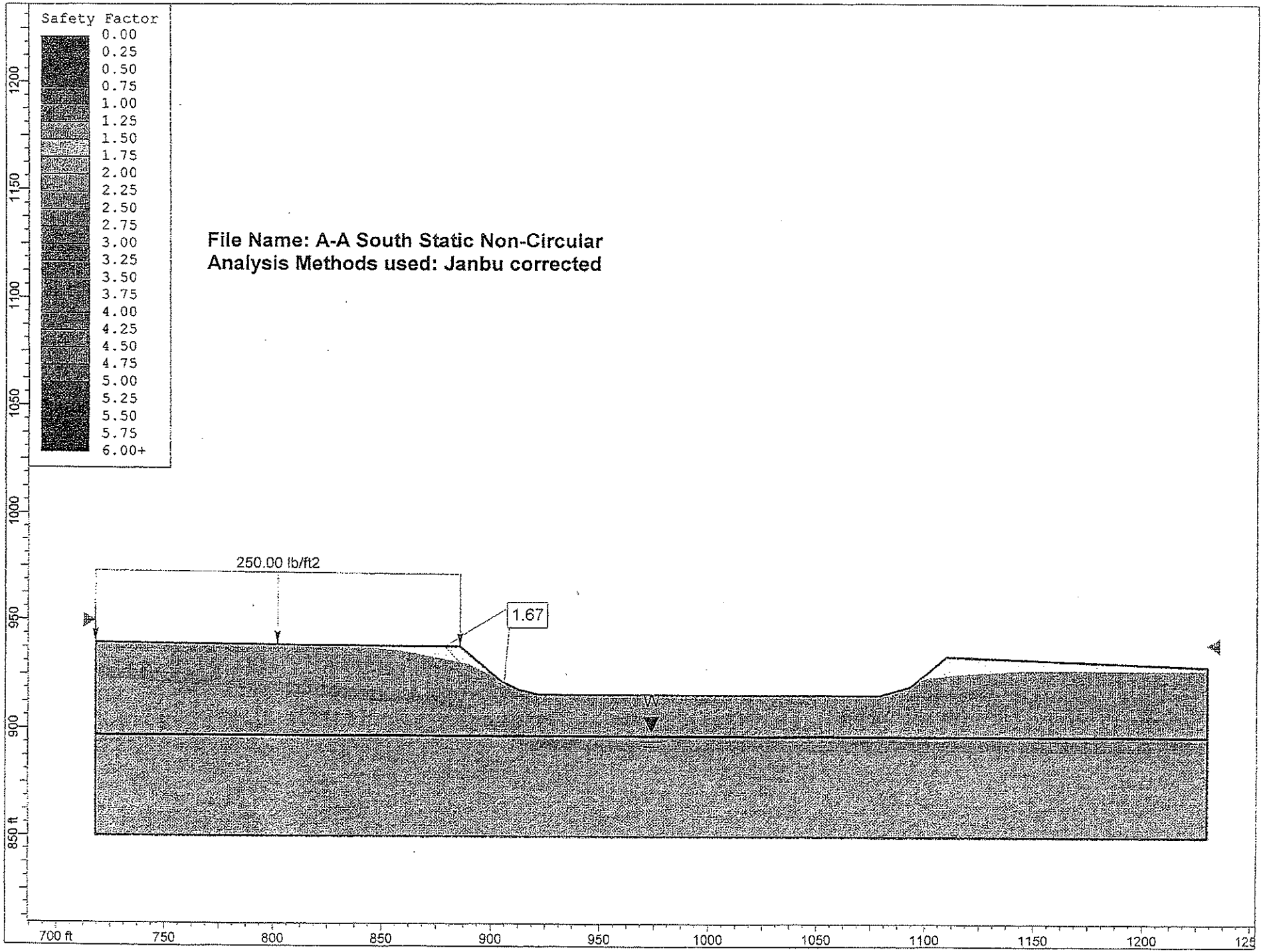
Material Boundary
718.096 918.525
884.000 905.000
918.000 885.000
1229.857 885.000

Material Boundary
932.000 911.000
1050.000 912.000
1070.000 899.000
1084.000 904.500
1229.857 904.500

External Boundary
718.096 850.000
1229.857 850.000
1229.857 885.000
1229.857 890.000
1229.857 895.000
1229.857 903.808
1229.857 904.500
1229.857 928.000
1229.857 929.454
1110.000 934.000
1095.833 922.333
1093.000 920.000
1079.000 916.000
933.000 916.000
923.000 916.000
913.000 918.000
905.000 922.000
903.538 923.231
886.000 938.000
834.096 938.419
718.096 939.354
718.096 935.000
718.096 928.525
718.096 923.525
718.096 918.525

Water Table
718.000 897.000
1229.857 897.000

Distributed Load
886.000 938.000
834.096 938.419
718.096 939.354


Safety Factor
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25
5.50
5.75
6.00+
File Name: A-A South Static Non-Circular
Analysis Methods used: Janbu corrected
250.00 lb/ft2
1.67
1200
1150
1100
1050
1000
950
900
850 ft
700 ft
750
800
850
900
950
1000
1050
1100
1150
1200

Slide Analysis Information

Document Name

File Name: A-A South Static Non-Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Janbu corrected
Spencer

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 115
Left Projection Angle (End Angle): 165
Right Projection Angle (Start Angle): 10
Right Projection Angle (End Angle): 45
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 900 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 1.578750
Axis Location: 911.892, 960.427
Left Slip Surface Endpoint: 877.891, 938.085
Right Slip Surface Endpoint: 909.381, 919.809
Resisting Horizontal Force=18795 lb
Driving Horizontal Force=11905 lb

Method: spencer
FS: 1.669650
Axis Location: 909.359, 956.921
Left Slip Surface Endpoint: 879.061, 938.056
Right Slip Surface Endpoint: 906.272, 921.364
Resisting Moment=546789 lb-ft
Driving Moment=327487 lb-ft
Resisting Horizontal Force=12882.2 lb
Driving Horizontal Force=7715.47 lb

List of All Coordinates

Material Boundary
836.000	938.000
860.000	936.000
890.000	930.000
903.538	923.231

Material Boundary
1095.833	922.333
1100.000	924.000
1116.000	926.000
1150.000	926.000
1229.857	926.000

Material Boundary
884.000	910.000
918.000	890.000
1229.857	890.000

Material Boundary
718.096	923.525
884.000	910.000

Material Boundary
718.096	926.525
884.000	915.000
918.000	895.000
1229.857	895.000

Material Boundary
834.096	938.419
836.000	938.000

Material Boundary
718.096	935.000
850.000	935.000
884.012	925.045
918.000	911.000
932.000	911.000

Material Boundary
718.096	918.525
884.000	905.000
918.000	885.000
1229.857	885.000

Material Boundary
932.000	911.000
1050.000	912.000
1070.000	899.000
1084.000	904.500
1229.857	904.500

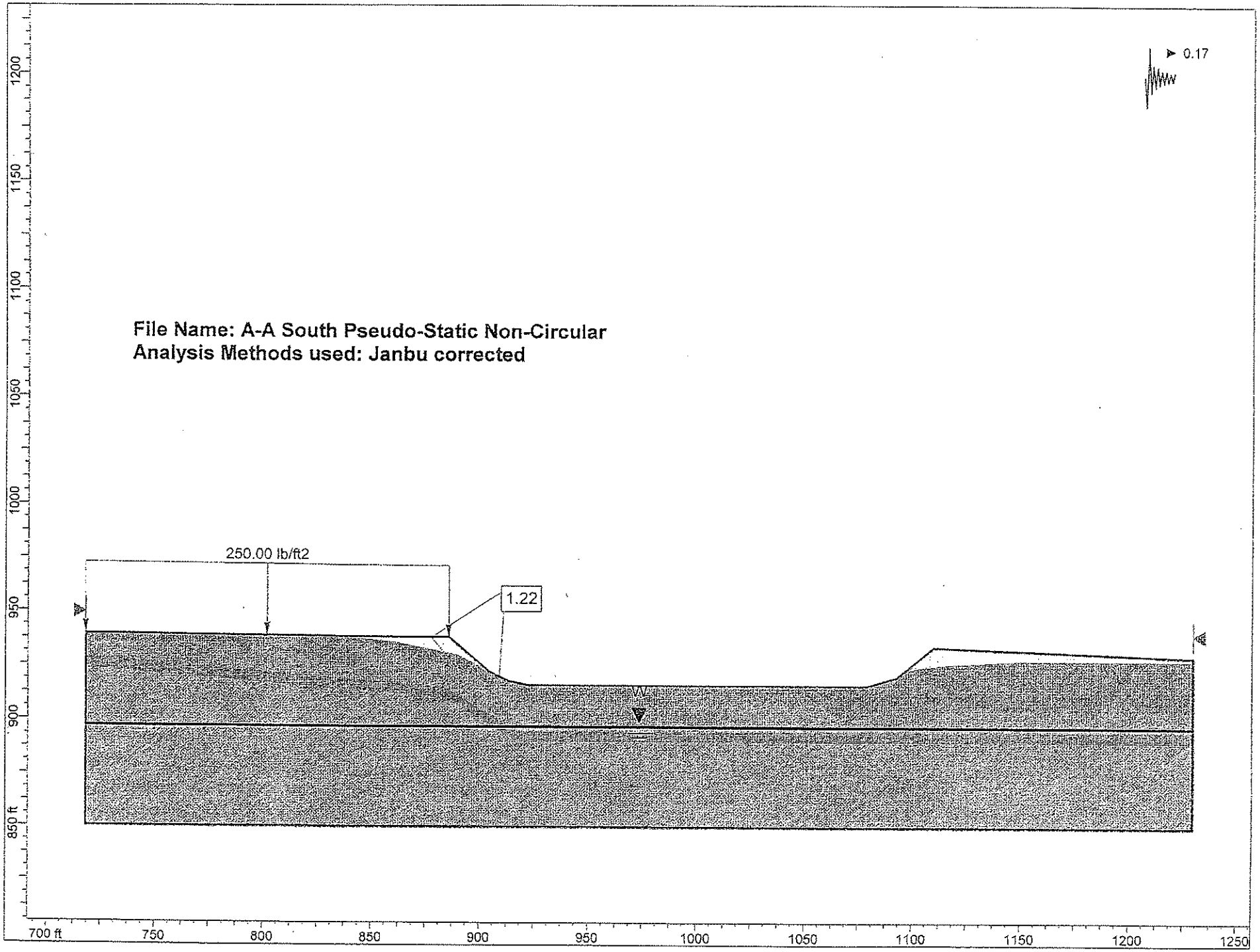
External Boundary
718.096	850.000
1229.857	850.000
1229.857	885.000
1229.857	890.000
1229.857	895.000
1229.857	903.808
1229.857	904.500
1229.857	926.000
1229.857	929.454
1110.000	934.000
1095.833	922.333
1093.000	920.000
1079.000	916.000
933.000	916.000
923.000	916.000
913.000	918.000
905.000	922.000
903.538	923.231
886.000	938.000
834.096	938.419
718.096	939.354
718.096	935.000
718.096	926.525
718.096	923.525
718.096	918.525

Water Table
718.000	897.000

1229.857 897.000

Distributed Load

886.000 938.000
834.096 938.419
718.096 939.354


0.17
File Name: A-A South Pseudo-Static Non-Circular
Analysis Methods used: Janbu corrected
250.00 lb/ft2
1.22
1200
1150
1100
1050
1000
950
900
850 ft
700 ft
750
800
850
900
950
1000
1050
1100
1150
1200
1250

Slide Analysis Information

Document Name

File Name: A-A South Pseudo-Static Non-Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Janbu corrected

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 115
Left Projection Angle (End Angle): 165
Right Projection Angle (Start Angle): 10
Right Projection Angle (End Angle): 45
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.17
1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (CL)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 900 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 1.216000
Axis Location: 911.892, 960.427
Left Slip Surface Endpoint: 877.891, 938.065
Right Slip Surface Endpoint: 909.381, 919.809
Resisting Horizontal Force=17935.7 lb
Driving Horizontal Force=14749.8 lb

List of All Coordinates

Material Boundary

838.000	938.000
860.000	936.000
890.000	930.000
903.538	923.231

Material Boundary

1095.833	922.333
1100.000	924.000
1116.000	926.000
1150.000	928.000
1229.857	928.000

Material Boundary

884.000	910.000
918.000	890.000
1229.857	890.000

Material Boundary

718.096	923.525
884.000	910.000

Material Boundary

718.096	928.525
884.000	915.000
918.000	895.000
1229.857	895.000

Material Boundary

834.096	938.419
838.000	938.000

Material Boundary

718.096	935.000
850.000	935.000
884.012	925.045
918.000	911.000
932.000	911.000

Material Boundary

718.096	918.525
884.000	905.000
918.000	885.000
1229.857	885.000

Material Boundary

932.000	911.000
1050.000	912.000
1070.000	899.000
1084.000	904.500
1229.857	904.500

