

Slide Analysis Information

Document Name

File Name: section CC partial liquefaction.sli

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
Spencer

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: 4

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML-SM UD
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 800 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Liquefied Soil A
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 420 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Liquefied Soil B
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 980 psf
Friction Angle: 0 degrees
Water Surface: Water Table

Custom Hu value: 1

List of All Coordinates

Material Boundary

93.161	464.720
850.000	468.000

Material Boundary

190.000	483.000
231.496	469.168
540.000	470.000
740.000	471.000
850.000	471.550

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
231.496	467.168
231.496	469.168

Material Boundary

231.496	467.168
850.000	469.550

Material Boundary

-330.000	461.500
-30.000	461.500
260.000	461.500
550.000	456.500
850.000	456.500

Material Boundary

-330.000	456.500
-30.000	454.000
260.000	456.500
550.000	451.500
850.000	449.000

Material Boundary

-330.000	449.000
-30.000	451.500
260.000	451.500
550.000	446.500
850.000	444.000

Material Boundary

-330.000	444.000
-30.000	446.500
260.000	444.000
-30.000	441.500
-330.000	444.000

Material Boundary

-330.000	431.500
-30.000	434.000
260.000	435.000
-30.000	436.500
-330.000	439.000

Material Boundary

-330.000	429.000
-30.000	431.500
260.000	426.500
550.000	431.500
850.000	436.500

Material Boundary

-30.000	454.000
260.000	459.000
550.000	454.000
850.000	451.500

Material Boundary

-30.000	451.500
260.000	456.500
550.000	449.000
850.000	449.000

Material Boundary

-30.000	434.000
260.000	431.500
550.000	431.500
260.000	435.000

External Boundary

200.000	483.000
198.942	483.000
190.000	483.000
189.375	483.208
184.000	485.000
183.073	485.309
175.000	488.000
174.160	487.986
172.299	487.955
169.000	487.901
168.082	487.916
163.000	488.000
157.036	486.012
154.000	485.000
144.060	481.687
139.000	480.000
129.060	476.687
124.000	475.000
118.940	473.313
93.161	464.720
-330.000	464.000
-330.000	461.500
-330.000	456.500

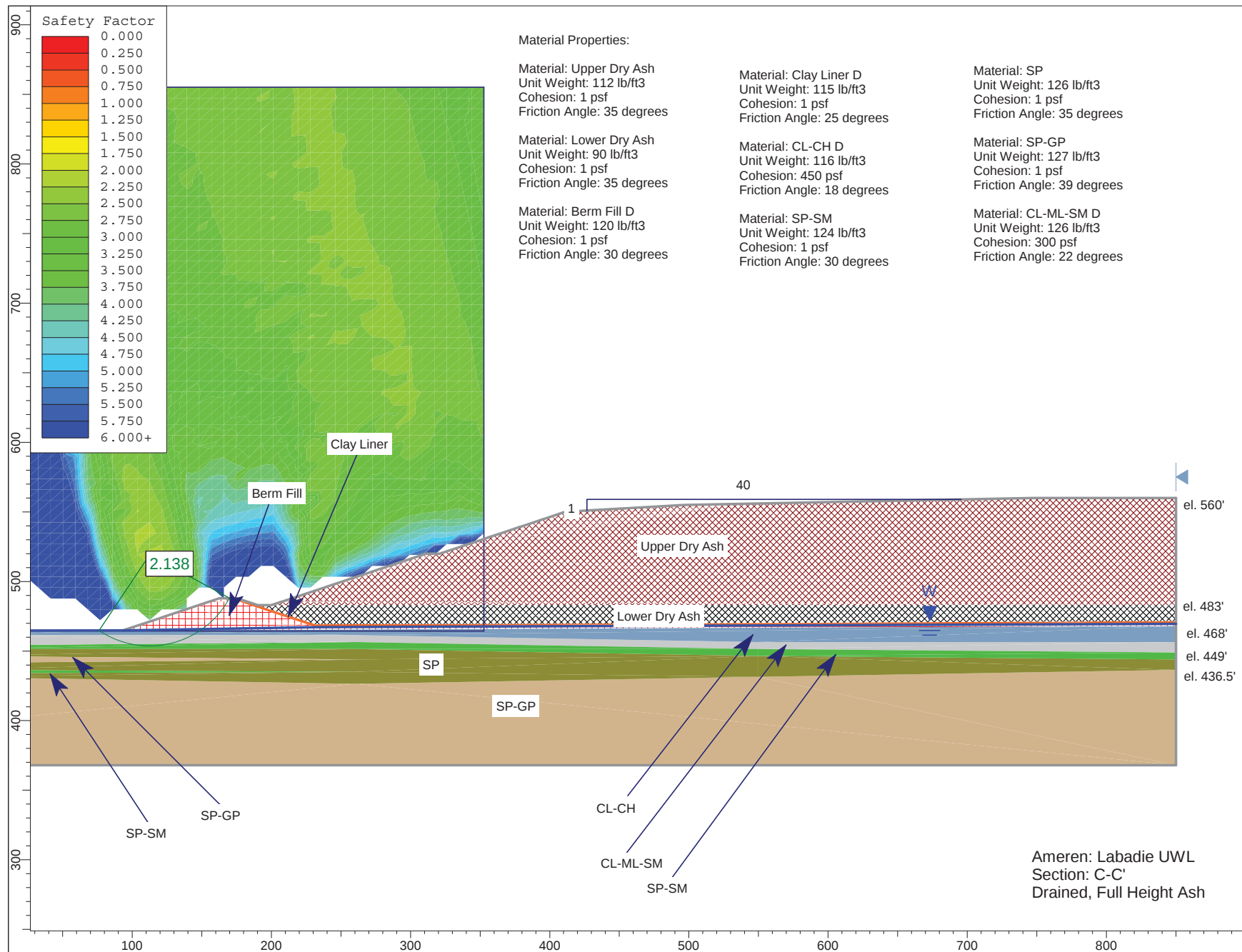
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-330.000	444.000
-330.000	439.000
-330.000	431.500
-330.000	429.000
-330.000	368.000
850.000	368.000
850.000	436.500
850.000	444.000
850.000	449.000
850.000	451.500
850.000	456.500
850.000	468.000
850.000	469.550
850.000	471.550
850.000	483.098

Water Table

-330.000	464.000
93.161	464.720
231.496	467.168
850.000	469.550

Search Grid

67.775	485.025
154.000	485.025
154.000	635.158
67.775	635.158



Slide Analysis Information

Document Name

File Name: section CC full drained.sli

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
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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

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Bishop simplified
Spencer

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: 4

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH D
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 450 psf
Friction Angle: 18 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML-SM D
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table

Custom Hu value: 1

List of All Coordinates

Material Boundary

93.161	464.720
850.000	468.000

Material Boundary

190.000	483.000
231.496	469.168
540.000	470.000
740.000	471.000
850.000	471.550

Material Boundary

200.000	483.000
850.000	483.098

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
231.496	467.168
231.496	469.168

Material Boundary

231.496	467.168
850.000	469.550

Material Boundary

-330.000	461.500
-30.000	461.500
260.000	461.500
550.000	456.500
850.000	456.500

Material Boundary

-330.000	456.500
-30.000	454.000
260.000	456.500
550.000	451.500
850.000	449.000

Material Boundary

-330.000	449.000
-30.000	451.500
260.000	451.500
550.000	446.500
850.000	444.000

Material Boundary

-330.000	444.000
-30.000	446.500

260.000	444.000
-30.000	441.500
-330.000	444.000

Material Boundary

-330.000	431.500
-30.000	434.000
260.000	435.000
-30.000	436.500
-330.000	439.000

Material Boundary

-330.000	429.000
-30.000	431.500
260.000	426.500
550.000	431.500
850.000	436.500

External Boundary

850.000	560.000
746.465	560.000
531.296	555.697
496.414	555.000
428.162	551.003
411.000	550.000
410.785	549.928
396.000	545.000
394.686	544.562
381.000	540.000
378.604	539.201
366.000	535.000
357.068	532.023
351.000	530.000
337.385	525.462
336.000	525.000
321.299	520.100
321.000	520.000
316.824	520.000
311.000	520.000
310.590	519.863
296.000	515.000
294.508	514.503
281.000	510.000
278.441	509.147
266.000	505.000
256.165	501.722
251.000	500.000
249.169	499.390
236.000	495.000
234.321	494.440
221.000	490.000
207.609	485.536
206.000	485.000
205.359	484.786
200.000	483.000
198.942	483.000

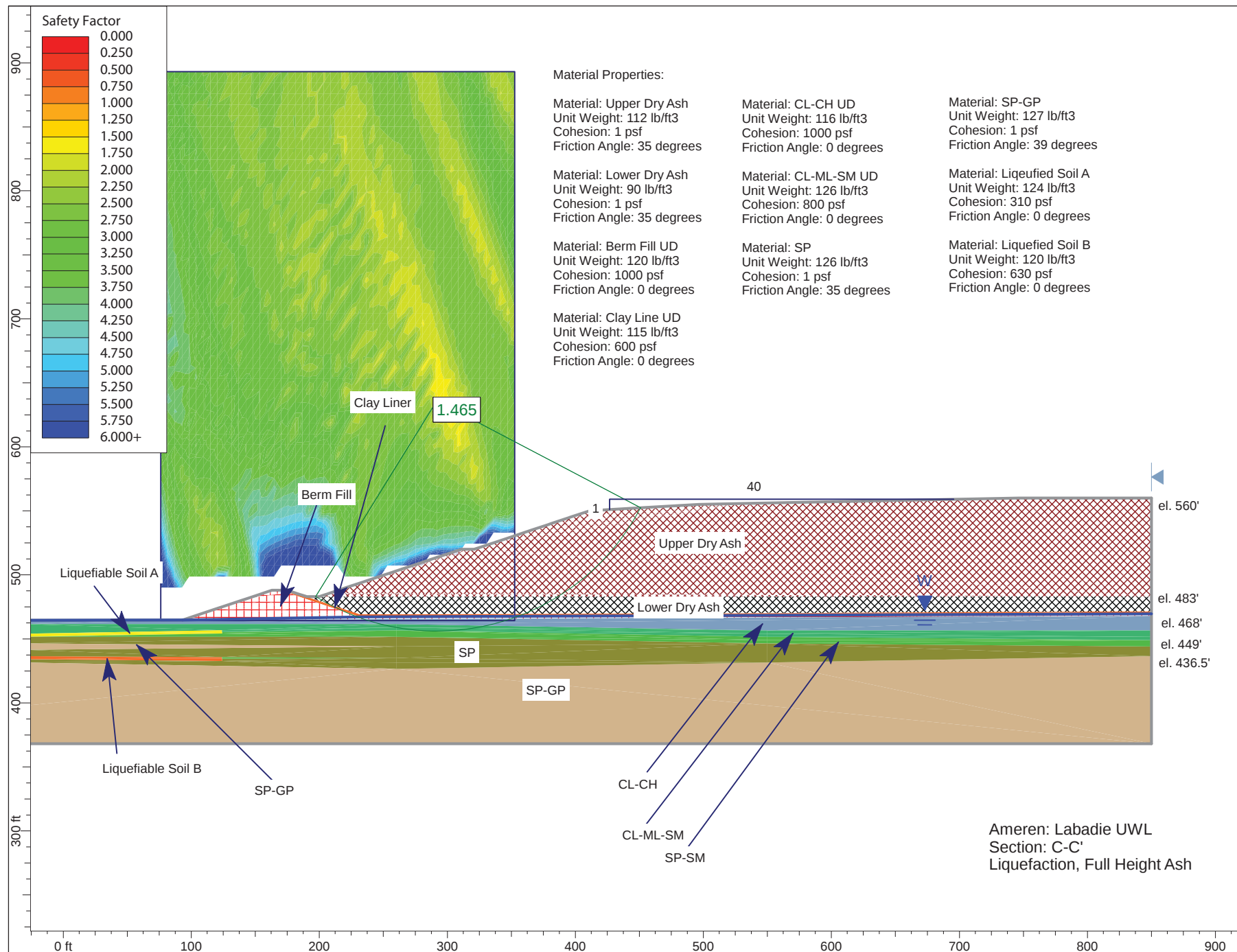
190.000	483.000
189.375	483.208
184.000	485.000
183.073	485.309
175.000	488.000
174.160	487.986
172.299	487.955
169.000	487.901
168.082	487.916
163.000	488.000
157.036	486.012
154.000	485.000
144.060	481.687
139.000	480.000
129.060	476.687
124.000	475.000
118.940	473.313
93.161	464.720
-330.000	464.000
-330.000	461.500
-330.000	456.500
-330.000	449.000
-330.000	444.000
-330.000	439.000
-330.000	431.500
-330.000	429.000
-330.000	368.000
850.000	368.000
850.000	436.500
850.000	444.000
850.000	449.000
850.000	456.500
850.000	468.000
850.000	469.550
850.000	471.550
850.000	483.098

Water Table

-330.000	464.000
93.161	464.720
231.496	467.168
850.000	469.550

Search Grid

-92.049	464.321
352.646	464.321
352.646	855.143
-92.049	855.143



Slide Analysis Information

Document Name

File Name: section CC full liquefaction trial.sli

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
Spencer

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: 4

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML-SM UD
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 800 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil A

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 310 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil B

Strength Type: Mohr-Coulomb

Unit Weight: 120 lb/ft³

Cohesion: 630 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.502530

Center: 291.823, 635.908

Radius: 179.900

Left Slip Surface Endpoint: 197.044, 483.000

Right Slip Surface Endpoint: 451.140, 552.349

Resisting Moment=7.78283e+007 lb-ft

Driving Moment=5.1798e+007 lb-ft

Method: spencer

FS: 1.465350

Center: 291.823, 635.908

Radius: 179.900

Left Slip Surface Endpoint: 197.044, 483.000

Right Slip Surface Endpoint: 451.140, 552.349

Resisting Moment=7.59023e+007 lb-ft

Driving Moment=5.1798e+007 lb-ft

Resisting Horizontal Force=359889 lb

Driving Horizontal Force=245599 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 9611

Number of Invalid Surfaces: 19000

Error Codes:

Error Code -103 reported for 18463 surfaces

Error Code -107 reported for 17 surfaces

Error Code -112 reported for 520 surfaces

Method: spencer

Number of Valid Surfaces: 9529

Number of Invalid Surfaces: 19082

Error Codes:

Error Code -103 reported for 18463 surfaces

Error Code -107 reported for 17 surfaces

Error Code -108 reported for 39 surfaces
Error Code -111 reported for 14 surfaces
Error Code -112 reported for 549 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

76.179	464.321
352.646	464.321
352.646	893.287
76.179	893.287

Material Boundary

93.161	464.720
850.000	468.000

Material Boundary

190.000	483.000
231.496	469.168
540.000	470.000
740.000	471.000
850.000	471.550

Material Boundary

200.000	483.000
850.000	483.098

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
231.496	467.168
231.496	469.168

Material Boundary

231.496	467.168
850.000	469.550

Material Boundary

-330.000	461.500
-30.000	461.500
260.000	461.500
550.000	456.500
850.000	456.500

Material Boundary

-330.000	456.500
-30.000	454.000
124.000	455.328
260.000	456.500
550.000	451.500
850.000	449.000

Material Boundary

-330.000	449.000
-30.000	451.500
260.000	451.500
550.000	446.500
850.000	444.000

Material Boundary

-330.000	444.000
-30.000	446.500
260.000	444.000
-30.000	441.500
-330.000	444.000

Material Boundary

-330.000	431.500
-30.000	434.000
124.060	434.531
260.000	435.000
124.060	435.703
-30.000	436.500
-330.000	439.000

Material Boundary

-330.000	429.000
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-30.000	431.500
260.000	426.500
550.000	431.500
850.000	436.500

Material Boundary

-30.000	454.000
124.000	456.655
260.000	459.000
550.000	454.000
850.000	451.500

Material Boundary

-30.000	451.500
124.000	454.155
260.000	456.500
550.000	449.000
850.000	449.000

Material Boundary

-30.000	434.000
124.060	432.672
260.000	431.500
550.000	431.500
260.000	435.000

Material Boundary

124.000	454.155
124.000	455.328
124.000	456.655

Material Boundary

124.060	432.672
124.060	434.531
124.060	435.703

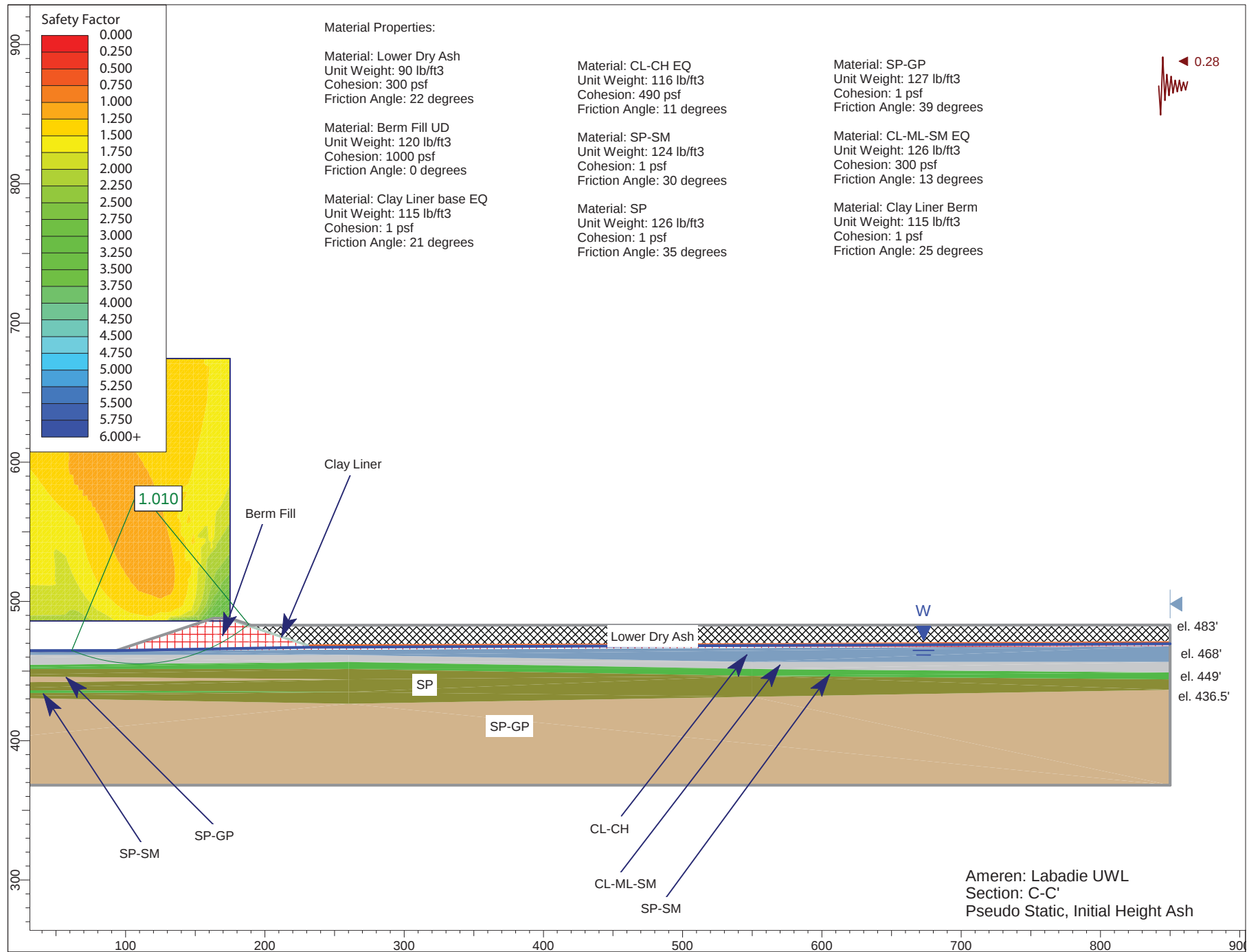
External Boundary

850.000	560.000
746.465	560.000
531.296	555.697
496.414	555.000
428.162	551.003
411.000	550.000
410.785	549.928
396.000	545.000
394.686	544.562
381.000	540.000
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366.000	535.000
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337.385	525.462
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321.299	520.100
321.000	520.000
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190.000	483.000
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184.000	485.000
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172.299	487.955
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163.000	488.000
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139.000	480.000
129.060	476.687
124.000	475.000
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-330.000	464.000
-330.000	461.500
-330.000	456.500
-330.000	449.000
-330.000	444.000
-330.000	439.000
-330.000	431.500
-330.000	429.000
-330.000	368.000
850.000	368.000
850.000	436.500
850.000	444.000
850.000	449.000
850.000	451.500
850.000	456.500
850.000	468.000
850.000	469.550
850.000	471.550
850.000	483.098

Water Table

-330.000	464.000
93.161	464.720
231.496	467.168
850.000	469.550



Slide Analysis Information

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File Name: section CC Partial pseudo static.sli

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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: 4

Loading

Seismic Load Coefficient (Horizontal): 0.28

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD

Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner base EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH EQ
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 490 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML-SM EQ
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 300 psf
Friction Angle: 13 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Berm
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³

Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary

93.161	464.720
850.000	468.000

Material Boundary

190.000	483.000
231.496	469.168
540.000	470.000
740.000	471.000
850.000	471.550

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
231.496	467.168
231.496	469.168

Material Boundary

231.496	467.168
850.000	469.550

Material Boundary

-330.000	461.500
-30.000	461.500
260.000	461.500
550.000	456.500
850.000	456.500

Material Boundary

-330.000	456.500
-30.000	454.000
260.000	456.500
550.000	451.500
850.000	449.000

Material Boundary

-330.000	449.000
-30.000	451.500
260.000	451.500
550.000	446.500
850.000	444.000

Material Boundary

-330.000	444.000
-30.000	446.500
260.000	444.000
-30.000	441.500

-330.000 444.000

Material Boundary

-330.000 431.500
-30.000 434.000
260.000 435.000
-30.000 436.500
-330.000 439.000

Material Boundary

-330.000 429.000
-30.000 431.500
260.000 426.500
550.000 431.500
850.000 436.500

External Boundary

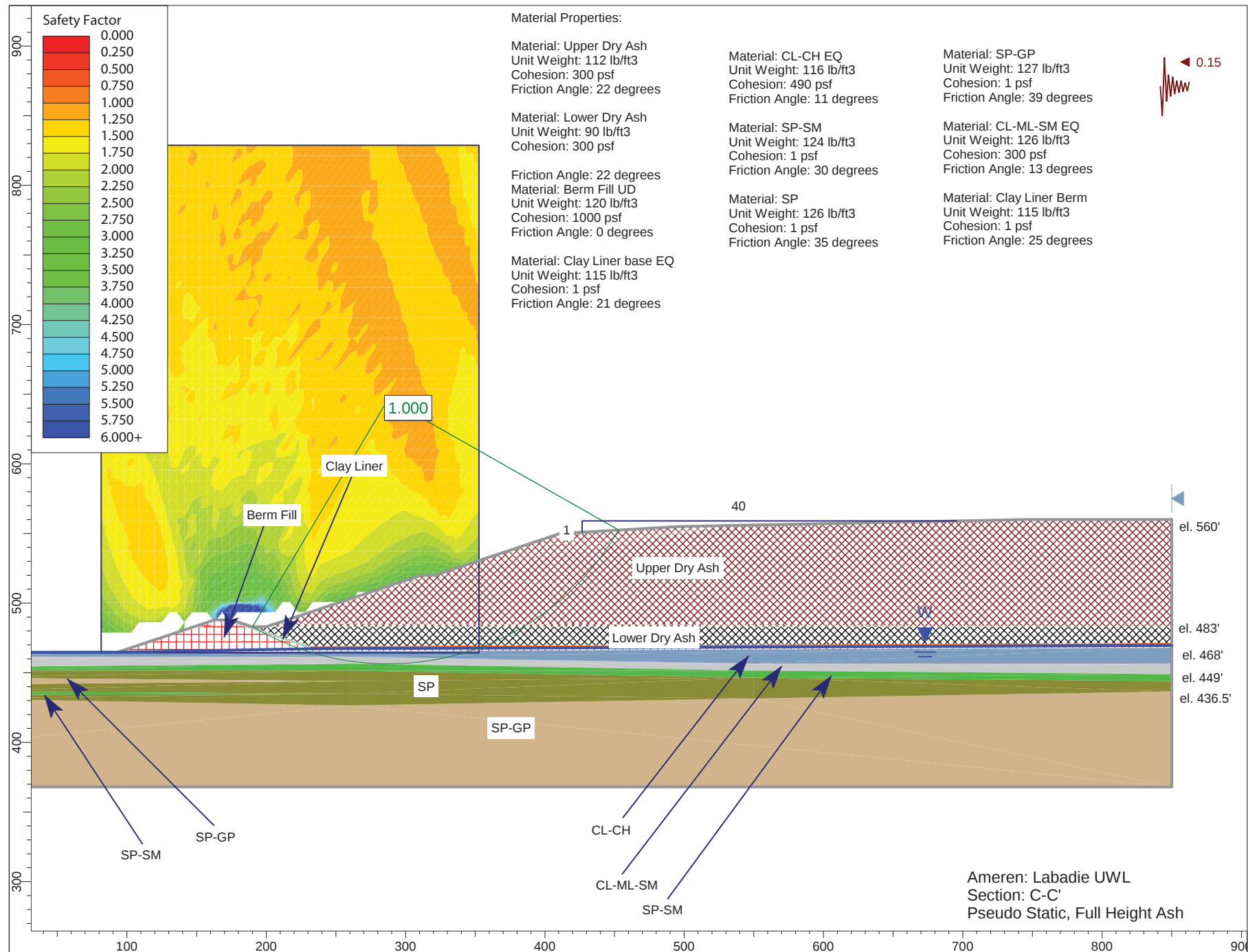
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154.000 485.000
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129.060 476.687
124.000 475.000
118.940 473.313
93.161 464.720
-330.000 464.000
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-330.000 439.000
-330.000 431.500
-330.000 429.000
-330.000 368.000
850.000 368.000
850.000 436.500
850.000 444.000
850.000 449.000
850.000 456.500
850.000 468.000
850.000 469.550
850.000 471.550
850.000 483.098

Water Table

-330.000	464.000
93.161	464.720
231.496	467.168
850.000	469.550

Search Grid

10.389	486.000
175.000	486.000
175.000	674.579
10.389	674.579



Slide Analysis Information

Document Name

File Name: section CC full pseudo static.sli

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
Spencer

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: 4

Loading

Seismic Load Coefficient (Horizontal): 0.15

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash

Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft3
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner base EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft3
Cohesion: 1 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH EQ
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft3
Cohesion: 490 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft3
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft3
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft3
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML-SM EQ
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft3

Cohesion: 300 psf
Friction Angle: 13 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Berm
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary

93.161	464.720
850.000	468.000

Material Boundary

190.000	483.000
231.496	469.168
540.000	470.000
740.000	471.000
850.000	471.550

Material Boundary

200.000	483.000
850.000	483.098

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
231.496	467.168
231.496	469.168

Material Boundary

231.496	467.168
850.000	469.550

Material Boundary

-330.000	461.500
-30.000	461.500
260.000	461.500
550.000	456.500
850.000	456.500

Material Boundary

-330.000	456.500
-30.000	454.000
260.000	456.500
550.000	451.500
850.000	449.000

Material Boundary

-330.000	449.000
-30.000	451.500
260.000	451.500
550.000	446.500
850.000	444.000

Material Boundary

-330.000	444.000
-30.000	446.500
260.000	444.000
-30.000	441.500
-330.000	444.000

Material Boundary

-330.000	431.500
-30.000	434.000
260.000	435.000
-30.000	436.500
-330.000	439.000

Material Boundary

-330.000	429.000
-30.000	431.500
260.000	426.500
550.000	431.500
850.000	436.500

External Boundary

850.000	560.000
746.465	560.000
531.296	555.697
496.414	555.000
428.162	551.003
411.000	550.000
410.785	549.928
396.000	545.000
394.686	544.562
381.000	540.000
378.604	539.201
366.000	535.000
357.068	532.023
351.000	530.000
337.385	525.462
336.000	525.000
321.299	520.100
321.000	520.000
316.824	520.000
311.000	520.000
310.590	519.863
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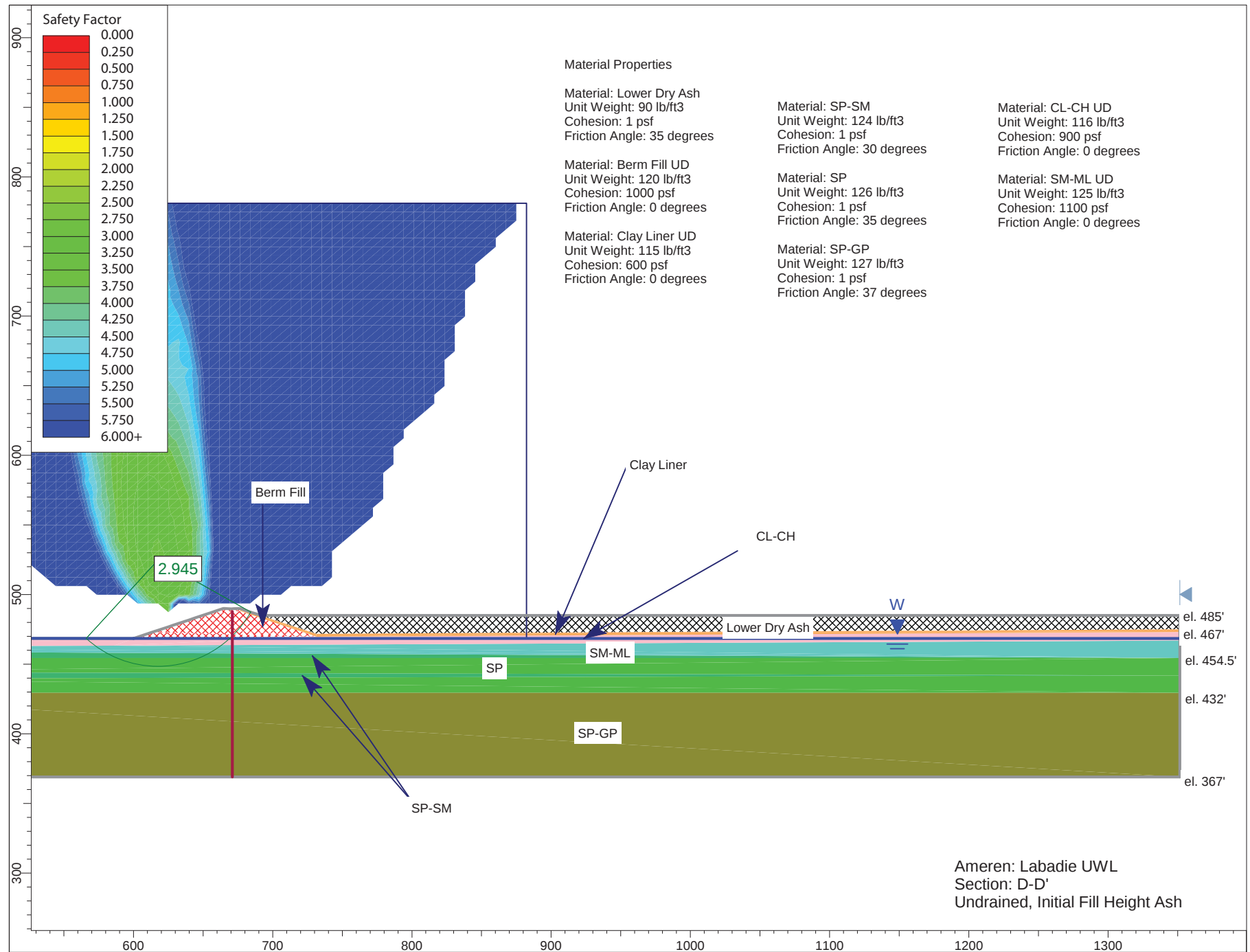
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200.000	483.000
198.942	483.000
190.000	483.000
189.375	483.208
184.000	485.000
183.073	485.309
175.000	488.000
174.160	487.986
172.299	487.955
169.000	487.901
168.082	487.916
163.000	488.000
157.036	486.012
154.000	485.000
144.060	481.687
139.000	480.000
129.060	476.687
124.000	475.000
118.940	473.313
93.161	464.720
-330.000	464.000
-330.000	461.500
-330.000	456.500
-330.000	449.000
-330.000	444.000
-330.000	439.000
-330.000	431.500
-330.000	429.000
-330.000	368.000
850.000	368.000
850.000	436.500
850.000	444.000
850.000	449.000
850.000	456.500
850.000	468.000
850.000	469.550
850.000	471.550
850.000	483.098

Water Table

-330.000	464.000
93.161	464.720
231.496	467.168
850.000	469.550

Search Grid

81.576	464.321
352.646	464.321
352.646	828.742
81.576	828.742



Slide Analysis Information

Document Name

File Name: Section DD Partial UnDrained 10192012.sli

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
Spencer

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

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML UD
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1100 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary
691.524 485.008
731.239 471.770
966.524 473.008

1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

731.239	469.770
1351.524	473.008

Material Boundary

89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
320.000	459.500
280.000	457.000
320.000	454.500
1351.524	454.500

Material Boundary

89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	432.000
89.000	432.000

Material Boundary

0.000	459.500
89.000	459.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
1351.524	454.500

Material Boundary

600.000	468.500
731.239	469.770

Material Boundary

280.000	442.000
330.000	444.500
1351.524	441.973
330.000	439.500
280.000	442.000

External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	441.973
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