External Boundary

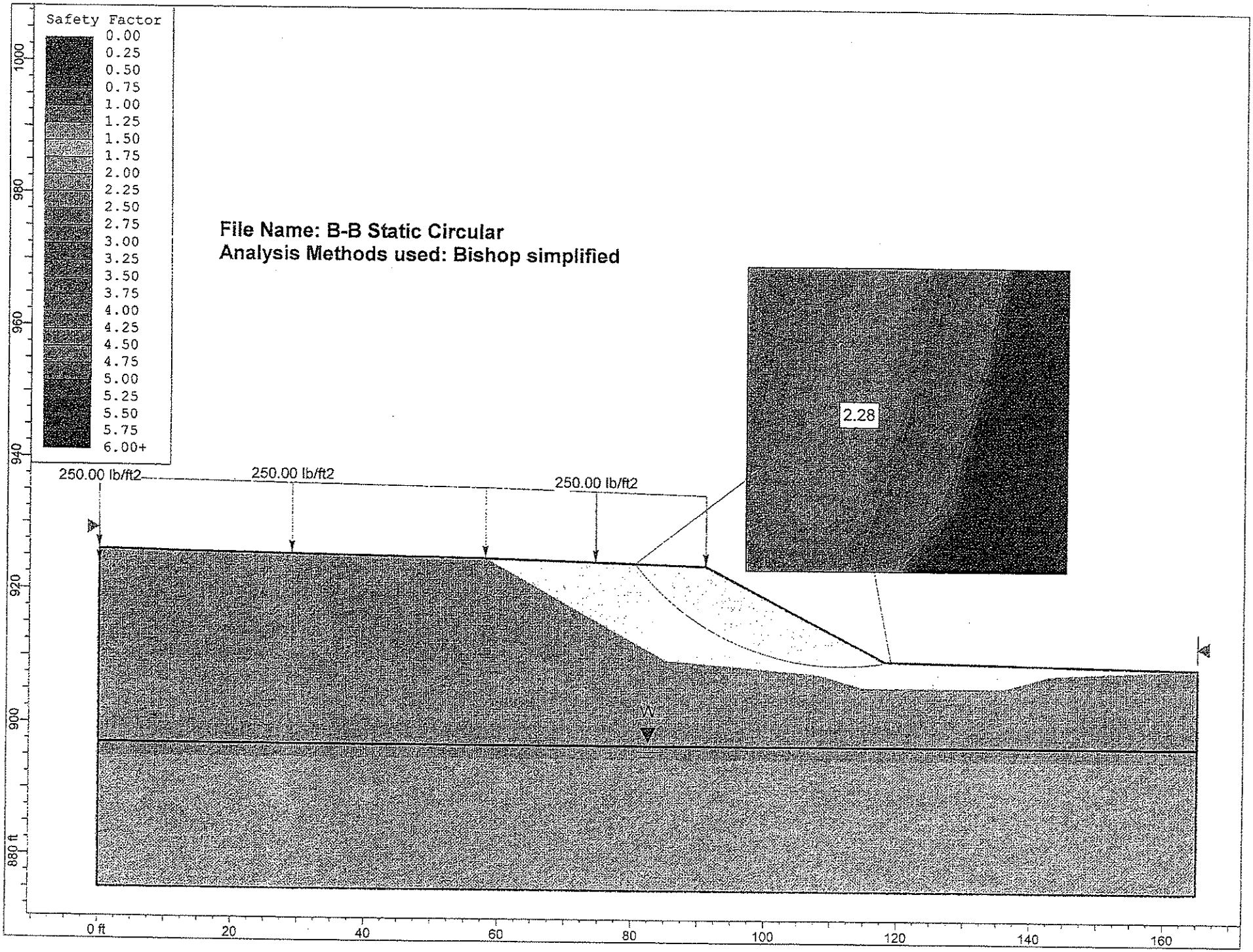
718.096	850.000
1229.857	850.000
1229.857	885.000
1229.857	890.000
1229.857	895.000
1229.857	903.808
1229.857	904.500
1229.857	928.000
1229.857	929.454
1110.000	934.000
1095.833	922.333
1093.000	920.000
1079.000	916.000
933.000	916.000
923.000	916.000
913.000	918.000
905.000	922.000
903.538	923.231
886.000	938.000
834.096	938.419
718.096	939.354
718.096	935.000
718.096	928.525
718.096	923.525
718.096	918.525

Water Table

718.000	897.000
1229.857	897.000

Distributed Load

718.096	939.354
834.096	938.419
886.000	935.000


Safety Factor
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25
5.50
5.75
6.00+
File Name: B-B Static Circular
Analysis Methods used: Bishop simplified
2.28
250.00 lb/ft2
250.00 lb/ft2
250.00 lb/ft2
1000
980
960
940
920
900
880 ft
0 ft
20
40
60
80
100
120
140
160

Slide Analysis Information

Document Name

File Name: B-B Static Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Bishop simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 450 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified
FS: 2.281250
Center: 111.446, 948.811
Radius: 39.555
Left Slip Surface Endpoint: 80.384, 924.322
Right Slip Surface Endpoint: 118.976, 909.979
Resisting Moment=1.02074e+006 lb-ft
Driving Moment=447445 lb-ft

List of All Coordinates

Search Grid

96.983	923.476
145.194	923.476
145.194	969.540
96.983	969.540

Material Boundary

58.000	925.000
85.000	910.000
108.000	908.000
115.000	906.000
136.000	906.000
143.000	908.000
165.000	909.000

Material Boundary

0.000	890.000
165.000	890.000

Material Boundary

0.000	895.000
165.000	895.000

Material Boundary

0.000	900.000
165.000	900.000

External Boundary

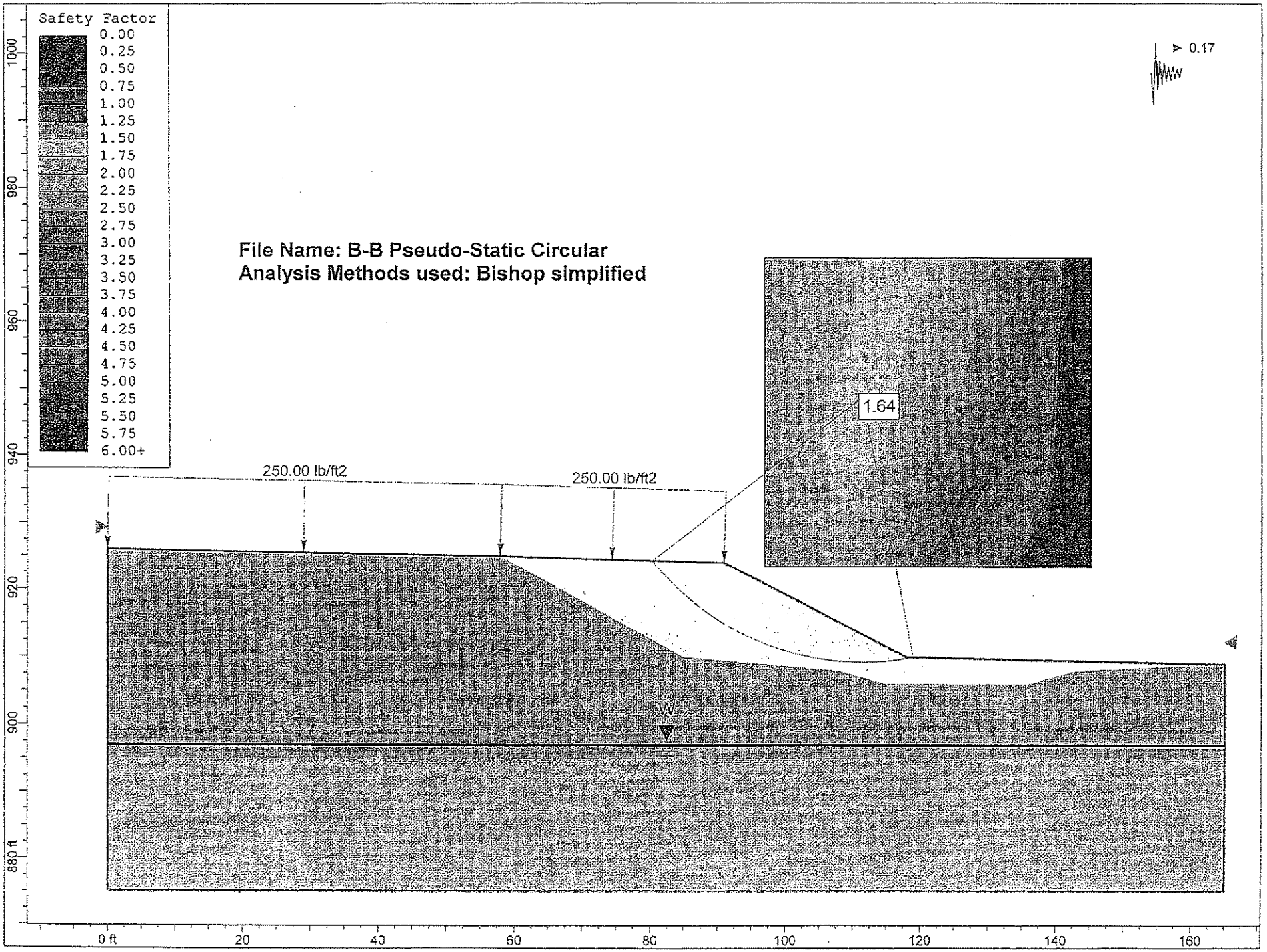
58.000	925.000
0.000	926.000
0.000	900.000
0.000	895.000
0.000	890.000
0.000	885.000
0.000	875.000
165.000	875.000
165.000	885.000
165.000	890.000
165.000	895.000
165.000	900.000
165.000	909.000
118.000	910.000
91.000	924.000

Water Table

0.000	897.000
165.000	897.000

Distributed Load

91.000	924.000
58.000	925.000
0.000	926.000
0.000	923.714


Safety Factor
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
3.25
3.50
3.75
4.00
4.25
4.50
4.75
5.00
5.25
5.50
5.75
6.00+
0.17
File Name: B-B Pseudo-Static Circular
Analysis Methods used: Bishop simplified
1.64
250.00 lb/ft2
250.00 lb/ft2
W
1000
980
960
940
920
900
880 ft
0 ft
20
40
60
80
100
120
140
160

Slide Analysis Information

Document Name

File Name: B-B Pseudo-Static Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Bishop simplified

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.17
1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Normal to boundary, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified
FS: 1.642700
Center: 111.446, 948.811
Radius: 39.555
Left Slip Surface Endpoint: 80.384, 924.322
Right Slip Surface Endpoint: 118.976, 909.979
Resisting Moment=985556 lb-ft
Driving Moment=599962 lb-ft

List of All Coordinates

Search Grid
98.983 923.476
145.194 923.476
145.194 969.540
98.983 969.540

Material Boundary
58.000 925.000
85.000 910.000
108.000 908.000
115.000 906.000
136.000 906.000
143.000 908.000
165.000 909.000

Material Boundary
0.000 890.000
165.000 890.000

Material Boundary
0.000 895.000
165.000 895.000

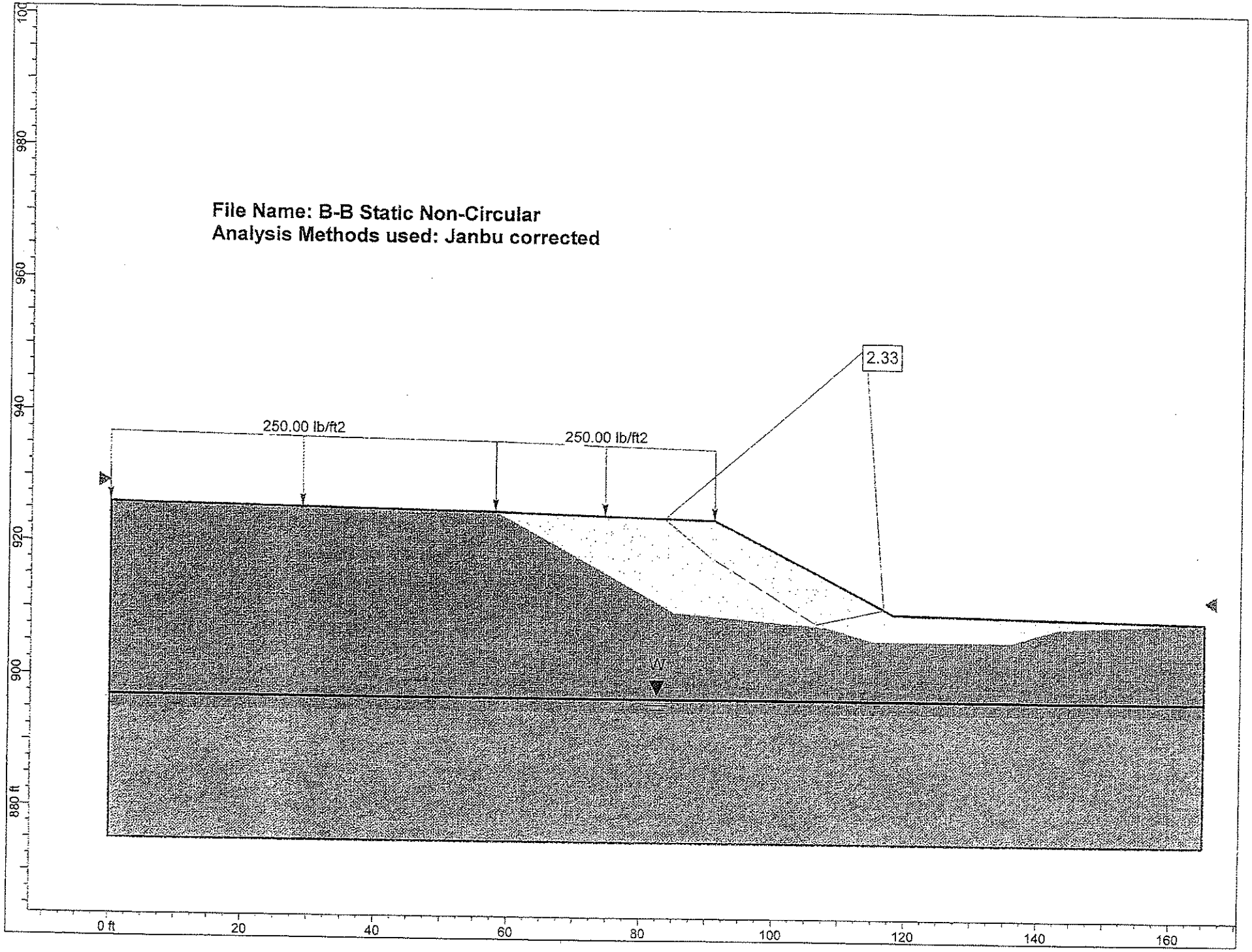
Material Boundary
0.000 900.000
165.000 900.000

External Boundary
58.000 925.000
0.000 926.000
0.000 900.000
0.000 895.000
0.000 890.000
0.000 885.000
0.000 875.000
165.000 875.000
165.000 885.000
165.000 890.000
165.000 895.000
165.000 900.000
165.000 909.000
118.000 910.000
91.000 924.000

Water Table
0.000 897.000
165.000 897.000

Distributed Load
91.000 924.000
58.000 925.000
0.000 926.000

File Name: B-B Static Non-Circular
Analysis Methods used: Janbu corrected



Slide Analysis Information

Document Name

File Name: B-B Static Non-Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Janbu corrected

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 115
Left Projection Angle (End Angle): 165
Right Projection Angle (Start Angle): 10
Right Projection Angle (End Angle): 45
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 450 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 2.328240
Axis Location: 113.516, 950.568
Left Slip Surface Endpoint: 83.487, 924.228
Right Slip Surface Endpoint: 116.571, 910.741
Resisting Horizontal Force=18747.9 lb
Driving Horizontal Force=8052.4 lb

List of All Coordinates

Material Boundary

58.000	925.000
85.000	910.000
108.000	908.000
115.000	906.000
136.000	906.000
143.000	908.000
165.000	909.000

Material Boundary

0.000	890.000
165.000	890.000

Material Boundary

0.000	895.000
165.000	895.000

Material Boundary

0.000	900.000
165.000	900.000

External Boundary

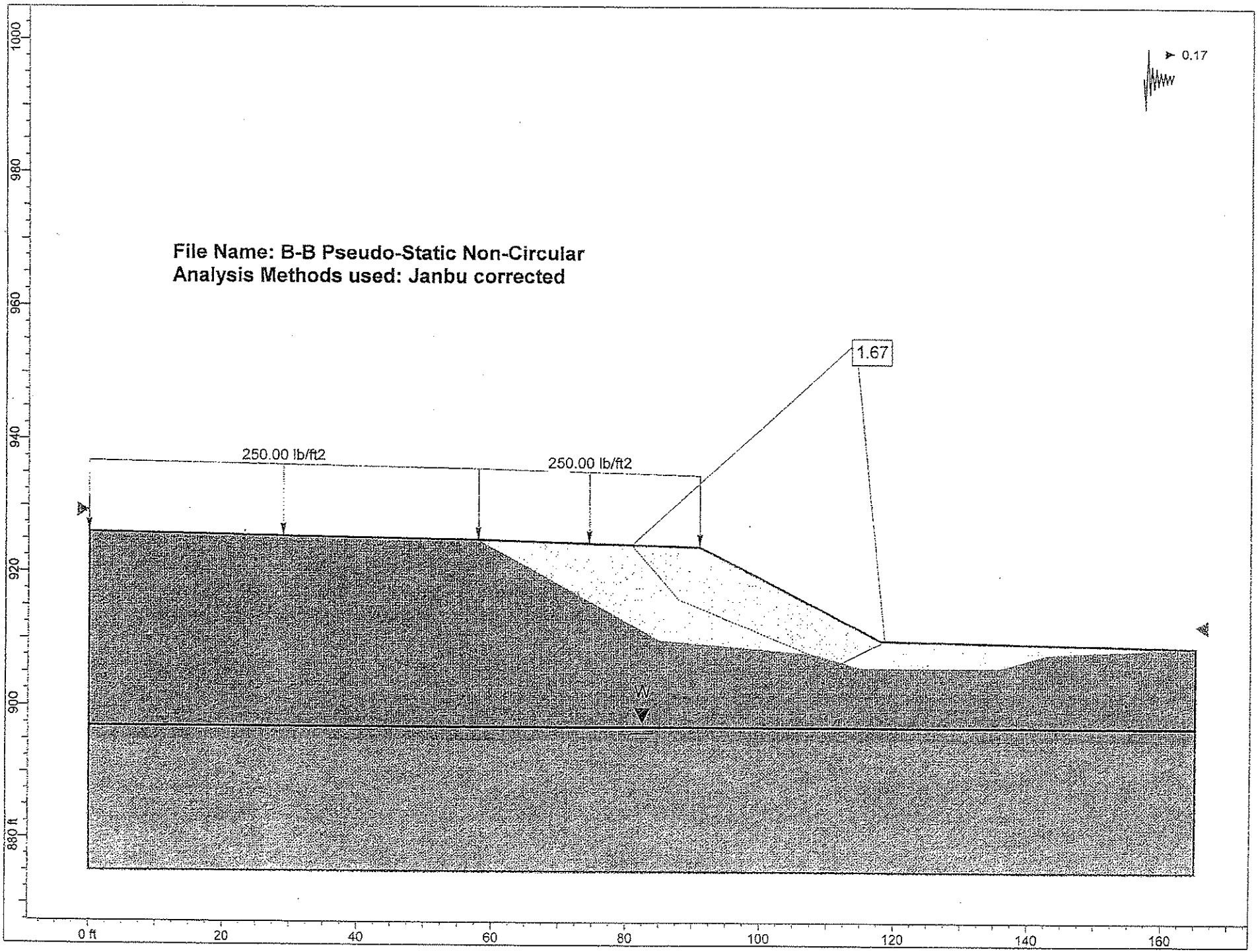
58.000	925.000
0.000	926.000
0.000	900.000
0.000	895.000
0.000	890.000
0.000	885.000
0.000	875.000
165.000	875.000
165.000	885.000
165.000	890.000
165.000	895.000
165.000	900.000
165.000	909.000
118.000	910.000
91.000	924.000

Water Table

0.000	897.000
165.000	897.000

Distributed Load

91.000	924.000
58.000	925.000
0.000	926.000


0.17
File Name: B-B Pseudo-Static Non-Circular
Analysis Methods used: Janbu corrected
1.67
250.00 lb/ft2
250.00 lb/ft2
W
1000
980
960
940
920
900
880 ft
0 ft
20
40
60
80
100
120
140
160

Slide Analysis Information

Document Name

File Name: B-B Pseudo-Static Non-Circular

Project Settings

Project Title: SLIDE - An Interactive Slope Stability Program
Failure Direction: Left to Right
Units of Measurement: Imperial Units
Pore Fluid Unit Weight: 62.4 lb/ft3
Groundwater Method: Water Surfaces
Data Output: Standard
Calculate Excess Pore Pressure: Off
Allow Ru with Water Surfaces or Grids: Off
Random Numbers: Pseudo-random Seed
Random Number Seed: 10116
Random Number Generation Method: Park and Miller v.3

Analysis Methods

Analysis Methods used:
Janbu corrected

Number of slices: 25
Tolerance: 0.005
Maximum number of iterations: 50

Surface Options

Surface Type: Non-Circular Block Search
Number of Surfaces: 5000
Pseudo-Random Surfaces: Enabled
Convex Surfaces Only: Disabled
Left Projection Angle (Start Angle): 115
Left Projection Angle (End Angle): 165
Right Projection Angle (Start Angle): 10
Right Projection Angle (End Angle): 45
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.17
1 Distributed Load present:
Distributed Load Constant Distribution, Orientation: Vertical, Magnitude: 250 lb/ft2

Material Properties

Material: New Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Old Fill
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 200 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Alluvium (SM/SC)
Strength Type: Mohr-Coulomb
Unsaturated Unit Weight: 125 lb/ft3
Saturated Unit Weight: 125 lb/ft3
Cohesion: 100 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock-Highly Weathered
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 800 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Bedrock
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 500 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 1.668640
Axis Location: 114.058, 954.915
Left Slip Surface Endpoint: 80.853, 924.307
Right Slip Surface Endpoint: 118.621, 909.987
Resisting Horizontal Force=24894.7 lb

Driving Horizontal Force=14937.1 lb

List of All Coordinates

Water Table
0.000 897.000
165.000 897.000

Material Boundary
58.000 925.000
85.000 910.000
108.000 908.000
115.000 906.000
136.000 906.000
143.000 908.000
165.000 909.000

Material Boundary
0.000 890.000
165.000 890.000

Material Boundary
0.000 895.000
165.000 895.000

Material Boundary
0.000 900.000
165.000 900.000

External Boundary
58.000 925.000
0.000 926.000
0.000 900.000
0.000 895.000
0.000 890.000
0.000 885.000
0.000 875.000
165.000 875.000
165.000 885.000
165.000 890.000
165.000 895.000
165.000 900.000
165.000 909.000
118.000 910.000
91.000 924.000

Distributed Load
91.000 924.000
58.000 925.000
0.000 926.000

Focus/Block Search Window
63.132 924.000
55.238 907.233
91.000 897.000
91.000 924.000

Focus/Block Search Window
103.982 917.269
91.000 897.000
129.023 897.000
135.514 909.627

APPENDIX D
TECHNICAL MEMORANDUM FOR LIMITED ADL STUDY

KLEINFELDER
An employee owned company

January 31, 2007
Project No. 75010/2

Mr. Thomas E. Sardo, P.E
STV Incorporated
8001 Irvine Center Drive, 4th Floor
Irvine, California 92618

Subject: **Aerially Deposited Lead Technical Letter Report**
Appendix D to Draft Foundation Report
101 Freeway Reyes Adobe Interchange
Los Angeles, California

Dear Mr. Sardo:

Kleinfelder, Inc. (Kleinfelder) has performed aerially deposited lead (ADL) testing of the United States (US) Highway 101/Reyes Adobe Overcrossing (herein known as the Site) in Los Angeles, California, (Plate 1). This letter has been prepared to provide STV Incorporated with a summary of the findings of the ADL testing.

Purpose and Scope of Work

The purpose of this ADL testing was to evaluate the presence of ADL on the Site relative to the September 22, 2000 Variance granted to the California Department of Transportation (Caltrans) by the California Department of Toxic Substances Control (DTSC, 2001). Kleinfelder's scope of work for this ADL testing included collecting soil samples, performing laboratory testing, and preparing this technical letter.

Background and Regulatory Information

According to Title 22, California Code of Regulations (CCR), solid wastes with total lead concentrations equal to or exceeding 1,000 milligrams per kilogram (mg/kg), the Total Threshold Limit Concentration (TTLC), are classified as California hazardous waste. Assembly Bill (AB 2784) 2784, effective January 1, 1999, amended California Health and Safety Code (HSC) Section 25157.8 (a) and Title 22 CCR by reducing the practical disposal limit for non-hazardous solid waste to 350 mg/kg total lead until the California Regional Water Quality Control Board (RWQCB) amends a disposal facility's waste discharge requirements.

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Solid wastes with soluble lead concentrations (assessed using California Waste Extraction Test [WET] procedures) equal to or exceeding 5.0 milligrams per liter (mg/L), the Soluble Threshold Limit Concentration (STLC), also are classified as California hazardous waste under California law. California hazardous materials must be disposed of under a hazardous waste manifest at an approved Class I disposal facility. Wastes with lead concentrations less than both the TTLC and the STLC, which are therefore not a California hazardous waste, may be disposed of at a Class II or III facility, provided that site-specific disposal facility requirements are satisfied.

According to federal law, as stipulated in the Resource Conservation and Recovery Act (RCRA), wastes that exceed 5.0 mg/l soluble lead, extracted using the federal Toxicity Characteristic Leaching Procedure (TCLP) are classified as RCRA hazardous waste. This material must be disposed of as RCRA hazardous waste if transported offsite.

In September 22, 2000, the DTSC issued a revised Variance to Caltrans specifying that "lead-contaminated soil," as defined by California HSC and Title 22 CCR, within a highway right-of-way could remain within the right-of-way during earthmoving and road construction activities provided certain criteria were met (DTSC, 2001). In a April 6, 2006 letter, the DTSC extended the variance to Caltrans until June 30, 2007. The DTSC Variance was written as two conditions.

For Variance Condition 1, "lead-contaminated" soil with total lead concentrations 350 mg/kg or less and 0.5 mg/L or less soluble lead (using a modified WET extraction procedure with de-ionized [DI] water as the extractant rather than an acidic, buffered sodium citrate solution) may be reused in a Caltrans right-of-way provided it is placed a minimum of 5 feet (1.5 meter) above the maximum water table and is covered by 1 foot (0.3 meter) of non-hazardous soil. The limit on total lead within shall be the following: Total parts per million (ppm), equivalent to mg/kg lead, shall be at or below the statutory limits in effect when the soils is used as fill or the risk-based limit of 1,496 mg/kg, whichever is less. On the effective date of this variance, HSC section 25157.8 limits total lead concentrations to 350 ppm.

For Variance Condition 2, "lead-contaminated" soil that contains more than 500 micrograms per liter (ug/L) and less than 50 mg/L extractable lead (using a modified WET extraction procedure with DI water as the extractant rather than an acidic, buffered sodium citrate solution) and 350 mg/kg or less total lead may be used as fill provided that it is placed a minimum of 5 feet (1.5 meters) above the maximum water table and is covered by a pavement structure.

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The hydrogen ion index (pH) of the reused soil also must be at or above 5.0 standard units (SU); otherwise the soil must be placed as specified in Variance Condition 2.

Other reuse conditions, soil handling procedures, and notifications are specified in the Variance. Soil that exceeds 350 mg/kg total lead or 50 mg/L soluble lead (DI-WET) cannot be reused within a Caltrans right-of-way and must be properly disposed offsite.

It is important to note that the total lead limit of 350 mg/kg is the current statutory limit (HSC 25157.8) in effect at the time the revised Variance was issued in September 2000. The Variance indicates that this maximum lead value could be modified if the statutory limit is changed, but the maximum total lead value cannot exceed a risk-based limit of 1,496 mg/kg.

Soil Sampling

This section summarizes ADL soil-sampling activities performed on the Site. The soil sampling required soil samples from exposed unpaved locations in areas where excavations are planned near two abutments and two bents. A site plan showing the boring locations is shown in Plate 2. Soil samples collected from the Site were tested for pH, total lead and organochlorine pesticides. Testing of some samples for soluble lead was also required and performed based on total lead analytical results.

Prior to implementation of subsurface field investigation activities, Caltrans was notified that traffic control would be required under Encroachment Permit No. 706-6SV-2176. Kleinfelder also notified Underground Service Alert (USA) that a subsurface investigation was taking place so that its subscribing utility companies with underground utilities in the area would be notified.

A total of 25 soil samples were collected from six boring locations (designated Borings B1 through B3 and HB-1 through HB-3). For Borings B-1 through B-2, soil samples were collected at 150 millimeters (mm; 0.5 feet), 350 mm (1.5 feet), 600 mm (2 feet), 900 mm (3 feet), and 1,500 mm (5 feet). For Boring B-3, soil samples were collected at150 millimeters (mm; 0.5 feet), 350 mm (1.5 feet), 600 mm (2 feet), and 900 mm (3 feet). For borings HB-1 and HB-2, soil samples were collected at the surface, 150 millimeters (mm; 0.5 foot), 350 mm (1.5 foot). For Boring HB-3, soil samples were collected at the surface and from approximate depths of 150 mm (0.5, foot), 350 mm (1.5 foot), 600 mm (2 foot), and 900 mm (3 foot).

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Soil Sampling Methodology

Soil samples were collected using hand-auger methods at each of the sampling depths. Soil samples were collected directly from the target sample depth by manually scooping soil directly into glass sampling jars. Borings were then further advanced using hand-auger and hollow-stem auger drilling methods as a part of a geotechnical investigation that Kleinfelder performed at the time of the ADL sampling.

Decontamination procedures included: (1) washing the equipment with a Liquinox™ detergent and water solution; (2) rinsing with tap water; (3) rinsing with de-ionized water, and 4) allowing equipment to air dry or drying with paper towels.

Summary of Analytical Results

The samples collected were analyzed for total lead by U.S. Environmental Protection Agency (EPA) Method 6010B by Enviro-Chem, Inc., located in Pomona, California, a laboratory accredited by the California Environmental Protection Agency (Cal/EPA), Department of Health Services (DHS), Environmental Laboratory Accreditation Program (ELAP). Based on analytical results, total lead was detected in all of the 25 soil samples analyzed, at concentrations up to 232 milligrams per kilogram (mg/kg). Since several soil samples contained greater than 50 mg/kg total lead, further testing was required for soluble lead.

Based on analytical results, soluble lead as analyzed using the CA WET Method (EPA 3050A) with sodium Citrate was detected in seven of the soil samples, at concentrations up to 9.74 mg/L. These samples were then analyzed for soluble lead using the De-ionized water extraction method. Based on these analytical results, soluble lead was detected in three of the samples at concentrations up to 0.474 mg/L.

Four samples (B-3/1 @ 0.5', B-3/2 @ 1.5', HB-1 @ 0', and HB-1 @ 0.5') were also analyzed for soluble lead (TCLP) using EPA Method 1311. Based on the analytical results, soluble lead (TCLP) was detected in the four samples at concentrations up to 1.62 mg/L.

All of the samples (25 total) were analyzed for pH using EPA Method 9045C. The pH values of the soil samples analyzed ranged from 6.89 to 8.63. According to DTSC, soils with a pH of less than 5.0 would be of concern for potentially leaching lead (DTSC, 2000). However, none of the soil samples analyzed had a pH less than 5.0. Table 1

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summarizing the soil analytical data and the certified laboratory reports along with the chain-of-custody are included as attachments to this letter report. Twelve of the samples were analyzed for organochlorine pesticides using EPA Method 8081A. Organochlorine pesticides were not detected in the samples.