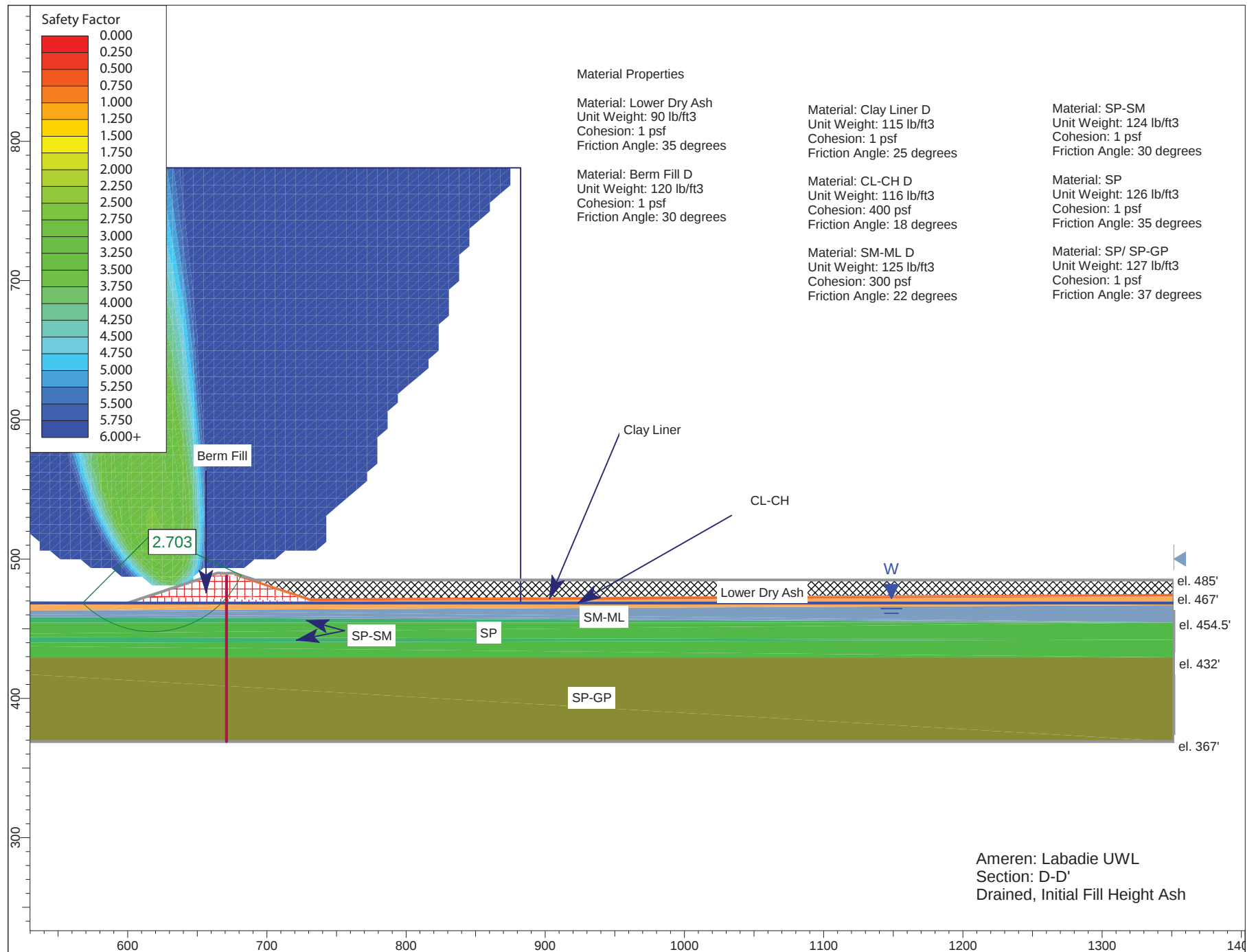
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600.000	468.500
1351.524	468.500

Focus/Block Search Line

671.059	369.008
671.059	487.731

Search Grid

514.811	468.572
882.239	468.572
882.239	781.073
514.811	781.073



Slide Analysis Information

Document Name

File Name: Section DD Partial Drained 10192012.sli

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
Spencer

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

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH D
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 400 psf
Friction Angle: 18 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary
691.524 485.008
731.239 471.770
966.524 473.008

1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

731.239	469.770
1351.524	473.008

Material Boundary

89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
320.000	459.500
280.000	457.000
320.000	454.500
1351.524	454.500

Material Boundary

89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	432.000
89.000	432.000

Material Boundary

0.000	459.500
89.000	459.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
1351.524	454.500

Material Boundary

600.000	468.500
731.239	469.770

Material Boundary

280.000	442.000
320.000	444.500
1351.524	442.037
330.000	439.500
280.000	442.000

External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	442.037
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

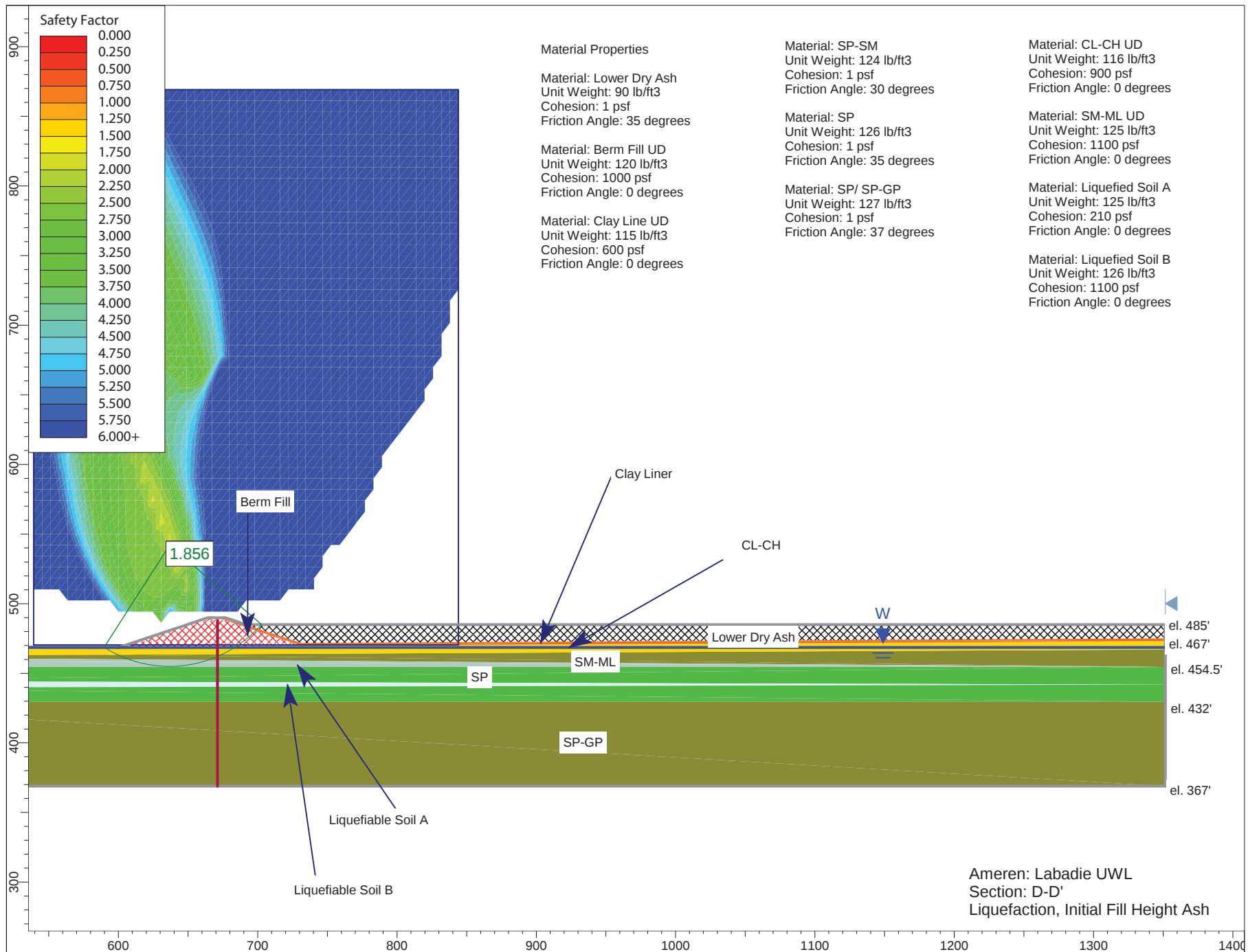
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600.000	468.500
1351.524	468.500

Focus/Block Search Line

671.059	369.008
671.059	487.731

Search Grid

514.811	468.572
882.239	468.572
882.239	781.073
514.811	781.073



Slide Analysis Information

Document Name

File Name: Section DD Partial liquefaction10192012.sli

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
Spencer

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

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML UD
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1100 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Liquefied Soil A
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 210 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Liquefied Soil B
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1100 psf
Friction Angle: 0 degrees
Water Surface: Water Table

Custom Hu value: 1

List of All Coordinates

Material Boundary

691.524	485.008
731.239	471.770
966.524	473.008
1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

600.000	468.500
731.239	469.770
1351.524	473.008

Material Boundary

0.000	459.500
89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
320.000	459.500
280.000	457.000
320.000	454.500
1351.524	454.500

Material Boundary

0.000	432.000
89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
1351.524	454.500

Material Boundary

280.000	442.000
330.000	444.500
1351.524	441.903
330.000	439.500
280.000	442.000

External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	441.903
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
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670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

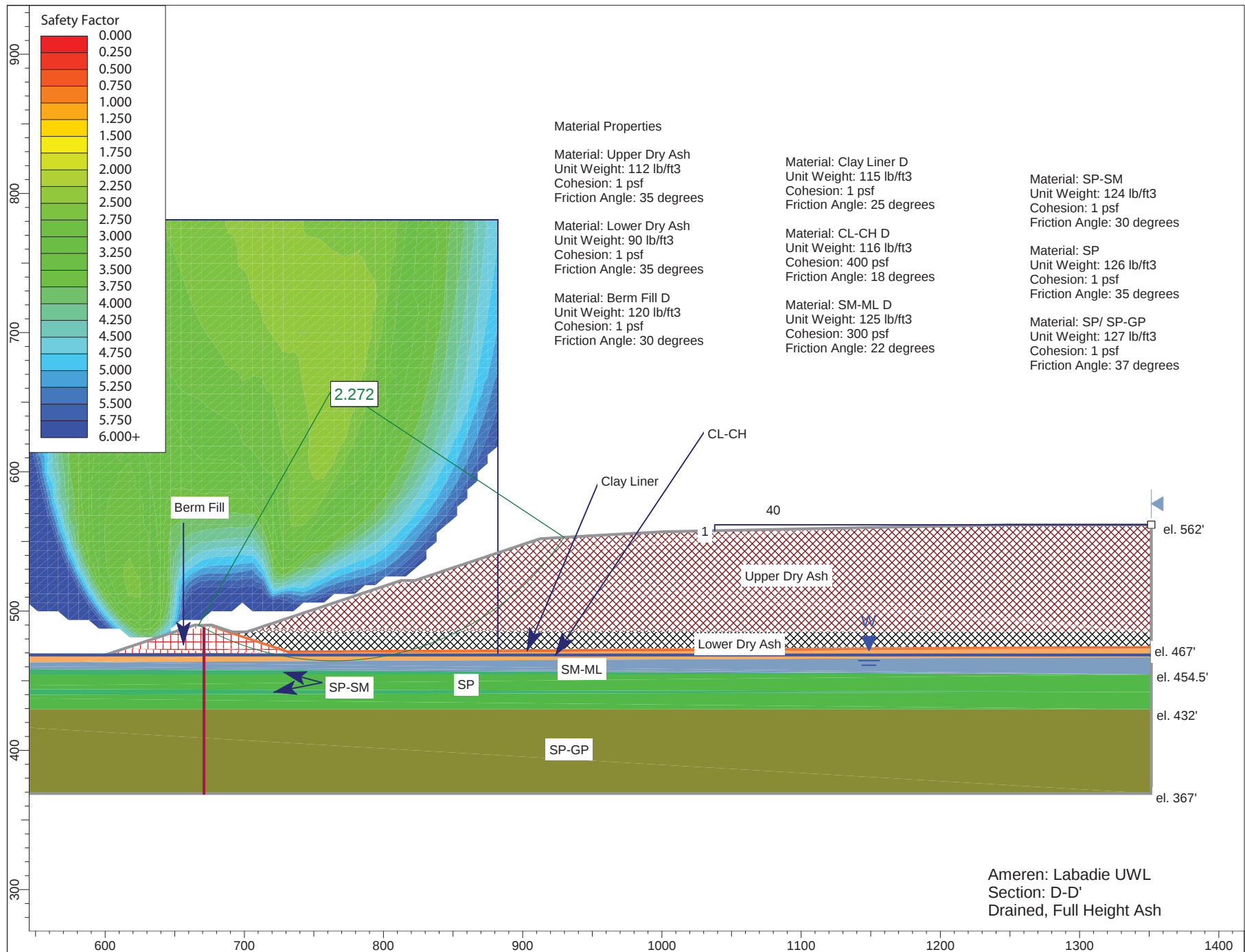
-0.000	469.008
600.000	468.500
1351.524	468.500

Focus/Block Search Line

671.059	369.008
671.059	487.731

Search Grid

539.169	470.359
844.124	470.359
844.124	869.204
539.169	869.204



Slide Analysis Information

Document Name

File Name: Section DD Full Drained 10192012.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH D
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 400 psf
Friction Angle: 18 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table

Custom Hu value: 1

List of All Coordinates

Material Boundary

691.524	485.008
731.239	471.770
966.524	473.008
1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

731.239	469.770
1351.524	473.008

Material Boundary

701.524	485.008
1351.524	484.949

Material Boundary

89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
320.000	459.500
280.000	457.000
320.000	454.500
1351.524	454.500

Material Boundary

89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	432.000
89.000	432.000

Material Boundary

0.000	459.500
89.000	459.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
1351.524	454.500

Material Boundary

600.000	468.500
731.239	469.770

Material Boundary

280.000	442.000
330.000	444.500
1351.524	441.961
330.000	439.500
280.000	442.000

External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	441.961
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
1351.524	562.008
1250.221	562.008
1135.274	559.709
1000.182	557.008
935.839	553.357
912.524	552.008
900.658	548.053
897.524	547.008
884.510	542.670
882.524	542.008
868.376	537.292
867.524	537.008
866.146	536.549
852.524	532.008
843.872	529.124
837.524	527.008
827.732	523.744
822.524	522.008
815.418	522.008
812.524	522.008
800.863	518.121
797.524	517.008
784.760	512.753

782.524	512.008
768.670	507.390
767.524	507.008
765.715	506.405
752.524	502.008
744.442	499.314
737.524	497.008
729.376	494.292
722.524	492.008
714.376	489.292
707.524	487.008
704.265	485.922
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

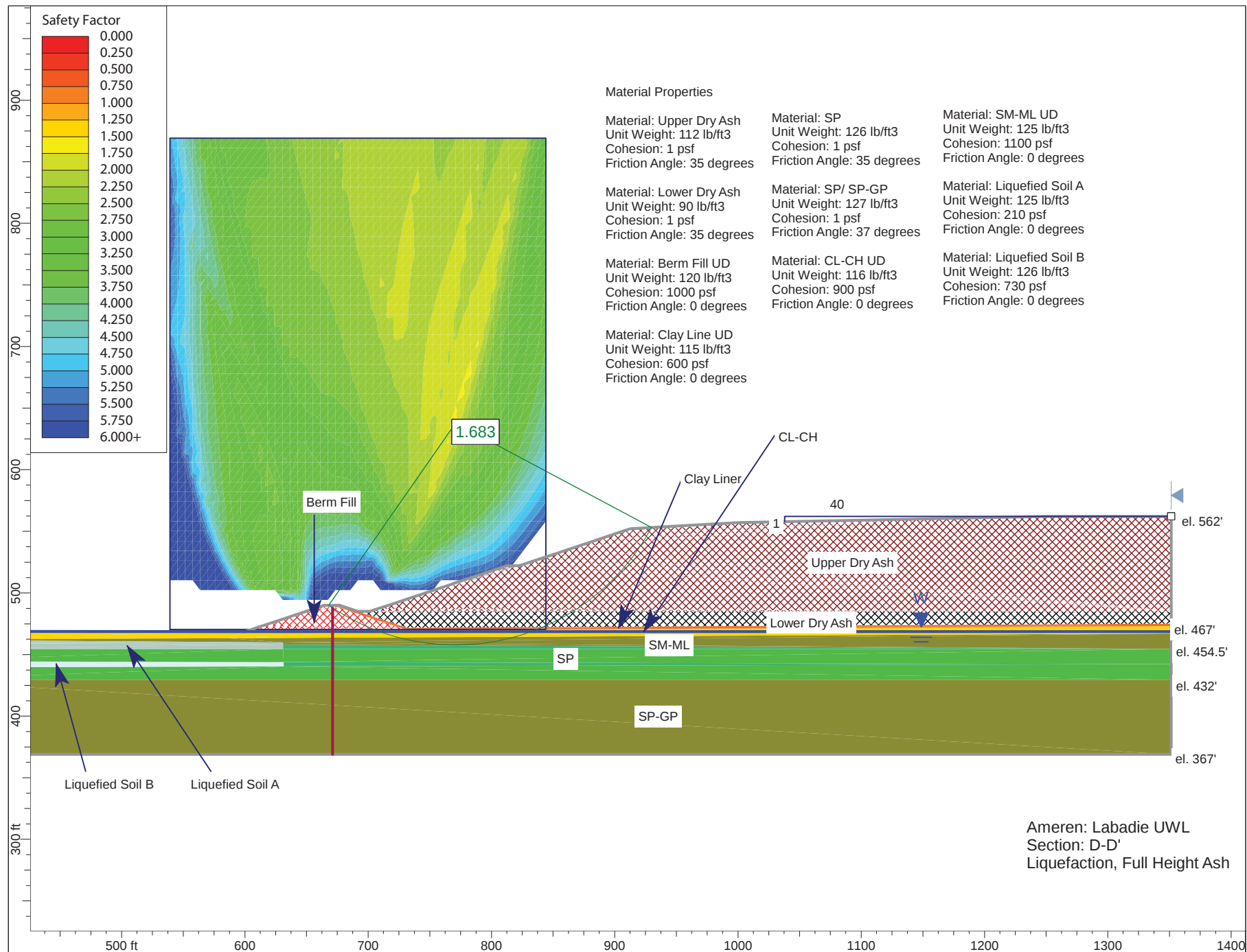
-0.000	469.008
600.000	468.500
1351.524	468.500

Focus/Block Search Line

671.059	369.008
671.059	487.731

Search Grid

514.811	468.572
882.239	468.572
882.239	781.073
514.811	781.073



Slide Analysis Information

Document Name

File Name: Section DD Full liquefaction10192012 trial.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML UD
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1100 psf
Friction Angle: 0 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil A

Strength Type: Mohr-Coulomb

Unit Weight: 125 lb/ft³

Cohesion: 210 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil B

Strength Type: Mohr-Coulomb

Unit Weight: 126 lb/ft³

Cohesion: 730 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.729460

Center: 783.133, 677.758

Radius: 220.615

Left Slip Surface Endpoint: 667.461, 489.899

Right Slip Surface Endpoint: 966.504, 555.097

Resisting Moment=1.19849e+008 lb-ft

Driving Moment=6.92989e+007 lb-ft

Method: spencer

FS: 1.683230

Center: 770.935, 637.874

Radius: 180.327

Left Slip Surface Endpoint: 667.897, 489.883

Right Slip Surface Endpoint: 930.052, 553.022

Resisting Moment=7.82576e+007 lb-ft

Driving Moment=4.64926e+007 lb-ft

Resisting Horizontal Force=373621 lb

Driving Horizontal Force=221967 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 20901

Number of Invalid Surfaces: 7710

Error Codes:

Error Code -103 reported for 6371 surfaces

Error Code -107 reported for 8 surfaces

Error Code -112 reported for 1288 surfaces

Error Code -118 reported for 43 surfaces

Method: spencer

Number of Valid Surfaces: 20847

Number of Invalid Surfaces: 7764

Error Codes:

Error Code -103 reported for 6371 surfaces

Error Code -107 reported for 8 surfaces
Error Code -108 reported for 12 surfaces
Error Code -111 reported for 10 surfaces
Error Code -112 reported for 1320 surfaces
Error Code -118 reported for 43 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-118 = Surface does not pass through the search focus

List of All Coordinates

Search Grid

539.169	470.359
844.124	470.359
844.124	869.204
539.169	869.204

Material Boundary

691.524	485.008
731.239	471.770
966.524	473.008
1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

600.000	468.500
731.239	469.770
1351.524	473.008

Material Boundary

701.524	485.008
1351.524	484.949

Material Boundary

0.000	459.500
89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
630.976	457.993
320.000	459.500
280.000	457.000
320.000	454.500
630.976	454.500
1351.524	454.500

Material Boundary

0.000	432.000
89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
630.976	459.739
1351.524	454.500

Material Boundary

280.000	442.000
320.000	444.500
631.373	443.790
1351.524	442.149
631.373	440.300

320.000	439.500
280.000	442.000

Material Boundary

630.976	454.500
630.976	457.993
630.976	459.739

Material Boundary

631.373	440.300
631.373	443.790

External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	442.149
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
1351.524	562.008
1250.221	562.008
1135.274	559.709
1000.182	557.008
935.839	553.357
912.524	552.008
900.658	548.053
897.524	547.008
884.510	542.670
882.524	542.008
868.376	537.292
867.524	537.008
866.146	536.549
852.524	532.008
843.872	529.124
837.524	527.008
827.732	523.744
822.524	522.008
815.418	522.008
812.524	522.008
800.863	518.121
797.524	517.008
784.760	512.753
782.524	512.008
768.670	507.390
767.524	507.008
765.715	506.405
752.524	502.008
744.442	499.314
737.524	497.008

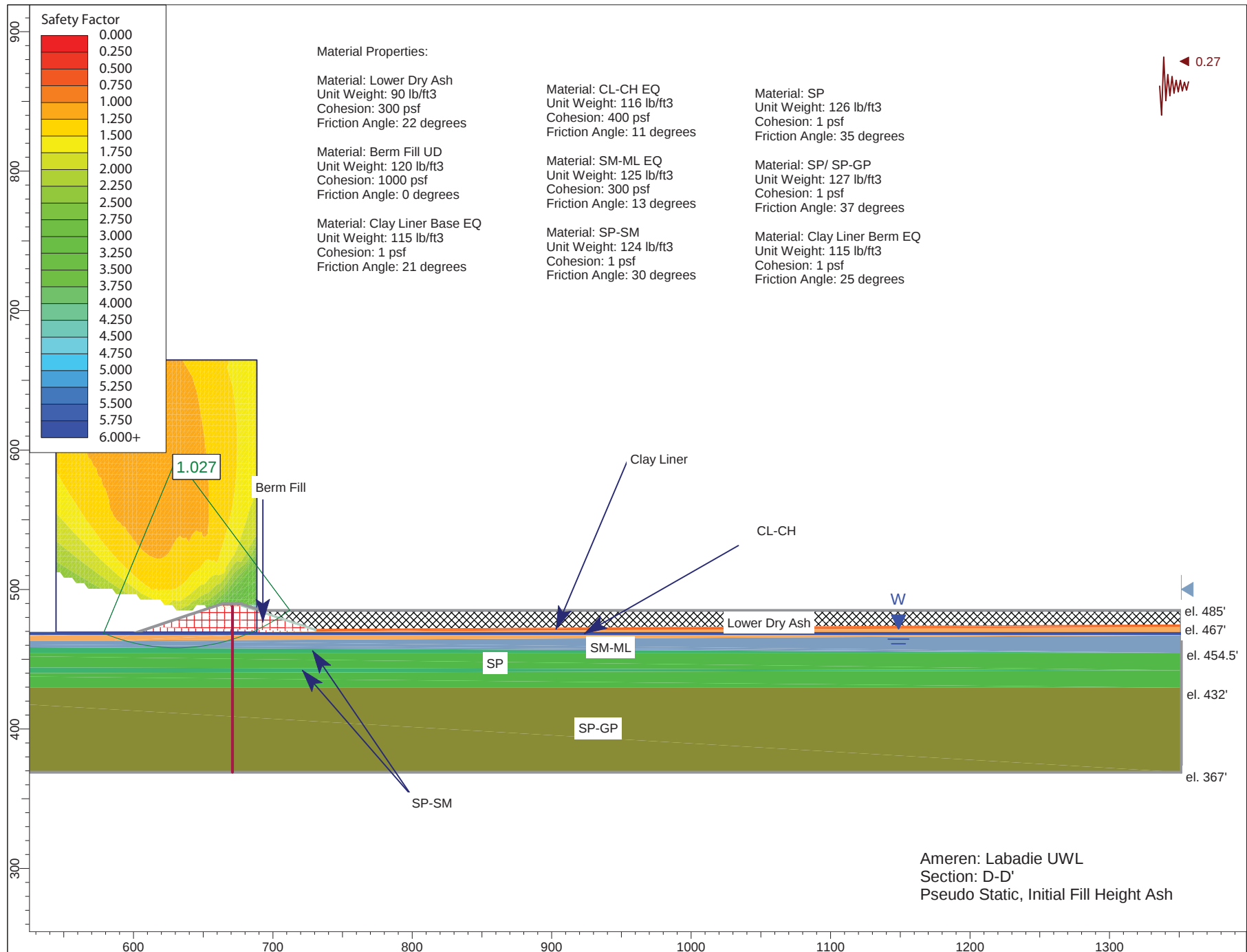
729.376	494.292
722.524	492.008
714.376	489.292
707.524	487.008
704.265	485.922
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

-0.000	469.008
600.000	468.500
1351.524	468.500

Focus/Block Search Line

671.059	369.008
671.059	487.731



Slide Analysis Information

Document Name

File Name: Section DD Partial Pseudo Static 10192012.sli

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
Spencer

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): 0.27

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD

Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Base EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH EQ
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 400 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML EQ
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 300 psf
Friction Angle: 13 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Berm EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³

Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary

691.524	485.008
731.239	471.770
966.524	473.008
1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

600.000	468.500
731.239	469.770
1351.524	473.008

Material Boundary

0.000	459.500
89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
320.000	459.500
280.000	457.000
320.000	454.500
1351.524	454.500

Material Boundary

0.000	432.000
89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
1351.524	454.500

Material Boundary

280.000	442.000
320.000	444.500
1351.524	442.088
320.000	439.500
280.000	442.000

External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	442.088
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

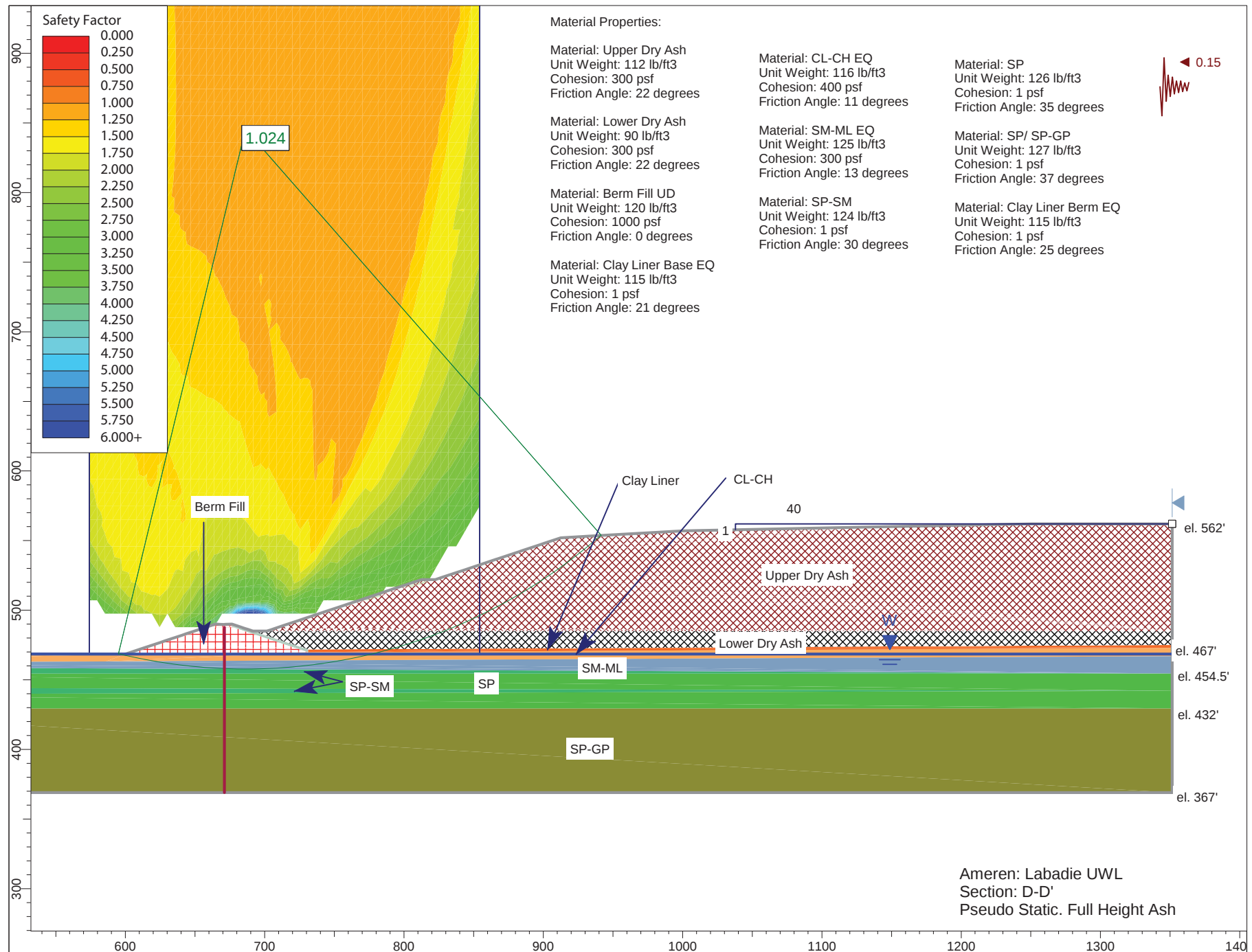
-0.000	469.008
600.000	468.500
1351.524	468.500

Focus/Block Search Line

671.059	369.008
671.059	487.731

Search Grid

544.464	469.356
688.483	469.356
688.483	664.586
544.464	664.586



Slide Analysis Information

Document Name

File Name: Section DD Full Pseudo Static 10182012.sli

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
Spencer

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): 0.15

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash

Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft3
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Base EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft3
Cohesion: 1 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH EQ
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft3
Cohesion: 400 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML EQ
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3
Cohesion: 300 psf
Friction Angle: 13 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft3
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft3
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft3

Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Berm EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft3
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

List of All Coordinates

Material Boundary

691.524	485.008
731.239	471.770
966.524	473.008
1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

600.000	468.500
731.239	469.770
1351.524	473.008

Material Boundary

701.524	485.008
1351.524	484.949

Material Boundary

0.000	459.500
89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
320.000	459.500
280.000	457.000
320.000	454.500
1351.524	454.500

Material Boundary

0.000	432.000
-------	---------

89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
1351.524	454.500

Material Boundary

280.000	442.000
320.000	444.500
1351.524	442.119
320.000	439.500
280.000	442.000

External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	442.119
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
1351.524	562.008
1250.221	562.008
1135.274	559.709
1000.182	557.008
935.839	553.357
912.524	552.008
900.658	548.053
897.524	547.008
884.510	542.670
882.524	542.008
868.376	537.292
867.524	537.008
866.146	536.549
852.524	532.008
843.872	529.124
837.524	527.008
827.732	523.744
822.524	522.008
815.418	522.008
812.524	522.008
800.863	518.121
797.524	517.008
784.760	512.753

782.524	512.008
768.670	507.390
767.524	507.008
765.715	506.405
752.524	502.008
744.442	499.314
737.524	497.008
729.376	494.292
722.524	492.008
714.376	489.292
707.524	487.008
704.265	485.922
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

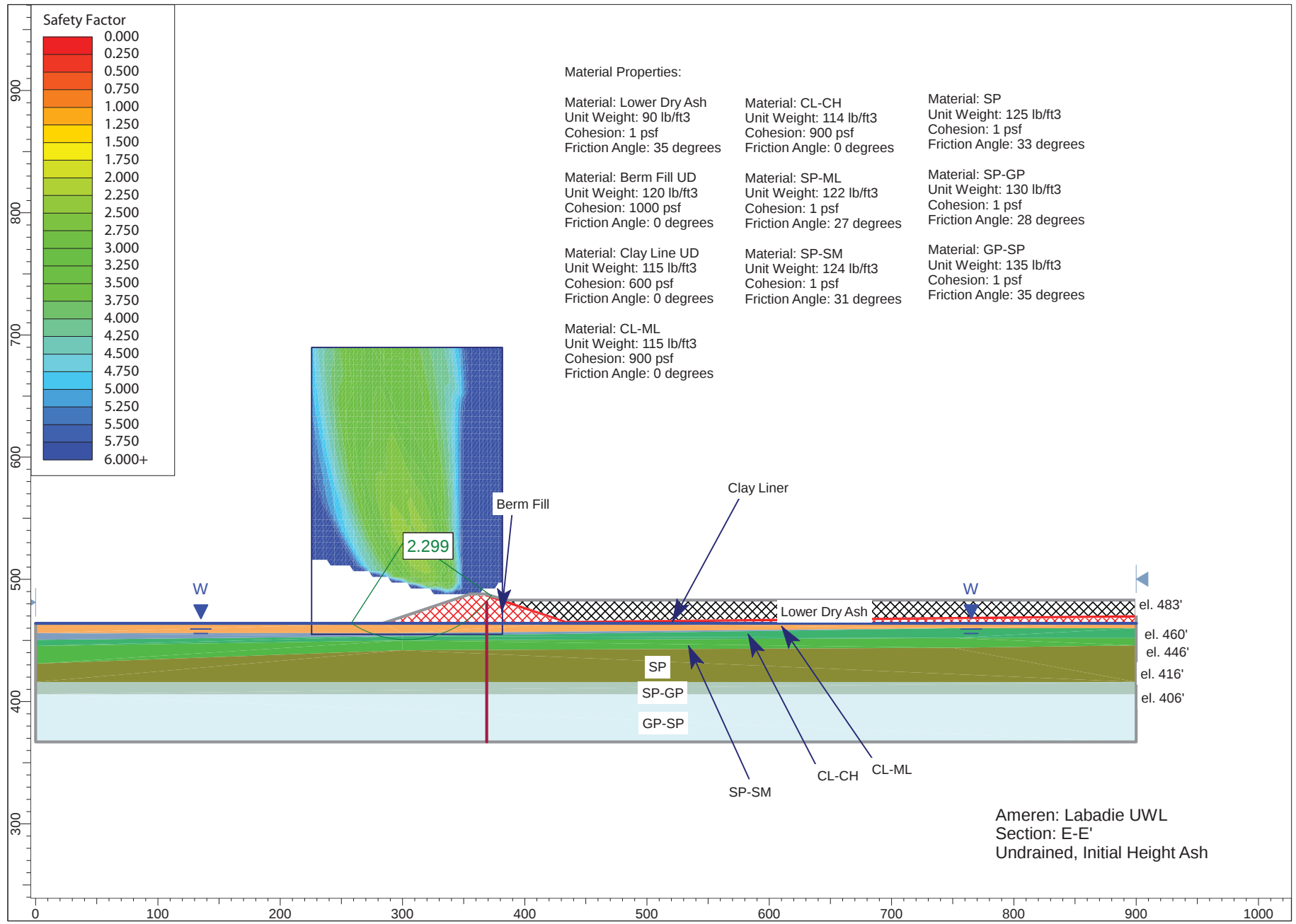
-0.000	469.008
600.000	468.500
1351.524	468.500