Variance Conclusions

The analytical results of this ADL Survey suggest that the soil tested on the Site does not contain total lead and soluble lead in excess of the limits set forth in Variance Condition 1. As such, soil within the Site boundaries would be appropriate for reuse within the Caltrans rights-of-way for this project under Variance Condition 1.

Waste Characterization Conclusions

The analytical results of this ADL Survey indicate that the soil tested at two boring locations (B-3 and HB-1) on the Site contain total soluble lead using a sodium citrate extraction in excess of 5 mg/L. As such, soil within the Site boundaries must be disposed of or re-used on site under the conditions set forth in Variance Condition 1.

Recommendations

Based on the findings and conclusions of this report, Kleinfelder does not recommend that additional ADL soil sampling be completed for the Site. In our opinion, the data reported herein are sufficient to characterize Site soil. Kleinfelder also recommends any soils within the site boundary be handled according to the conditions set forth in Variance 1 and California hazardous waste laws.

Conclusions

Based on the analytical results of this ADL Survey, the upper 3 feet of soil tested on the Site does not contain total lead or soluble lead in excess of the limits set forth in Variance Condition 1. As such, soil from these areas would be appropriate for reuse within the Caltrans rights-of-way for this project under Variance Condition 1, provided that it is placed a minimum of 5 feet (1.5 meters) above the maximum water table and is covered by at least 1 foot of non-hazardous soil.

Kleinfelder recommends that the upper 3 feet of soil excavated from the Site be utilized in accordance with variance conditions. If soil is not used onsite, the excess soil must

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be disposed of as non-RCRA, California hazardous waste at a Class I hazardous waste disposal facility.

Limitations

Kleinfelder performed the scope of work in accordance with generally accepted standards of care practiced by other members in our profession at the time the work was completed. Our findings are limited to the conditions and results reported for the time the observations were completed. No warranty, expressed or implied, is made.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance, but in no event later than 3 years from the date of the report. Land or facility use, on and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party and client agrees to defend, indemnify, and hold harmless Kleinfelder from any claim or liability associated with such unauthorized use or non-compliance.

The scope of services described herein is not intended to be inclusive, to identify all potential concerns, or to eliminate the possibility of other environmental problems. Within current technology, no level of assessment can show conclusively that a property or its structures are completely free of hazardous substances. Therefore, Kleinfelder cannot offer a certification that the property is free of environmental liability. Kleinfelder will assume no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury which results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials. Kleinfelder offers a range of investigative and engineering services to suit the varying needs of our clients. Although risk can never be eliminated, more detailed and extensive investigations yield more information, which may help understand and manage the degree of risk. Since such detailed services involve greater expense, our clients participate in determining the level of service that provides adequate information for their purposes at an acceptable level of risk.

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Closing Remarks

We appreciate the opportunity to provide our environmental services. If you have questions, please contact the undersigned at (818) 226-6900.

Respectfully submitted,

KLEINFELDER, INC.

Raymond Montero
Staff Professional II

Herbert (Bert) A. Vogler III, PG
Senior Hydrogeologist

Justin J. Kempton, PE, GE
Area Manager

Attachments:

Plates

Plate 1 Site Location Map
Plate 2 Site Plan Showing Approximate Boring Locations

Tables

Table 1 Summary of Soil Analytical Data

Appendix

Appendix A Laboratory Analytical Report and Chain-of-Custody

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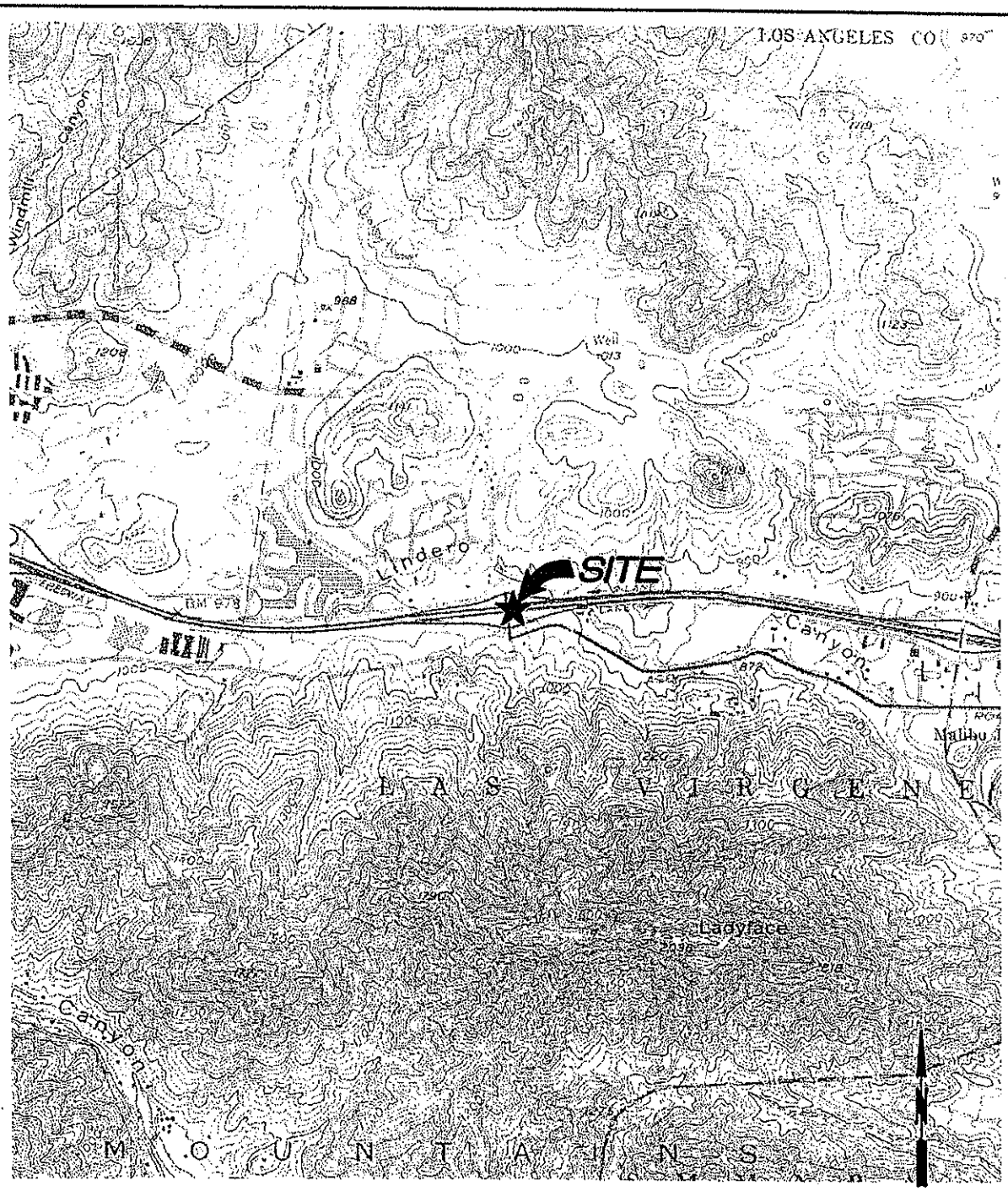
PLATES



SOURCE: U.S.G.S. 7.5' topographic series, Agoura Hills, California quadrangle dated 1950, photorevised 1981.

ATTACHED IMAGES: Images: SCN_2007012408415 7_001.jpg
ATTACHED XREFS:
File-L:\2005\05PROJ
CAD FILE: U:\CCardiel\70510\ LAYOUT: Layout2

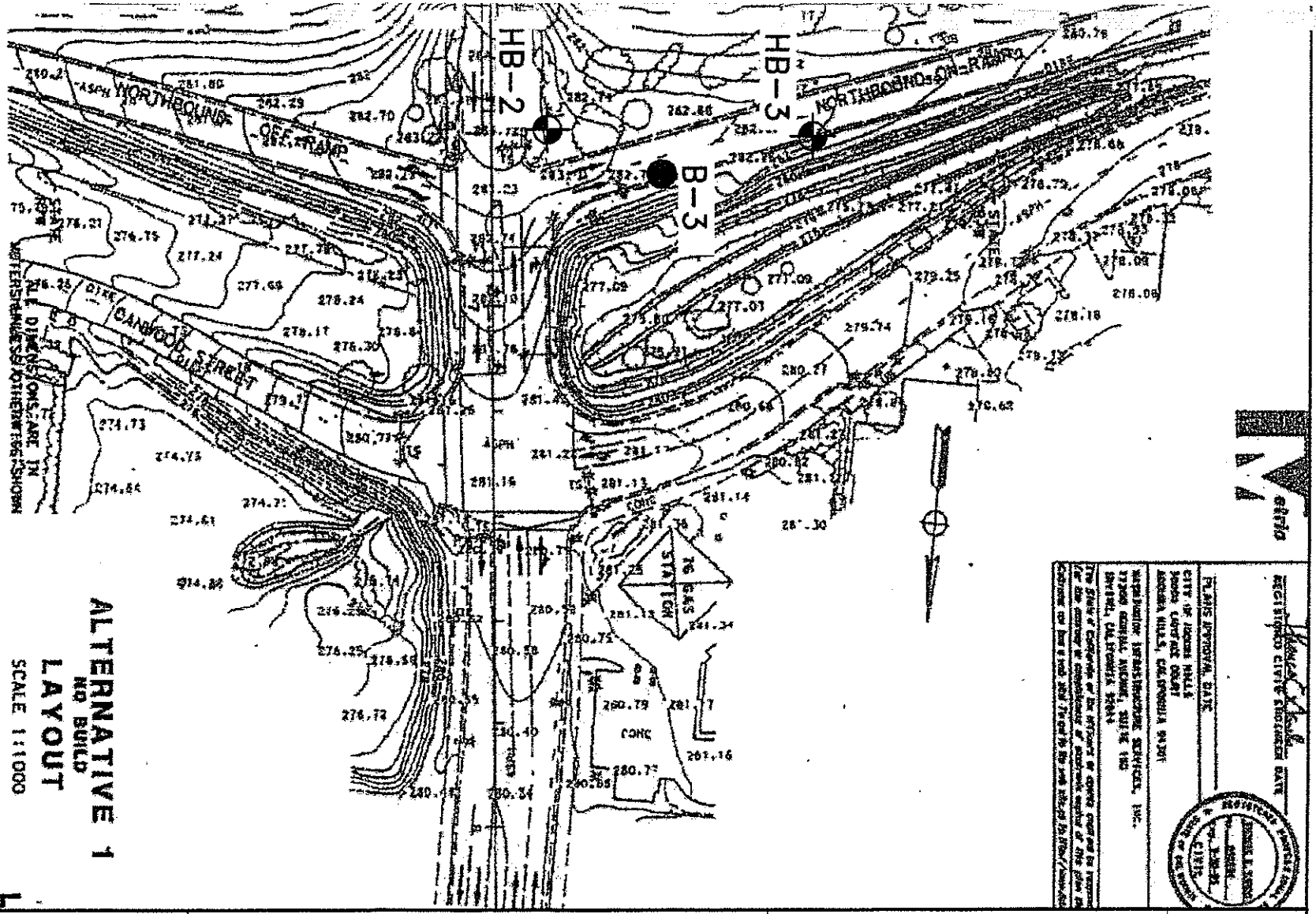
KLEINFELDER
6430 Variel Avenue, Suite 103
Woodland Hills, CA. 91367
PH. (818) 226-6900 FAX. (818) 226-6910
www.kleinfelder.com

SITE LOCATION MAP

REYES ADOBE ROAD
101 FREEWAY AND REYES ADOBE INTERCHANGE
AGOURA HILLS, CALIFORNIA

DRAWN BY:	C. CARDIEL
REVISED BY:	D. FAHRNEY
CHECKED BY:	R. MONTERO
PLATE	1

DRAWN: 1/24/07	APPROVED BY:	PROJECT NO. 70510	FILE NAME: 70510p1.dwg



DRAWN BY: C. CARDIEL	**SITE PLAN WITH APPROXIMATE BORING LOCATIONS**	KLEINFELDER	PLATE
REVISED BY: D. FAHRNEY			
CHECKED BY: R. MONTERO	REYES ADOBE ROAD 101 FREEWAY AND REYES ADOBE INTERCHANGE AGOURA HILLS, CALIFORNIA	6430 Variel Avenue, Suite 103 Woodlad Hills, CA. 91367 PH. (818) 226-6900 FAX. (818) 226-6910 www.kleinfelder.com	2
DATE: 1/24/07 APPROVED BY: _____	PROJECT NO. 75010 FILE NAME: 75010p2.dwg		

PLOTTED: 30 Jan 2007, 2:13pm, dfahrney

TABLES

TABLE 1
SUMMARY OF SOIL ANALYTICAL DATA
101 FREEWAY AND REYES ADOBE INTERCHANGE
AGOURA HILLS, CALIFORNIA

Sample ID	Sample Date	pH	Total Lead	STLC-Lead (Sodium Citrate)	STLC Lead (De-ionized)	TCLP-Lead	Organochlorine Pesticides
Analytical Method		9045C	6010B	6010B	6010B	40 CFR 261.24	8081A
Units		pH	mg/kg	mg/L	mg/L	mg/L	mg/kg
PQL		-	0.50	0.05	0.05	0.01	0.01-20
B-1/1 @ 0.5'	1/4/2007	7.32	2.05	NA	NA	NA	ND
B-1/2 @ 1.5'	1/4/2007	8.56	2.35	NA	NA	NA	ND
B-1/3 @ 2'	1/4/2007	8.61	1.72	NA	NA	NA	ND
B-1/4 @ 3'	1/4/2007	8.32	61.2	2.72	NA	NA	NA
B-1/5 @ 5'	1/4/2007	8.17	26.0	NA	NA	NA	NA
B-2/1 @ 0.5'	1/4/2007	8.34	16.4	NA	NA	NA	NA
B-2/2 @ 1.5'	1/4/2007	8.10	44.3	NA	NA	NA	ND
B-2/3 @ 2'	1/4/2007	7.98	3.75	NA	NA	NA	NA
B-2/4 @ 3'	1/4/2007	8.07	16.9	NA	NA	NA	NA
B-2/5 @ 5'	1/4/2007	7.91	17.0	NA	NA	NA	NA
B-3/1 @ 0.5'	1/4/2007	7.88	139	6.29*	0.223	1.62	ND
B-3/2 @ 1.5'	1/4/2007	8.63	165	6.83*	ND	0.575	ND
B-3/3 @ 2'	1/4/2007	8.51	8.03	NA	NA	NA	NA
B-3/4 @ 3'	1/4/2007	8.39	6.00	NA	NA	NA	NA
HB-1 @ 0'	1/4/2007	7.95	232	9.74*	0.474	0.345	NA
HB-1/1 @ 0.5'	1/4/2007	7.83	169	8.38*	0.216	0.228	ND
HB-1/2 @ 1.5'	1/4/2007	7.69	46.9	NA	NA	NA	ND
HB-2 @ 0'	1/4/2007	7.64	59.4	1.97	NA	NA	NA
HB-2/1 @ 0.5'	1/4/2007	6.89	52.9	1.47	NA	NA	ND
HB-2/2 @ 1.5'	1/4/2007	7.42	13.7	NA	NA	NA	ND
HB-3 @ 0'	1/4/2007	7.43	40.7	NA	NA	NA	NA
HB-3/1 @ 0.5'**	1/4/2007	7.59	48.7	NA	NA	NA	ND
HB-3/2 @ 1.5'	1/4/2007	7.76	4.75	NA	NA	NA	ND
HB-3/3 @ 2'	1/4/2007	7.95	27.3	NA	NA	NA	NA
HB-3/4 @ 3'	1/4/2007	7.68	4.96	NA	NA	NA	NA

Notes:

PQL	Pratical quanitation limit
*	The concentration exceeds the Soluble Threshold Limit Concentration (STLC) Limit of 5 parts per million (ppm), therefore the sample is defined as hazardous waste per California Code of Regulations (CCR) Title 22
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
NA	Not analyzed
ND	Not detected
**	Enviro-Chem lab report has error and calls the sample ID "HB-3/2" @ 0.5'. It should be HB-3/2 @ 1.5'

APPENDIX A

LABORATORY ANALYTICAL REPORT AND CHAIN-OF-CUSTODY

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

Date: January 11, 2007

Mr. Ray Montero
Kleinfelder
1370 Valley Vista Drive
Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

Project Name: **US 101-Reyes Adobe Rd. Interchange**
Project Number: **75010-2**
Lab I.D.: **070104-15 through -39**

Dear Mr. Montero:

The **analytical results** for the soil samples, received by our laboratory on January 4, 2007, are attached. All samples were received chilled, intact and accompanying chain of custody.

Enviro-Chem appreciates the opportunity to provide you and your company this and other services. Please do not hesitate to call us if you have any questions.

Sincerely,

Curtis Desilets
Vice President/Program Manager

Jesse Tu, Ph.D.
Laboratory Manager

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324
PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

EPA 6010B FOR TTLC-LEAD
UNITS: MG/KG = MILLIGRAM PER KILOGRAM = PPM

SAMPLE I.D.	LAB I.D.	TTLC-LEAD RESULT	DF
B-1/1 @ 0.5'	070104-15	2.05	1
B-1/2 @ 1.5'	070104-16	2.35	1
B-1/3 @ 2'	070104-17	1.72	1
B-1/4 @ 3'	070104-18	61.2 *	1
B-1/5 @ 5'	070104-19	26.0	1
B-2/1 @ 0.5'	070104-20	16.4	1
B-2/2 @ 1.5'	070104-21	44.3	1
B-2/3 @ 2'	070104-22	3.75	1
B-2/4 @ 3'	070104-23	16.9	1
B-2/5 @ 5'	070104-24	17.0	1
B-3/1 @ 0.5'	070104-25	139 *	1
B-3/2 @ 1.5'	070104-26	165 *	1
B-3/3 @ 2'	070104-27	8.03	1
B-3/4 @ 3'	070104-28	6.00	1
HB-1 @ 0'	070104-29	232 *	1
HB-1/1 @ 0.5'	070104-30	169 *	1
HB-1/2 @ 1.5'	070104-31	46.9	1
HB-2 @ 0'	070104-32	59.4 *	1
HB-2/1 @ 0.5'	070104-33	52.9 *	1
HB-2/2 @ 1.5'	070104-34	13.7	1
HB-3 @ 0'	070104-35	40.7	1
HB-3/1 @ 0.5'	070104-36	48.7	1
HB-3/2 @ 1.5'	070104-37	4.75	1
HB-3/3 @ 2'	070104-38	27.3	1
HB-3/4 @ 3'	070104-39	4.96	1
Method Blank	---	ND	1
	PQL	0.50	

COMMENTS:
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = DF X PQL
ND = Non-Detected or below the Actual Detection Limit
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
STLC Limit for lead = 5 PPM
* = STLC analysis is recommended (if marked)
*** = The concentration exceeds the TTLC Limit @ 1000 PPM, therefore the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)

Data Reviewed and Approved by: _____

CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --TTLC--SOLID/SOIL MATRIX

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/5/2007 Unit : mg/kg(ppm)

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Arsenic (As)	070104-15	1.00	111	PASS	0	50.0	53.3	107%	53.4	107%	0%
Copper (Cu)	070104-15	1.00	99.2	PASS	9.33	50.0	64.3	110%	64.0	109%	1%
Lead (Pb)	070104-15	1.00	110	PASS	2.05	50.0	53.5	103%	53.5	103%	0%

ANALYSIS DATE. :

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.300				0.300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Arsenic (As)	PASS	PASS	PASS	PASS
Copper (Cu)	PASS	PASS	PASS	PASS
Lead (Pb)	PASS	PASS	PASS	PASS
Mercury (Hg)				
Accepted Range	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: Keith

FINAL REVIEWER: [illegible]

QA/QC for Metals Analysis --TTLC--SOLID/SOIL MATRIX

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/5/2007

Unit : mg/kg(ppm)

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Arsenic (As)	070104-37	1.00	114	PASS	0.048	50.0	51.1	102%	51.9	104%	2%
Copper (Cu)	070104-37	1.00	100.0	PASS	9.56	50.0	59.3	99%	59.9	101%	1%
Lead (Pb)	070104-37	1.00	113	PASS	4.75	50.0	53.5	98%	54.5	100%	2%

ANALYSIS DATE. :

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.300				0.300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Arsenic (As)	PASS	PASS	PASS	PASS
Copper (Cu)	PASS	PASS	PASS	PASS
Lead (Pb)	PASS	PASS	PASS	PASS
Mercury (Hg)				
Accepted Range	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: Keith L

FINAL REVIEWER: [signature]

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

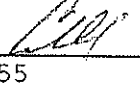
LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324
PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO
DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/04/07
DATE REPORTED: 01/11/07

pH ANALYSIS
METHOD: EPA 9045C
UNIT: pH UNITS

SAMPLE I.D.	LAB I.D.	pH RESULT
B-1/1 @ 0.5'	070104-15	7.32
B-1/2 @ 1.5'	070104-16	8.56
B-1/3 @ 2'	070104-17	8.61
B-1/4 @ 3'	070104-18	8.32
B-1/5 @ 5'	070104-19	8.17
B-2/1 @ 0.5'	070104-20	8.34
B-2/2 @ 1.5'	070104-21	8.10
B-2/3 @ 2'	070104-22	7.98
B-2/4 @ 3'	070104-23	8.07
B-2/5 @ 5'	070104-24	7.91
B-3/1 @ 0.5'	070104-25	7.88
B-3/2 @ 1.5'	070104-26	8.63
B-3/3 @ 2'	070104-27	8.51
B-3/4 @ 3'	070104-28	8.39
HB-1 @ 0'	070104-29	7.95
HB-1/1 @ 0.5'	070104-30	7.83
HB-1/2 @ 1.5'	070104-31	7.69
HB-2 @ 0'	070104-32	7.64
HB-2/1 @ 0.5'	070104-33	6.89
HB-2/2 @ 1.5'	070104-34	7.42
HB-3 @ 0'	070104-35	7.43
HB-3/1 @ 0.5'	070104-36	7.59
HB-3/2 @ 1.5'	070104-37	7.76
HB-3/3 @ 2'	070104-38	7.95
HB-3/4 @ 3'	070104-39	7.68

COMMENTS:
pH ANALYSIS CONDUCTED ON 1:1 SOIL/DEIONIZED WATER EXTRACTION

DATA REVIEWED AND APPROVED BY: 
CAL-DHS ELAP CERTIFICATE No.: 1555

Enviro-Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766
Tel (909)590-5905 Fax (909)590-5907

Matrix: Water/Liquid

QA/QC Report

Analysis	Units	Date Analyzed	Sample I.D.	S.R.	Duplicate	% RPD	ACP %RPD
Alkalinity	mg/L					0.00%	0-20
Residual Chlorine	mg/L					0.00%	0-20
Density	g/mL					0.00%	0-20
EC/SC	umhos/cm					0.00%	0-20
pH	pH units	1/4/2007	070104-2	8.97	8.95	0.22%	0-20
TDS	mg/L					0.00%	0-20
TSS	mg/L	1/9/2007	070105-31	31	32	3.17%	0-20
Turbidity	mg/L					0.00%	0-20
OIL & GREASE 413.1	mg/L					0.00%	0-20
Salinity	S					0.00%	0-20
Settleable Solid	mL/L/hr					0.00%	0-20
Resistivity	ohms					0.00%	0-20
Acidity	mg/L					0.00%	0-20

%RPD = Relative Percent Difference ACP %RPD = Acceptable Relative Percent Difference

Analysis	Units	Date Analyzed	Sample I.D.	Spk Conc	S.R.	ACP %RPD	ACP %RC	MS	MS %RC	MSD	MSD %RC	% RPD
Acidity	mg/L					0-20	80-120					#VALUE!
Ammonia as N	mg/L	1/8/2007	070108-LCS1/2	5.00	0.000	0-20	80-120	4.85	97%	4.65	93%	4.0%
Chloride	mg/L			20.0		0-20	80-120					#VALUE!
COD	mg/L	1/10/2007	LCS1/2	500	0.000	0-20	80-120	461	92%	453	91%	1.6%
CR VI	mg/L			0.4		0-20	80-120					#VALUE!
Cyanide	mg/L			0.2		0-20	80-120					#VALUE!
Fluoride	mg/L			1.0		0-20	80-120					#VALUE!
MBAS	mg/L			0.6		0-20	80-120					#VALUE!
Nitrate as N	mg/L			0.400		0-20	80-120					#VALUE!
Nitrite as N	mg/L			0.400		0-20	80-120					#VALUE!
EPA 1664A	mg/L			4.0		0-20	80-120					#VALUE!
OIL & GREASE 413.2	mg/L			20		0-20	80-120					#VALUE!
Phenolics	mg/L			0.5		0-20	80-120					#VALUE!
Sulfate	mg/L			20.0		0-20	80-120					#VALUE!
Dissolved Sulfide	mg/L	1/10/2007	070104-11	0.300	0.000	0-20	80-120	0.257	86%	0.255	85%	0.7%
Total Sulfide	mg/L			0.3		0-20	80-120					#VALUE!
TRPH	mg/L			20.0		0-20	80-120					#VALUE!

S.R. = Sample Results %RC = Percent Recovery ACP %RC = Acceptable Percent Recovery Spk Conc = Spike Concentration

Analyst Signature: WP

Final Reviewer: [illegible]

Enviro-Chem, Inc.
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Tel (909)590-5905 Fax (909)590-5907

Matrix: Water/Liquid

QA/QC Report

Analysis	Units	Date Analyzed	Sample I.D.	S.R.	Duplicate	% RPD	ACP %RPD
Alkalinity	mg/L					0.00%	0-20
Residual Chlorine	mg/L					0.00%	0-20
Density	g/mL					0.00%	0-20
EC/SC	umhos/cm					0.00%	0-20
pH	pH units	1/4/2007	070104-54	8.12	8.14	0.25%	0-20
TDS	mg/L					0.00%	0-20
TSS	mg/L	1/9/2007	070105-31	31	32	3.17%	0-20
Turbidity	mg/L					0.00%	0-20
OIL & GREASE 413.1	mg/L					0.00%	0-20
Salinity	S					0.00%	0-20
Settleable Solid	mL/L/hr					0.00%	0-20
Resistivity	ohms					0.00%	0-20
Acidity	mg/L					0.00%	0-20

%RPD = Relative Percent Difference **ACP %RPD** = Acceptable Relative Percent Difference

Analysis	Units	Date Analyzed	Sample I.D.	Spk Conc	S.R.	ACP %RPD	ACP %RC	MS	MS %RC	MSD	MSD %RC	% RPD
Acidity	mg/L					0-20	80-120					#VALUE!
Ammonia as N	mg/L	1/8/2007	070108-LCS1/2	5.00	0.000	0-20	80-120	4.85	97%	4.65	93%	4.0%
Chloride	mg/L			20.0		0-20	80-120					#VALUE!
COD	mg/L	1/10/2007	LCS1/2	500	0.000	0-20	80-120	461	92%	453	91%	1.6%
CR VI	mg/L			0.4		0-20	80-120					#VALUE!
Cyanide	mg/L			0.2		0-20	80-120					#VALUE!
Fluoride	mg/L			1.0		0-20	80-120					#VALUE!
MBAS	mg/L			0.6		0-20	80-120					#VALUE!
Nitrate as N	mg/L			0.400		0-20	80-120					#VALUE!
Nitrite as N	mg/L			0.400		0-20	80-120					#VALUE!
EPA 1664A	mg/L			4.0		0-20	80-120					#VALUE!
OIL & GREASE 413.2	mg/L			20		0-20	80-120					#VALUE!
Phenolics	mg/L			0.5		0-20	80-120					#VALUE!
Sulfate	mg/L			20.0		0-20	80-120					#VALUE!
Dissolved Sulfide	mg/L	1/10/2007	070104-11	0.300	0.000	0-20	80-120	0.257	86%	0.255	85%	0.7%
Total Sulfide	mg/L			0.3		0-20	80-120					#VALUE!
TRPH	mg/L			20.0		0-20	80-120					#VALUE!