Focus/Block Search Line

671.059	369.008
671.059	487.731

Search Grid

574.112	468.500
854.236	468.500
854.236	951.794
574.112	951.794



Slide Analysis Information

Document Name

File Name: Section EE Partial Undrained 7292013.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³
Cohesion: 1 psf
Friction Angle: 28 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb

Unit Weight: 135 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: spencer

FS: 2.299110

Center: 303.681, 534.874

Radius: 84.338

Left Slip Surface Endpoint: 257.966, 464.000

Right Slip Surface Endpoint: 372.770, 486.504

Resisting Moment=9.51331e+006 lb-ft

Driving Moment=4.13782e+006 lb-ft

Resisting Horizontal Force=99308.2 lb

Driving Horizontal Force=43194.2 lb

Method: gle/morgenstern-price

FS: 2.311290

Center: 303.681, 534.874

Radius: 84.338

Left Slip Surface Endpoint: 257.966, 464.000

Right Slip Surface Endpoint: 372.770, 486.504

Resisting Moment=9.5637e+006 lb-ft

Driving Moment=4.13782e+006 lb-ft

Resisting Horizontal Force=99899.2 lb

Driving Horizontal Force=43222.3 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 18509

Number of Invalid Surfaces: 10102

Error Codes:

Error Code -103 reported for 6978 surfaces

Error Code -107 reported for 606 surfaces

Error Code -108 reported for 111 surfaces

Error Code -111 reported for 2 surfaces

Error Code -112 reported for 2405 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 18503

Number of Invalid Surfaces: 10108

Error Codes:

Error Code -103 reported for 6978 surfaces

Error Code -107 reported for 606 surfaces

Error Code -108 reported for 117 surfaces

Error Code -111 reported for 2 surfaces

Error Code -112 reported for 2405 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

225.631	455.071
381.730	455.071
381.730	689.787
225.631	689.787

Material Boundary

384.053	482.998
433.806	466.000
900.000	470.650

Material Boundary

367.800	486.000
367.800	488.000

Material Boundary

367.800	486.000
433.806	464.000
433.806	466.000

Material Boundary

433.806	464.000
---------	---------

900.000	468.650
---------	---------

Material Boundary

283.800	464.000
433.806	464.000
900.000	464.000

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

External Boundary

0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650

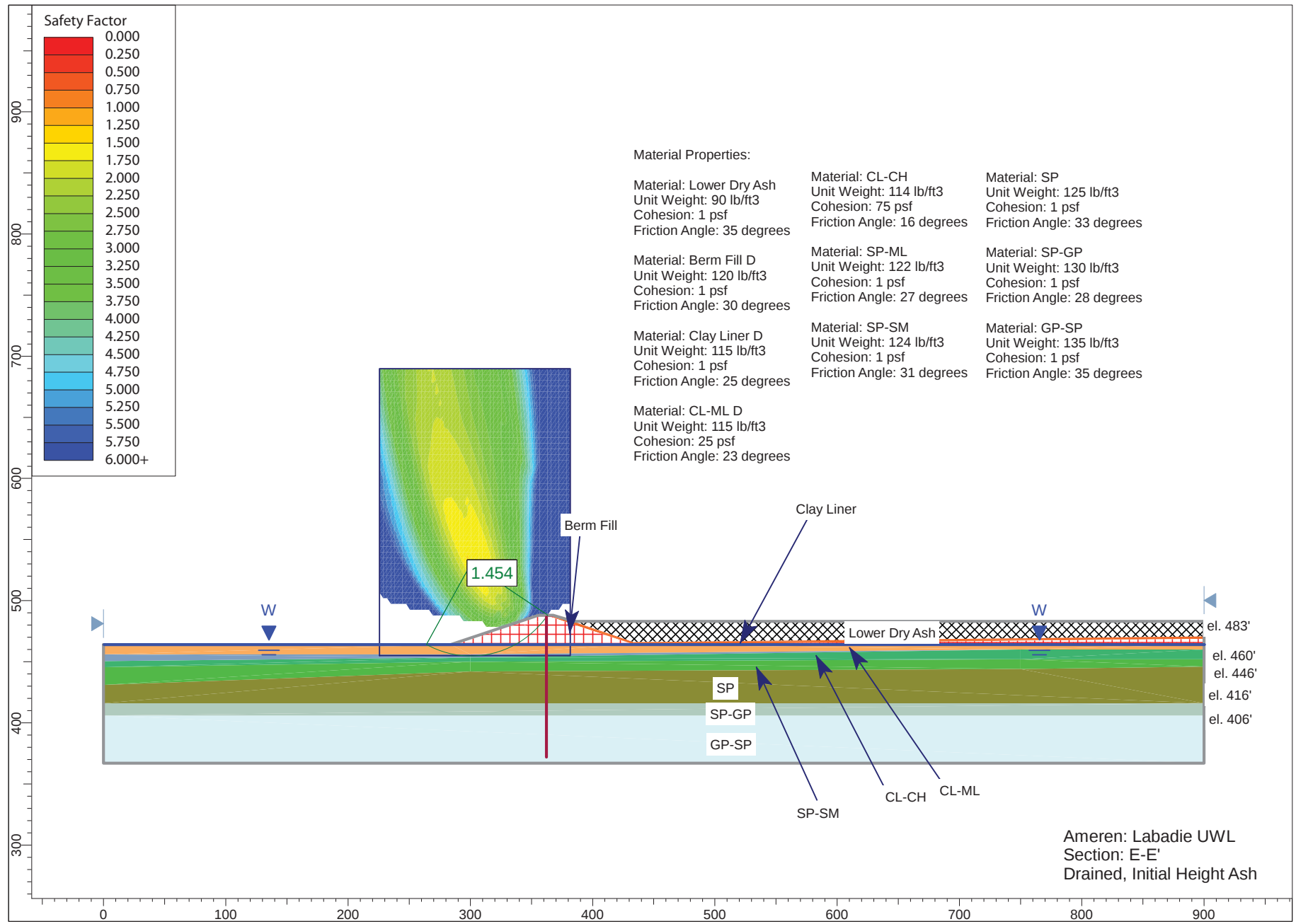
900.000	483.000
384.053	482.998
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

0.104	464.000
433.910	464.000
900.104	464.000

Focus/Block Search Line

368.937	367.000
368.937	481.446



Slide Analysis Information

Document Name

File Name: Section EE Partial Drained 7292013.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 25 psf
Friction Angle: 23 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 75 psf
Friction Angle: 16 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³
Cohesion: 1 psf
Friction Angle: 28 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb

Unit Weight: 135 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: spencer

FS: 1.453920

Center: 300.559, 530.180

Radius: 75.618

Left Slip Surface Endpoint: 263.976, 464.000

Right Slip Surface Endpoint: 363.319, 488.000

Resisting Moment=4.03455e+006 lb-ft

Driving Moment=2.77495e+006 lb-ft

Resisting Horizontal Force=47488.2 lb

Driving Horizontal Force=32662.1 lb

Method: gle/morgenstern-price

FS: 1.445600

Center: 300.559, 530.180

Radius: 75.618

Left Slip Surface Endpoint: 263.976, 464.000

Right Slip Surface Endpoint: 363.319, 488.000

Resisting Moment=4.01147e+006 lb-ft

Driving Moment=2.77495e+006 lb-ft

Resisting Horizontal Force=47287.9 lb

Driving Horizontal Force=32711.5 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 20636

Number of Invalid Surfaces: 7975

Error Codes:

Error Code -103 reported for 4828 surfaces

Error Code -107 reported for 624 surfaces

Error Code -108 reported for 97 surfaces

Error Code -111 reported for 8 surfaces

Error Code -112 reported for 2418 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 20645

Number of Invalid Surfaces: 7966

Error Codes:

Error Code -103 reported for 4828 surfaces

Error Code -107 reported for 624 surfaces

Error Code -108 reported for 96 surfaces

Error Code -111 reported for 5 surfaces

Error Code -112 reported for 2413 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

225.631	455.071
381.730	455.071
381.730	689.787
225.631	689.787

Material Boundary

384.047	483.000
433.806	466.000
900.000	470.650

Material Boundary

367.800	486.000
367.800	488.000

Material Boundary

367.800	486.000
433.806	464.000
433.806	466.000

Material Boundary

433.806	464.000
---------	---------

900.000	468.650
---------	---------

Material Boundary

283.800	464.000
433.806	464.000
900.000	464.000

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

External Boundary

0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650

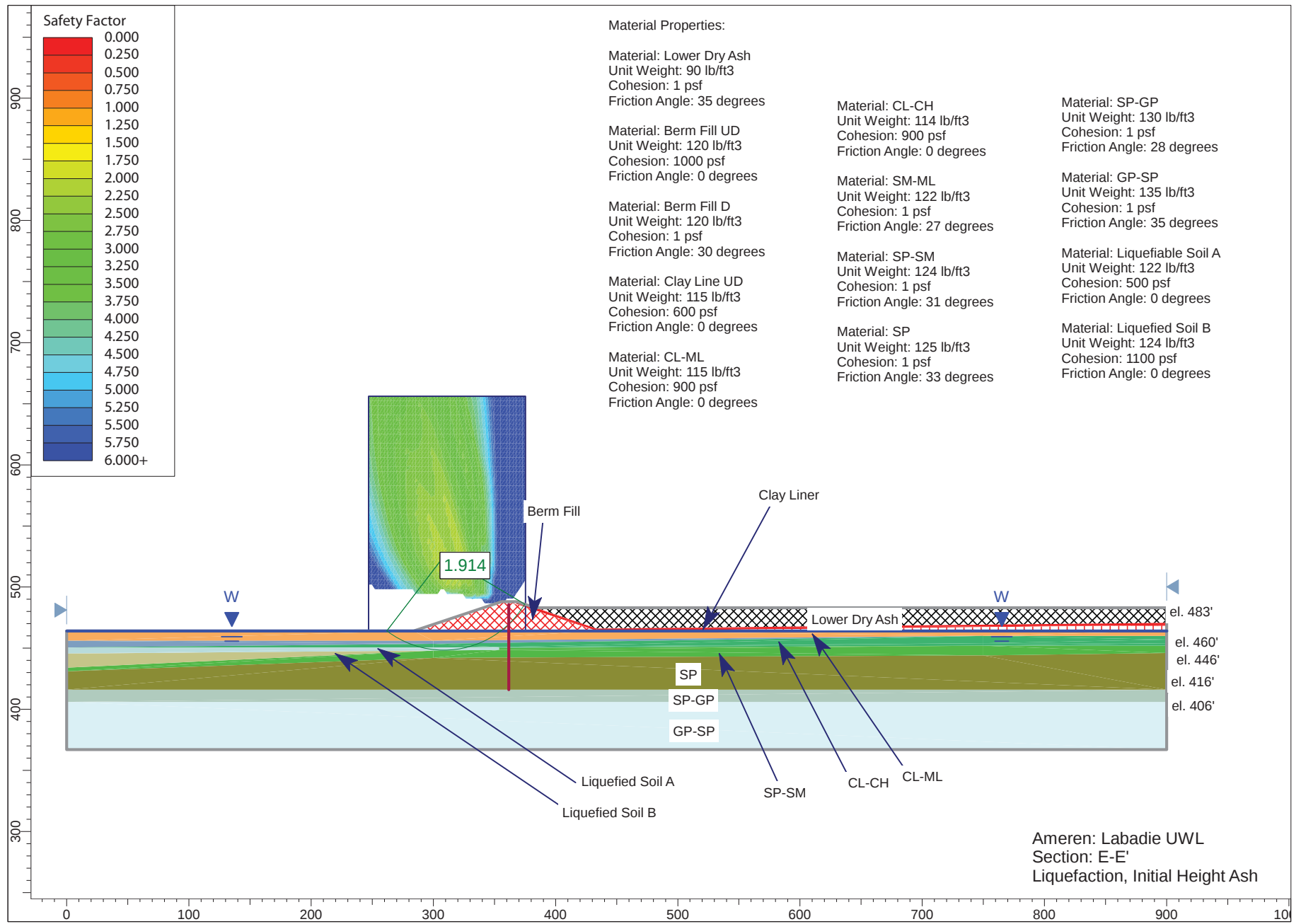
900.000	483.000
384.047	483.000
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

0.425	464.000
434.231	464.000
900.425	464.000

Focus/Block Search Line

362.308	372.087
362.308	486.533



Slide Analysis Information

Document Name

File Name: Section EE Partial Liquefaction 7292013.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb

Unit Weight: 130 lb/ft³

Cohesion: 1 psf

Friction Angle: 28 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb

Unit Weight: 135 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefiable Soil A

Strength Type: Mohr-Coulomb

Unit Weight: 122 lb/ft³

Cohesion: 500 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil B

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 1100 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: spencer

FS: 1.914130

Center: 308.703, 525.238

Radius: 77.096

Left Slip Surface Endpoint: 261.867, 464.000

Right Slip Surface Endpoint: 374.972, 485.842

Resisting Moment=7.87829e+006 lb-ft

Driving Moment=4.11586e+006 lb-ft

Resisting Horizontal Force=86716.9 lb

Driving Horizontal Force=45303.5 lb

Method: gle/morgenstern-price

FS: 1.914420

Center: 308.703, 525.238

Radius: 77.096

Left Slip Surface Endpoint: 261.867, 464.000

Right Slip Surface Endpoint: 374.972, 485.842

Resisting Moment=7.87947e+006 lb-ft

Driving Moment=4.11586e+006 lb-ft

Resisting Horizontal Force=86713.3 lb

Driving Horizontal Force=45294.9 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 23000

Number of Invalid Surfaces: 5611

Error Codes:

Error Code -103 reported for 580 surfaces

Error Code -107 reported for 688 surfaces

Error Code -108 reported for 241 surfaces

Error Code -111 reported for 65 surfaces

Error Code -112 reported for 4037 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 22997

Number of Invalid Surfaces: 5614

Error Codes:

Error Code -103 reported for 580 surfaces

Error Code -107 reported for 688 surfaces

Error Code -108 reported for 245 surfaces

Error Code -111 reported for 65 surfaces

Error Code -112 reported for 4036 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

247.102	463.651
375.437	463.651
375.437	656.111
247.102	656.111

Material Boundary

384.049	483.000
433.806	466.000
900.000	470.650

Material Boundary

367.800	486.000
367.800	488.000

Material Boundary

367.800	486.000
433.806	464.000
433.806	466.000

Material Boundary

433.806	464.000
900.000	468.650

Material Boundary

283.800	464.000
433.806	464.000
900.000	464.000

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
353.785	450.239
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

Material Boundary

0.000	450.500
300.073	450.500
353.785	450.918
750.000	454.000
900.000	457.000

Material Boundary

750.000	452.000
900.000	454.000

Material Boundary

0.000	445.500
300.000	448.000
353.785	448.478
750.000	452.000

Material Boundary

0.000	434.000
300.000	448.000

Material Boundary

353.785	448.478
353.785	450.239
353.785	450.918

External Boundary

0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	434.000
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	454.000
900.000	457.000
900.000	460.000
900.000	464.000
900.000	468.650

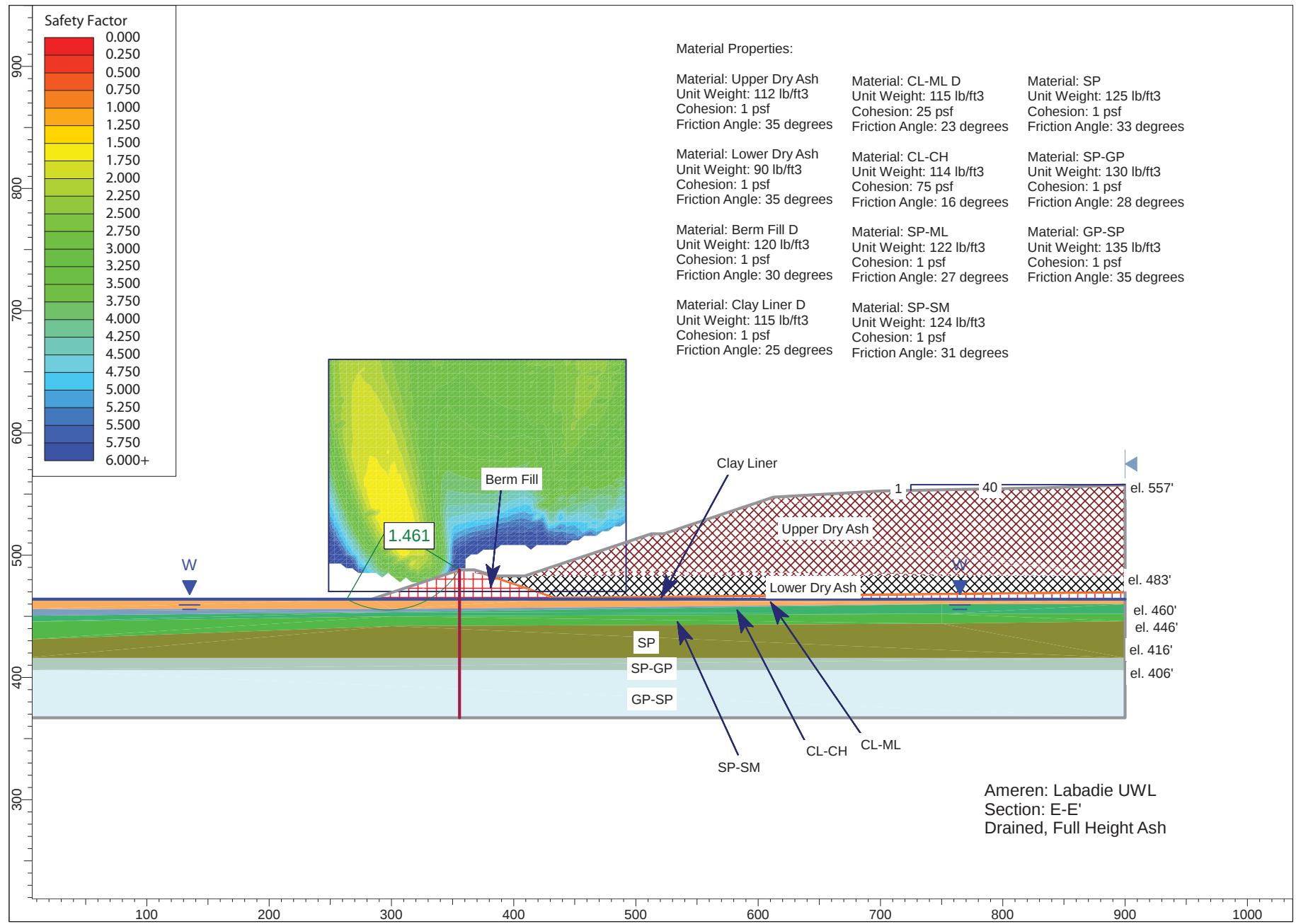
900.000	470.650
900.000	483.000
384.049	483.000
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

0.189	464.000
433.995	464.000
900.189	464.000

Focus/Block Search Line

361.650	416.000
361.650	485.800



Slide Analysis Information

Document Name

File Name: Section EE Full Drained 7292013.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 25 psf
Friction Angle: 23 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 75 psf
Friction Angle: 16 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb

Unit Weight: 130 lb/ft³

Cohesion: 1 psf

Friction Angle: 28 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb

Unit Weight: 135 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: spencer

FS: 1.461290

Center: 297.304, 523.511

Radius: 68.431

Left Slip Surface Endpoint: 263.522, 464.000

Right Slip Surface Endpoint: 355.800, 488.000

Resisting Moment=3.01894e+006 lb-ft

Driving Moment=2.06594e+006 lb-ft

Resisting Horizontal Force=39146.3 lb

Driving Horizontal Force=26788.8 lb

Method: gle/morgenstern-price

FS: 1.453250

Center: 297.304, 523.511

Radius: 68.431

Left Slip Surface Endpoint: 263.522, 464.000

Right Slip Surface Endpoint: 355.800, 488.000

Resisting Moment=3.00233e+006 lb-ft

Driving Moment=2.06594e+006 lb-ft

Resisting Horizontal Force=38979.9 lb

Driving Horizontal Force=26822.5 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 19364

Number of Invalid Surfaces: 9247

Error Codes:

Error Code -101 reported for 243 surfaces

Error Code -103 reported for 5972 surfaces

Error Code -107 reported for 289 surfaces

Error Code -108 reported for 66 surfaces

Error Code -111 reported for 65 surfaces

Error Code -112 reported for 2612 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 19428
Number of Invalid Surfaces: 9183
Error Codes:
Error Code -101 reported for 243 surfaces
Error Code -103 reported for 5972 surfaces
Error Code -107 reported for 289 surfaces
Error Code -108 reported for 35 surfaces
Error Code -111 reported for 56 surfaces
Error Code -112 reported for 2588 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero)
surface / slope intersections.

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

-107 = Total driving moment or
total driving force is negative. This will occur
if the wrong failure direction is specified,
or if high external or anchor loads are applied
against the failure direction.

-108 = Total driving moment
or total driving force < 0.1. This is to
limit the calculation of extremely high safety
factors if the driving force is very small
(0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$
< 0.2 for the final iteration of the safety factor calculation. This screens out
some slip surfaces which may not be valid in the context of the analysis, in
particular, deep seated slip surfaces with many high negative base angle
slices in the passive zone.

List of All Coordinates

Search Grid

248.639	470.329
491.964	470.329
491.964	660.264
248.639	660.264

Material Boundary

384.014	483.011
433.806	466.000

900.000 470.650

Material Boundary

367.800 488.000
376.524 483.508

Material Boundary

376.524 483.508
433.806 464.000
433.806 466.000

Material Boundary

409.030 483.010
900.000 483.000

Material Boundary

433.806 464.000
900.000 468.650

Material Boundary

283.800 464.000
433.806 464.000
900.000 464.000

Material Boundary

0.000 456.000
300.000 456.000
750.000 460.000
900.000 460.000

Material Boundary

0.000 450.500
300.000 453.500
750.000 460.000

Material Boundary

0.000 445.500
300.000 450.000
750.000 452.000
900.000 452.000

Material Boundary

0.000 431.000
300.000 442.000
750.000 444.000
900.000 446.000

Material Boundary

0.000 416.000
900.000 416.000

Material Boundary

0.000 406.000
900.000 406.000

External Boundary

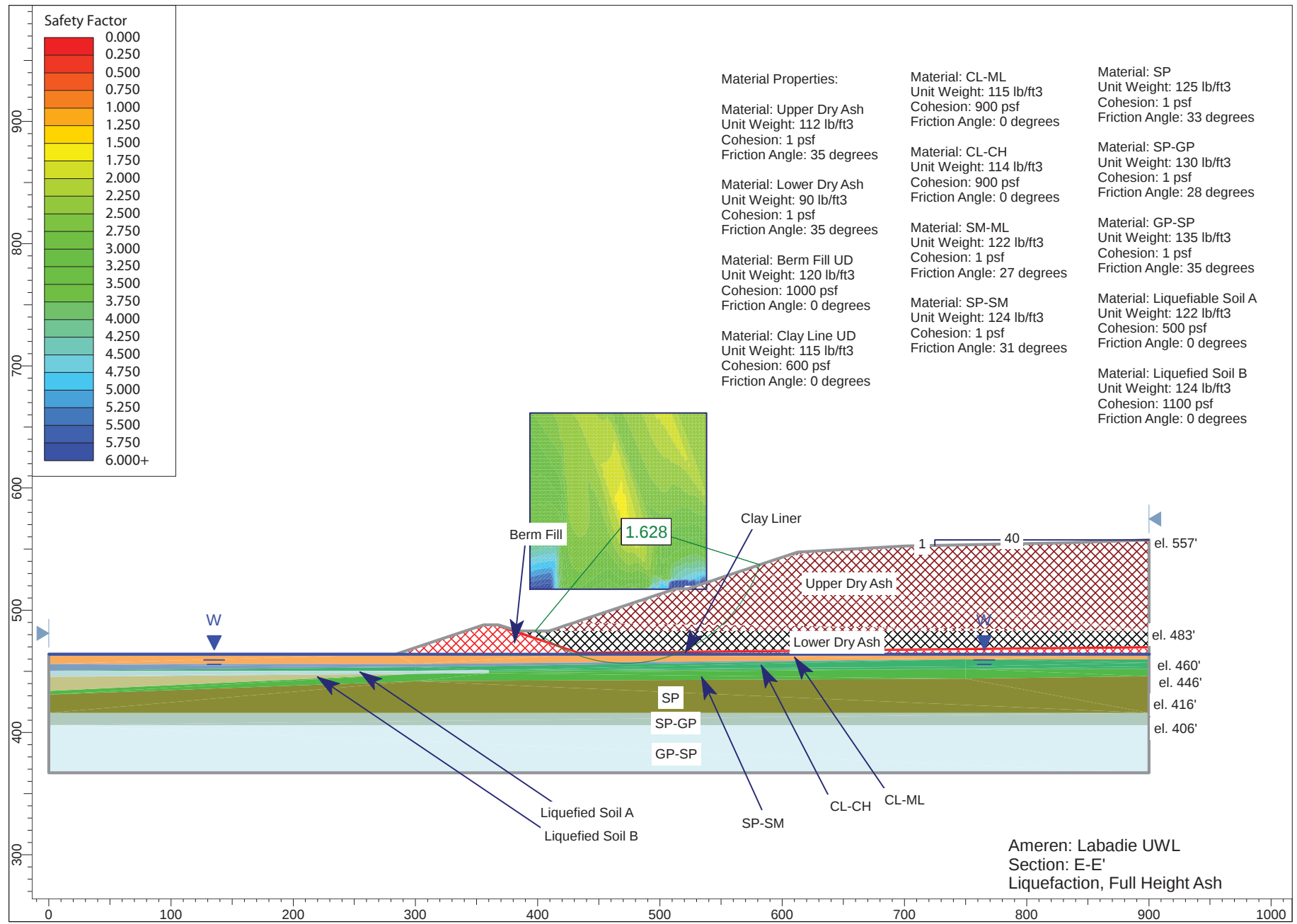
0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650
900.000	483.000
900.000	557.508
835.274	555.209
700.182	552.508
635.839	548.857
612.524	547.508
600.658	543.553
597.524	542.508
584.510	538.170
582.524	537.508
568.376	532.792
567.524	532.508
566.146	532.049
552.524	527.508
543.872	524.624
537.524	522.508
527.732	519.244
522.524	517.508
515.418	517.508
512.524	517.508
500.863	513.621
497.524	512.508
484.760	508.253
482.524	507.508
468.670	502.890
467.524	502.508
465.715	501.905
452.524	497.508
444.442	494.814
437.524	492.508
429.376	489.792
422.524	487.508
414.376	484.792
409.030	483.010
384.014	483.011
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

-0.000	464.000
433.805	464.000
900.000	464.000

Focus/Block Search Line

355.800	367.000
355.800	488.000



Slide Analysis Information

Document Name

File Name: Section EE Full Liquefaction 7292013.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb

Unit Weight: 130 lb/ft³

Cohesion: 1 psf

Friction Angle: 28 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb

Unit Weight: 135 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefiable Soil A

Strength Type: Mohr-Coulomb

Unit Weight: 122 lb/ft³

Cohesion: 500 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil B

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 1100 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: spencer

FS: 1.627860

Center: 471.644, 571.976

Radius: 115.560

Left Slip Surface Endpoint: 397.890, 483.012

Right Slip Surface Endpoint: 581.876, 537.292

Resisting Moment=3.03045e+007 lb-ft

Driving Moment=1.86161e+007 lb-ft

Resisting Horizontal Force=217947 lb

Driving Horizontal Force=133886 lb

Method: gle/morgenstern-price

FS: 1.601280

Center: 471.644, 571.976

Radius: 115.560

Left Slip Surface Endpoint: 397.890, 483.012

Right Slip Surface Endpoint: 581.876, 537.292

Resisting Moment=2.98097e+007 lb-ft

Driving Moment=1.86161e+007 lb-ft

Resisting Horizontal Force=214284 lb

Driving Horizontal Force=133820 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 11768

Number of Invalid Surfaces: 16843

Error Codes:

Error Code -103 reported for 16622 surfaces

Error Code -107 reported for 2 surfaces

Error Code -108 reported for 24 surfaces

Error Code -111 reported for 28 surfaces

Error Code -112 reported for 167 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 11771

Number of Invalid Surfaces: 16840

Error Codes:

Error Code -103 reported for 16622 surfaces

Error Code -107 reported for 2 surfaces

Error Code -108 reported for 23 surfaces

Error Code -111 reported for 26 surfaces

Error Code -112 reported for 167 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

393.664	517.152
538.071	517.152
538.071	661.427
393.664	661.427

Material Boundary

384.047	483.000
433.806	466.000
900.000	470.650

Material Boundary

367.800	486.000
367.800	488.000

Material Boundary

367.800	486.000
433.806	464.000
433.806	466.000

Material Boundary

409.064	483.021
900.000	483.000

Material Boundary

433.806	464.000
900.000	468.650

Material Boundary

283.800	464.000
433.806	464.000
900.000	464.000

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
360.037	450.267
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

Material Boundary

0.000	450.500
300.073	450.500
360.037	450.966
750.000	454.000
900.000	457.000

Material Boundary

750.000	452.000
900.000	454.000

Material Boundary

0.000	445.500
300.000	448.000
360.037	448.534
750.000	452.000

Material Boundary

0.000	434.000
300.000	448.000

Material Boundary

360.037	448.534
360.037	450.267
360.037	450.966

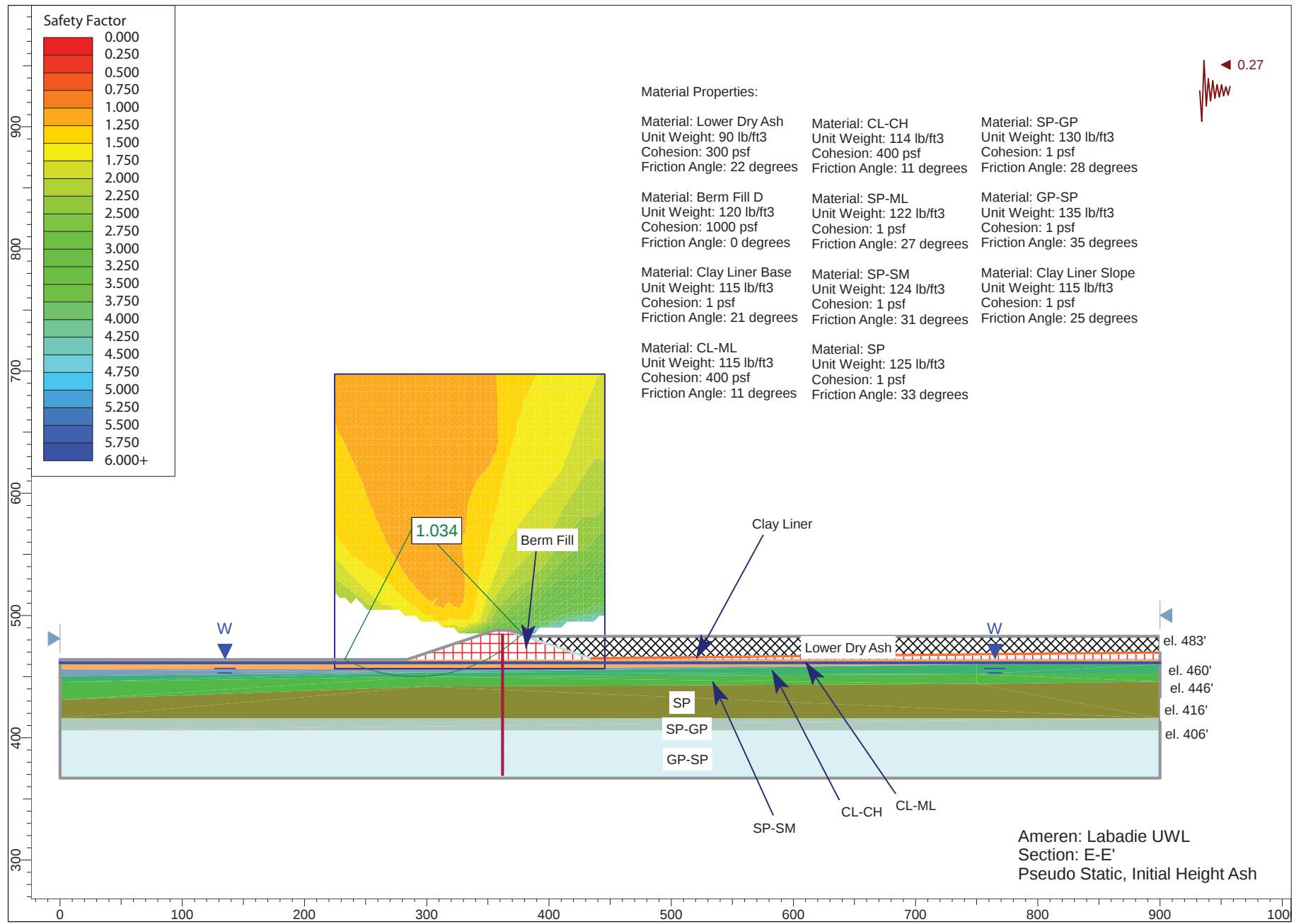
External Boundary

0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	434.000
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	454.000

900.000	457.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650
900.000	483.000
900.000	557.508
835.274	555.209
700.182	552.508
635.839	548.857
612.524	547.508
600.658	543.553
597.524	542.508
584.510	538.170
582.524	537.508
568.376	532.792
567.524	532.508
566.146	532.049
552.524	527.508
543.872	524.624
537.524	522.508
527.732	519.244
522.524	517.508
515.418	517.508
512.524	517.508
500.863	513.621
497.524	512.508
484.760	508.253
482.524	507.508
468.670	502.890
467.524	502.508
465.715	501.905
452.524	497.508
444.442	494.814
437.524	492.508
429.376	489.792
422.524	487.508
414.376	484.792
409.064	483.021
384.047	483.000
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

0.444	464.000
434.250	464.000
900.444	464.000



Slide Analysis Information

Document Name

File Name: Section EE Partial Pseudo Static 7292013.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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): 0.27