S.R. = Sample Results %RC = Percent Recovery ACP %RC = Acceptable Percent Recovery Spk Conc = Spike Concentration

Analyst Signature: _____ **Final Reviewer:** _____

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324
PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO
DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/08-10/07
DATE REPORTED: 01/11/07

EPA 6010B FOR STLC-LEAD
UNIT: MG/L IN THE STLC LEACHATE

SAMPLE I.D.	LAB I.D.	STLC-LEAD RESULT	DF
B-1/4 @ 3'	070104-18	2.72	1
HB-2 @ 0'	070104-32	1.97	1
HB-2/1 @ 0.5'	070104-33	1.47	1
Method Blank	--	ND	1
	PQL	0.05	

COMMENTS:
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = DF X PQL
ND = Non-Detected or below the Actual Detection Limit
STLC = Soluble Threshold Limit Concentration
MG/L = Milligram Per Liter = PPM
*** = The concentration exceeds the STLC Limit @ 5 PPM, therefore the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)

Data Reviewed and Approved by: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --STLC

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/10/2007

Unit : mg/L (ppm)

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Arsenic (As)	061228-7	1.000	106	PASS	0	5.00	4.89	98%	4.87	97%	0%
Chromium(Cr)	061228-7	1.00	105	PASS	0.256	5.00	5.17	98%	5.16	98%	0%
Lead (Pb)	061228-7	1.00	107	PASS	4.03	5.00	8.90	97%	8.93	98%	1%

ANALYSIS DATE:

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.0300				0.0300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Arsenic (As)	PASS	PASS	PASS	PASS
Chromium(Cr)	PASS	PASS	PASS	PASS
Lead (Pb)	PASS	PASS	PASS	PASS
Mercury (Hg)				
Accepted Range	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: Kristie

FINAL REVIEWER: [illegible]

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324
PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO
DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/08-09/07
DATE REPORTED: 01/11/07

TCLP-LEAD ANALYSIS
(PER 40 CFR 261.24)/LIMIT @ 5.0
CONCENTRATION UNIT: MG/L IN LEACHATE

SAMPLE I.D.	LAB I.D.	TCLP-LEAD RESULT	DF
B-3/1 @ 0.5'	070104-25	1.62	1
B-3/2 @ 1.5'	070104-26	0.575	1
HB-1 @ 0'	070104-29	0.345	1
HB-1/1 @ 0.5'	070104-30	0.228	1
Method Blank	--	ND	1
	PQL	0.01	

COMMENTS
MG/L = Milligram per Liter = PPM
TCLP Extraction Method = EPA 1311
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
ND = Below the Actual Detection Limit or non-detected
EPA# = The EPA Hazardous Waste Number
LIMIT@ = The "EPA Acceptable Land Disposal Limit"
*** = The concentration exceeds the TCLP Limit (if marked)

Data Reviewed and Approved by: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --TCLP

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/9/2007

Unit : mg/L (ppm)

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Arsenic (As)	061213-11	1.00	112	PASS	0	1.00	1.12	112%	1.10	110%	2%
Chromium (Cr)	061213-11	1.00	107	PASS	0	1.00	0.944	94%	0.949	95%	1%
Lead (Pb)	061213-11	1.00	112	PASS	0.022	1.00	0.998	98%	0.989	97%	1%

ANALYSIS DATE:

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.0300				0.0300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Arsenic (As)	PASS	PASS	PASS	PASS
Chromium (Cr)	PASS	PASS	PASS	PASS
Lead (Pb)	PASS	PASS	PASS	PASS
Mercury (Hg)				
Accepted Range	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: Keith

FINAL REVIEWER: CD

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03/07
REPORT TO: Mr. RAY MONTERO

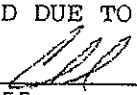
DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **B-1/1 @ 0.5'**
LAB I.D.: 070104-15

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

DATA REVIEWED AND APPROVED BY: 
CAL-DHS ELAP CERTIFICATE No.: 1555

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03/07
REPORT TO: Mr. RAY MONTERO

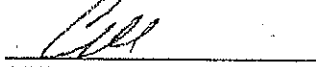
DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **B-1/2 @ 1.5'**
LAB I.D.: 070104-16

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

DATA REVIEWED AND APPROVED BY: 
CAL-DHS ELAP CERTIFICATE No.: 1555

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **B-2/1 @ 0.5'**
LAB I.D.: 070104-20

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **B-2/2 @ 1.5'**
LAB I.D.: 070104-21

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

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CAL-DHS ELAP CERTIFICATE No.: 1555

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
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Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03/07
REPORT TO: Mr. RAY MONTERO

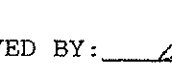
DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **B-3/1 @ 0.5'**
LAB I.D.: 070104-25

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

DATA REVIEWED AND APPROVED BY: 
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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
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Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **B-3/2 @ 1.5'**
LAB I.D.: 070104-26

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
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Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-1/1 @ 0.5'**
LAB I.D.: 070104-30

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	10*
alpha-BHC	ND	0.001	10*
beta-BHC	ND	0.001	10*
gamma-BHC (Lindane)	ND	0.001	10*
delta-BHC	ND	0.001	10*
alpha-Chlordane	ND	0.001	10*
gamma-Chlordane	ND	0.001	10*
4,4'-DDD	ND	0.001	10*
4,4'-DDE	ND	0.001	10*
4,4'-DDT	ND	0.001	10*
Dieldrin	ND	0.001	10*
Endosulfan I	ND	0.001	10*
Endosulfan II	ND	0.001	10*
Endosulfan Sulfate	ND	0.001	10*
Endrin	ND	0.001	10*
Endrin Aldehyde	ND	0.001	10*
Endrin Ketone	ND	0.001	10*
Heptachlor Epoxide	ND	0.001	10*
Heptachlor	ND	0.001	10*
Methoxyclor	ND	0.001	10*
Toxaphene	ND	0.200	10*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
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Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-1/2 @ 1.5'** LAB I.D.: 070104-31

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	10*
alpha-BHC	ND	0.001	10*
beta-BHC	ND	0.001	10*
gamma-BHC (Lindane)	ND	0.001	10*
delta-BHC	ND	0.001	10*
alpha-Chlordane	ND	0.001	10*
gamma-Chlordane	ND	0.001	10*
4,4'-DDD	ND	0.001	10*
4,4'-DDE	ND	0.001	10*
4,4'-DDT	ND	0.001	10*
Dieldrin	ND	0.001	10*
Endosulfan I	ND	0.001	10*
Endosulfan II	ND	0.001	10*
Endosulfan Sulfate	ND	0.001	10*
Endrin	ND	0.001	10*
Endrin Aldehyde	ND	0.001	10*
Endrin Ketone	ND	0.001	10*
Heptachlor Epoxide	ND	0.001	10*
Heptachlor	ND	0.001	10*
Methoxyclor	ND	0.001	10*
Toxaphene	ND	0.200	10*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
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PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

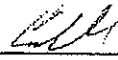
DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-2/1 @ 0.5'**
LAB I.D.: 070104-33

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	10*
alpha-BHC	ND	0.001	10*
beta-BHC	ND	0.001	10*
gamma-BHC (Lindane)	ND	0.001	10*
delta-BHC	ND	0.001	10*
alpha-Chlordane	ND	0.001	10*
gamma-Chlordane	ND	0.001	10*
4,4'-DDD	ND	0.001	10*
4,4'-DDE	ND	0.001	10*
4,4'-DDT	ND	0.001	10*
Dieldrin	ND	0.001	10*
Endosulfan I	ND	0.001	10*
Endosulfan II	ND	0.001	10*
Endosulfan Sulfate	ND	0.001	10*
Endrin	ND	0.001	10*
Endrin Aldehyde	ND	0.001	10*
Endrin Ketone	ND	0.001	10*
Heptachlor Epoxide	ND	0.001	10*
Heptachlor	ND	0.001	10*
Methoxyclor	ND	0.001	10*
Toxaphene	ND	0.200	10*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

DATA REVIEWED AND APPROVED BY: 
CAL-DHS ELAP CERTIFICATE No.: 1555

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-2/2 @ 1.5'**
LAB I.D.: 070104-34

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	10*
alpha-BHC	ND	0.001	10*
beta-BHC	ND	0.001	10*
gamma-BHC (Lindane)	ND	0.001	10*
delta-BHC	ND	0.001	10*
alpha-Chlordane	ND	0.001	10*
gamma-Chlordane	ND	0.001	10*
4,4'-DDD	ND	0.001	10*
4,4'-DDE	ND	0.001	10*
4,4'-DDT	ND	0.001	10*
Dieldrin	ND	0.001	10*
Endosulfan I	ND	0.001	10*
Endosulfan II	ND	0.001	10*
Endosulfan Sulfate	ND	0.001	10*
Endrin	ND	0.001	10*
Endrin Aldehyde	ND	0.001	10*
Endrin Ketone	ND	0.001	10*
Heptachlor Epoxide	ND	0.001	10*
Heptachlor	ND	0.001	10*
Methoxyclor	ND	0.001	10*
Toxaphene	ND	0.200	10*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

DATA REVIEWED AND APPROVED BY: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
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Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-3/1 @ 0.5'**
LAB I.D.: 070104-36

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT

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LABORATORY REPORT

CUSTOMER: **Kleinfelder**
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Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

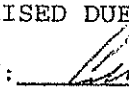
DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-3/2 @0.5'**
LAB I.D.: 070104-37

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	10*
alpha-BHC	ND	0.001	10*
beta-BHC	ND	0.001	10*
gamma-BHC (Lindane)	ND	0.001	10*
delta-BHC	ND	0.001	10*
alpha-Chlordane	ND	0.001	10*
gamma-Chlordane	ND	0.001	10*
4,4'-DDD	ND	0.001	10*
4,4'-DDE	ND	0.001	10*
4,4'-DDT	ND	0.001	10*
Dieldrin	ND	0.001	10*
Endosulfan I	ND	0.001	10*
Endosulfan II	ND	0.001	10*
Endosulfan Sulfate	ND	0.001	10*
Endrin	ND	0.001	10*
Endrin Aldehyde	ND	0.001	10*
Endrin Ketone	ND	0.001	10*
Heptachlor Epoxide	ND	0.001	10*
Heptachlor	ND	0.001	10*
Methoxyclor	ND	0.001	10*
Toxaphene	ND	0.200	10*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

DATA REVIEWED AND APPROVED BY: 
CAL-DHS ELAP CERTIFICATE No.: 1555

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METHOD BLANK REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

METHOD BLANK FOR LAB I.D.:
070104-15, -16, -20, -21, -25, -26, -30, -31, -33, -34, -36, -37

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	1
alpha-BHC	ND	0.001	1
beta-BHC	ND	0.001	1
gamma-BHC (Lindane)	ND	0.001	1
delta-BHC	ND	0.001	1
alpha-Chlordane	ND	0.001	1
gamma-Chlordane	ND	0.001	1
4,4'-DDD	ND	0.001	1
4,4'-DDE	ND	0.001	1
4,4'-DDT	ND	0.001	1
Dieldrin	ND	0.001	1
Endosulfan I	ND	0.001	1
Endosulfan II	ND	0.001	1
Endosulfan Sulfate	ND	0.001	1
Endrin	ND	0.001	1
Endrin Aldehyde	ND	0.001	1
Endrin Ketone	ND	0.001	1
Heptachlor Epoxide	ND	0.001	1
Heptachlor	ND	0.001	1
Methoxyclor	ND	0.001	1
Toxaphene	ND	0.200	1

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT

DATA REVIEWED AND APPROVED BY: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

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1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909)590-5905 Fax (909)590-5907

EPA 8081 QA/QC Report

Matrix: **Soil/Sludge** Date Analyzed: 1/4-5/2006

Unit: mg/Kg

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

Spiked Sample Lab I.D.: 061222-4,8,10,82 MS/MSD

Analyte	S.R.	spk conc	MS	%REC	MSD	%REC	%RPD	ACP %RPD	ACP %REC
Gamma-BHC	0.000	0.0500	0.0499	100%	0.0491	98%	2%	0-20%	70-130
Aldrin	0.000	0.0500	0.0476	95%	0.0469	94%	1%	0-20%	70-130
4,4-DDE	0.000	0.0500	0.0485	97%	0.0477	95%	2%	0-20%	70-130

Lab Control Spike (LCS) Recovery:

Analyte	spk conc	LCS	% REC	ACP %REC
Gamma-BHC	0.00500	0.00540	108%	75-125
Aldrin	0.00500	0.00562	112%	75-125
4,4-DDE	0.00500	0.00471	94%	75-125
Dieldrin	0.00500	0.00482	96%	75-125

Surrogate Recovery	ACP%	%REC	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.		MB	061222-4,8,10,82	061222-20,22,23,84	061222-36,38,39,86	061222-52,53,55,88	070104-15	070104-16
Tetra-chloro-meta-xylene	50-150	114%	109%	110%	108%	109%	97%	104%
Decachlorobiphenyl	50-150	83%	89%	87%	87%	85%	80%	77%

Surrogate Recovery	%REC	%REC	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.	070104-20	070104-21	070104-25	070104-26	070104-30	070104-31	070104-33	070104-34
Tetra-chloro-meta-xylene	91%	104%	99%	112%	109%	107%	105%	106%
Decachlorobiphenyl	81%	83%	81%	87%	87%	87%	83%	86%

Surrogate Recovery	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.	070104-36	070104-37				
Tetra-chloro-meta-xylene	112%	108%				
Decachlorobiphenyl	88%	86%				

S.R. = Sample Result

spk conc = Spike Concentration

%REC = Percent Recovery

ACP %RPD = Acceptable Percent RPD Range

ACP %REC = Acceptable Percent Recovery Range

** = Surrogate fail due to matrix interference (If Marked)*

Note: *LCS, MS, MSD are in control therefore results are in control.*

Analyzed and Reviewed By: AW

Final Reviewer: CD

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

Date: January 15, 2007

Mr. Ray Montero
Kleinfelder
1370 Valley Vista Drive
Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

Project Name: **US 101-Reyes Adobe Rd. Interchange**
Project Number: **75010-2**
Lab I.D.: **070104-15 through -39**

Dear Mr. Montero:

The **STLC/STLC DI-Pb results** for the soil samples, received by our laboratory on January 4, 2007, are attached. All samples were received chilled, intact and accompanying chain of custody.

Enviro-Chem appreciates the opportunity to provide you and your company this and other services. Please do not hesitate to call us if you have any questions.