Material Properties

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D

Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Base
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 400 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 400 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³

Cohesion: 1 psf
Friction Angle: 28 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: GP-SP
Strength Type: Mohr-Coulomb
Unit Weight: 135 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Slope
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: spencer
FS: 1.033930
Center: 290.995, 577.017
Radius: 127.100
Left Slip Surface Endpoint: 232.844, 464.000
Right Slip Surface Endpoint: 378.455, 484.794
Resisting Moment=1.47209e+007 lb-ft
Driving Moment=1.42378e+007 lb-ft
Resisting Horizontal Force=106694 lb
Driving Horizontal Force=103193 lb

Method: gle/morgenstern-price
FS: 1.031440
Center: 313.086, 538.437
Radius: 84.504
Left Slip Surface Endpoint: 273.085, 464.000
Right Slip Surface Endpoint: 378.395, 484.812
Resisting Moment=7.71979e+006 lb-ft
Driving Moment=7.48444e+006 lb-ft
Resisting Horizontal Force=82375 lb
Driving Horizontal Force=79863.7 lb

Valid / Invalid Surfaces

Method: spencer
Number of Valid Surfaces: 20608
Number of Invalid Surfaces: 8003
Error Codes:
Error Code -103 reported for 4592 surfaces
Error Code -108 reported for 82 surfaces
Error Code -111 reported for 186 surfaces
Error Code -112 reported for 3143 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 20649
Number of Invalid Surfaces: 7962
Error Codes:
Error Code -103 reported for 4592 surfaces
Error Code -108 reported for 80 surfaces
Error Code -111 reported for 147 surfaces
Error Code -112 reported for 3143 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-108 = Total driving moment or total driving force < 0.1 . This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

224.722	456.455
445.632	456.455
445.632	697.579
224.722	697.579

Material Boundary

383.980	483.023
433.806	466.000
900.000	470.650

Material Boundary

367.800	486.000
367.800	488.000

Material Boundary

367.800	486.000
433.806	464.000
433.806	466.000

Material Boundary

433.806	464.000
900.000	468.650

Material Boundary

283.800	464.000
433.806	464.000
900.000	464.000

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

External Boundary

0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650

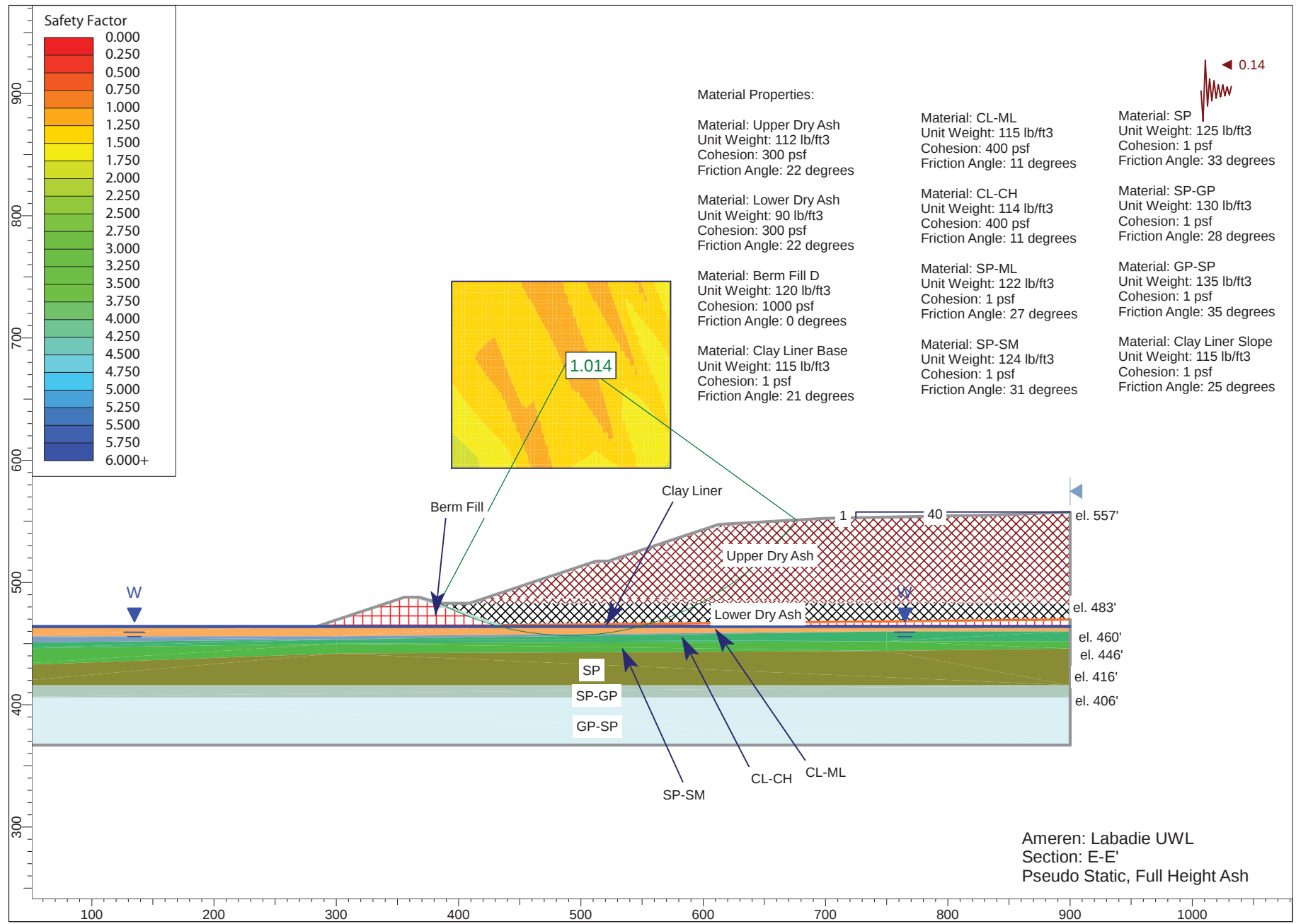
900.000	483.000
383.980	483.023
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

0.000	461.305
433.806	461.305
900.000	461.305

Focus/Block Search Line

362.051	369.772
362.051	484.218



Slide Analysis Information

Document Name

File Name: Section EE Full Pseudo Static 7292013.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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): 0.14

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash

Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft3
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D

Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Base

Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft3
Cohesion: 1 psf
Friction Angle: 21 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML

Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft3
Cohesion: 400 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH

Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft3
Cohesion: 400 psf
Friction Angle: 11 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-ML

Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft3
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM

Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft3
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP

Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft3

Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³
Cohesion: 1 psf
Friction Angle: 28 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: GP-SP
Strength Type: Mohr-Coulomb
Unit Weight: 135 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Slope
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: spencer
FS: 1.014230
Center: 491.009, 685.181
Radius: 228.702
Left Slip Surface Endpoint: 384.103, 483.004
Right Slip Surface Endpoint: 676.323, 551.154
Resisting Moment=1.06578e+008 lb-ft
Driving Moment=1.05083e+008 lb-ft
Resisting Horizontal Force=422533 lb
Driving Horizontal Force=416604 lb

Method: gle/morgenstern-price
FS: 1.007860
Center: 491.009, 685.181
Radius: 228.702
Left Slip Surface Endpoint: 384.103, 483.004
Right Slip Surface Endpoint: 676.323, 551.154
Resisting Moment=1.05909e+008 lb-ft
Driving Moment=1.05083e+008 lb-ft
Resisting Horizontal Force=420603 lb
Driving Horizontal Force=417321 lb

Valid / Invalid Surfaces

Method: spencer
Number of Valid Surfaces: 16193

Number of Invalid Surfaces: 12418
Error Codes:
Error Code -103 reported for 12394 surfaces
Error Code -109 reported for 1 surface
Error Code -111 reported for 23 surfaces

Method: gle/morgenstern-price
Number of Valid Surfaces: 16216
Number of Invalid Surfaces: 12395
Error Codes:
Error Code -103 reported for 12394 surfaces
Error Code -109 reported for 1 surface

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-109 = Soiltype for slice base not located. This error should occur very rarely, if at all. It may occur if a very low number of slices is combined with certain soil geometries, such that the midpoint of a slice base is actually outside the soil region, even though the slip surface is wholly within the soil region.

-111 = safety factor equation did not converge

List of All Coordinates

Search Grid

394.284	593.514
573.404	593.514
573.404	746.293
394.284	746.293

Material Boundary

384.035	483.004
433.806	466.000
900.000	470.650

Material Boundary

367.800	486.000
367.800	488.000

Material Boundary

367.800	486.000
433.806	464.000
433.806	466.000

Material Boundary

409.010	483.003
900.000	483.000

Material Boundary

433.806	464.000
900.000	468.650

Material Boundary

283.800	464.000
433.806	464.000
900.000	464.000

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

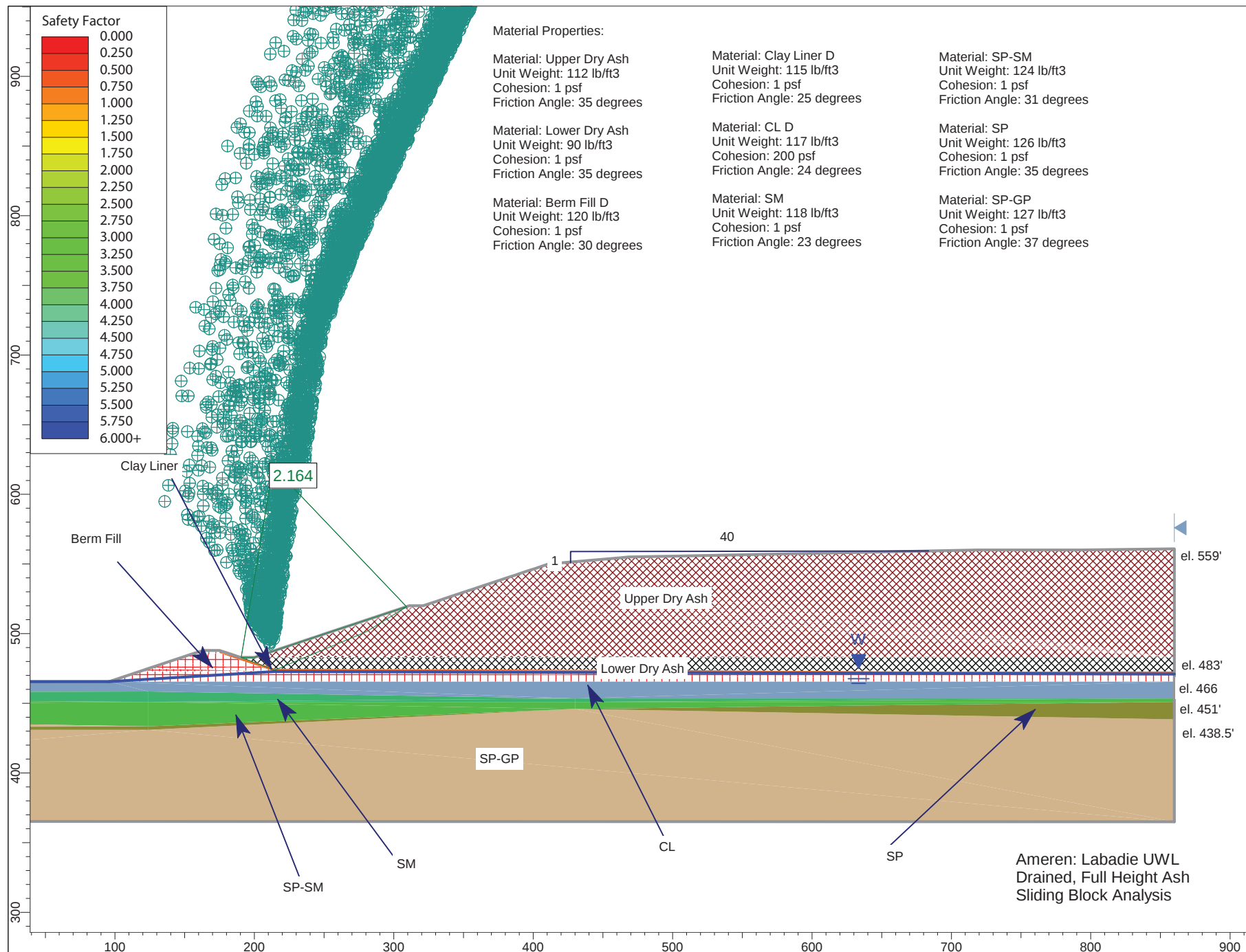
External Boundary

0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000

900.000	452.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650
900.000	483.000
900.000	557.508
835.274	555.209
700.182	552.508
635.839	548.857
612.524	547.508
600.658	543.553
597.524	542.508
584.510	538.170
582.524	537.508
568.376	532.792
567.524	532.508
566.146	532.049
552.524	527.508
543.872	524.624
537.524	522.508
527.732	519.244
522.524	517.508
515.418	517.508
512.524	517.508
500.863	513.621
497.524	512.508
484.760	508.253
482.524	507.508
468.670	502.890
467.524	502.508
465.715	501.905
452.524	497.508
444.442	494.814
437.524	492.508
429.376	489.792
422.524	487.508
414.376	484.792
409.010	483.003
384.035	483.004
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

-0.089	464.000
433.717	464.000
899.911	464.000



Slide Analysis Information

Document Name

File Name: Section BB Full Drained Sliding Block.sli

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
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): 95
Left Projection Angle (End Angle): 265
Right Projection Angle (Start Angle): -85
Right Projection Angle (End Angle): 85
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb

Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL D
Strength Type: Mohr-Coulomb
Unit Weight: 117 lb/ft³
Cohesion: 200 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM
Strength Type: Mohr-Coulomb
Unit Weight: 118 lb/ft³
Cohesion: 1 psf
Friction Angle: 23 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³

Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 2.164490

Axis Location: 213.470, 619.831

Left Slip Surface Endpoint: 190.547, 483.000

Right Slip Surface Endpoint: 309.181, 519.394

Resisting Moment=9.52735e+006 lb-ft

Driving Moment=4.40166e+006 lb-ft

Method: spencer

FS: 2.254100

Axis Location: 239.420, 780.724

Left Slip Surface Endpoint: 173.044, 487.991

Right Slip Surface Endpoint: 433.781, 551.983

Resisting Moment=5.67719e+007 lb-ft

Driving Moment=2.51861e+007 lb-ft

Resisting Horizontal Force=186672 lb

Driving Horizontal Force=82814.3 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 3852

Number of Invalid Surfaces: 1148

Error Codes:

Error Code -105 reported for 154 surfaces

Error Code -107 reported for 1 surface

Error Code -108 reported for 81 surfaces

Error Code -111 reported for 22 surfaces

Error Code -112 reported for 890 surfaces

Method: spencer

Number of Valid Surfaces: 3424

Number of Invalid Surfaces: 1576

Error Codes:

Error Code -105 reported for 154 surfaces

Error Code -107 reported for 1 surface

Error Code -108 reported for 289 surfaces

Error Code -111 reported for 214 surfaces

Error Code -112 reported for 918 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope
intersections with no valid slip surface.

-107 = Total driving moment or
total driving force is negative. This will occur

if the wrong failure direction is specified,
or if high external or anchor loads are applied
against the failure direction.

-108 = Total driving moment
or total driving force < 0.1. This is to
limit the calculation of extremely high safety
factors if the driving force is very small
(0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$
< 0.2 for the final iteration of the safety factor calculation. This screens out
some slip surfaces which may not be valid in the context of the analysis, in
particular, deep seated slip surfaces with many high negative base angle
slices in the passive zone.

List of All Coordinates

Material Boundary

-650.000	458.500
124.000	458.500
430.000	453.500
860.010	453.500

Material Boundary

-650.000	456.000
124.000	451.000
430.000	451.000
860.010	453.500

Material Boundary

-650.000	446.000
124.000	433.500
430.000	446.000
860.009	450.998

Material Boundary

-650.000	433.500
124.000	433.500

Material Boundary

-650.000	431.000
124.000	431.000
430.000	446.000
860.008	438.502

Material Boundary

190.000	483.000
214.462	474.846
491.000	474.000
671.000	473.000
860.012	473.000

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
214.462	472.846
214.462	474.846

Material Boundary

214.462	472.846
860.011	471.000

Material Boundary

95.732	465.577
860.011	465.591

Material Boundary

200.000	483.000
860.013	482.998

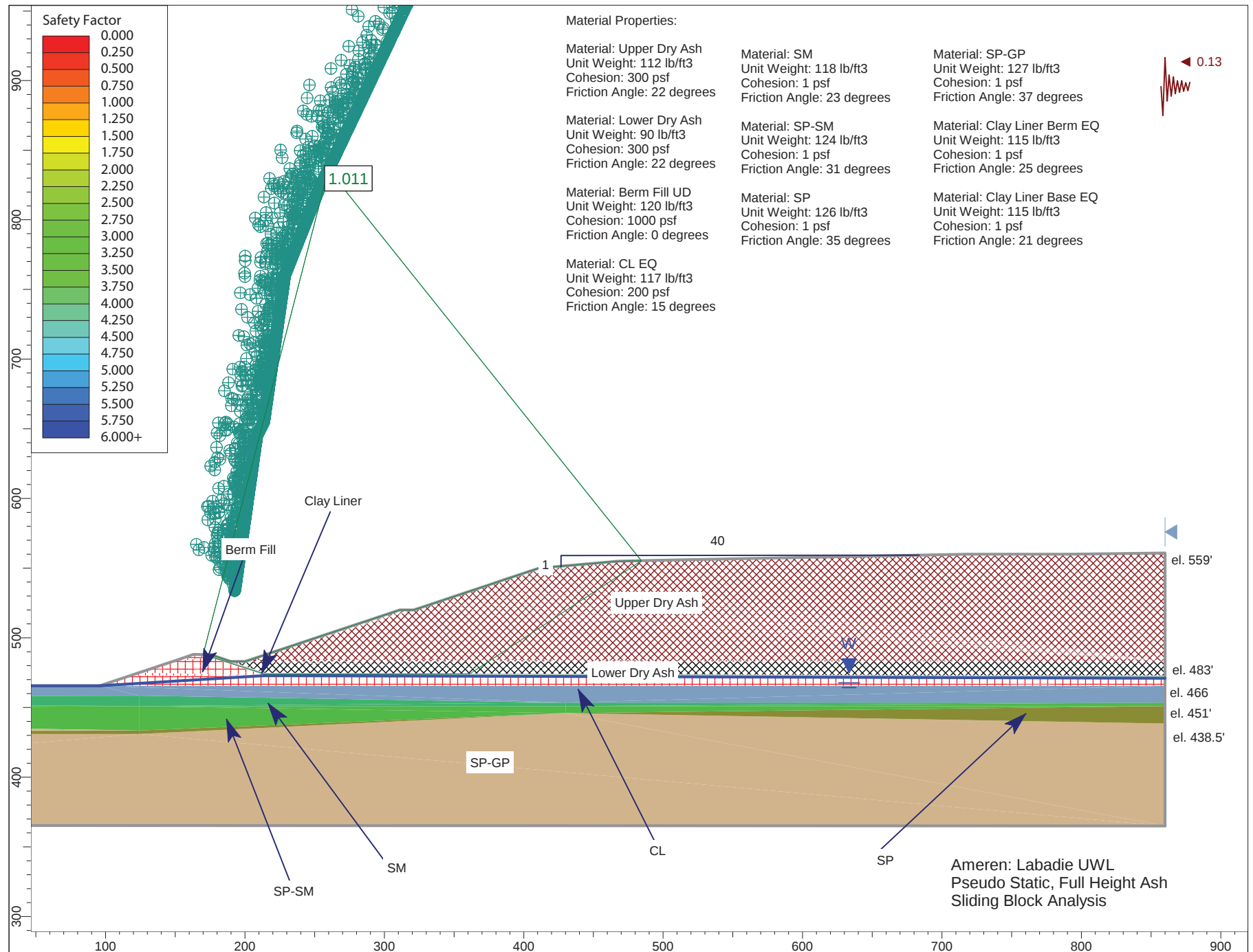
External Boundary

-650.000	365.500
860.000	365.000
860.008	438.502
860.009	450.998
860.010	453.500
860.010	453.500
860.011	465.591
860.011	471.000
860.012	473.000
860.013	482.998
860.021	560.896
792.394	560.000
718.434	560.000
500.172	555.635
468.434	555.000
461.429	554.390
411.000	550.000
401.743	546.914
396.000	545.000
386.646	541.882
381.000	540.000
371.552	536.851
366.000	535.000
356.462	531.821
351.000	530.000
341.374	526.791
336.000	525.000
329.925	522.975
321.000	520.000
315.050	520.000
311.000	520.000
302.030	517.010
296.000	515.000
286.965	511.988

281.000	510.000
271.903	506.968
266.000	505.000
256.842	501.947
251.000	500.000
245.235	498.078
236.000	495.000
230.209	493.070
221.000	490.000
215.184	488.061
206.000	485.000
203.665	484.222
200.000	483.000
196.100	483.000
190.000	483.000
187.654	483.782
184.000	485.000
180.474	486.175
175.000	488.000
170.055	487.977
169.000	487.972
166.542	487.983
163.000	488.000
159.335	486.778
154.000	485.000
147.892	482.964
139.000	480.000
132.892	477.964
124.000	475.000
117.892	472.964
95.732	465.577
-650.000	465.500
-650.000	458.500
-650.000	456.000
-650.000	446.000
-650.000	433.500
-650.000	431.000

Water Table

-650.000	465.500
95.732	465.577
214.462	472.846
860.011	471.000



Slide Analysis Information

Document Name

File Name: Section BB Full Pseudo Static Sliding Block.sli

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
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): 95
Left Projection Angle (End Angle): 195
Right Projection Angle (Start Angle): -85
Right Projection Angle (End Angle): 85
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.13

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Lower Dry Ash

Strength Type: Mohr-Coulomb

Unit Weight: 90 lb/ft³

Cohesion: 300 psf

Friction Angle: 22 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Berm Fill UD

Strength Type: Mohr-Coulomb

Unit Weight: 120 lb/ft³

Cohesion: 1000 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: CL EQ

Strength Type: Mohr-Coulomb

Unit Weight: 117 lb/ft³

Cohesion: 200 psf

Friction Angle: 15 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SM

Strength Type: Mohr-Coulomb

Unit Weight: 118 lb/ft³

Cohesion: 1 psf

Friction Angle: 23 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SP-SM

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 1 psf

Friction Angle: 31 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SP

Strength Type: Mohr-Coulomb

Unit Weight: 126 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb

Unit Weight: 127 lb/ft³

Cohesion: 1 psf

Friction Angle: 37 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Clay Liner Berm EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 15 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Base EQ
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 15 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 1.003900
Axis Location: 238.860, 786.102
Left Slip Surface Endpoint: 170.055, 487.977
Right Slip Surface Endpoint: 436.077, 552.183
Resisting Horizontal Force=285838 lb
Driving Horizontal Force=284728 lb

Method: spencer
FS: 1.011170
Axis Location: 259.880, 835.983
Left Slip Surface Endpoint: 170.055, 487.977
Right Slip Surface Endpoint: 484.389, 555.319
Resisting Moment=1.34538e+008 lb-ft
Driving Moment=1.33051e+008 lb-ft
Resisting Horizontal Force=342406 lb
Driving Horizontal Force=338622 lb

Valid / Invalid Surfaces

Method: janbu corrected
Number of Valid Surfaces: 3792
Number of Invalid Surfaces: 1208
Error Codes:
Error Code -105 reported for 1129 surfaces
Error Code -108 reported for 57 surfaces
Error Code -111 reported for 19 surfaces
Error Code -112 reported for 3 surfaces

Method: spencer
Number of Valid Surfaces: 3293
Number of Invalid Surfaces: 1707
Error Codes:
Error Code -105 reported for 1129 surfaces
Error Code -108 reported for 68 surfaces
Error Code -111 reported for 505 surfaces
Error Code -112 reported for 5 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Material Boundary

-650.000	458.500
124.000	458.500
430.000	453.500
860.010	453.500

Material Boundary

-650.000	456.000
124.000	451.000
430.000	451.000
860.010	453.500

Material Boundary

-650.000	446.000
124.000	433.500
430.000	446.000
860.009	450.998

Material Boundary

-650.000	433.500
124.000	433.500

Material Boundary

-650.000	431.000
124.000	431.000
430.000	446.000
860.008	438.502

Material Boundary

190.000	483.000
214.462	474.846
491.000	474.000
671.000	473.000
860.012	473.000

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
214.462	472.846
214.462	474.846

Material Boundary

214.462	472.846
860.011	471.000

Material Boundary

95.732	465.577
860.011	465.591

Material Boundary

200.000	483.000
860.013	482.998

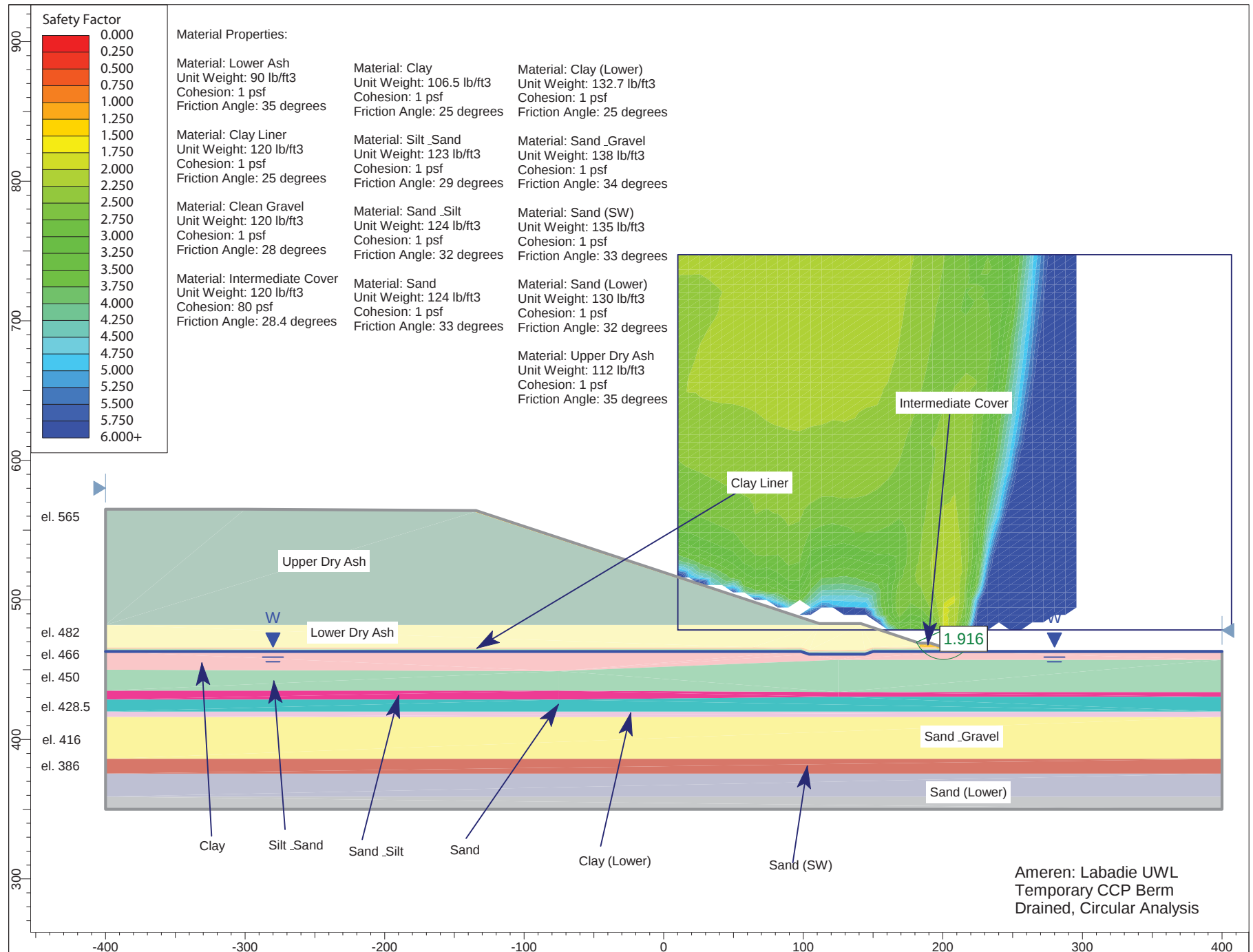
External Boundary

-650.000	365.500
860.000	365.000
860.008	438.502
860.009	450.998
860.010	453.500
860.010	453.500
860.011	465.591
860.011	471.000
860.012	473.000
860.013	482.998
860.021	560.896
792.394	560.000
718.434	560.000
500.172	555.635
468.434	555.000
461.429	554.390
411.000	550.000
401.743	546.914
396.000	545.000
386.646	541.882
381.000	540.000
371.552	536.851
366.000	535.000
356.462	531.821
351.000	530.000
341.374	526.791
336.000	525.000
329.925	522.975
321.000	520.000
315.050	520.000
311.000	520.000
302.030	517.010
296.000	515.000
286.965	511.988

281.000	510.000
271.903	506.968
266.000	505.000
256.842	501.947
251.000	500.000
245.235	498.078
236.000	495.000
230.209	493.070
221.000	490.000
215.184	488.061
206.000	485.000
203.665	484.222
200.000	483.000
196.100	483.000
190.000	483.000
187.654	483.782
184.000	485.000
180.474	486.175
175.000	488.000
170.055	487.977
169.000	487.972
166.542	487.983
163.000	488.000
159.335	486.778
154.000	485.000
147.892	482.964
139.000	480.000
132.892	477.964
124.000	475.000
117.892	472.964
95.732	465.577
-650.000	465.500
-650.000	458.500
-650.000	456.000
-650.000	446.000
-650.000	433.500
-650.000	431.000

Water Table

-650.000	465.500
95.732	465.577
214.462	472.846
860.011	471.000



Slide Analysis Information

Document Name

File Name: Ash Berm Global.sli

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

Material Properties

Material: Lower Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Clean Gravel
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 28 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Intermediate Cover
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 80 psf
Friction Angle: 28.4 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay
Strength Type: Mohr-Coulomb
Unit Weight: 106.5 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Silt & Sand
Strength Type: Mohr-Coulomb
Unit Weight: 123 lb/ft³
Cohesion: 1 psf
Friction Angle: 29 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand & Silt
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay (Lower)
Strength Type: Mohr-Coulomb
Unit Weight: 132.7 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Sand & Gravel

Strength Type: Mohr-Coulomb

Unit Weight: 138 lb/ft³

Cohesion: 1 psf

Friction Angle: 34 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Sand (SW)

Strength Type: Mohr-Coulomb

Unit Weight: 135 lb/ft³

Cohesion: 1 psf

Friction Angle: 33 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Sand (Lower)

Strength Type: Mohr-Coulomb

Unit Weight: 130 lb/ft³

Cohesion: 1 psf

Friction Angle: 32 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Limestone

Strength Type: Infinite strength

Unit Weight: 120 lb/ft³

Material: Upper Dry Ash

Strength Type: Mohr-Coulomb

Unit Weight: 112 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: janbu corrected

FS: 1.826810

Center: 200.519, 478.457

Radius: 21.327

Left Slip Surface Endpoint: 181.068, 469.711

Right Slip Surface Endpoint: 215.213, 463.000

Resisting Horizontal Force=8227.58 lb

Driving Horizontal Force=4503.8 lb

Method: spencer

FS: 1.916280

Center: 200.519, 478.457

Radius: 21.327

Left Slip Surface Endpoint: 181.068, 469.711

Right Slip Surface Endpoint: 215.213, 463.000

Resisting Moment=186332 lb-ft

Driving Moment=97236.8 lb-ft
Resisting Horizontal Force=7727.48 lb
Driving Horizontal Force=4032.55 lb

Valid / Invalid Surfaces

Method: janbu corrected

Number of Valid Surfaces: 13853

Number of Invalid Surfaces: 14758

Error Codes:

Error Code -99 reported for 574 surfaces

Error Code -103 reported for 4298 surfaces

Error Code -106 reported for 413 surfaces

Error Code -107 reported for 423 surfaces

Error Code -108 reported for 7878 surfaces

Error Code -111 reported for 102 surfaces

Error Code -112 reported for 509 surfaces

Error Code -1000 reported for 561 surfaces

Method: spencer

Number of Valid Surfaces: 13685

Number of Invalid Surfaces: 14926

Error Codes:

Error Code -99 reported for 574 surfaces

Error Code -103 reported for 4298 surfaces

Error Code -106 reported for 413 surfaces

Error Code -107 reported for 423 surfaces

Error Code -108 reported for 7914 surfaces

Error Code -111 reported for 122 surfaces

Error Code -112 reported for 621 surfaces

Error Code -1000 reported for 561 surfaces

Error Codes

The following errors were encountered during the computation:

-99 = Slip surface intersects an infinite strength material. If infinite strength regions are defined for a model, a large number of potential slip surfaces may show this error code. This is Normal.

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-106 = Average slice width is less than 0.0001 * (maximum horizontal extent of soil region). This limitation is imposed to avoid numerical errors which may result from too many slices, or too small a slip region.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

List of All Coordinates

Search Grid

10.111	478.457
406.794	478.457
406.794	747.380
10.111	747.380

Material Boundary

-134.500	564.000
-135.500	563.000
111.500	482.000
141.200	482.000
183.200	468.000
183.200	466.000
195.000	466.000
196.000	465.000
200.000	465.000
206.000	463.000
209.200	463.000

Material Boundary

-400.000	463.000
98.200	463.000
104.200	461.000
144.200	461.000
150.200	463.000
206.000	463.000

Material Boundary

-400.000	465.000
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98.200	465.000
104.200	463.000
144.200	463.000
150.200	465.000
196.000	465.000

Material Boundary

-400.000	466.000
63.500	466.000
98.200	466.000
104.200	463.982
144.200	463.982
150.200	466.000
183.200	466.000

Material Boundary

63.500	466.000
111.500	482.000

Material Boundary

-400.000	450.000
-75.000	449.000
125.000	457.000
400.000	457.000

Material Boundary

-400.000	435.000
-75.000	435.000
125.000	434.000
400.000	434.000

Material Boundary

-400.000	428.500
-75.000	428.500
125.000	430.500
400.000	430.500

Material Boundary

-400.000	420.000
400.000	420.000

Material Boundary

-400.000	416.000
400.000	416.000

Material Boundary

-400.000	386.000
400.000	386.000

Material Boundary

-400.000	375.500
400.000	375.500

Material Boundary

-400.000	359.000
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400.000	359.000
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Material Boundary

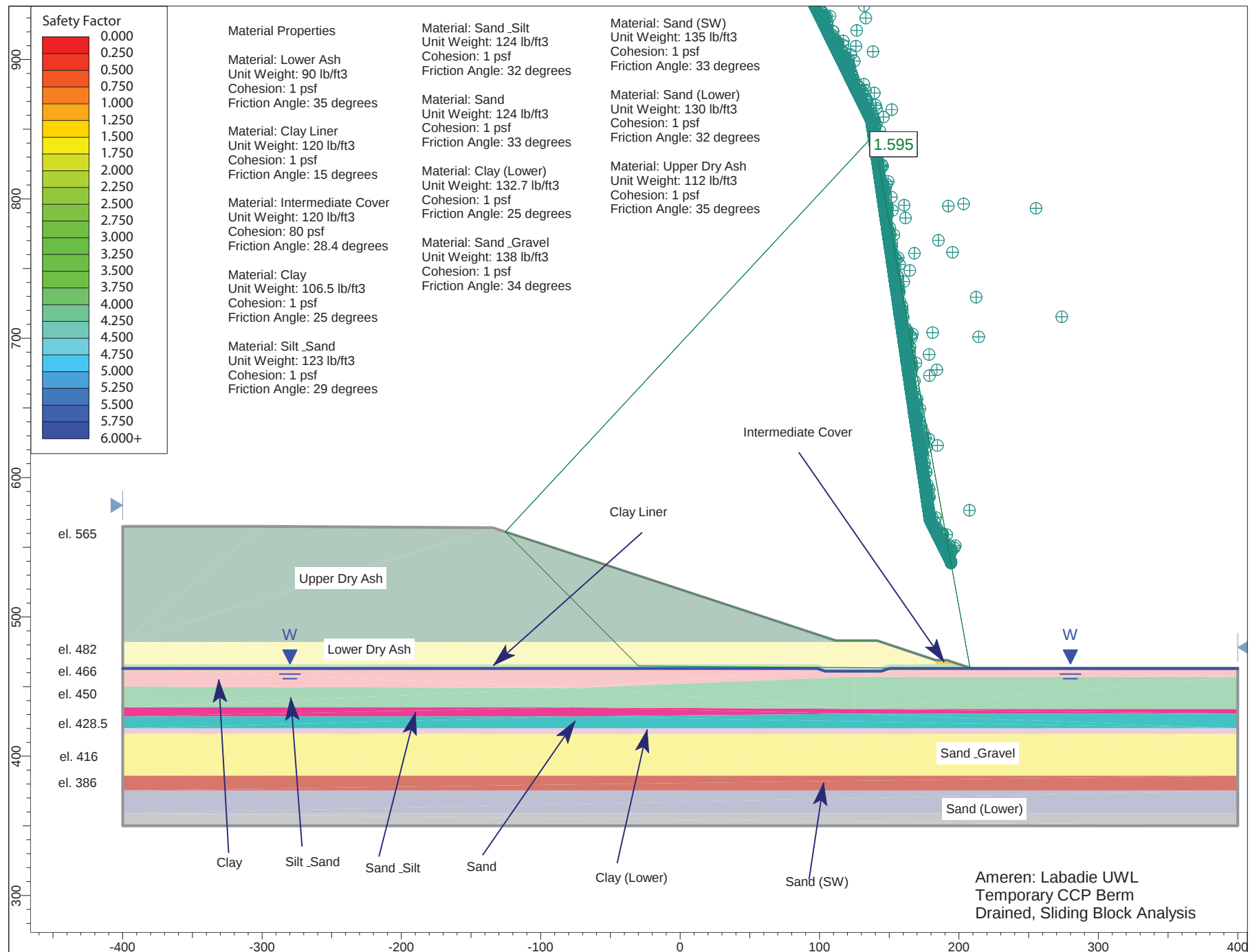
-400.000	482.000
111.500	482.000

External Boundary

209.200	463.000
191.200	469.000
183.200	469.000
141.200	483.000
111.500	483.000
-134.500	564.000
-300.000	565.000
-400.000	565.000
-400.000	482.000
-400.000	466.000
-400.000	465.000
-400.000	463.000
-400.000	450.000
-400.000	435.000
-400.000	428.500
-400.000	420.000
-400.000	416.000
-400.000	386.000
-400.000	375.500
-400.000	359.000
-400.000	350.000
400.000	350.000
400.000	359.000
400.000	375.500
400.000	386.000
400.000	416.000
400.000	420.000
400.000	430.500
400.000	434.000
400.000	457.000
400.000	463.000

Water Table

-400.000	463.000
98.200	463.000
104.200	461.000
144.200	461.000
150.200	463.000
206.000	463.000
400.000	463.000



Slide Analysis Information

Document Name

File Name: Ash Berm Sliding Block.sli

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): 95
Left Projection Angle (End Angle): 265
Right Projection Angle (Start Angle): -85
Right Projection Angle (End Angle): 85
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Material: Lower Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner
Strength Type: Mohr-Coulomb

Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 15 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Intermediate Cover
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 80 psf
Friction Angle: 28.4 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay
Strength Type: Mohr-Coulomb
Unit Weight: 106.5 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Silt & Sand
Strength Type: Mohr-Coulomb
Unit Weight: 123 lb/ft³
Cohesion: 1 psf
Friction Angle: 29 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand & Silt
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay (Lower)
Strength Type: Mohr-Coulomb
Unit Weight: 132.7 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand & Gravel
Strength Type: Mohr-Coulomb
Unit Weight: 138 lb/ft³

Cohesion: 1 psf
Friction Angle: 34 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand (SW)
Strength Type: Mohr-Coulomb
Unit Weight: 135 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand (Lower)
Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³
Cohesion: 1 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Limestone
Strength Type: Infinite strength
Unit Weight: 120 lb/ft³

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 1.586580
Axis Location: 138.815, 845.570
Left Slip Surface Endpoint: -125.443, 561.018
Right Slip Surface Endpoint: 207.903, 463.432
Resisting Horizontal Force=383790 lb
Driving Horizontal Force=241897 lb

Method: spencer
FS: 1.594970
Axis Location: 138.815, 845.570
Left Slip Surface Endpoint: -125.443, 561.018
Right Slip Surface Endpoint: 207.903, 463.432
Resisting Moment=1.60404e+008 lb-ft
Driving Moment=1.00568e+008 lb-ft
Resisting Horizontal Force=355228 lb
Driving Horizontal Force=222717 lb

Valid / Invalid Surfaces

Method: janbu corrected

Number of Valid Surfaces: 4482
Number of Invalid Surfaces: 518
Error Codes:
Error Code -105 reported for 483 surfaces
Error Code -108 reported for 7 surfaces
Error Code -111 reported for 9 surfaces
Error Code -112 reported for 19 surfaces

Method: spencer

Number of Valid Surfaces: 4168
Number of Invalid Surfaces: 832
Error Codes:
Error Code -105 reported for 483 surfaces
Error Code -108 reported for 157 surfaces
Error Code -111 reported for 152 surfaces
Error Code -112 reported for 40 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.

-108 = Total driving moment or total driving force < 0.1 . This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Material Boundary

-134.500	564.000
-135.500	563.000
111.500	482.000
141.200	482.000
183.200	468.000
183.200	466.000
195.000	466.000
196.000	465.000
200.000	465.000
206.000	463.000
209.200	463.000

Material Boundary

-400.000	463.000
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98.200	463.000
104.200	461.000
144.200	461.000
150.200	463.000
206.000	463.000

Material Boundary

-400.000	465.000
98.200	465.000
104.200	463.000
144.200	463.000
150.200	465.000
196.000	465.000

Material Boundary

-400.000	466.000
63.500	466.000
98.200	466.000
104.200	463.982
144.200	463.982
150.200	466.000
183.200	466.000

Material Boundary

63.500	466.000
111.500	482.000

Material Boundary

-400.000	450.000
-75.000	449.000
125.000	457.000
400.000	457.000

Material Boundary

-400.000	435.000
-75.000	435.000
125.000	434.000
400.000	434.000

Material Boundary

-400.000	428.500
-75.000	428.500
125.000	430.500
400.000	430.500

Material Boundary

-400.000	420.000
400.000	420.000

Material Boundary

-400.000	416.000
400.000	416.000

Material Boundary

-400.000	386.000
400.000	386.000

Material Boundary

-400.000	375.500
400.000	375.500

Material Boundary

-400.000	359.000
400.000	359.000

Material Boundary

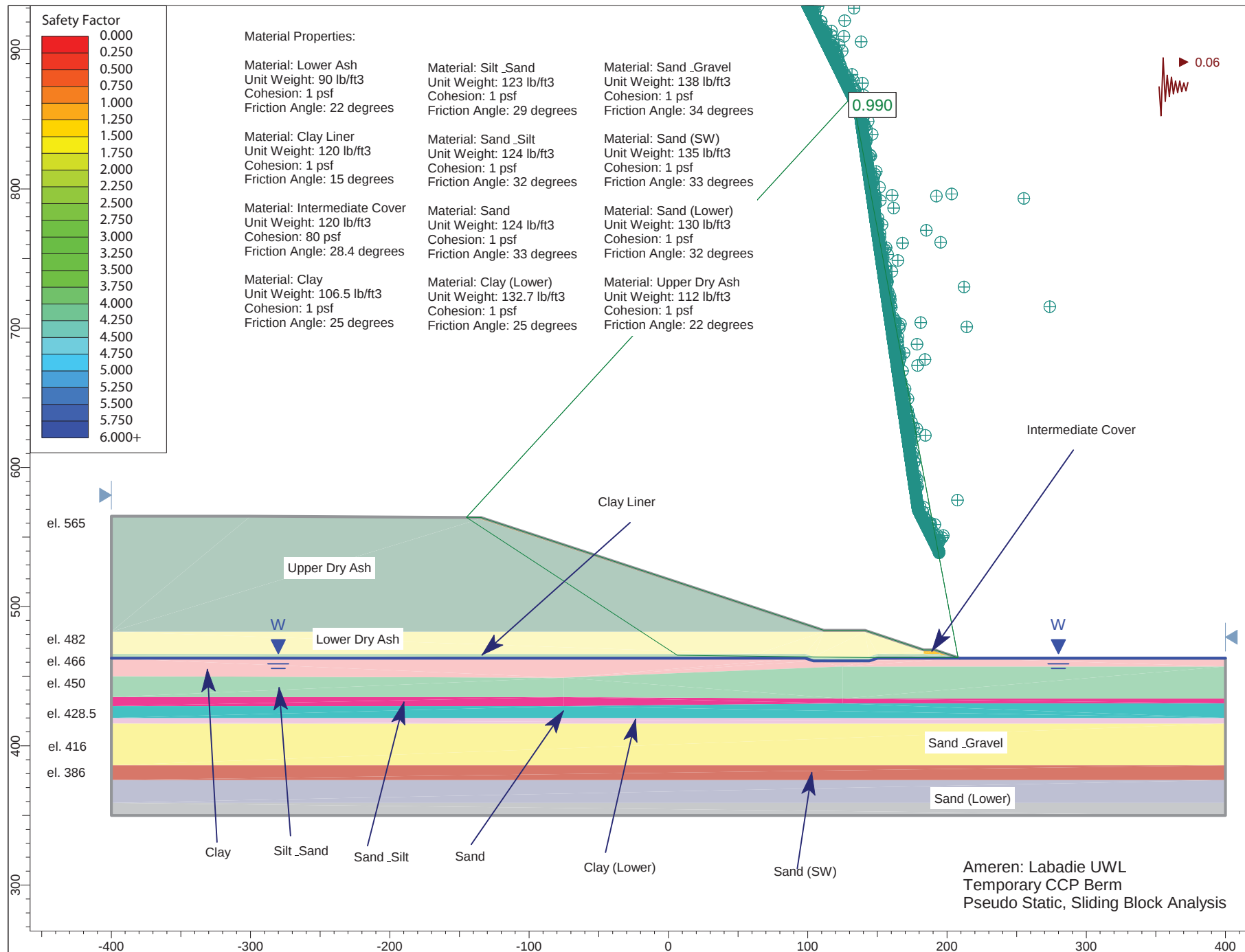
-400.000	482.000
111.500	482.000

External Boundary

209.200	463.000
191.200	469.000
183.200	469.000
141.200	483.000
111.500	483.000
-134.500	564.000
-300.000	565.000
-400.000	565.000
-400.000	482.000
-400.000	466.000
-400.000	465.000
-400.000	463.000
-400.000	450.000
-400.000	435.000
-400.000	428.500
-400.000	420.000
-400.000	416.000
-400.000	386.000
-400.000	375.500
-400.000	359.000
-400.000	350.000
400.000	350.000
400.000	359.000
400.000	375.500
400.000	386.000
400.000	416.000
400.000	420.000
400.000	430.500
400.000	434.000
400.000	457.000
400.000	463.000

Water Table

-400.000	463.000
98.200	463.000
104.200	461.000
144.200	461.000
150.200	463.000
206.000	463.000
400.000	463.000



Slide Analysis Information

Document Name

File Name: Ash Berm Pseudostatic Sliding Block.sli

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): 95
Left Projection Angle (End Angle): 265
Right Projection Angle (Start Angle): -85
Right Projection Angle (End Angle): 85
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.06

Material Properties

Material: Lower Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 22 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Clay Liner

Strength Type: Mohr-Coulomb

Unit Weight: 120 lb/ft³

Cohesion: 1 psf

Friction Angle: 15 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Intermediate Cover

Strength Type: Mohr-Coulomb

Unit Weight: 120 lb/ft³

Cohesion: 80 psf

Friction Angle: 28.4 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Clay

Strength Type: Mohr-Coulomb

Unit Weight: 106.5 lb/ft³

Cohesion: 1 psf

Friction Angle: 25 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Silt & Sand

Strength Type: Mohr-Coulomb

Unit Weight: 123 lb/ft³

Cohesion: 1 psf

Friction Angle: 29 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Sand & Silt

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 1 psf

Friction Angle: 32 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Sand

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 1 psf

Friction Angle: 33 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Clay (Lower)

Strength Type: Mohr-Coulomb

Unit Weight: 132.7 lb/ft³

Cohesion: 1 psf

Friction Angle: 25 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Sand & Gravel

Strength Type: Mohr-Coulomb
Unit Weight: 138 lb/ft³
Cohesion: 1 psf
Friction Angle: 34 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand (SW)

Strength Type: Mohr-Coulomb
Unit Weight: 135 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Sand (Lower)

Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³
Cohesion: 1 psf
Friction Angle: 32 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Limestone

Strength Type: Infinite strength
Unit Weight: 120 lb/ft³

Material: Upper Dry Ash

Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected

FS: 0.984554
Axis Location: 133.565, 863.640
Left Slip Surface Endpoint: -141.998, 564.045
Right Slip Surface Endpoint: 207.903, 463.432
Resisting Horizontal Force=300440 lb
Driving Horizontal Force=305153 lb

Method: spencer

FS: 0.990260
Axis Location: 132.052, 866.712
Left Slip Surface Endpoint: -145.062, 564.064
Right Slip Surface Endpoint: 207.903, 463.432
Resisting Moment=1.24732e+008 lb-ft
Driving Moment=1.25959e+008 lb-ft
Resisting Horizontal Force=281922 lb
Driving Horizontal Force=284695 lb

Valid / Invalid Surfaces

Method: janbu corrected

Number of Valid Surfaces: 4503

Number of Invalid Surfaces: 497

Error Codes:

Error Code -105 reported for 483 surfaces

Error Code -108 reported for 4 surfaces

Error Code -111 reported for 4 surfaces

Error Code -112 reported for 6 surfaces

Method: spencer

Number of Valid Surfaces: 3728

Number of Invalid Surfaces: 1272

Error Codes:

Error Code -105 reported for 483 surfaces

Error Code -108 reported for 401 surfaces

Error Code -111 reported for 381 surfaces

Error Code -112 reported for 7 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Material Boundary

-134.500	564.000
-135.500	563.000
111.500	482.000
141.200	482.000
183.200	468.000
183.200	466.000
195.000	466.000
196.000	465.000
200.000	465.000
206.000	463.000
209.200	463.000

Material Boundary

-400.000	463.000
98.200	463.000
104.200	461.000
144.200	461.000
150.200	463.000
206.000	463.000

Material Boundary

-400.000	465.000
98.200	465.000
104.200	463.000
144.200	463.000
150.200	465.000
196.000	465.000

Material Boundary

-400.000	466.000
63.500	466.000
98.200	466.000
104.200	463.982
144.200	463.982
150.200	466.000
183.200	466.000

Material Boundary

63.500	466.000
111.500	482.000

Material Boundary

-400.000	450.000
-75.000	449.000
125.000	457.000
400.000	457.000

Material Boundary

-400.000	435.000
-75.000	435.000
125.000	434.000
400.000	434.000

Material Boundary

-400.000	428.500
-75.000	428.500
125.000	430.500
400.000	430.500

Material Boundary

-400.000	420.000
400.000	420.000

Material Boundary

-400.000	416.000
400.000	416.000

Material Boundary

-400.000	386.000
400.000	386.000

Material Boundary

-400.000	375.500
400.000	375.500

Material Boundary

-400.000	359.000
400.000	359.000

Material Boundary

-400.000	482.000
111.500	482.000

External Boundary

209.200	463.000
191.200	469.000
183.200	469.000
141.200	483.000
111.500	483.000
-134.500	564.000
-300.000	565.000
-400.000	565.000
-400.000	482.000
-400.000	466.000
-400.000	465.000
-400.000	463.000
-400.000	450.000
-400.000	435.000
-400.000	428.500
-400.000	420.000
-400.000	416.000
-400.000	386.000
-400.000	375.500
-400.000	359.000
-400.000	350.000
400.000	350.000
400.000	359.000
400.000	375.500
400.000	386.000
400.000	416.000
400.000	420.000
400.000	430.500
400.000	434.000
400.000	457.000
400.000	463.000

Water Table

-400.000	463.000
98.200	463.000
104.200	461.000
144.200	461.000
150.200	463.000
206.000	463.000
400.000	463.000

ANALYSIS AND DESIGN OF VENEER COVER SOILS
Based on ASCE Webinar by R.M. Koerner - Geosynthetic Institute

Project: Ameren Labadie UWL

Date: 5/30/2012

By: J.Fouse

Checked:

Angle of Slope	$\beta =$	18.435	degrees (	3 :1)
Vertical Height Between Benches	H =	40	feet	
Length of Slope	L =	120.0	feet	
Thickness of Soil Cover	h =	2	feet	
Properties of Soil Cover	Moist Unit Weight	$\gamma_m =$	116	PCF
	Sat. Unit Weight	$\gamma_s =$	122	PCF
	Friction Angle	$\phi =$	25	degrees
	Cohesion	c =	0	PSF
Minimum Interface Shear Properties	Friction Angle	$\delta =$	15	degrees
	Adhesion	a =	246	PSF

Cover/textured HDPE

Weight of Active Block	W _a =	26371	LBS/FT
Weight of Passive Block	W _p =	773	LBS/FT
Normal Force of Active Block	N _a =	25017	LBS/FT
Adhesion Force to HDPE	C _a =	28044	LBS/FT
Cohesive Shear Base Passive Block	C =	0	LBS/FT
	a =	2502	LBS/FT
	b =	-10927	LBS/FT
	c =	1620	LBS/FT

Factor of Safety - Gravitational Forces FS = 4.21

Seismic Force Coefficient (Horz.) Cs = 0.179 g

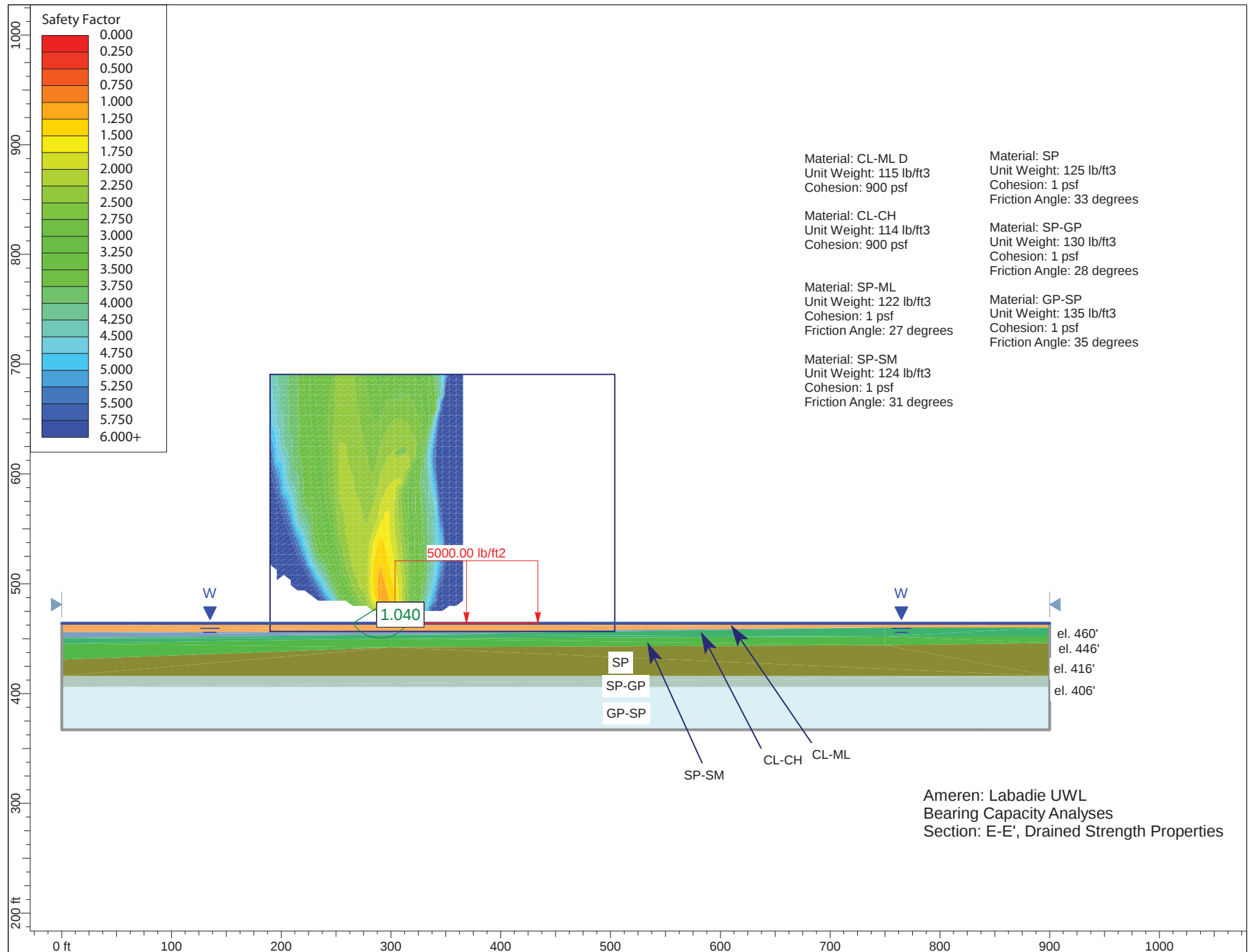
a = 12115 LBS/FT
b = -33477 LBS/FT
c = 4861 LBS/FT

Factor of Safety With Seismic FS = 2.61

Seepage Parallel to Slope, Depth h_w = 2.00 feet

Factor of Safety with Parallel Seepage FS = 3.78

(This calculation ignores passive block. Based on Stark & MDNR, 1998.)



Slide Analysis Information

Document Name

File Name: Section EE Full Drained 10192012 (undrained props).sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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: 5000 lb/ft²

Material Properties

Material: CL-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH

Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-ML

Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM

Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP

Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³
Cohesion: 1 psf
Friction Angle: 28 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb
Unit Weight: 135 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: spencer

FS: 1.040280
Center: 290.159, 479.881
Radius: 29.617
Left Slip Surface Endpoint: 265.160, 464.000
Right Slip Surface Endpoint: 315.157, 464.000
Resisting Moment=1.15633e+006 lb-ft

Driving Moment=1.11155e+006 lb-ft
Resisting Horizontal Force=31057.3 lb
Driving Horizontal Force=29854.7 lb

Method: gle/morgenstern-price

FS: 1.042170

Center: 290.159, 479.881

Radius: 29.617

Left Slip Surface Endpoint: 265.160, 464.000

Right Slip Surface Endpoint: 315.157, 464.000

Resisting Moment=1.15842e+006 lb-ft

Driving Moment=1.11155e+006 lb-ft

Resisting Horizontal Force=31202.3 lb

Driving Horizontal Force=29939.9 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 6712

Number of Invalid Surfaces: 21899

Error Codes:

Error Code -103 reported for 15836 surfaces

Error Code -107 reported for 3615 surfaces

Error Code -108 reported for 1849 surfaces

Error Code -111 reported for 138 surfaces

Error Code -112 reported for 461 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 6742

Number of Invalid Surfaces: 21869

Error Codes:

Error Code -103 reported for 15836 surfaces

Error Code -107 reported for 3615 surfaces

Error Code -108 reported for 1822 surfaces

Error Code -111 reported for 135 surfaces

Error Code -112 reported for 461 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

-107 = Total driving moment or
total driving force is negative. This will occur
if the wrong failure direction is specified,
or if high external or anchor loads are applied
against the failure direction.

-108 = Total driving moment
or total driving force < 0.1. This is to

limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$
< 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

189.657	456.455
503.725	456.455
503.725	690.716
189.657	690.716

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

External Boundary

0.000	464.000
0.000	456.000
0.000	450.500

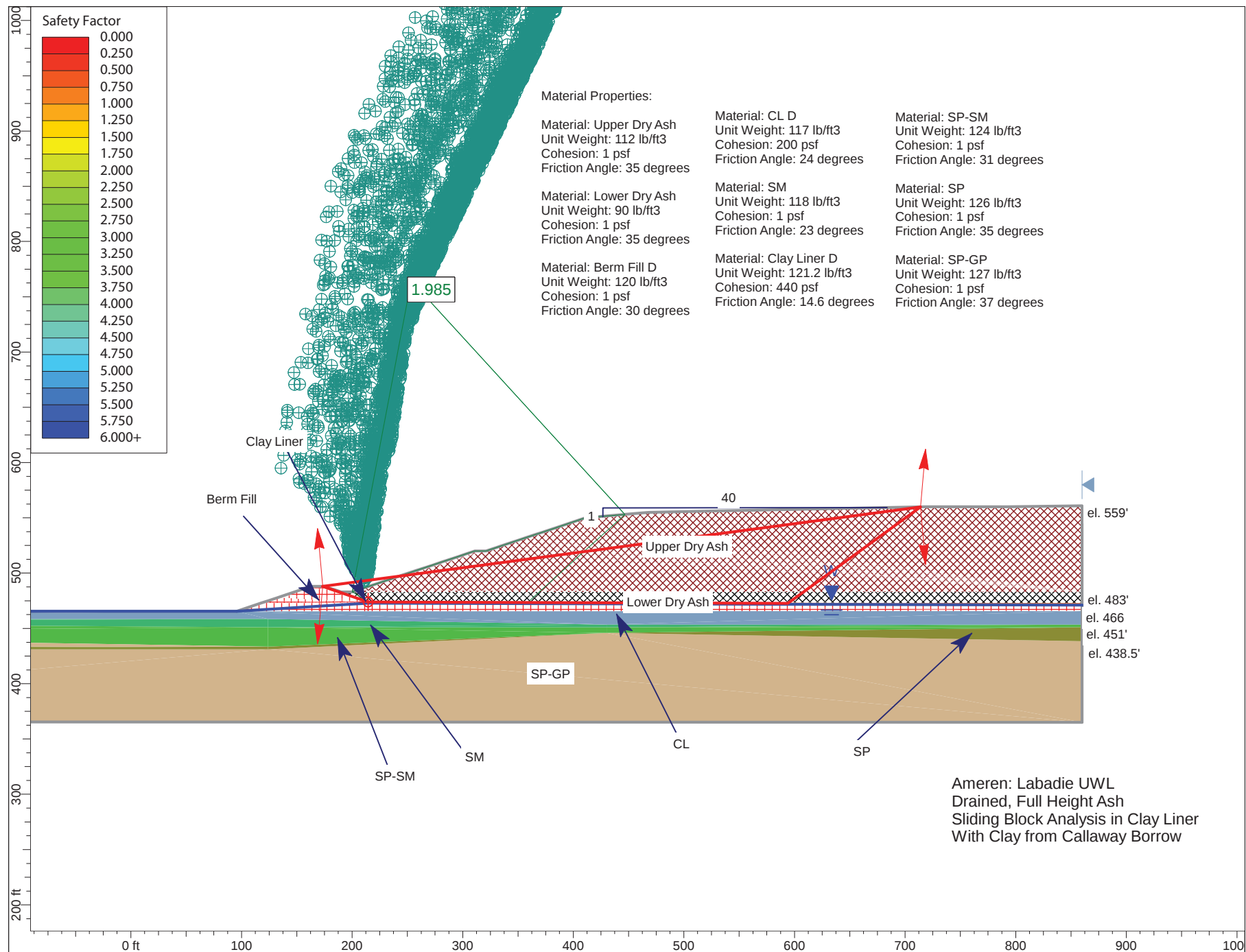
0.000	445.500
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	460.000
900.000	464.000
300.000	464.000

Water Table

0.000	464.000
433.806	464.000
900.000	464.000

Distributed Load

433.832	464.000
303.589	464.000



Slide Analysis Information

Document Name

File Name: Section BB Full Drained Sliding Block cal.sli

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
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): 95
Left Projection Angle (End Angle): 265
Right Projection Angle (Start Angle): -85
Right Projection Angle (End Angle): 85
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb

Unit Weight: 90 lb/ft3
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft3
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 121.2 lb/ft3
Cohesion: 440 psf
Friction Angle: 14.6 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL D
Strength Type: Mohr-Coulomb
Unit Weight: 117 lb/ft3
Cohesion: 200 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM
Strength Type: Mohr-Coulomb
Unit Weight: 118 lb/ft3
Cohesion: 1 psf
Friction Angle: 23 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft3
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft3
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft3

Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.984940

Axis Location: 253.389, 764.456

Left Slip Surface Endpoint: 200.228, 483.076

Right Slip Surface Endpoint: 446.596, 553.099

Resisting Moment=1.28785e+008 lb-ft

Driving Moment=6.48809e+007 lb-ft

Method: spencer

FS: 2.081750

Axis Location: 253.389, 764.456

Left Slip Surface Endpoint: 200.228, 483.076

Right Slip Surface Endpoint: 446.596, 553.099

Resisting Moment=1.25861e+008 lb-ft

Driving Moment=6.04593e+007 lb-ft

Resisting Horizontal Force=382217 lb

Driving Horizontal Force=183604 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 3856

Number of Invalid Surfaces: 1144

Error Codes:

Error Code -105 reported for 154 surfaces

Error Code -107 reported for 1 surface

Error Code -108 reported for 81 surfaces

Error Code -111 reported for 26 surfaces

Error Code -112 reported for 882 surfaces

Method: spencer

Number of Valid Surfaces: 3428

Number of Invalid Surfaces: 1572

Error Codes:

Error Code -105 reported for 154 surfaces

Error Code -107 reported for 1 surface

Error Code -108 reported for 296 surfaces

Error Code -111 reported for 213 surfaces

Error Code -112 reported for 908 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope
intersections with no valid slip surface.

-107 = Total driving moment or
total driving force is negative. This will occur

if the wrong failure direction is specified,
or if high external or anchor loads are applied
against the failure direction.

-108 = Total driving moment
or total driving force < 0.1. This is to
limit the calculation of extremely high safety
factors if the driving force is very small
(0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$
< 0.2 for the final iteration of the safety factor calculation. This screens out
some slip surfaces which may not be valid in the context of the analysis, in
particular, deep seated slip surfaces with many high negative base angle
slices in the passive zone.