Sincerely,

Curtis Desilets
Vice President/Program Manager

Jesse Tu, Ph.D.
Laboratory Manager

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324
PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/10-15/07
DATE REPORTED: 01/15/07

EPA 6010B FOR STLC-LEAD
UNIT: MG/L IN THE STLC LEACHATE

SAMPLE I.D.	LAB I.D.	STLC-LEAD RESULT	DF
B-3/1 @ 0.5'	070104-25	6.29 ***	1
B-3/2 @ 1.5'	070104-26	6.83 ***	1
HB-1 @ 0'	070104-29	9.74 ***	1
HB-1/1 @ 0.5'	070104-30	8.38 ***	1
Method Blank	--	ND	1
	PQL	0.05	

COMMENTS:
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = DF X PQL
ND = Non-Detected or below the Actual Detection Limit
STLC = Soluble Threshold Limit Concentration
MG/L = Milligram Per Liter = PPM
*** = The concentration exceeds the STLC Limit @ 5 PPM, therefore the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)

Data Reviewed and Approved by: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --STLC

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/15/2007 Unit : mg/L (ppm)

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Chromium (Cr)	070112-9	1.00	103	PASS	0	5.00	5.08	102%	5.09	102%	0%
Copper (Cu)	070112-9	1.00	96.7	PASS	0.533	5.00	5.89	107%	5.92	108%	1%
Lead (Pb)	070112-9	1.00	107	PASS	0.127	5.00	5.11	100%	5.12	100%	0%

ANALYSIS DATE:

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.0300				0.0300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Chromium (Cr)	PASS	PASS	PASS	PASS
Copper (Cu)	PASS	PASS	PASS	PASS
Lead (Pb)	PASS	PASS	PASS	PASS
Mercury (Hg)				
Accepted Range	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: _____

FINAL REVIEWER: _____

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/11-15/07
DATE REPORTED: 01/15/07

EPA 6010B FOR STLC DI-LEAD
UNIT: MG/L IN THE STLC LEACHATE

SAMPLE I.D.	LAB I.D.	STLC-LEAD RESULT	DF
B-3/1 @ 0.5'	070104-25	0.223	1
B-3/2 @ 1.5'	070104-26	ND	1
HB-1 @ 0'	070104-29	0.474	1
HB-1/1 @ 0.5'	070104-30	0.216	1
Method Blank	--	ND	1
	PQL	0.05	

COMMENTS:
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = DF X PQL
Extraction performed using DI Water
ND = Non-Detected or below the Actual Detection Limit
STLC = Soluble Threshold Limit Concentration
MG/L = Milligram Per Liter = PPM

Data Reviewed and Approved by: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --STLC D.I.WATER

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/15/2007 Unit : *mg/L (ppm)*

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	*Sample Result*	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Barium (Ba)	070112-9	1.00	104	*PASS*	*0.169*	5.00	5.22	101%	5.23	101%	0%
Copper (Cu)	070112-9	1.00	96.7	*PASS*	*0.533*	5.00	5.89	107%	5.92	108%	1%
Lead (Pb)	070112-9	1.00	107	*PASS*	*0.127*	5.00	5.11	100%	5.12	100%	0%

ANALYSIS DATE:

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	*Sample Result*	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.0300				0.0300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Barium (Ba)	*PASS*	*PASS*	*PASS*	*PASS*
Copper (Cu)	*PASS*	*PASS*	*PASS*	*PASS*
Lead (Pb)	*PASS*	*PASS*	*PASS*	*PASS*
Mercury (Hg)				
Accepted Range	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: _____

FINAL REVIEWER: _____

Enviro-Chem, Inc. Laboratories
1214 E. Lexington Avenue,
Pomona, CA 91766
Tel: (909) 590-5905 Fax: (909) 590-5907
CA-DHS ELAP CERTIFICATE # 1555

Turnaround Time
0 Same Day
0 24 Hours
0 48 Hours
0 72 Hours
(0) Week (Standard)
Other:

SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	No. OF CONTAINERS	TEMPERATURE	PRESERVATION	EPA 601D	EPA 150.1/Test	EPA 8081A								Misc.	COMMENTS
								Analysis Required											
B-1/1 @ 0.5'	070704-15	1/3/07	pm	SOIL	2		ICE	X	X	X									
B-1/2 @ 1.5'	-16									X									
B-1/3 @ 2'	-17																		
B-1/4 @ 3'	-18																		
B-1/5 @ 5'	-19																		
B-2/1 @ 0.5'	-20									X									
B-2/2 @ 1.5'	-21									X									
B-2/3 @ 2'	-22																		
B-2/4 @ 3'	-23																		
B-2/5 @ 5'	-24																		
B-3/1 @ 0.5'	-25									X									
B-3/2 @ 1.5'	-26									X									
B-3/3 @ 2'	-27																		
B-3/4 @ 3'	-28																		

Company Name: KLEINFELDER
Address: 1370 VALLEY VISTA DR. STE 150
City/State/Zip: DIAMOND BAR, CA 91765

Project Contact: RAY MONTERO
Tel: 818-254-6018
Fax:

Sampler's Signature:
Project Name/ID: US 101 - REYES ADOBE RD INTERCHANGE / 7500

Relinquished by: M. Janousek	Received by:	1/4/07 Date & Time: 1110	Instructions for Sample Storage After Analysis:
Relinquished by:	Received by:	Date & Time:	(●) Dispose of O Return to Client O Store (30 Days)
Relinquished by:	Received by:	Date & Time:	O Other:

CHAIN OF CUSTODY RECORD

Date: 1/4/07

WHITE WITH SAMPLE - YELLOW TO CLIENT

Enviro-Chem, Inc. Laboratories
1214 E. Lexington Avenue,
Pomona, CA 91766
Tel: (909) 590-5905 · Fax: (909) 590-5907
CA-DHS ELAP CERTIFICATE # 1555

Turnaround Time
0 Same Day
0 24 Hours
0 48 Hours
0 72 Hours
● 1 Week (Standard)
Other:

SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	No. OF CONTAINERS	TEMPERATURE	PRESERVATION	EPA 6010	EPA 150.1/9045C	EPA 8081A								Misc. / COMMENTS
								Analysis Required										COMMENTS
HB-1 @ 0'	070104-29	1/4/07	am	SOIL	2 4oz		ICE	X	X									
HB-1/1 @ 0.5'	-30									X								
HB-1/2 @ 1.5'	-31									X								
HB-2 @ 0'	-32																	
HB-2/1 @ 0.5'	-33									X								
HB-2/2 @ 1.5'	-34									X								
HB-3 @ 0'	-35																	
HB-3/1 @ 0.5'	-36									X								
HB-3/2 @ 1.5'	-37									X								
HB-3/3 @ 2'	-38																	
HB-3/4 @ 3'	-39	↓	↓	↓	↓		↓	↓	↓									

Company Name: KLEINFELDER
Address: 1370 VALLEY VISTA DR., STE 150
City/State/Zip: DIAMOND BAR, CA 91765

Project Contact: RAY MONTERO
Tel: 818-254-6018
Fax:

Sampler's Signature:
Project Name/ID: US 101 / REYES ADOBE RD INTERCHANGE / 7501.0-2

Relinquished by: , M. Jaroszek	Received by:	1/4/07	Instructions for Sample Storage After Analysis:
Relinquished by:	Received by:	Date & Time:	● Dispose of O Return to Client O Store (30 Days)
Relinquished by:	Received by:	Date & Time:	O Other:

CHAIN OF CUSTODY RECORD

Date: 1/4/07

WHITE WITH SAMPLE - YELLOW TO CLIENT

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-3/1 @ 0.5'**
LAB I.D.: 070104-36

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	100*
alpha-BHC	ND	0.001	100*
beta-BHC	ND	0.001	100*
gamma-BHC (Lindane)	ND	0.001	100*
delta-BHC	ND	0.001	100*
alpha-Chlordane	ND	0.001	100*
gamma-Chlordane	ND	0.001	100*
4,4'-DDD	ND	0.001	100*
4,4'-DDE	ND	0.001	100*
4,4'-DDT	ND	0.001	100*
Dieldrin	ND	0.001	100*
Endosulfan I	ND	0.001	100*
Endosulfan II	ND	0.001	100*
Endosulfan Sulfate	ND	0.001	100*
Endrin	ND	0.001	100*
Endrin Aldehyde	ND	0.001	100*
Endrin Ketone	ND	0.001	100*
Heptachlor Epoxide	ND	0.001	100*
Heptachlor	ND	0.001	100*
Methoxyclor	ND	0.001	100*
Toxaphene	ND	0.200	100*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/04/07
REPORT TO: Mr. RAY MONTERO

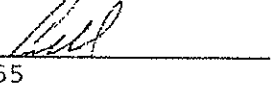
DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

SAMPLE I.D.: **HB-3/2 @0.5'**
LAB I.D.: 070104-37

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	10*
alpha-BHC	ND	0.001	10*
beta-BHC	ND	0.001	10*
gamma-BHC (Lindane)	ND	0.001	10*
delta-BHC	ND	0.001	10*
alpha-Chlordane	ND	0.001	10*
gamma-Chlordane	ND	0.001	10*
4,4'-DDD	ND	0.001	10*
4,4'-DDE	ND	0.001	10*
4,4'-DDT	ND	0.001	10*
Dieldrin	ND	0.001	10*
Endosulfan I	ND	0.001	10*
Endosulfan II	ND	0.001	10*
Endosulfan Sulfate	ND	0.001	10*
Endrin	ND	0.001	10*
Endrin Aldehyde	ND	0.001	10*
Endrin Ketone	ND	0.001	10*
Heptachlor Epoxide	ND	0.001	10*
Heptachlor	ND	0.001	10*
Methoxyclor	ND	0.001	10*
Toxaphene	ND	0.200	10*

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT
* = ACTUAL DETECTION LIMIT RAISED DUE TO MATRIX INTERFERENCE

DATA REVIEWED AND APPROVED BY: 
CAL-DHS ELAP CERTIFICATE No.: 1555

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

METHOD BLANK REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE EXTRACTED: 01/04/07
DATE ANALYZED: 01/05/07
DATE REPORTED: 01/11/07

METHOD BLANK FOR LAB I.D.:
070104-15, -16, -20, -21, -25, -26, -30, -31, -33, -34, -36, -37

Organochlorine Pesticides Analysis
Method: EPA 8081A
Unit: Mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	DF
Aldrin	ND	0.001	1
alpha-BHC	ND	0.001	1
beta-BHC	ND	0.001	1
gamma-BHC (Lindane)	ND	0.001	1
delta-BHC	ND	0.001	1
alpha-Chlordane	ND	0.001	1
gamma-Chlordane	ND	0.001	1
4,4'-DDD	ND	0.001	1
4,4'-DDE	ND	0.001	1
4,4'-DDT	ND	0.001	1
Dieldrin	ND	0.001	1
Endosulfan I	ND	0.001	1
Endosulfan II	ND	0.001	1
Endosulfan Sulfate	ND	0.001	1
Endrin	ND	0.001	1
Endrin Aldehyde	ND	0.001	1
Endrin Ketone	ND	0.001	1
Heptachlor Epoxide	ND	0.001	1
Heptachlor	ND	0.001	1
Methoxyclor	ND	0.001	1
Toxaphene	ND	0.200	1

COMMENTS:
DF = DILUTION FACTOR
PQL = PRACTICAL QUANTITATION LIMIT
ACTUAL DETECTION LIMIT = PQL X DF
ND = NON-DETECTED OR BELOW THE ACTUAL DETECTION LIMIT

DATA REVIEWED AND APPROVED BY: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

Enviro-Chem, Inc.

1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909)590-5905 Fax (909)590-5907

EPA 8081 QA/QC Report

Matrix: **Soil/Sludge** Date Analyzed: 1/4-5/2006

Unit: mg/Kg

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

Spiked Sample Lab I.D.: **061222-4,8,10,82 MS/MSD**

Analyte	S.R.	spk conc	MS	%REC	MSD	%REC	%RPD	ACP %RPD	ACP %REC
Gamma-BHC	0.000	0.0500	0.0499	100%	0.0491	98%	2%	0-20%	70-130
Aldrin	0.000	0.0500	0.0476	95%	0.0469	94%	1%	0-20%	70-130
4,4-DDE	0.000	0.0500	0.0485	97%	0.0477	95%	2%	0-20%	70-130

Lab Control Spike (LCS) Recovery:

Analyte	spk conc	LCS	% REC	ACP %REC
Gamma-BHC	0.00500	0.00540	108%	75-125
Aldrin	0.00500	0.00562	112%	75-125
4,4-DDE	0.00500	0.00471	94%	75-125
Dieldrin	0.00500	0.00482	96%	75-125

Surrogate Recovery	ACP%	%REC	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.		MB	061222-4,8,10,82	061222-20,22,23,84	061222-36,38,39,66	061222-52,53,55,68	070104-15	070104-16
Tetra-chloro-meta-xylene	50-150	114%	109%	110%	108%	109%	97%	104%
Decachlorobiphenyl	50-150	83%	89%	87%	87%	85%	80%	77%

Surrogate Recovery	%REC	%REC	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.	070104-20	070104-21	070104-25	070104-26	070104-30	070104-31	070104-33	070104-34
Tetra-chloro-meta-xylene	91%	104%	99%	112%	109%	107%	105%	106%
Decachlorobiphenyl	81%	83%	81%	87%	87%	87%	83%	86%

Surrogate Recovery	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.	070104-36	070104-37				
Tetra-chloro-meta-xylene	112%	108%				
Decachlorobiphenyl	88%	86%				

S.R. = Sample Result

spk conc = Spike Concentration

%REC = Percent Recovery

ACP %RPD = Acceptable Percent RPD Range

ACP %REC = Acceptable Percent Recovery Range

** = Surrogate fail due to matrix interference (If Marked)*

Note: *LCS, MS, MSD are in control therefore results are in control.*

Analyzed and Reviewed By: AW

Final Reviewer: CO

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

Date: January 15, 2007

Mr. Ray Montero
Kleinfelder
1370 Valley Vista Drive
Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

Project Name: **US 101-Reyes Adobe Rd. Interchange**
Project Number: **75010-2**
Lab I.D.: **070104-15 through -39**

Dear Mr. Montero:

The **STLC/STLC DI-Pb results** for the soil samples, received by our laboratory on January 4, 2007, are attached. All samples were received chilled, intact and accompanying chain of custody.

Enviro-Chem appreciates the opportunity to provide you and your company this and other services. Please do not hesitate to call us if you have any questions.

Sincerely,

Curtis Desilets
Vice President/Program Manager

Jesse Tu, Ph.D.
Laboratory Manager

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324

PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/10-15/07
DATE REPORTED: 01/15/07

EPA 6010B FOR STLC-LEAD
UNIT: MG/L IN THE STLC LEACHATE

SAMPLE I.D.	LAB I.D.	STLC-LEAD RESULT	DF
B-3/1 @ 0.5'	070104-25	6.29 ***	1
B-3/2 @ 1.5'	070104-26	6.83 ***	1
HB-1 @ 0'	070104-29	9.74 ***	1
HB-1/1 @ 0.5'	070104-30	8.38 ***	1
Method Blank	--	ND	1
	PQL	**0.05**	

COMMENTS:
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = DF X PQL
ND = Non-Detected or below the Actual Detection Limit
STLC = Soluble Threshold Limit Concentration
MG/L = Milligram Per Liter = PPM
*** = The concentration exceeds the STLC Limit @ 5 PPM, therefore the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)

Data Reviewed and Approved by: _____

CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --STLC

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/15/2007

Unit : mg/L (ppm)

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Chromium (Cr)	070112-9	1.00	103	PASS	0	5.00	5.08	102%	5.09	102%	0%
Copper (Cu)	070112-9	1.00	96.7	PASS	0.533	5.00	5.89	107%	5.92	108%	1%
Lead (Pb)	070112-9	1.00	107	PASS	0.127	5.00	5.11	100%	5.12	100%	0%

ANALYSIS DATE:

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.0300				0.0300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Chromium (Cr)	PASS	PASS	PASS	PASS
Copper (Cu)	PASS	PASS	PASS	PASS
Lead (Pb)	PASS	PASS	PASS	PASS
Mercury (Hg)				
Accepted Range	75 ~ 125	75 ~ 125	85 ~ 115	0 ~ 20

ANALYST: Keith

FINAL REVIEWER: @

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Kleinfelder**
1370 Valley Vista Drive, Suite 150
Diamond Bar, CA 91765
Tel(909)396-0335 Fax(909)396-1324
PROJECT NAME: **US 101-Reyes Adobe Rd. Interchange**
PROJECT NUMBER: **75010-2**
MATRIX: SOIL
DATE SAMPLED: 01/03-04/07
REPORT TO: Mr. RAY MONTERO

DATE RECEIVED: 01/04/07
DATE ANALYZED: 01/11-15/07
DATE REPORTED: 01/15/07

EPA 6010B FOR STLC DI-LEAD
UNIT: MG/L IN THE STLC LEACHATE

SAMPLE I.D.	LAB I.D.	STLC-LEAD RESULT	DF
B-3/1 @ 0.5'	070104-25	0.223	1
B-3/2 @ 1.5'	070104-26	ND	1
HB-1 @ 0'	070104-29	0.474	1
HB-1/1 @ 0.5'	070104-30	0.216	1
Method Blank	--	ND	1
	PQL	0.05	

COMMENTS:
DF = Dilution Factor
PQL = Practical Quantitation Limit
Actual Detection Limit = DF X PQL
Extraction performed using DI Water
ND = Non-Detected or below the Actual Detection Limit
STLC = Soluble Threshold Limit Concentration
MG/L = Milligram Per Liter = PPM

Data Reviewed and Approved by: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --STLC D.I.WATER

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 1/15/2007

Unit : *mg/L (ppm)*

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	*Sample Result*	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Barium (Ba)	070112-9	1.00	104	*PASS*	*0.169*	5.00	5.22	101%	5.23	101%	0%
Copper (Cu)	070112-9	1.00	96.7	*PASS*	*0.533*	5.00	5.89	107%	5.92	108%	1%
Lead (Pb)	070112-9	1.00	107	*PASS*	*0.127*	5.00	5.11	100%	5.12	100%	0%

ANALYSIS DATE:

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	*Sample Result*	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)		0.0300				0.0300		0%		0%	#DIV/0!