List of All Coordinates

Material Boundary

-650.000	458.500
124.000	458.500
430.000	453.500
860.010	453.500

Material Boundary

-650.000	456.000
124.000	451.000
430.000	451.000
860.010	453.500

Material Boundary

-650.000	446.000
124.000	433.500
430.000	446.000
860.009	450.998

Material Boundary

-650.000	433.500
124.000	433.500

Material Boundary

-650.000	431.000
124.000	431.000
430.000	446.000
860.008	438.502

Material Boundary

190.000	483.000
214.462	474.846
491.000	474.000
671.000	473.000
860.012	473.000

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
214.462	472.846
214.462	474.846

Material Boundary

214.462	472.846
860.011	471.000

Material Boundary

95.732	465.577
860.011	465.591

Material Boundary

200.000	483.000
860.013	482.998

External Boundary

-650.000	365.500
860.000	365.000
860.008	438.502
860.009	450.998
860.010	453.500
860.010	453.500
860.011	465.591
860.011	471.000
860.012	473.000
860.013	482.998
860.021	560.896
792.394	560.000
718.434	560.000
500.172	555.635
468.434	555.000
461.429	554.390
411.000	550.000
401.743	546.914
396.000	545.000
386.646	541.882
381.000	540.000
371.552	536.851
366.000	535.000
356.462	531.821
351.000	530.000
341.374	526.791
336.000	525.000
329.925	522.975
321.000	520.000
315.050	520.000
311.000	520.000
302.030	517.010
296.000	515.000
286.965	511.988

281.000	510.000
271.903	506.968
266.000	505.000
256.842	501.947
251.000	500.000
245.235	498.078
236.000	495.000
230.209	493.070
221.000	490.000
215.184	488.061
206.000	485.000
203.665	484.222
200.000	483.000
196.100	483.000
190.000	483.000
187.654	483.782
184.000	485.000
180.474	486.175
175.000	488.000
170.055	487.977
169.000	487.972
166.542	487.983
163.000	488.000
159.335	486.778
154.000	485.000
147.892	482.964
139.000	480.000
132.892	477.964
124.000	475.000
117.892	472.964
95.732	465.577
-650.000	465.500
-650.000	458.500
-650.000	456.000
-650.000	446.000
-650.000	433.500
-650.000	431.000

Water Table

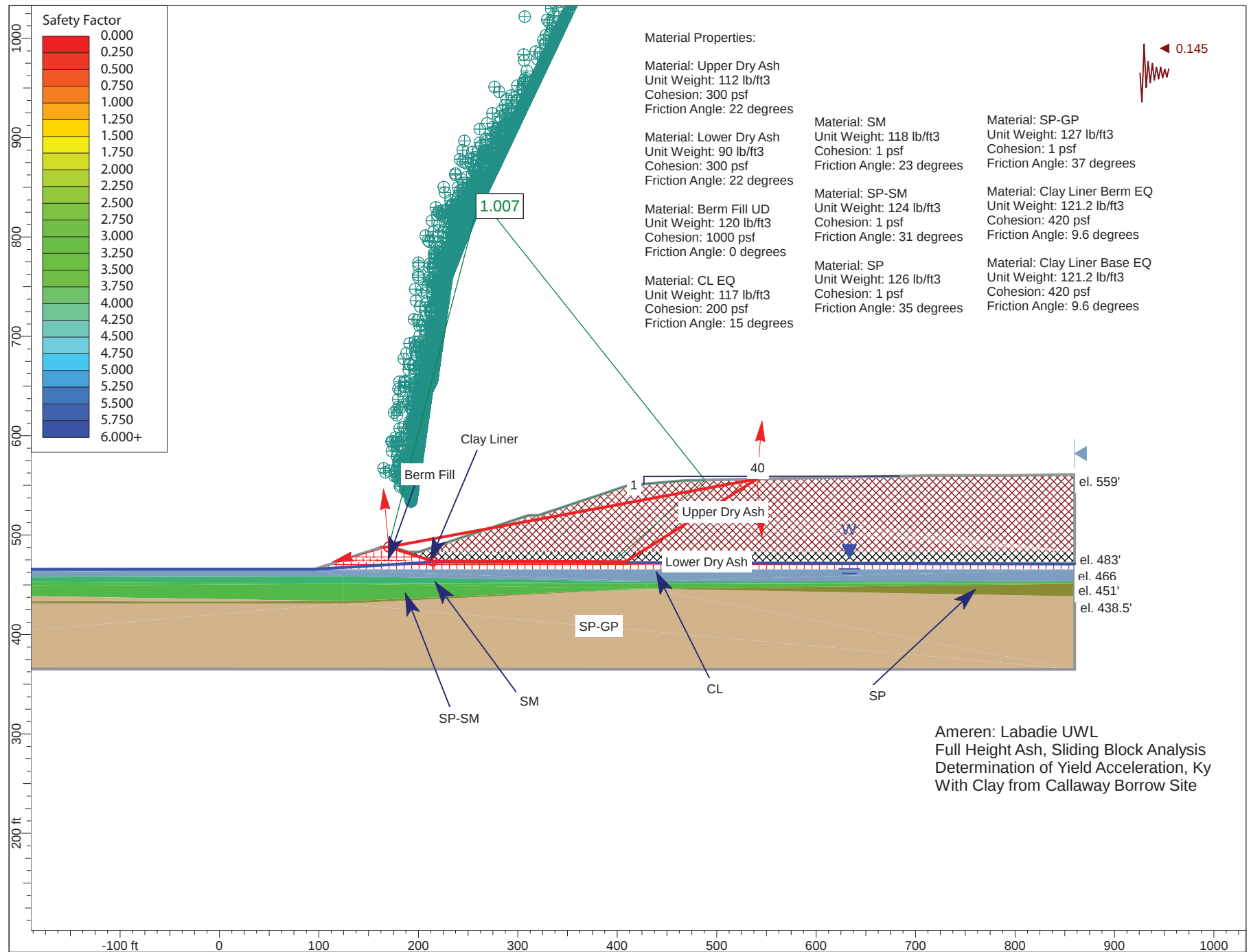
-650.000	465.500
95.732	465.577
214.462	472.846
860.011	471.000

Focus/Block Search Window

173.371	487.992
214.462	473.823
593.955	472.634
713.918	559.910

Focus/Block Search Point

214.462	473.823
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Slide Analysis Information

Document Name

File Name: Section BB Full Pseudo Static Sliding Block cal.sli

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
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): 95
Left Projection Angle (End Angle): 195
Right Projection Angle (Start Angle): -85
Right Projection Angle (End Angle): 85
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.145

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Lower Dry Ash

Strength Type: Mohr-Coulomb

Unit Weight: 90 lb/ft³

Cohesion: 300 psf

Friction Angle: 22 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Berm Fill UD

Strength Type: Mohr-Coulomb

Unit Weight: 120 lb/ft³

Cohesion: 1000 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: CL EQ

Strength Type: Mohr-Coulomb

Unit Weight: 117 lb/ft³

Cohesion: 200 psf

Friction Angle: 15 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SM

Strength Type: Mohr-Coulomb

Unit Weight: 118 lb/ft³

Cohesion: 1 psf

Friction Angle: 23 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SP-SM

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 1 psf

Friction Angle: 31 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SP

Strength Type: Mohr-Coulomb

Unit Weight: 126 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb

Unit Weight: 127 lb/ft³

Cohesion: 1 psf

Friction Angle: 37 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Clay Liner Berm EQ
Strength Type: Mohr-Coulomb
Unit Weight: 121.2 lb/ft³
Cohesion: 420 psf
Friction Angle: 9.6 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner Base EQ
Strength Type: Mohr-Coulomb
Unit Weight: 121.2 lb/ft³
Cohesion: 420 psf
Friction Angle: 9.6 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: janbu corrected
FS: 0.997465
Axis Location: 261.668, 839.746
Left Slip Surface Endpoint: 170.055, 487.977
Right Slip Surface Endpoint: 488.115, 555.394
Resisting Horizontal Force=403195 lb
Driving Horizontal Force=404220 lb

Method: spencer
FS: 1.007200
Axis Location: 261.668, 839.746
Left Slip Surface Endpoint: 170.055, 487.977
Right Slip Surface Endpoint: 488.115, 555.394
Resisting Moment=1.51225e+008 lb-ft
Driving Moment=1.50144e+008 lb-ft
Resisting Horizontal Force=372771 lb
Driving Horizontal Force=370107 lb

Valid / Invalid Surfaces

Method: janbu corrected
Number of Valid Surfaces: 3826
Number of Invalid Surfaces: 1174
Error Codes:
Error Code -105 reported for 1129 surfaces
Error Code -108 reported for 8 surfaces
Error Code -111 reported for 21 surfaces
Error Code -112 reported for 16 surfaces

Method: spencer
Number of Valid Surfaces: 3444
Number of Invalid Surfaces: 1556
Error Codes:
Error Code -105 reported for 1129 surfaces
Error Code -108 reported for 84 surfaces
Error Code -111 reported for 315 surfaces
Error Code -112 reported for 28 surfaces

Error Codes

The following errors were encountered during the computation:

-105 = More than two surface / slope intersections with no valid slip surface.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Material Boundary

-650.000	458.500
124.000	458.500
430.000	453.500
860.010	453.500

Material Boundary

-650.000	456.000
124.000	451.000
430.000	451.000
860.010	453.500

Material Boundary

-650.000	446.000
124.000	433.500
430.000	446.000
860.009	450.998

Material Boundary

-650.000	433.500
124.000	433.500

Material Boundary

-650.000	431.000
124.000	431.000
430.000	446.000
860.008	438.502

Material Boundary

190.000	483.000
214.462	474.846
491.000	474.000
671.000	473.000
860.012	473.000

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
214.462	472.846
214.462	474.846

Material Boundary

214.462	472.846
860.011	471.000

Material Boundary

95.732	465.577
860.011	465.591

Material Boundary

200.000	483.000
860.013	482.998

External Boundary

-650.000	365.500
860.000	365.000
860.008	438.502
860.009	450.998
860.010	453.500
860.010	453.500
860.011	465.591
860.011	471.000
860.012	473.000
860.013	482.998
860.021	560.896
792.394	560.000
718.434	560.000
500.172	555.635
468.434	555.000
461.429	554.390
411.000	550.000
401.743	546.914
396.000	545.000
386.646	541.882
381.000	540.000
371.552	536.851
366.000	535.000
356.462	531.821
351.000	530.000
341.374	526.791
336.000	525.000
329.925	522.975
321.000	520.000
315.050	520.000
311.000	520.000
302.030	517.010
296.000	515.000
286.965	511.988

281.000	510.000
271.903	506.968
266.000	505.000
256.842	501.947
251.000	500.000
245.235	498.078
236.000	495.000
230.209	493.070
221.000	490.000
215.184	488.061
206.000	485.000
203.665	484.222
200.000	483.000
196.100	483.000
190.000	483.000
187.654	483.782
184.000	485.000
180.474	486.175
175.000	488.000
170.055	487.977
169.000	487.972
166.542	487.983
163.000	488.000
159.335	486.778
154.000	485.000
147.892	482.964
139.000	480.000
132.892	477.964
124.000	475.000
117.892	472.964
95.732	465.577
-650.000	465.500
-650.000	458.500
-650.000	456.000
-650.000	446.000
-650.000	433.500
-650.000	431.000

Water Table

-650.000	465.500
95.732	465.577
214.462	472.846
860.011	471.000

Focus/Block Search Window

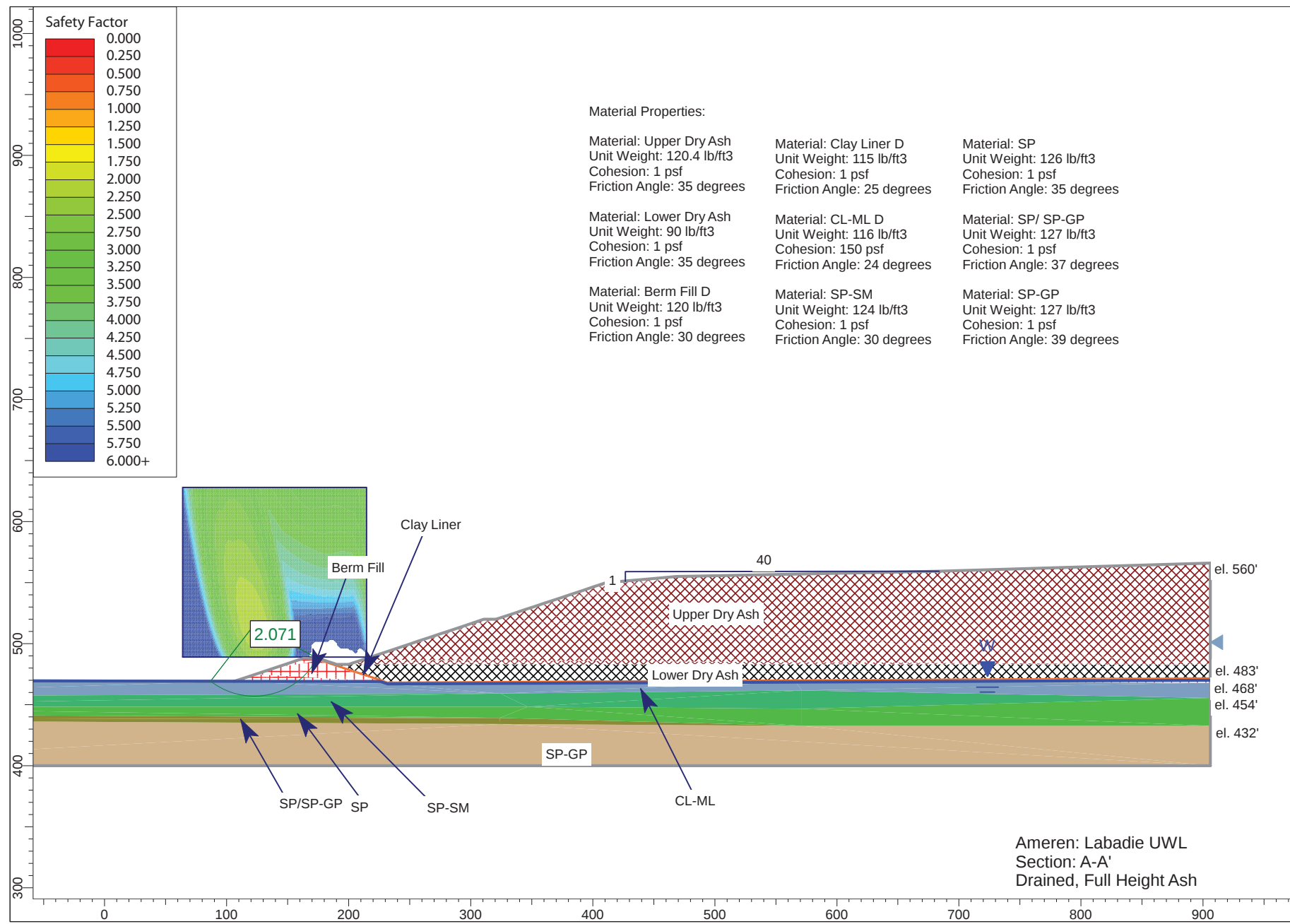
170.055	487.977
214.462	473.808
408.263	473.263
540.567	556.443

Focus/Block Search Point

214.462	473.808
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Focus/Block Search Point

170.055	487.977
---------	---------



Slide Analysis Information

Document Name

File Name: Section AA Full Drained.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 120.4 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 150 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table

Custom Hu value: 1

List of All Coordinates

Material Boundary

-310.816	456.500
324.184	459.061
571.184	461.561
906.000	455.500

Material Boundary

346.669	448.252
571.184	446.561
906.000	455.500

Material Boundary

-310.816	442.454
323.787	439.064
571.184	432.561

Material Boundary

-310.816	437.454
324.184	434.061

Material Boundary

324.184	434.061
571.184	432.561

Material Boundary

190.000	483.000
232.000	469.000
566.246	468.488
906.000	467.967

Material Boundary

106.184	469.061
225.991	469.003
232.000	469.000

Material Boundary

200.000	483.000
906.000	483.000

Material Boundary

-310.816	448.252
346.669	448.252

Material Boundary

571.184	432.561
906.000	432.561

Material Boundary

232.000	469.000
906.000	472.524

Material Boundary

175.000	488.000
175.000	486.000
225.991	469.003
232.000	467.000
566.246	468.488
906.000	470.000

External Boundary

906.000	566.071
683.709	559.305
468.434	555.000
440.357	552.556
411.000	550.000
398.805	545.935
396.000	545.000
391.110	543.370
381.000	540.000
375.110	538.037
366.000	535.000
359.899	532.966
351.000	530.000
344.696	527.899
336.000	525.000
321.203	520.068
321.000	520.000
320.919	520.000
311.000	520.000
310.751	519.917
296.000	515.000
294.928	514.643
281.000	510.000
271.864	506.955
266.000	505.000
256.681	501.894
251.000	500.000
241.544	496.848
236.000	495.000
226.527	491.842
221.000	490.000
211.527	486.842
206.000	485.000
203.789	484.263
200.000	483.000
196.315	483.000
190.000	483.000
187.789	483.737
184.000	485.000
178.316	486.895
175.000	488.000
170.579	487.765
169.000	487.681
166.789	487.798
163.000	488.000
157.316	486.105
154.000	485.000
148.473	483.158

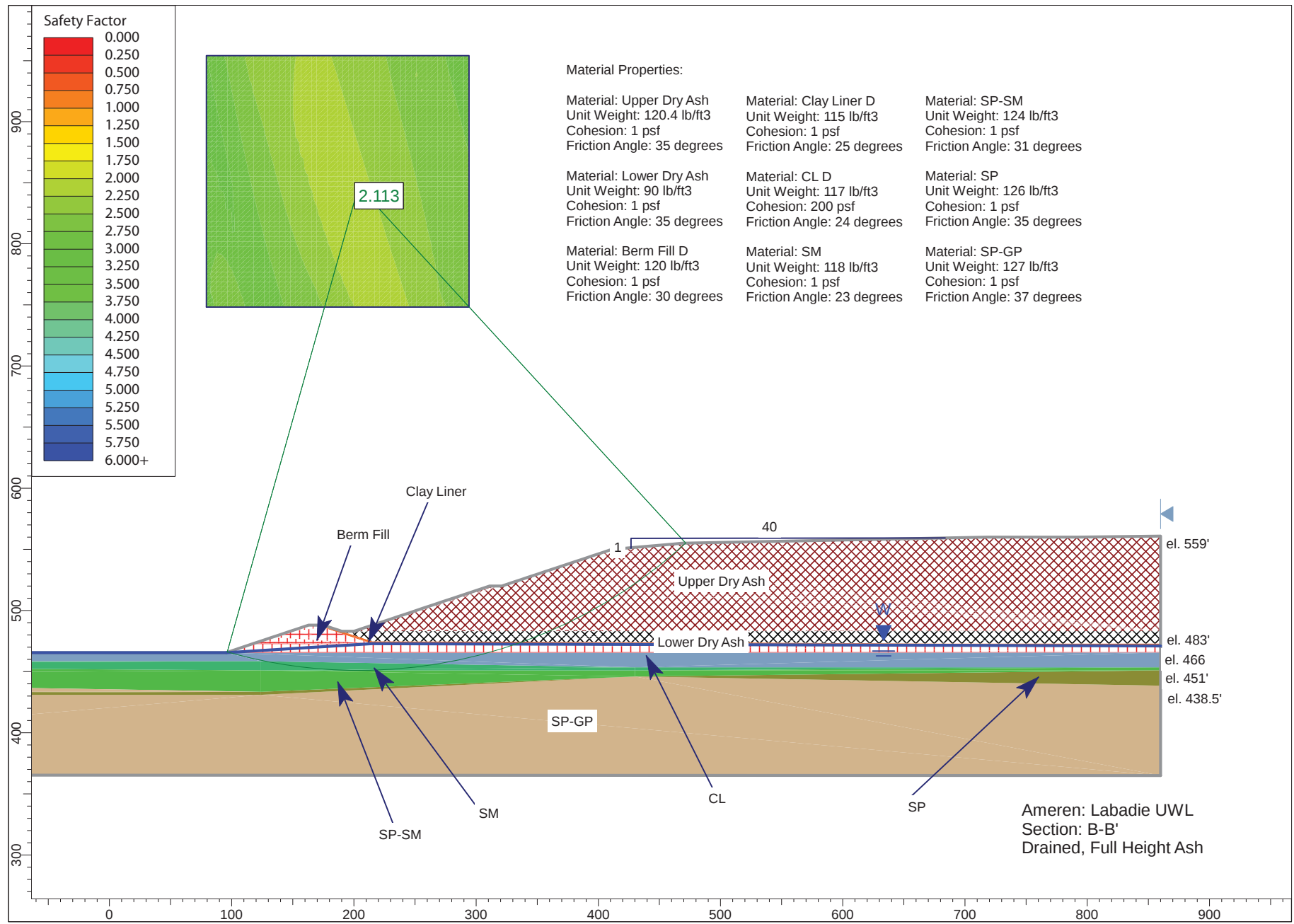
139.000	480.000
129.527	476.842
124.000	475.000
118.473	473.158
106.184	469.061
-310.816	469.954
-310.816	456.500
-310.816	448.252
-310.816	442.454
-310.816	437.454
-310.816	400.000
906.000	400.000
906.000	432.561
906.000	455.500
906.000	467.967
906.000	470.000
906.000	472.524
906.000	483.000

Water Table

-310.816	469.954
106.184	469.061
225.991	469.003
232.000	467.000
906.000	470.000

Search Grid

63.910	489.052
214.620	489.052
214.620	627.986
63.910	627.986



Slide Analysis Information

Document Name

File Name: Section BB Full Drained.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 120.4 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL D
Strength Type: Mohr-Coulomb
Unit Weight: 117 lb/ft³
Cohesion: 200 psf
Friction Angle: 24 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM
Strength Type: Mohr-Coulomb
Unit Weight: 118 lb/ft³
Cohesion: 1 psf
Friction Angle: 23 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 2.113250

Center: 203.933, 846.926

Radius: 396.052

Left Slip Surface Endpoint: 96.322, 465.774

Right Slip Surface Endpoint: 471.652, 555.064

Resisting Moment=3.08719e+008 lb-ft

Driving Moment=1.46087e+008 lb-ft

Method: spencer

FS: 2.096060

Center: 203.933, 846.926

Radius: 396.052

Left Slip Surface Endpoint: 96.322, 465.774

Right Slip Surface Endpoint: 471.652, 555.064

Resisting Moment=3.06207e+008 lb-ft

Driving Moment=1.46087e+008 lb-ft

Resisting Horizontal Force=720090 lb

Driving Horizontal Force=343545 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 10351

Number of Invalid Surfaces: 18260

Error Codes:

Error Code -103 reported for 18260 surfaces

Method: spencer

Number of Valid Surfaces: 10351

Number of Invalid Surfaces: 18260

Error Codes:

Error Code -103 reported for 18260 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

List of All Coordinates

Search Grid

79.355	748.175
294.144	748.175
294.144	953.907

79.355 953.907

Material Boundary

-650.000 458.500
124.000 458.500
430.000 453.500
860.010 453.500

Material Boundary

-650.000 456.000
124.000 451.000
430.000 451.000
860.010 453.500

Material Boundary

-650.000 446.000
124.000 433.500
430.000 446.000
860.009 450.998

Material Boundary

-650.000 433.500
124.000 433.500

Material Boundary

-650.000 431.000
124.000 431.000
430.000 446.000
860.008 438.502

Material Boundary

190.000 483.000
214.462 474.846
491.000 474.000
671.000 473.000
860.012 473.000

Material Boundary

175.000 486.000
175.000 488.000

Material Boundary

175.000 486.000
214.462 472.846
214.462 474.846

Material Boundary

214.462 472.846
860.011 471.000

Material Boundary

95.732 465.577
860.011 465.591

Material Boundary

200.000 483.000
860.013 482.998

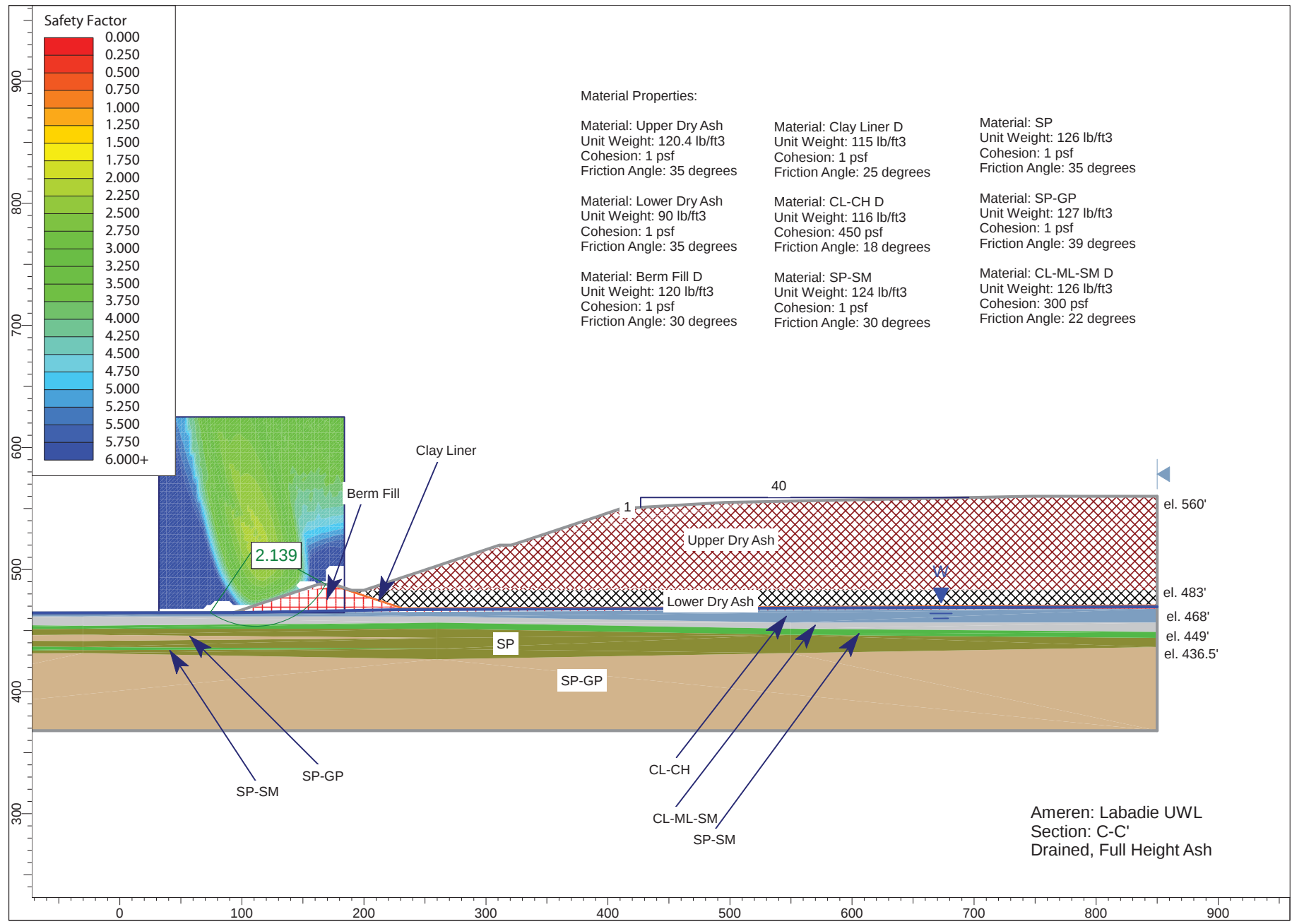
External Boundary

-650.000	365.500
860.000	365.000
860.008	438.502
860.009	450.998
860.010	453.500
860.010	453.500
860.011	465.591
860.011	471.000
860.012	473.000
860.013	482.998
860.021	560.896
792.394	560.000
718.434	560.000
500.172	555.635
468.434	555.000
461.429	554.390
411.000	550.000
401.743	546.914
396.000	545.000
386.646	541.882
381.000	540.000
371.552	536.851
366.000	535.000
356.462	531.821
351.000	530.000
341.374	526.791
336.000	525.000
329.925	522.975
321.000	520.000
315.050	520.000
311.000	520.000
302.030	517.010
296.000	515.000
286.965	511.988
281.000	510.000
271.903	506.968
266.000	505.000
256.842	501.947
251.000	500.000
245.235	498.078
236.000	495.000
230.209	493.070
221.000	490.000
215.184	488.061
206.000	485.000
203.665	484.222
200.000	483.000
196.100	483.000
190.000	483.000
187.654	483.782
184.000	485.000
180.474	486.175
175.000	488.000
170.055	487.977
169.000	487.972

166.542	487.983
163.000	488.000
159.335	486.778
154.000	485.000
147.892	482.964
139.000	480.000
132.892	477.964
124.000	475.000
117.892	472.964
95.732	465.577
-650.000	465.500
-650.000	458.500
-650.000	456.000
-650.000	446.000
-650.000	433.500
-650.000	431.000

Water Table

-650.000	465.500
95.732	465.577
214.462	472.846
860.011	471.000



Slide Analysis Information

Document Name

File Name: section CC full drained.sli

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
Spencer

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: 4

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 120.4 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH D
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 450 psf
Friction Angle: 18 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML-SM D
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 2.138540

Center: 111.062, 519.105

Radius: 65.861

Left Slip Surface Endpoint: 73.962, 464.688

Right Slip Surface Endpoint: 169.062, 487.902

Resisting Moment=5.2611e+006 lb-ft

Driving Moment=2.46013e+006 lb-ft

Method: spencer

FS: 2.137380

Center: 111.062, 522.312

Radius: 68.772

Left Slip Surface Endpoint: 73.527, 464.687

Right Slip Surface Endpoint: 170.621, 487.927

Resisting Moment=5.57806e+006 lb-ft

Driving Moment=2.60976e+006 lb-ft

Resisting Horizontal Force=72842 lb

Driving Horizontal Force=34080 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 7023

Number of Invalid Surfaces: 21588

Error Codes:

Error Code -103 reported for 20503 surfaces

Error Code -107 reported for 53 surfaces

Error Code -112 reported for 1032 surfaces

Method: spencer

Number of Valid Surfaces: 6801

Number of Invalid Surfaces: 21810

Error Codes:

Error Code -103 reported for 20503 surfaces

Error Code -107 reported for 53 surfaces

Error Code -108 reported for 163 surfaces

Error Code -111 reported for 17 surfaces

Error Code -112 reported for 1074 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or

total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment
or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$
< 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

32.043	464.576
184.003	464.576
184.003	624.954
32.043	624.954

Material Boundary

93.161	464.720
850.000	468.000

Material Boundary

190.000	483.000
231.496	469.168
540.000	470.000
740.000	471.000
850.000	471.550

Material Boundary

200.000	483.000
850.000	483.098

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
231.496	467.168
231.496	469.168

Material Boundary

231.496	467.168
850.000	469.550

Material Boundary

-330.000	461.500
-30.000	461.500
260.000	461.500
550.000	456.500
850.000	456.500

Material Boundary

-330.000	456.500
-30.000	454.000
260.000	456.500
550.000	451.500
850.000	449.000

Material Boundary

-330.000	449.000
-30.000	451.500
260.000	451.500
550.000	446.500
850.000	444.000

Material Boundary

-330.000	444.000
-30.000	446.500
260.000	444.000
-30.000	441.500
-330.000	444.000

Material Boundary

-330.000	431.500
-30.000	434.000
260.000	435.000
-30.000	436.500
-330.000	439.000

Material Boundary

-330.000	429.000
-30.000	431.500
260.000	426.500
550.000	431.500
850.000	436.500

External Boundary

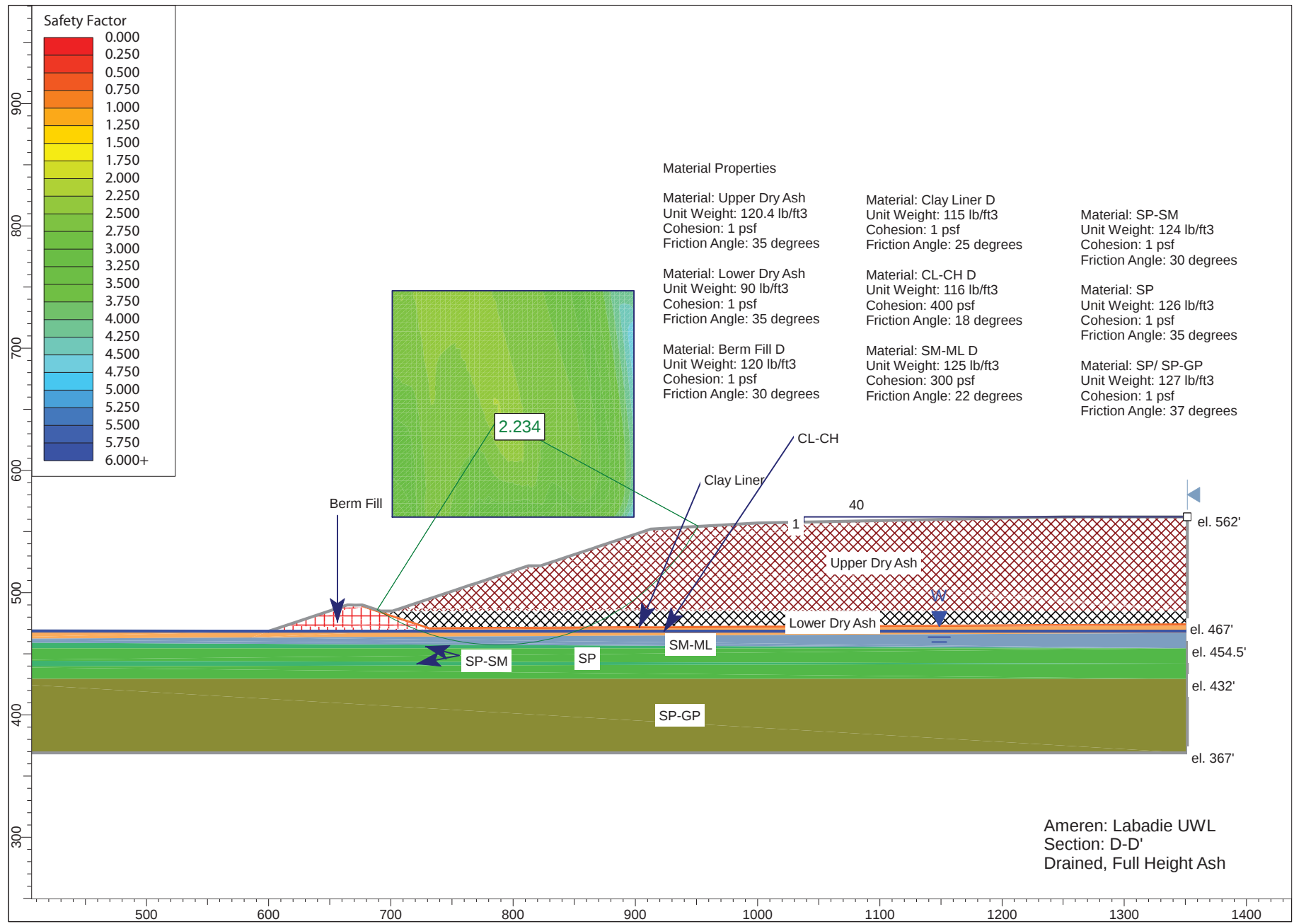
850.000	560.000
746.465	560.000
531.296	555.697
496.414	555.000
428.162	551.003
411.000	550.000
410.785	549.928
396.000	545.000
394.686	544.562
381.000	540.000
378.604	539.201
366.000	535.000
357.068	532.023

351.000	530.000
337.385	525.462
336.000	525.000
321.299	520.100
321.000	520.000
316.824	520.000
311.000	520.000
310.590	519.863
296.000	515.000
294.508	514.503
281.000	510.000
278.441	509.147
266.000	505.000
256.165	501.722
251.000	500.000
249.169	499.390
236.000	495.000
234.321	494.440
221.000	490.000
207.609	485.536
206.000	485.000
205.359	484.786
200.000	483.000
198.942	483.000
190.000	483.000
189.375	483.208
184.000	485.000
183.073	485.309
175.000	488.000
174.160	487.986
172.299	487.955
169.000	487.901
168.082	487.916
163.000	488.000
157.036	486.012
154.000	485.000
144.060	481.687
139.000	480.000
129.060	476.687
124.000	475.000
118.940	473.313
93.161	464.720
-330.000	464.000
-330.000	461.500
-330.000	456.500
-330.000	449.000
-330.000	444.000
-330.000	439.000
-330.000	431.500
-330.000	429.000
-330.000	368.000
850.000	368.000
850.000	436.500
850.000	444.000
850.000	449.000
850.000	456.500

850.000	468.000
850.000	469.550
850.000	471.550
850.000	483.098

Water Table

-330.000	464.000
93.161	464.720
231.496	467.168
850.000	469.550



Slide Analysis Information

Document Name

File Name: Section DD Full Drained 10192012.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 120.4 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH D
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 400 psf
Friction Angle: 18 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 300 psf
Friction Angle: 22 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 2.233920

Center: 788.082, 643.343

Radius: 186.143

Left Slip Surface Endpoint: 688.701, 485.949

Right Slip Surface Endpoint: 951.518, 554.247

Resisting Moment=1.31086e+008 lb-ft

Driving Moment=5.86799e+007 lb-ft

Method: spencer

FS: 2.204720

Center: 788.082, 643.343

Radius: 186.143

Left Slip Surface Endpoint: 688.701, 485.949

Right Slip Surface Endpoint: 951.518, 554.247

Resisting Moment=1.29373e+008 lb-ft

Driving Moment=5.86799e+007 lb-ft

Resisting Horizontal Force=620281 lb

Driving Horizontal Force=281342 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 10521

Number of Invalid Surfaces: 18090

Error Codes:

Error Code -103 reported for 18090 surfaces

Method: spencer

Number of Valid Surfaces: 10512

Number of Invalid Surfaces: 18099

Error Codes:

Error Code -103 reported for 18090 surfaces

Error Code -111 reported for 9 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

-111 = safety factor equation did not converge

List of All Coordinates

Search Grid

701.058	561.888
898.840	561.888
898.840	747.012
701.058	747.012

Material Boundary

691.524	485.008
731.239	471.770
966.524	473.008
1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

731.239	469.770
1351.524	473.008

Material Boundary

701.524	485.008
1351.524	484.949

Material Boundary

89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
320.000	459.500
280.000	457.000
320.000	454.500
1351.524	454.500

Material Boundary

89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	432.000
89.000	432.000

Material Boundary

0.000	459.500
89.000	459.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
1351.524	454.500

Material Boundary

600.000	468.500
731.239	469.770

Material Boundary

280.000	442.000
330.000	444.500
1351.524	441.961
330.000	439.500
280.000	442.000

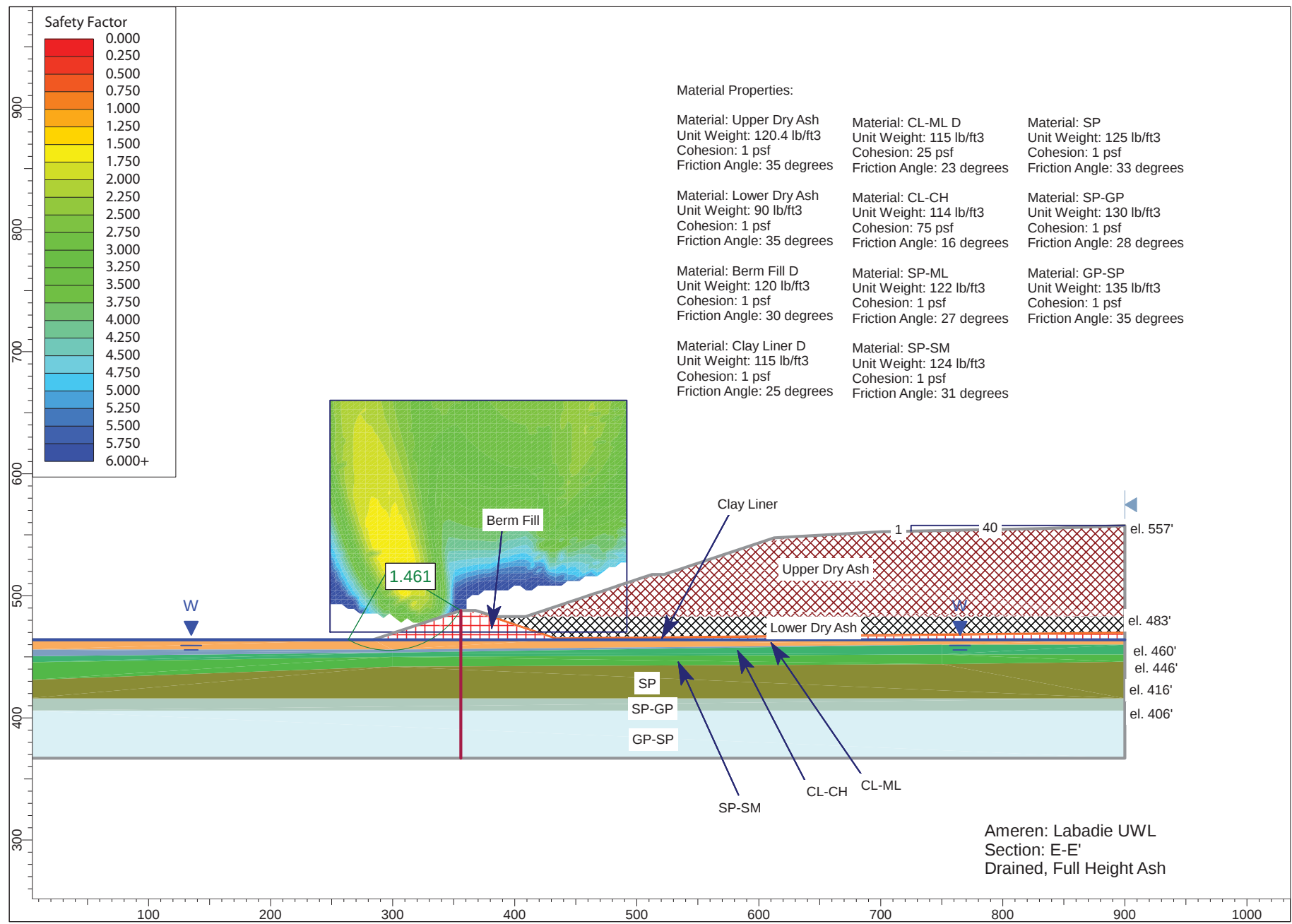
External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	441.961
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
1351.524	562.008
1250.221	562.008
1135.274	559.709
1000.182	557.008
935.839	553.357
912.524	552.008
900.658	548.053
897.524	547.008
884.510	542.670
882.524	542.008
868.376	537.292
867.524	537.008
866.146	536.549
852.524	532.008
843.872	529.124
837.524	527.008
827.732	523.744
822.524	522.008
815.418	522.008
812.524	522.008
800.863	518.121
797.524	517.008
784.760	512.753
782.524	512.008

768.670	507.390
767.524	507.008
765.715	506.405
752.524	502.008
744.442	499.314
737.524	497.008
729.376	494.292
722.524	492.008
714.376	489.292
707.524	487.008
704.265	485.922
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

-0.000	469.008
600.000	468.500
1351.524	468.500



Slide Analysis Information

Document Name

File Name: Section EE Full Drained 7292013 increased ash.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 120.4 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill D
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Liner D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 1 psf
Friction Angle: 25 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML D
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 25 psf
Friction Angle: 23 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 75 psf
Friction Angle: 16 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb

Unit Weight: 130 lb/ft³

Cohesion: 1 psf

Friction Angle: 28 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb

Unit Weight: 135 lb/ft³

Cohesion: 1 psf

Friction Angle: 35 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: spencer

FS: 1.461230

Center: 297.304, 523.511

Radius: 68.431

Left Slip Surface Endpoint: 263.522, 464.000

Right Slip Surface Endpoint: 355.800, 488.000

Resisting Moment=3.01881e+006 lb-ft

Driving Moment=2.06594e+006 lb-ft

Resisting Horizontal Force=39146.2 lb

Driving Horizontal Force=26789.9 lb

Method: gle/morgenstern-price

FS: 1.449120

Center: 297.304, 523.511

Radius: 68.431

Left Slip Surface Endpoint: 263.522, 464.000

Right Slip Surface Endpoint: 355.800, 488.000

Resisting Moment=2.99378e+006 lb-ft

Driving Moment=2.06594e+006 lb-ft

Resisting Horizontal Force=38975.9 lb

Driving Horizontal Force=26896.3 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 19370

Number of Invalid Surfaces: 9241

Error Codes:

Error Code -101 reported for 243 surfaces

Error Code -103 reported for 5972 surfaces

Error Code -107 reported for 278 surfaces

Error Code -108 reported for 56 surfaces

Error Code -111 reported for 81 surfaces

Error Code -112 reported for 2611 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 19427
Number of Invalid Surfaces: 9184
Error Codes:
Error Code -101 reported for 243 surfaces
Error Code -103 reported for 5972 surfaces
Error Code -107 reported for 278 surfaces
Error Code -108 reported for 29 surfaces
Error Code -111 reported for 65 surfaces
Error Code -112 reported for 2597 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero)
surface / slope intersections.

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

-107 = Total driving moment or
total driving force is negative. This will occur
if the wrong failure direction is specified,
or if high external or anchor loads are applied
against the failure direction.

-108 = Total driving moment
or total driving force < 0.1. This is to
limit the calculation of extremely high safety
factors if the driving force is very small
(0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$
< 0.2 for the final iteration of the safety factor calculation. This screens out
some slip surfaces which may not be valid in the context of the analysis, in
particular, deep seated slip surfaces with many high negative base angle
slices in the passive zone.

List of All Coordinates

Search Grid

248.639	470.329
491.964	470.329
491.964	660.264
248.639	660.264

Material Boundary

384.014	483.011
433.806	466.000

900.000 470.650

Material Boundary

367.800 488.000
376.524 483.508

Material Boundary

376.524 483.508
433.806 464.000
433.806 466.000

Material Boundary

409.030 483.010
900.000 483.000

Material Boundary

433.806 464.000
900.000 468.650

Material Boundary

283.800 464.000
433.806 464.000
900.000 464.000

Material Boundary

0.000 456.000
300.000 456.000
750.000 460.000
900.000 460.000

Material Boundary

0.000 450.500
300.000 453.500
750.000 460.000

Material Boundary

0.000 445.500
300.000 450.000
750.000 452.000
900.000 452.000

Material Boundary

0.000 431.000
300.000 442.000
750.000 444.000
900.000 446.000

Material Boundary

0.000 416.000
900.000 416.000

Material Boundary

0.000 406.000
900.000 406.000

External Boundary

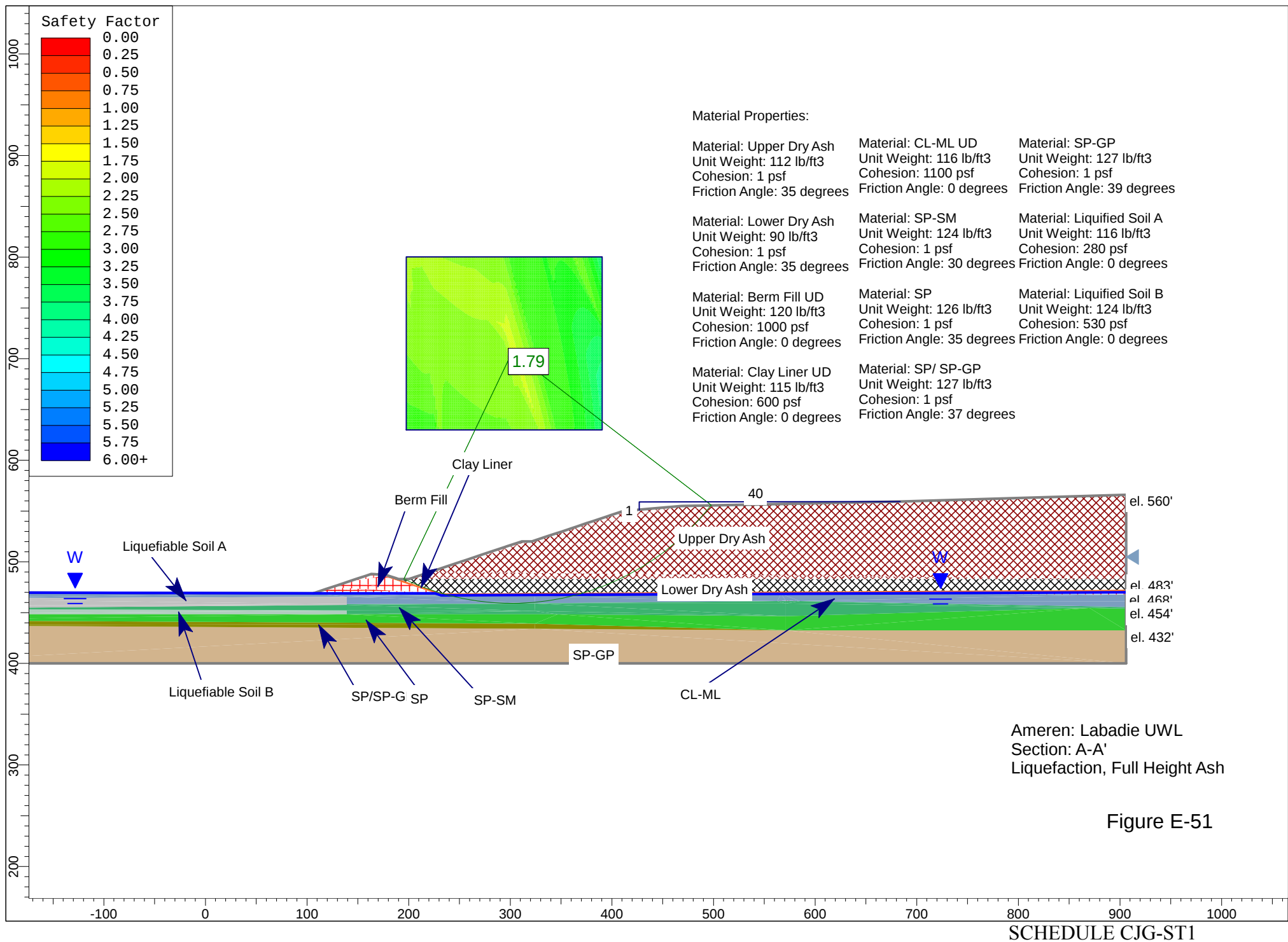
0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650
900.000	483.000
900.000	557.508
835.274	555.209
700.182	552.508
635.839	548.857
612.524	547.508
600.658	543.553
597.524	542.508
584.510	538.170
582.524	537.508
568.376	532.792
567.524	532.508
566.146	532.049
552.524	527.508
543.872	524.624
537.524	522.508
527.732	519.244
522.524	517.508
515.418	517.508
512.524	517.508
500.863	513.621
497.524	512.508
484.760	508.253
482.524	507.508
468.670	502.890
467.524	502.508
465.715	501.905
452.524	497.508
444.442	494.814
437.524	492.508
429.376	489.792
422.524	487.508
414.376	484.792
409.030	483.010
384.014	483.011
380.635	484.137
367.800	488.000
355.800	488.000
283.800	464.000

Water Table

-0.000	464.000
433.805	464.000
900.000	464.000

Focus/Block Search Line

355.800	367.000
355.800	488.000



Slide Analysis Information

Document Name

File Name: Section AA Full Liquefaction trial.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 1100 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Liquified Soil A

Strength Type: Mohr-Coulomb

Unit Weight: 116 lb/ft³

Cohesion: 280 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquified Soil B

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 530 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.793830

Center: 301.709, 706.526

Radius: 247.630

Left Slip Surface Endpoint: 195.141, 483.000

Right Slip Surface Endpoint: 498.023, 555.592

Resisting Moment=1.50128e+008 lb-ft

Driving Moment=8.36912e+007 lb-ft

Method: spencer

FS: 1.760750

Center: 301.709, 706.526

Radius: 247.630

Left Slip Surface Endpoint: 195.141, 483.000

Right Slip Surface Endpoint: 498.023, 555.592

Resisting Moment=1.47359e+008 lb-ft

Driving Moment=8.36912e+007 lb-ft

Resisting Horizontal Force=534205 lb

Driving Horizontal Force=303397 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 33047

Number of Invalid Surfaces: 79164

Error Codes:

Error Code -103 reported for 79164 surfaces

Method: spencer

Number of Valid Surfaces: 33047

Number of Invalid Surfaces: 79164

Error Codes:

Error Code -103 reported for 79164 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

List of All Coordinates

Search Grid

197.646	629.813
390.355	629.813
390.355	800.286
197.646	800.286

Material Boundary

-310.816	456.500
139.040	458.315
324.184	459.061
562.692	461.315
571.184	461.561
584.957	461.312
906.000	455.500

Material Boundary

346.669	448.252
571.184	446.561
869.969	454.538
906.000	455.500

Material Boundary

-310.816	442.454
323.787	439.064
571.184	432.561

Material Boundary

-310.816	437.454
324.184	434.061

Material Boundary

324.184	434.061
571.184	432.561

Material Boundary

190.000	483.000
232.000	469.000
566.246	468.488
906.000	467.967

Material Boundary

106.184	469.061
225.991	469.003
232.000	469.000

Material Boundary

200.000	483.000
906.000	483.000

Material Boundary

-310.816	448.252
139.066	448.252
346.669	448.252

Material Boundary

571.184	432.561
906.000	432.561

Material Boundary

232.000	469.000
906.000	472.524

Material Boundary

175.000	488.000
175.000	486.000
225.991	469.003
232.000	467.000
566.246	468.488
906.000	470.000

Material Boundary

-310.816	463.753
139.040	465.524
324.184	466.253
562.692	461.315
571.184	461.315
584.957	461.312
906.000	461.253

Material Boundary

-310.816	453.702
139.066	452.141
323.787	451.500
571.184	446.561

Material Boundary

-310.816	453.708
139.040	457.457
324.184	459.000
571.184	459.000
869.969	454.538
906.000	454.000

Material Boundary

139.040	457.457
139.040	458.315
139.040	465.524

Material Boundary

139.066	448.252
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139.066	452.141
---------	---------

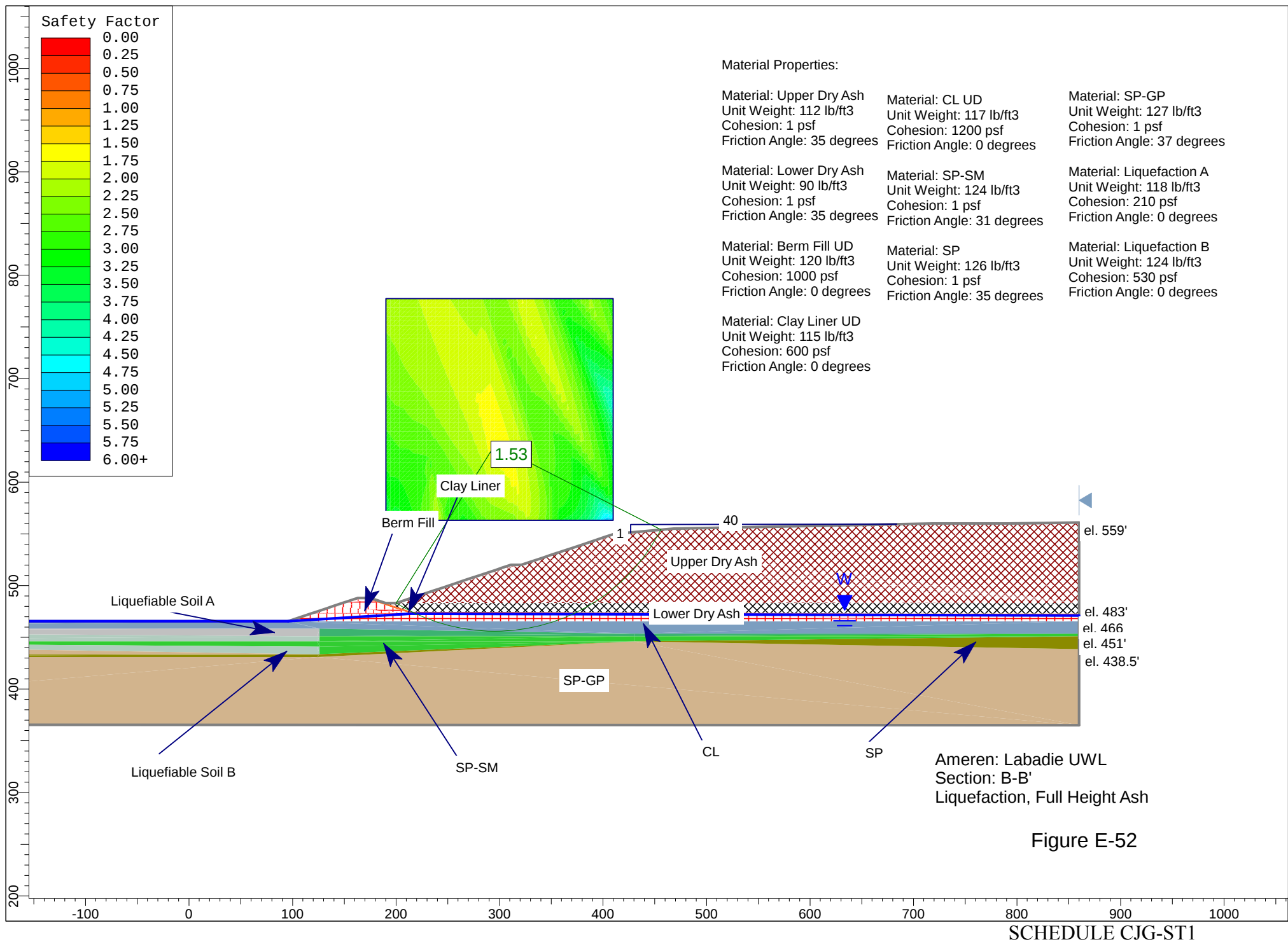
External Boundary

906.000	566.071
683.709	559.305
468.434	555.000
440.357	552.556
411.000	550.000
398.805	545.935
396.000	545.000
391.110	543.370
381.000	540.000
375.110	538.037
366.000	535.000
359.899	532.966
351.000	530.000
344.696	527.899
336.000	525.000
321.203	520.068
321.000	520.000
320.919	520.000
311.000	520.000
310.751	519.917
296.000	515.000
294.928	514.643
281.000	510.000
271.864	506.955
266.000	505.000
256.681	501.894
251.000	500.000
241.544	496.848
236.000	495.000
226.527	491.842
221.000	490.000
211.527	486.842
206.000	485.000
203.789	484.263
200.000	483.000
196.315	483.000
190.000	483.000
187.789	483.737
184.000	485.000
178.316	486.895
175.000	488.000
170.579	487.765
169.000	487.681
166.789	487.798
163.000	488.000
157.316	486.105
154.000	485.000
148.473	483.158
139.000	480.000
129.527	476.842
124.000	475.000
118.473	473.158
106.184	469.061

-310.816	469.954
-310.816	463.753
-310.816	456.500
-310.816	453.708
-310.816	453.702
-310.816	448.252
-310.816	442.454
-310.816	437.454
-310.816	400.000
906.000	400.000
906.000	432.561
906.000	454.000
906.000	455.500
906.000	461.253
906.000	467.967
906.000	470.000
906.000	472.524
906.000	483.000

Water Table

-310.816	469.954
106.184	469.061
225.991	469.003
232.000	467.000
906.000	470.000



Slide Analysis Information

Document Name

File Name: Section BB Full Liquefaction trial.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL UD
Strength Type: Mohr-Coulomb
Unit Weight: 117 lb/ft³
Cohesion: 1200 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM
Strength Type: Mohr-Coulomb
Unit Weight: 118 lb/ft³
Cohesion: 1 psf
Friction Angle: 23 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Liquefaction A

Strength Type: Mohr-Coulomb

Unit Weight: 118 lb/ft³

Cohesion: 210 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefaction B

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 530 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.532240

Center: 295.485, 636.018

Radius: 180.396

Left Slip Surface Endpoint: 199.944, 483.000

Right Slip Surface Endpoint: 456.120, 553.928

Resisting Moment=8.16863e+007 lb-ft

Driving Moment=5.33118e+007 lb-ft

Method: spencer

FS: 1.505000

Center: 295.485, 636.018

Radius: 180.396

Left Slip Surface Endpoint: 199.944, 483.000

Right Slip Surface Endpoint: 456.120, 553.928

Resisting Moment=8.02343e+007 lb-ft

Driving Moment=5.33118e+007 lb-ft

Resisting Horizontal Force=380943 lb

Driving Horizontal Force=253118 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 10920

Number of Invalid Surfaces: 17691

Error Codes:

Error Code -103 reported for 17691 surfaces

Method: spencer

Number of Valid Surfaces: 10920

Number of Invalid Surfaces: 17691

Error Codes:

Error Code -103 reported for 17691 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

List of All Coordinates

Search Grid

190.079	563.188
409.674	563.188
409.674	777.395
190.079	777.395

Material Boundary

-650.000	458.500
124.000	458.500
125.993	458.467
430.000	453.500
860.010	453.500

Material Boundary

-650.000	456.000
124.000	451.000
125.993	451.000
430.000	451.000
860.010	453.500

Material Boundary

-650.000	446.000
124.000	433.500

Material Boundary

-650.000	433.500
124.000	433.500

Material Boundary

-650.000	431.000
124.000	431.000
430.000	446.000
860.008	438.502

Material Boundary

190.000	483.000
214.462	474.846
491.000	474.000
671.000	473.000
860.012	473.000

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
214.462	472.846
214.462	474.846

Material Boundary

214.462	472.846
860.011	471.000

Material Boundary

95.732	465.577
860.011	465.591

Material Boundary

200.000	483.000
860.013	482.998

Material Boundary

-650.000	446.000
124.000	446.000
125.993	446.000
430.000	446.000
126.006	441.033
124.000	441.000
-650.000	446.000

Material Boundary

124.000	433.500
126.006	433.582
430.000	446.000

Material Boundary

430.000	446.000
860.009	450.998

Material Boundary

125.993	446.000
125.993	451.000
125.993	458.467

Material Boundary

126.006	433.582
126.006	441.033

External Boundary

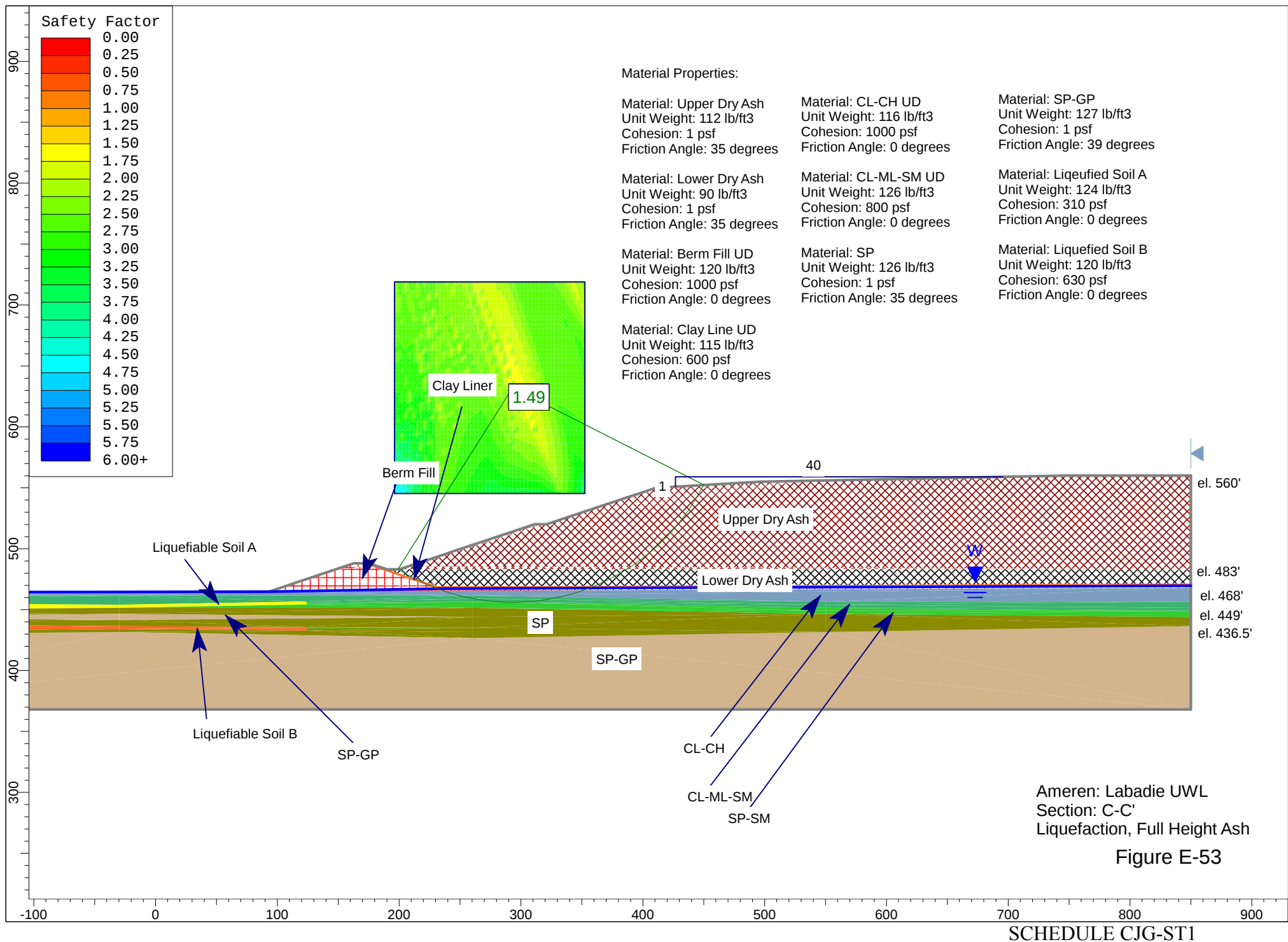
-650.000	365.500
860.000	365.000
860.008	438.502
860.009	450.998
860.010	453.500
860.010	453.500
860.011	465.591
860.011	471.000
860.012	473.000
860.013	482.998

860.021	560.896
792.394	560.000
718.434	560.000
500.172	555.635
468.434	555.000
461.429	554.390
411.000	550.000
401.743	546.914
396.000	545.000
386.646	541.882
381.000	540.000
371.552	536.851
366.000	535.000
356.462	531.821
351.000	530.000
341.374	526.791
336.000	525.000
329.925	522.975
321.000	520.000
315.050	520.000
311.000	520.000
302.030	517.010
296.000	515.000
286.965	511.988
281.000	510.000
271.903	506.968
266.000	505.000
256.842	501.947
251.000	500.000
245.235	498.078
236.000	495.000
230.209	493.070
221.000	490.000
215.184	488.061
206.000	485.000
203.665	484.222
200.000	483.000
196.100	483.000
190.000	483.000
187.654	483.782
184.000	485.000
180.474	486.175
175.000	488.000
170.055	487.977
169.000	487.972
166.542	487.983
163.000	488.000
159.335	486.778
154.000	485.000
147.892	482.964
139.000	480.000
132.892	477.964
124.000	475.000
117.892	472.964
95.732	465.577
-650.000	465.500

-650.000	458.500
-650.000	456.000
-650.000	446.000
-650.000	433.500
-650.000	431.000

Water Table

-650.000	465.500
95.732	465.577
214.462	472.846
860.011	471.000



Slide Analysis Information

Document Name

File Name: section CC full liquefaction trial.sli

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
Spencer

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: 4

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML-SM UD
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 800 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 39 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil A

Strength Type: Mohr-Coulomb

Unit Weight: 124 lb/ft³

Cohesion: 310 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil B

Strength Type: Mohr-Coulomb

Unit Weight: 120 lb/ft³

Cohesion: 630 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.489100

Center: 293.035, 632.077

Radius: 176.242

Left Slip Surface Endpoint: 199.028, 483.000

Right Slip Surface Endpoint: 450.184, 552.293

Resisting Moment=7.50122e+007 lb-ft

Driving Moment=5.03741e+007 lb-ft

Method: spencer

FS: 1.457850

Center: 293.035, 632.077

Radius: 176.242

Left Slip Surface Endpoint: 199.028, 483.000

Right Slip Surface Endpoint: 450.184, 552.293

Resisting Moment=7.34381e+007 lb-ft

Driving Moment=5.03741e+007 lb-ft

Resisting Horizontal Force=353627 lb

Driving Horizontal Force=242567 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 9261

Number of Invalid Surfaces: 19350

Error Codes:

Error Code -103 reported for 19350 surfaces

Method: spencer

Number of Valid Surfaces: 9252

Number of Invalid Surfaces: 19359

Error Codes:

Error Code -103 reported for 19350 surfaces

Error Code -108 reported for 1 surface

Error Code -111 reported for 8 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

List of All Coordinates

Search Grid

196.036	545.266
352.486	545.266
352.486	718.889
196.036	718.889

Material Boundary

93.161	464.720
850.000	468.000

Material Boundary

190.000	483.000
231.496	469.168
540.000	470.000
740.000	471.000
850.000	471.550

Material Boundary

200.000	483.000
850.000	483.098

Material Boundary

175.000	486.000
175.000	488.000

Material Boundary

175.000	486.000
231.496	467.168
231.496	469.168

Material Boundary

231.496	467.168
850.000	469.550

Material Boundary

-330.000	461.500
-30.000	461.500
260.000	461.500
550.000	456.500
850.000	456.500

Material Boundary

-330.000	456.500
-30.000	454.000
124.000	455.328
260.000	456.500
550.000	451.500
850.000	449.000

Material Boundary

-330.000	449.000
-30.000	451.500
260.000	451.500
550.000	446.500
850.000	444.000

Material Boundary

-330.000	444.000
-30.000	446.500
260.000	444.000
-30.000	441.500
-330.000	444.000

Material Boundary

-330.000	431.500
-30.000	434.000
124.060	434.531
260.000	435.000
124.060	435.703
-30.000	436.500
-330.000	439.000