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Barium (Ba)	*PASS*	*PASS*	*PASS*	*PASS*
Copper (Cu)	*PASS*	*PASS*	*PASS*	*PASS*
Lead (Pb)	*PASS*	*PASS*	*PASS*	*PASS*
Mercury (Hg)				
Accepted Range	**75 ~ 125**	**75 ~ 125**	**85 ~ 115**	**0 ~ 20**

ANALYST: _____

FINAL REVIEWER: _____

Enviro-Chem, Inc. Laboratories
1214 E. Lexington Avenue,
Pomona, CA 91766
Tel: (909) 590-5905 Fax: (909) 590-5907
CA-DHS ELAP CERTIFICATE # 1555

Turnaround Time
0 Same Day
0 24 Hours
0 48 Hours
0 72 Hours
(0) Week (Standard)
Other:

Misc.

SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	No. OF CONTAINERS	TEMPERATURE	PRESERVATION	EPA 6010	EPA 150.1/9045C	EPA 8081A							COMMENTS
B-1/1 @ 0.5'	070104-15	1/3/07	pm	SOIL	2		ICE	X	X	X							
B-1/2 @ 1.5'	-16	↓	↓	↓	↓		↓	↓	↓	X							
B-1/3 @ 2'	-17																
B-1/4 @ 3'	-18																
B-1/5 @ 5'	-19																
B-2/1 @ 0.5'	-20									X							
B-2/2 @ 1.5'	-21									X							
B-2/3 @ 2'	-22																
B-2/4 @ 3'	-23																
B-2/5 @ 5'	-24																
B-3/1 @ 0.5'	-25									X							
B-3/2 @ 1.5'	-26									X							
B-3/3 @ 2'	-27																
B-3/4 @ 3'	-28																
		↓	↓	↓	↓		↓	↓	↓								

Analysis Required

Company Name: KLEINFELDER
Address: 1370 VALLEY VISTA DR. STE 150
City/State/Zip: DIAMOND BAR, CA 91765

Project Contact: RAY MONTERO
Tel: 818-254-6018
Fax:

Sampler's Signature: [signature]
Project Name/ID: US 101 - REYES ADOBE RD INTERCHANGE/75010

Relinquished by: [signature], M. Janousek	Received by: [signature]	Date & Time: 1/4/07 1110	Instructions for Sample Storage After Analysis:
Relinquished by:	Received by:	Date & Time:	☒ Dispose of O Return to Client O Store (30 Days)
Relinquished by:	Received by:	Date & Time:	O Other:

CHAIN OF CUSTODY RECORD

Date: 1/4/07

WHITE WITH SAMPLE . YELLOW TO CLIENT

Enviro-Chem, Inc. Laboratories
1214 E. Lexington Avenue,
Pomona, CA 91766
Tel: (909) 590-5905 · Fax: (909) 590-5907
CA-DHS ELAP CERTIFICATE # 1555

Turnaround Time
0 Same Day
0 24 Hours
0 48 Hours
0 72 Hours
@ 1 Week (Standard)
Other:

SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	No. OF CONTAINERS	TEMPERATURE	PRESERVATION	EPA 6010	EPA 150.1/9045C	EPA 8081A								Misc. / COMMENTS
								Analysis Required										COMMENTS
HB-1 @ 0'	070104-29	1/4/07	am	SOIL	2 4oz		ICE	X	X									
HB-1/1 @ 0.5'	-30									X								
HB-1/2 @ 1.5'	-31									X								
HB-2 @ 0'	-32																	
HB-2/1 @ 0.5'	-33									X								
HB-2/2 @ 1.5'	-34									X								
HB-3 @ 0'	-35																	
HB-3/1 @ 0.5'	-36									X								
HB-3/2 @ 1.5'	-37									X								
HB-3/3 @ 2'	-38																	
HB-3/4 @ 3'	-39	↓	↓	↓	↓		↓	↓	↓									

Company Name: KLEINFELDER
Address: 1370 VALLEY VISTA DR., STE 150
City/State/Zip: DIAMOND BAR, CA 91765

Project Contact: RAY MONTERO
Tel: 818-254-6018
Fax:

Sampler's Signature:
Project Name/ID: US 101 / REYES ADOBE RD INTERCHANGE / 7501-2

Relinquished by: , M. Janousek	Received by:	Date & Time: 1/4/07 1110	Instructions for Sample Storage After Analysis:
Relinquished by:	Received by:	Date & Time:	@ Dispose of O Return to Client O Store (30 Days)
Relinquished by:	Received by:	Date & Time:	O Other:

CHAIN OF CUSTODY RECORD

Date: 1/4/07

WHITE WITH SAMPLE · YELLOW TO CLIENT

APPENDIX E
RESPONSE TO CALTRANS REVIEW COMMENTS

KLEINFELDER

September 6, 2007

STV, Inc.
100 Pacifica, Suite 140
Irvine, California 92618

Attention: Mr. Tim J. McGrady
Project Manager

Subject: Response to Caltrans Review Comments
Proposed Reyes Adobe Road Bridge Widening
Over U.S. Highway 101
Bridge No. 53-1726
Agoura Hills, California

References: 1) Draft Geotechnical Design Report, Proposed Reyes Adobe Road Bridge Widening, by Kleinfelder West, Inc. dated June 1, 2007
2) Draft Foundation Report, Proposed Reyes Adobe Road Bridge Widening, by Kleinfelder West, Inc. dated May 30, 2007

Dear Mr. McGrady:

Kleinfelder West, Inc. (Kleinfelder) is pleased to submit our response to Caltrans review comments dated July 3, 2007. A copy of the comments is included as Appendix A. The response to the review comments is in the same order as the comments.

Draft Geotechnical Design Report

Comment No. 1: In Table 1 – Summary of Design Parameters for Slope Stability Analysis, some of the design parameters (Angle of Internal Friction and Cohesion) representing different elevations (soil layers) are somewhat inconsistent with the lab test results. Please reevaluate and explain it.

Response: Design parameters summarized in Table 1 were developed based on the results of the current and previous field investigations, laboratory testing, and our experience with similar materials. The laboratory direct shear testing results for similar soils were combined and the upper and lower bound values were reviewed. The recommended values for design tend to be conservative in our opinion.

Comment No. 2: Caltrans concurs with the procedure of determining Peak Bedrock Acceleration (PBA) using both Caltrans California Seismic Hazard Map and Sadigh's attenuation relationships. The recommended seismic design parameters are summarized as follows: the controlling fault is the Malibu coast-Santa Monica-Hollywood-Raymond (MMR), the fault type is reverse/oblique, the site distance from the

fault is 11 km, the maximum credible earthquake (MCE) is 7.5, the peak bedrock acceleration (PBA) is 0.5g, and the soil profile type is S_D.

Response: Acknowledged. Caltrans concurs with our procedure and the recommended seismic design parameters.

Comment No 3: A soil unit weight of 140 pounds per cubic foot for compacted fill appears to be high and it should also be consistent with lab test results. Please reevaluate and provide the supporting data.

Response: Caltrans BDS Section 6 for Culverts specifies that the vertical earth pressure on flexible or rigid converts should be an equivalent fluid pressure of 140 pcf, which corresponds to an overlying soil unit weight of 140 pcf. This unit weight is recommended only for culvert design.

Draft Foundation Report

Comment No. 4: In Tables 1 and 2 – Summary of Design Parameters for Slope Stability Analysis, some of the design parameters (Angle of Internal Friction and Cohesion) representing different elevations (soil layers) are somewhat inconsistent with the lab test results. Additional lab tests may be needed to reassess the design parameters.

Response: See response for Comment No.1.

Comment No. 5: Caltrans concurs with the procedure of determining Peak Bedrock Acceleration (PBA) using both Caltrans California Seismic Hazard Map and Sadigh's attenuation relationships. The recommended seismic design parameters are summarized as follows: the controlling fault is the Malibu coast-Santa Monica-Hollywood-Raymond (MMR), the fault type is reverse/oblique, the site distance from the fault is 11 km, the maximum credible earthquake (MCE) is 7.5, the peak bedrock acceleration (PBA) is 0.5g, and the soil profile type is S_D. Caltrans also concurs with the modified ARS curve presented in Figure 6.

Response: Acknowledged. Caltrans concurs with our procedure and the recommended seismic design parameters.

Comment No. 6: Both samples tested for consolidation were inundated at 2.14 tsf. Please explain why at this particular load the samples were inundated. Also explain the swell characteristics at this load for the B-2 sample.

Response: There is a typo in the comment. It should be "2.14 ksf". The specimen was inundated at 2.14 ksf which corresponds to approximately 15 to 20 feet of overburden for a finished grade condition (with new fill on top) subject to wetting. About 2% swelling occurred after inundation based on B-2 sample. We will include a discussion of

expansive potential of the existing fill material (CL) in Section 8 of our final FR and recommend removal from the bridge abutments as shown in Figure 8.

Comment No. 7: Caltrans concurs with the modified ARS curve presented on the Plans.

Response: Acknowledged. This comment does not require a response.

Closure

We will include all responses to the final GDR and FR as an appendix.

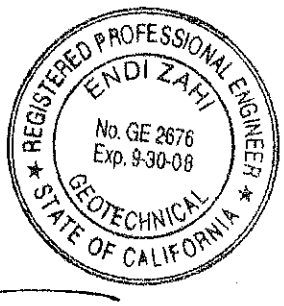
The following is attached and complete this letter.

Appendix A Caltrans Review Comments

We appreciate the opportunity to be of service to you on this project. If you have any questions or comments regarding this letter, please contact the undersigned.

Sincerely,

KLEINFELDER, INC.



Justin Kempton, PE, GE
Area Manager

Endi Zhai, PhD, GE
Principal Geotechnical Engineer

Distribution: (PDF) Addressee

APPENDIX A
CALTRANS REVIEW COMMENTS

FOUNDATION REVIEW

DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

TO: MR. EARL SEABERG
Office of Special Funded Projects
Attention: Ms. Lily Sun

DATE: July 3, 2007

FILE: 07 (District) LA (County) 101 (Route) 36.1 (Post Mile)

FDN REPORT BY: Kleinfelder West, Inc. DATED: 06/01/07 Reyes Adobe Road Bridge OC Widening (Structure Name)

GENERAL PLAN DATED: 05/31/07 FDN PLAN DATED: 05/31/07 07-240241 (EA Number) 53-1729 (Bridge Number)

Submittal (*Check One*): [X] 1st [ ] 2nd [ ] 3rd [ ] 4th [ ] Other: _____

The following review comments are made based on the Draft Geotechnical Design Report, the Draft Foundation Report, and the Contract Plans for the proposed Reyes Adobe Road Bridge Widening Over U.S. Highway 101 in Agoura Hills, California prepared by Kleinfelder West, Inc. dated June 1, 2007.

Draft Geotechnical Design Report

Section 6.2 Subsurface Conditions

1. In Table 1 – Summary of Design Parameters for Slope Stability Analysis, some of the design parameters (Angle of Internal Friction and Cohesion) representing different elevations (soil layers) are somehow inconsistent with the lab test results. Please reevaluate and explain it.

Section 7.2 Dynamic Analysis

2. Caltrans concurs with the procedure of determining Peak Bedrock Acceleration (PBA) using both Caltrans California Seismic Hazard Map and Sadigh's attenuation relationships. The recommended seismic design parameters are summarized as follows: the controlling fault is the Malibu coast-Santa Monica-Hollywood-Raymond (MMR), the fault type is reverse/oblique, the site distance from the fault is 11 km, the maximum credible earthquake (MCE) is 7.5, the peak bedrock acceleration (PBA) is 0.5g, and the soil profile type is S_D.

Section 7.4 Culvert Foundation

3. A soil unit weight of 140 pounds per cubic foot for compacted fill appears to be high and it should also be consistent with lab test results. Please reevaluate and provide the supporting data.

Draft Foundation Report

Section 5.3 Subsurface Profile and Engineering Parameters

4. In Tables 1 and 2 – Summary of Design Parameters for Slope Stability Analysis and Foundation Design, some of the design parameters (Angle of Internal Friction and Cohesion) representing different elevations (soil layers) are somehow inconsistent with the lab test results. Additional lab tests may be needed to reassess the design parameters.

Section 6.2 Seismic Shaking and Design ARS Curves

5. Caltrans concurs with the procedure of determining Peak Bedrock Acceleration (PBA) using both Caltrans California Seismic Hazard Map and Sadigh's attenuation relationships. The recommended seismic design parameters are summarized as follows: the controlling fault is the Malibu coast-Santa Monica-Hollywood-Raymond (MMR), the fault type is reverse/oblique, the site distance from the fault is 11 km, the maximum credible earthquake (MCE) is 7.5, the peak bedrock acceleration (PBA) is 0.5g, and the soil profile type is S_D. Caltrans also concurs with the modified ARS curve presented in Figure 6.

Appendix B – Laboratory Testing

6. Both samples tested for consolidation were inundated at 2.14 tsf. Please explain why at this particular load the samples were inundated. Also explain the swell characteristics at this load for the B-2 sample.

Contract Plans

7. Caltrans concurs with the modified ARS curve presented on the Plans.

All responses to Caltrans Foundation Review Comments should be attached to the final foundation reports as an Appendix. The review is limited to geotechnical engineering aspects of the project. If you have any questions or comments, please call Yung Chung at (916) 227-5398.

Approval: (C3) Not approved (resubmittal to OGDS-1 required)

Office of Special Funded Projects

Reviewer's Name Yung Chung

Office of Geotechnical Design – South 1

cc: OGDS-1 (Sacramento), GS File

Revised 04/01