Material Boundary

-330.000	429.000
-30.000	431.500
260.000	426.500
550.000	431.500
850.000	436.500

Material Boundary

-30.000	454.000
124.000	456.655
260.000	459.000
550.000	454.000
850.000	451.500

Material Boundary

-30.000	451.500
124.000	454.155
260.000	456.500

550.000	449.000
850.000	449.000

Material Boundary

-30.000	434.000
124.060	432.672
260.000	431.500
550.000	431.500
260.000	435.000

Material Boundary

124.000	454.155
124.000	455.328
124.000	456.655

Material Boundary

124.060	432.672
124.060	434.531
124.060	435.703

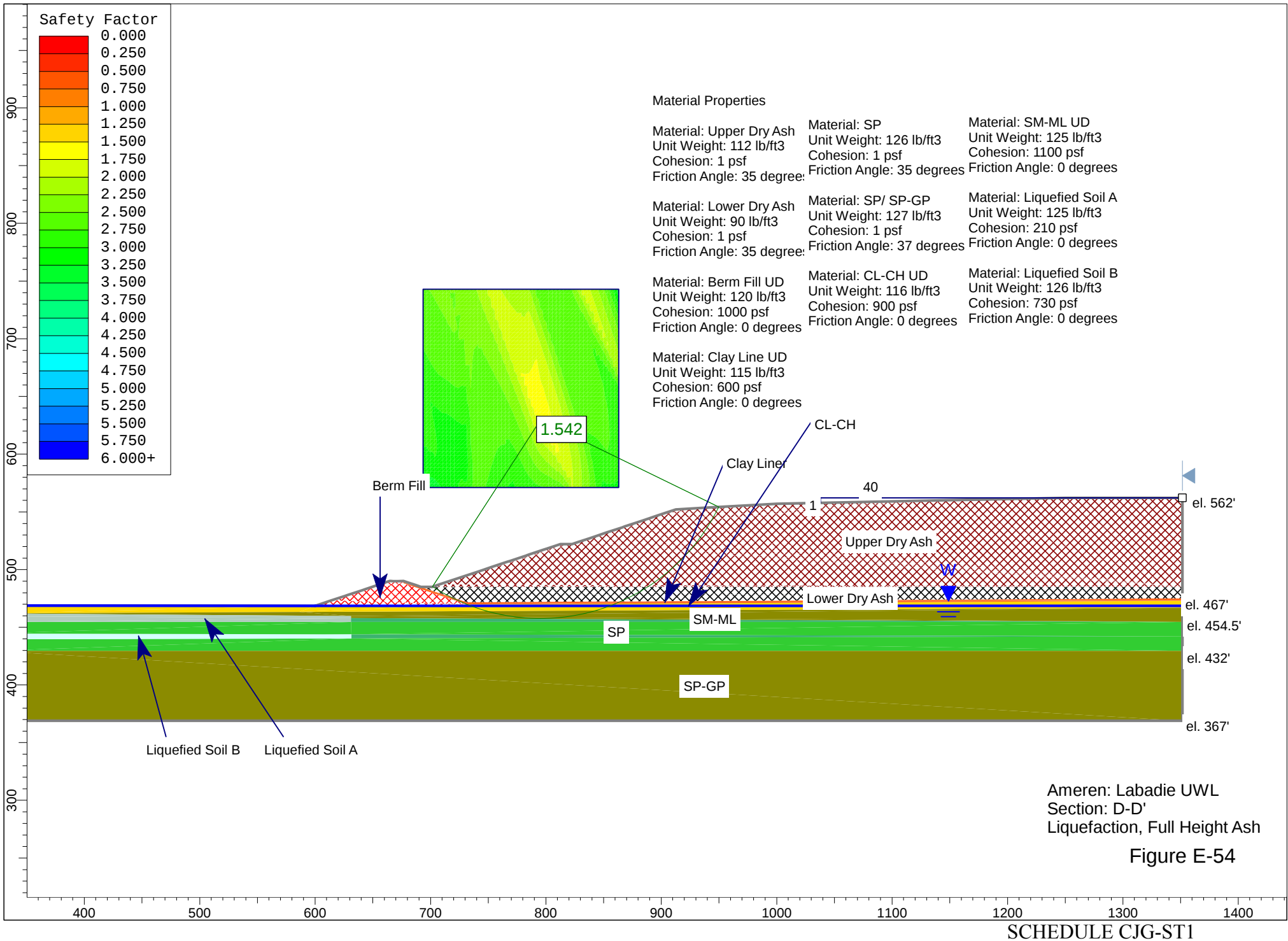
External Boundary

850.000	560.000
746.465	560.000
531.296	555.697
496.414	555.000
428.162	551.003
411.000	550.000
410.785	549.928
396.000	545.000
394.686	544.562
381.000	540.000
378.604	539.201
366.000	535.000
357.068	532.023
351.000	530.000
337.385	525.462
336.000	525.000
321.299	520.100
321.000	520.000
316.824	520.000
311.000	520.000
310.590	519.863
296.000	515.000
294.508	514.503
281.000	510.000
278.441	509.147
266.000	505.000
256.165	501.722
251.000	500.000
249.169	499.390
236.000	495.000
234.321	494.440
221.000	490.000
207.609	485.536
206.000	485.000
205.359	484.786

200.000	483.000
198.942	483.000
190.000	483.000
189.375	483.208
184.000	485.000
183.073	485.309
175.000	488.000
174.160	487.986
172.299	487.955
169.000	487.901
168.082	487.916
163.000	488.000
157.036	486.012
154.000	485.000
144.060	481.687
139.000	480.000
129.060	476.687
124.000	475.000
118.940	473.313
93.161	464.720
-330.000	464.000
-330.000	461.500
-330.000	456.500
-330.000	449.000
-330.000	444.000
-330.000	439.000
-330.000	431.500
-330.000	429.000
-330.000	368.000
850.000	368.000
850.000	436.500
850.000	444.000
850.000	449.000
850.000	451.500
850.000	456.500
850.000	468.000
850.000	469.550
850.000	471.550
850.000	483.098

Water Table

-330.000	464.000
93.161	464.720
231.496	467.168
850.000	469.550



Slide Analysis Information

Document Name

File Name: Section DD Full liquefaction10192012 trial.sli

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
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 30 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 126 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP/ SP-GP
Strength Type: Mohr-Coulomb
Unit Weight: 127 lb/ft³
Cohesion: 1 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH UD
Strength Type: Mohr-Coulomb
Unit Weight: 116 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML UD
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1100 psf
Friction Angle: 0 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil A

Strength Type: Mohr-Coulomb

Unit Weight: 125 lb/ft³

Cohesion: 210 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Material: Liquefied Soil B

Strength Type: Mohr-Coulomb

Unit Weight: 126 lb/ft³

Cohesion: 730 psf

Friction Angle: 0 degrees

Water Surface: Water Table

Custom Hu value: 1

Global Minimums

Method: bishop simplified

FS: 1.542230

Center: 795.258, 629.507

Radius: 172.083

Left Slip Surface Endpoint: 701.713, 485.071

Right Slip Surface Endpoint: 949.968, 554.159

Resisting Moment=7.53614e+007 lb-ft

Driving Moment=4.88651e+007 lb-ft

Method: spencer

FS: 1.505590

Center: 795.258, 629.507

Radius: 172.083

Left Slip Surface Endpoint: 701.713, 485.071

Right Slip Surface Endpoint: 949.968, 554.159

Resisting Moment=7.35709e+007 lb-ft

Driving Moment=4.88651e+007 lb-ft

Resisting Horizontal Force=364772 lb

Driving Horizontal Force=242278 lb

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 9730

Number of Invalid Surfaces: 18881

Error Codes:

Error Code -103 reported for 18881 surfaces

Method: spencer

Number of Valid Surfaces: 9730

Number of Invalid Surfaces: 18881

Error Codes:

Error Code -103 reported for 18881 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections,
but one or more surface / nonslope external polygon
intersections lie between them. This usually occurs
when the slip surface extends past the bottom of the
soil region, but may also occur on a benched
slope model with two sets of Slope Limits.

List of All Coordinates

Search Grid

693.479	571.138
863.111	571.138
863.111	742.812
693.479	742.812

Material Boundary

691.524	485.008
731.239	471.770
966.524	473.008
1151.524	474.008
1351.524	475.008

Material Boundary

676.524	488.008
676.524	490.008

Material Boundary

676.524	488.008
731.239	469.770
731.239	471.770

Material Boundary

600.000	468.500
731.239	469.770
1351.524	473.008

Material Boundary

701.524	485.008
1351.524	484.949

Material Boundary

0.000	459.500
89.000	459.500
280.000	457.000
320.000	462.000
586.149	463.291
1351.524	467.002

Material Boundary

1351.524	454.500
630.976	457.993
320.000	459.500
280.000	457.000

320.000	454.500
630.976	454.500
1351.524	454.500

Material Boundary

0.000	432.000
89.000	432.000
280.000	432.000
320.000	429.500
1351.524	429.500

Material Boundary

0.000	454.500
280.000	457.000

Material Boundary

320.000	462.000
630.976	459.739
1351.524	454.500

Material Boundary

280.000	442.000
320.000	444.500
631.373	443.790
1351.524	442.149
631.373	440.300
320.000	439.500
280.000	442.000

Material Boundary

630.976	454.500
630.976	457.993
630.976	459.739

Material Boundary

631.373	440.300
631.373	443.790

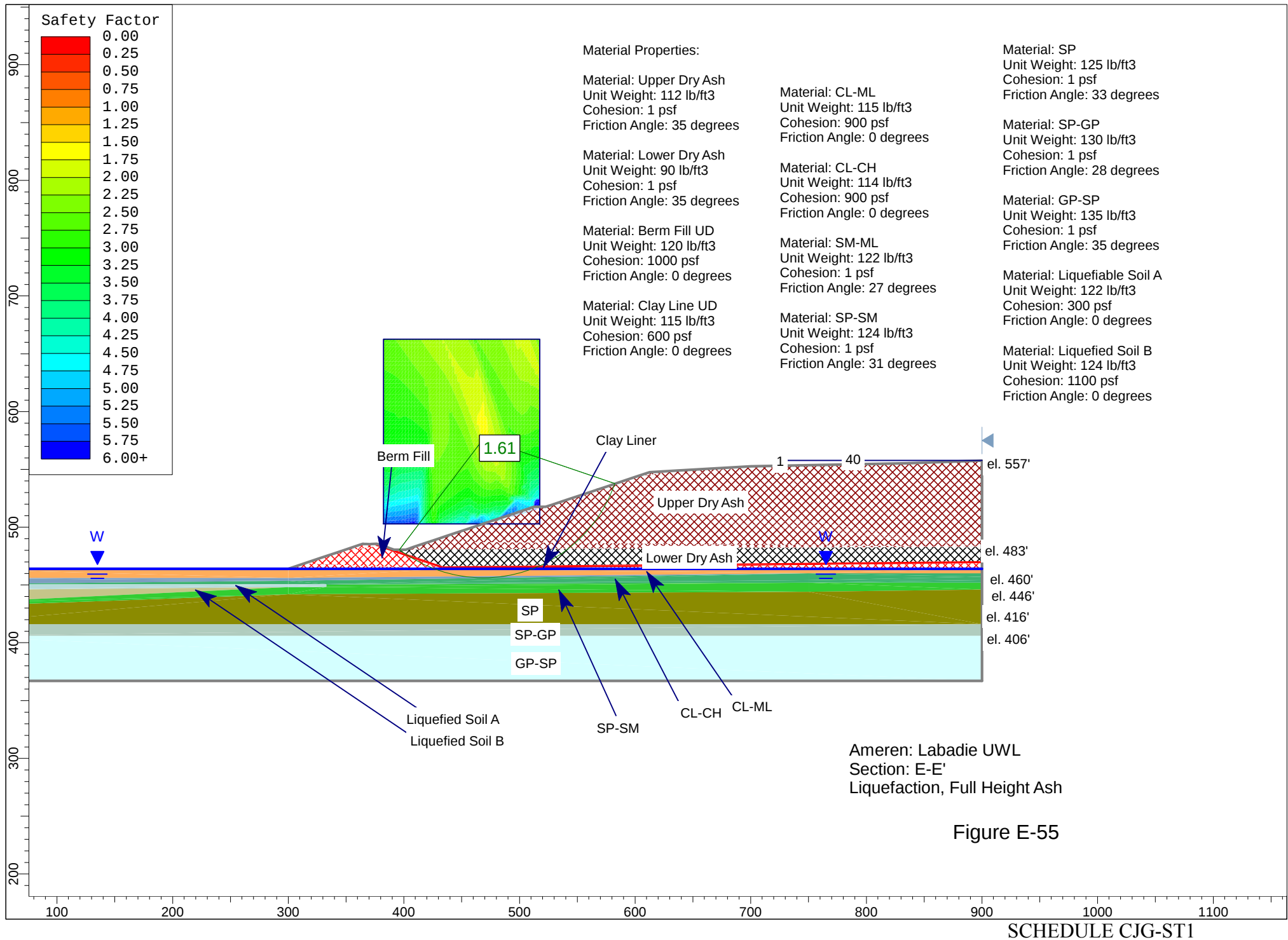
External Boundary

-0.000	469.008
0.000	459.500
0.000	454.500
0.000	432.000
-0.000	369.008
1351.524	369.008
1351.524	429.500
1351.524	442.149
1351.524	454.500
1351.524	467.002
1351.524	473.008
1351.524	475.008
1351.524	484.949
1351.524	562.008
1250.221	562.008
1135.274	559.709
1000.182	557.008

935.839	553.357
912.524	552.008
900.658	548.053
897.524	547.008
884.510	542.670
882.524	542.008
868.376	537.292
867.524	537.008
866.146	536.549
852.524	532.008
843.872	529.124
837.524	527.008
827.732	523.744
822.524	522.008
815.418	522.008
812.524	522.008
800.863	518.121
797.524	517.008
784.760	512.753
782.524	512.008
768.670	507.390
767.524	507.008
765.715	506.405
752.524	502.008
744.442	499.314
737.524	497.008
729.376	494.292
722.524	492.008
714.376	489.292
707.524	487.008
704.265	485.922
701.524	485.008
696.092	485.008
691.524	485.008
688.265	486.094
685.524	487.008
680.635	488.637
676.524	490.008
671.846	489.835
670.524	489.787
667.488	489.899
665.657	489.966
664.524	490.008
660.789	488.763
655.524	487.008
643.630	483.043
640.524	482.008
628.630	478.043
625.524	477.008
613.630	473.043
600.000	468.500

Water Table

-0.000	469.008
600.000	468.500
1351.524	468.500



Slide Analysis Information

Document Name

File Name: Section EE Full Liquefaction 10192012 trial.sli

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:
GLE/Morgenstern-Price with interslice force function: Half Sine
Spencer

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

Material Properties

Material: Upper Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 112 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Lower Dry Ash
Strength Type: Mohr-Coulomb
Unit Weight: 90 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees

Water Surface: Water Table
Custom Hu value: 1

Material: Berm Fill UD
Strength Type: Mohr-Coulomb
Unit Weight: 120 lb/ft³
Cohesion: 1000 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Clay Line UD
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 600 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-ML
Strength Type: Mohr-Coulomb
Unit Weight: 115 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: CL-CH
Strength Type: Mohr-Coulomb
Unit Weight: 114 lb/ft³
Cohesion: 900 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SM-ML
Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 1 psf
Friction Angle: 27 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP-SM
Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1 psf
Friction Angle: 31 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: SP
Strength Type: Mohr-Coulomb
Unit Weight: 125 lb/ft³
Cohesion: 1 psf
Friction Angle: 33 degrees
Water Surface: Water Table

Custom Hu value: 1

Material: SP-GP

Strength Type: Mohr-Coulomb
Unit Weight: 130 lb/ft³
Cohesion: 1 psf
Friction Angle: 28 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: GP-SP

Strength Type: Mohr-Coulomb
Unit Weight: 135 lb/ft³
Cohesion: 1 psf
Friction Angle: 35 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Liquefiable Soil A

Strength Type: Mohr-Coulomb
Unit Weight: 122 lb/ft³
Cohesion: 300 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Material: Liquefied Soil B

Strength Type: Mohr-Coulomb
Unit Weight: 124 lb/ft³
Cohesion: 1100 psf
Friction Angle: 0 degrees
Water Surface: Water Table
Custom Hu value: 1

Global Minimums

Method: spencer

FS: 1.607590
Center: 468.794, 576.286
Radius: 120.274
Left Slip Surface Endpoint: 396.046, 480.508
Right Slip Surface Endpoint: 582.660, 537.553
Resisting Moment=3.21609e+007 lb-ft
Driving Moment=2.00056e+007 lb-ft
Resisting Horizontal Force=223727 lb
Driving Horizontal Force=139169 lb

Method: gle/morgenstern-price

FS: 1.587840
Center: 471.496, 573.090
Radius: 116.536
Left Slip Surface Endpoint: 400.720, 480.508
Right Slip Surface Endpoint: 582.459, 537.486
Resisting Moment=3.00767e+007 lb-ft
Driving Moment=1.89419e+007 lb-ft
Resisting Horizontal Force=214922 lb

Driving Horizontal Force=135355 lb

Valid / Invalid Surfaces

Method: spencer

Number of Valid Surfaces: 10955

Number of Invalid Surfaces: 17656

Error Codes:

Error Code -103 reported for 17335 surfaces

Error Code -107 reported for 20 surfaces

Error Code -108 reported for 41 surfaces

Error Code -111 reported for 28 surfaces

Error Code -112 reported for 232 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 10982

Number of Invalid Surfaces: 17629

Error Codes:

Error Code -103 reported for 17335 surfaces

Error Code -107 reported for 20 surfaces

Error Code -108 reported for 35 surfaces

Error Code -111 reported for 23 surfaces

Error Code -112 reported for 216 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.

-107 = Total driving moment or total driving force is negative. This will occur if the wrong failure direction is specified, or if high external or anchor loads are applied against the failure direction.

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F)$ < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

List of All Coordinates

Search Grid

382.348	502.783
517.420	502.783
517.420	662.572
382.348	662.572

Material Boundary

391.524	480.508
433.806	466.000
900.000	470.650

Material Boundary

376.524	483.508
376.524	485.508

Material Boundary

376.524	483.508
433.806	464.000
433.806	466.000

Material Boundary

401.524	480.508
900.000	483.000

Material Boundary

433.806	464.000
900.000	468.650

Material Boundary

300.000	464.000
433.806	464.000
900.000	464.000

Material Boundary

0.000	456.000
300.000	456.000
750.000	460.000
900.000	460.000

Material Boundary

0.000	450.500
300.000	453.500
750.000	460.000

Material Boundary

0.000	445.500
300.000	450.000
332.923	450.146
750.000	452.000
900.000	452.000

Material Boundary

0.000	431.000
300.000	442.000
750.000	444.000
900.000	446.000

Material Boundary

0.000	416.000
900.000	416.000

Material Boundary

0.000	406.000
900.000	406.000

Material Boundary

0.000	450.500
300.073	450.500
332.923	450.756
750.000	454.000
900.000	457.000

Material Boundary

750.000	452.000
900.000	454.000

Material Boundary

0.000	445.500
300.000	448.000
332.923	448.293
750.000	452.000

Material Boundary

0.000	434.000
300.000	448.000

Material Boundary

332.923	448.293
332.923	450.146
332.923	450.756

External Boundary

0.000	464.000
0.000	456.000
0.000	450.500
0.000	445.500
0.000	434.000
0.000	431.000
0.000	416.000
0.000	406.000
0.000	367.000
900.000	367.000
900.000	406.000
900.000	416.000
900.000	446.000
900.000	452.000
900.000	454.000

900.000	457.000
900.000	460.000
900.000	464.000
900.000	468.650
900.000	470.650
900.000	483.000
900.000	557.508
835.274	555.209
700.182	552.508
635.839	548.857
612.524	547.508
600.658	543.553
597.524	542.508
584.510	538.170
582.524	537.508
568.376	532.792
567.524	532.508
566.146	532.049
552.524	527.508
543.872	524.624
537.524	522.508
527.732	519.244
522.524	517.508
515.418	517.508
512.524	517.508
500.863	513.621
497.524	512.508
484.760	508.253
482.524	507.508
468.670	502.890
467.524	502.508
465.715	501.905
452.524	497.508
444.442	494.814
437.524	492.508
429.376	489.792
422.524	487.508
414.376	484.792
407.524	482.508
404.265	481.422
401.524	480.508
396.092	480.508
391.524	480.508
388.265	481.594
385.524	482.508
380.635	484.137
376.524	485.508
371.846	485.335
370.524	485.287
367.488	485.399
365.657	485.466
364.524	485.508
360.789	484.263
355.524	482.508
343.630	478.543

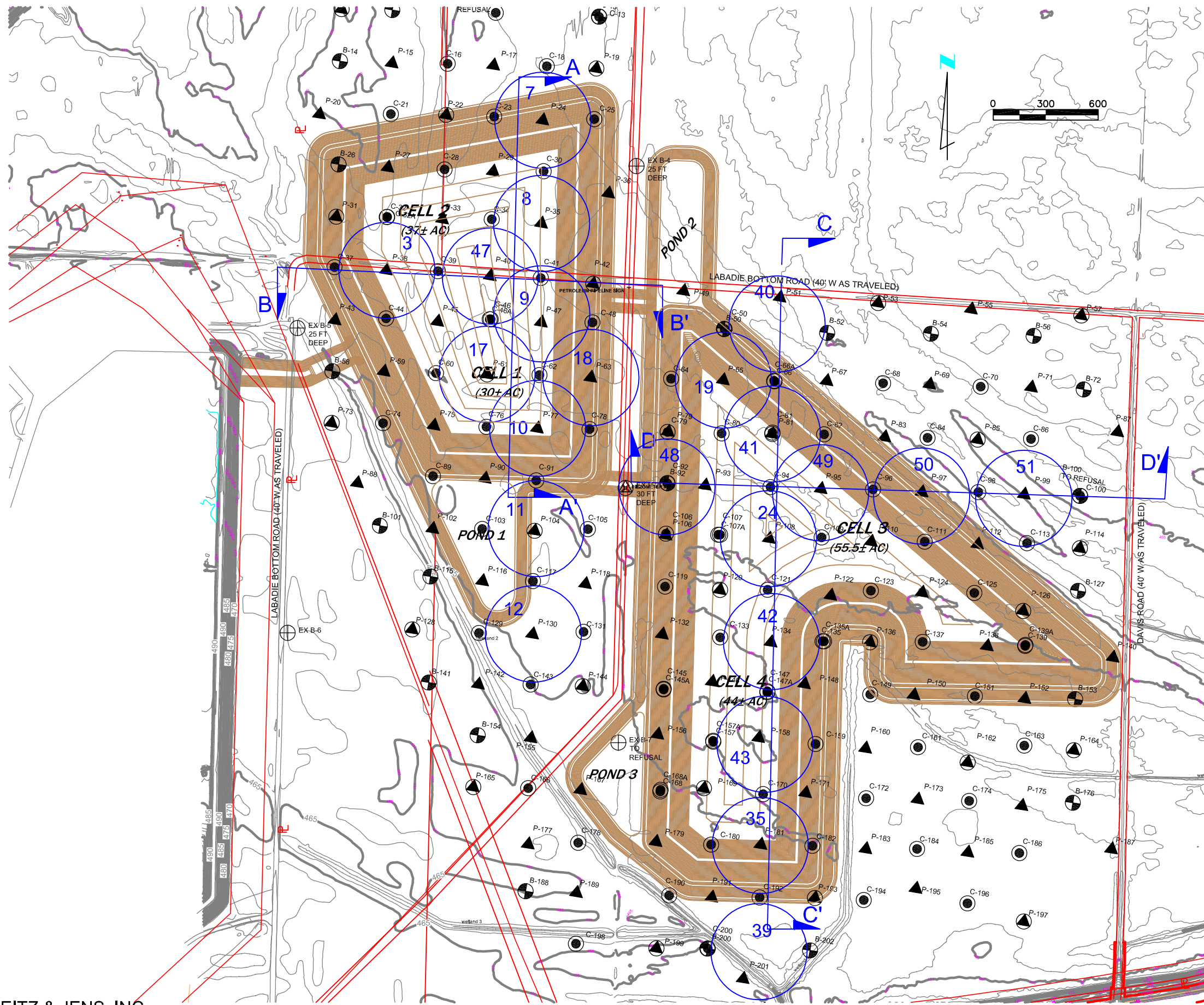
340.524	477.508
328.630	473.543
325.524	472.508
313.630	468.543
300.000	464.000

Water Table

0.000	464.000
433.806	464.000
900.000	464.000

Appendix F

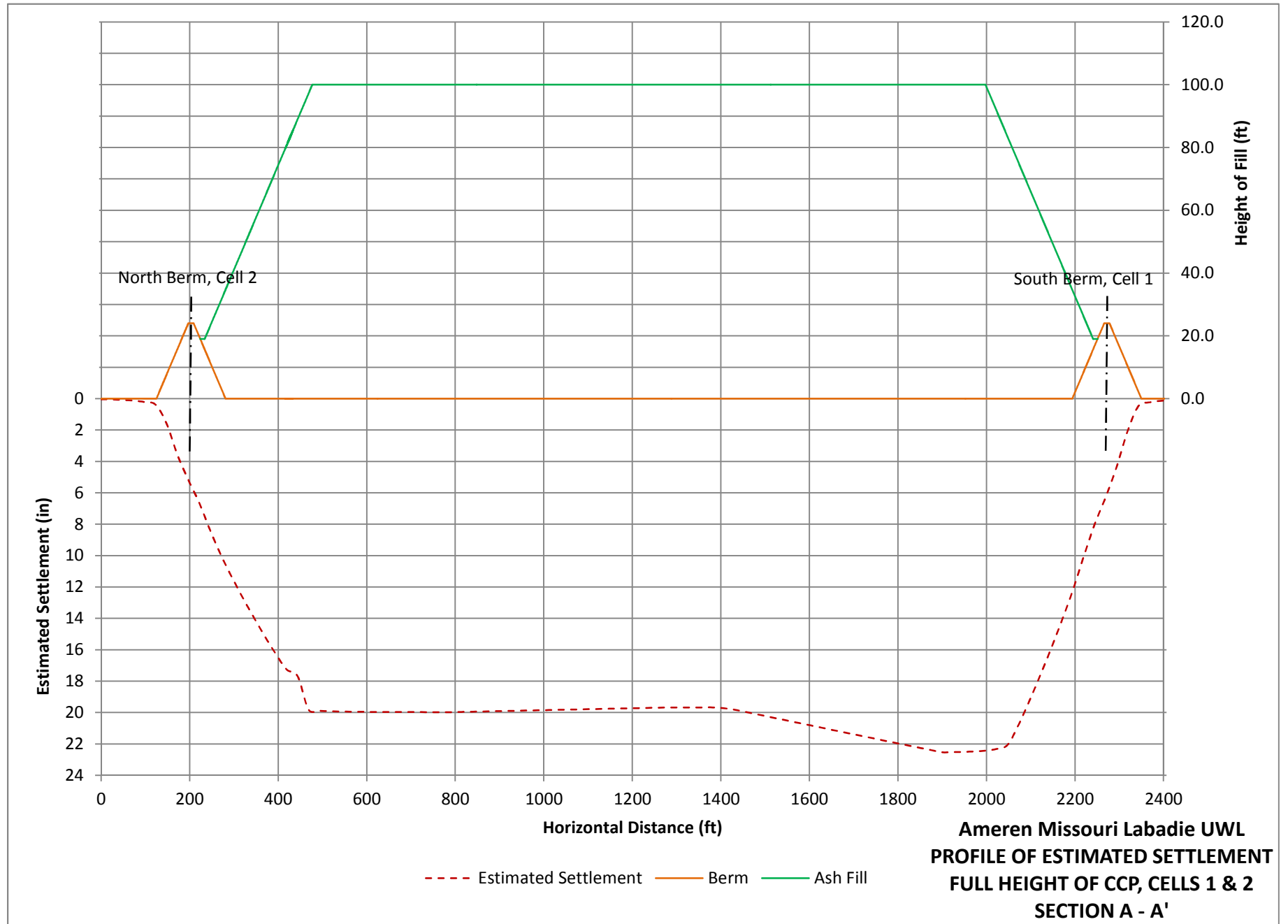
RESULTS OF SETTLEMENT ANALYSES
Revised August 2013

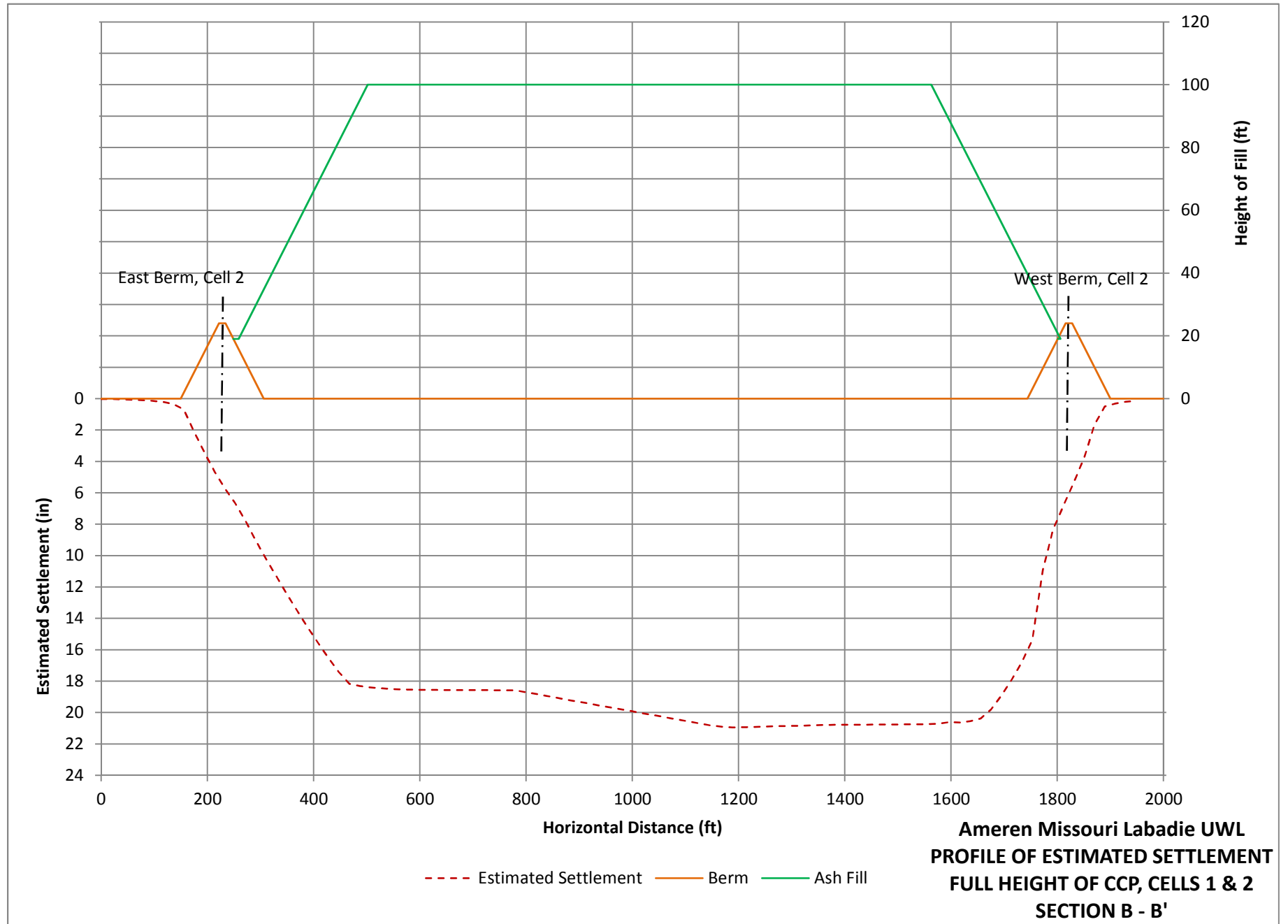


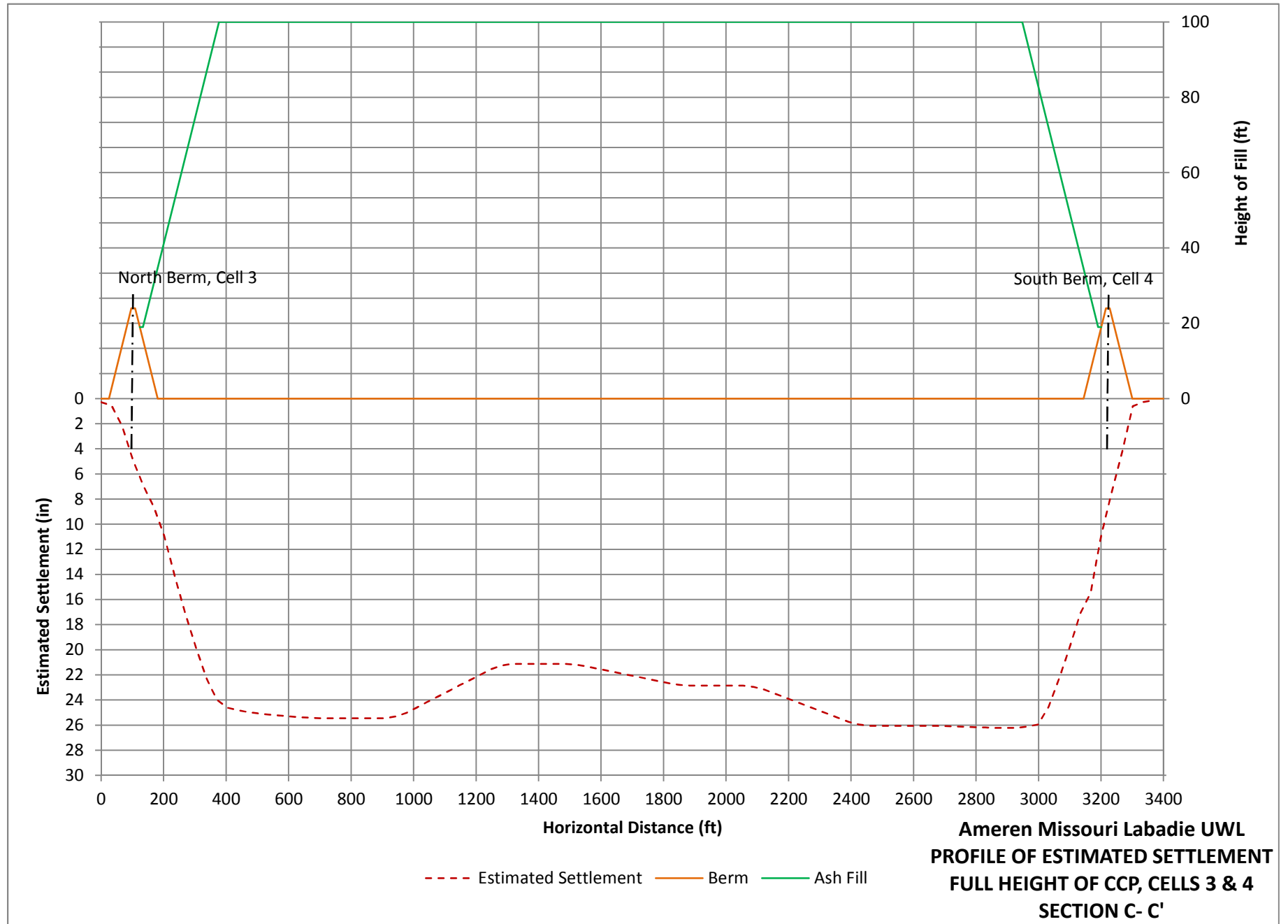
REITZ & JENS, INC.

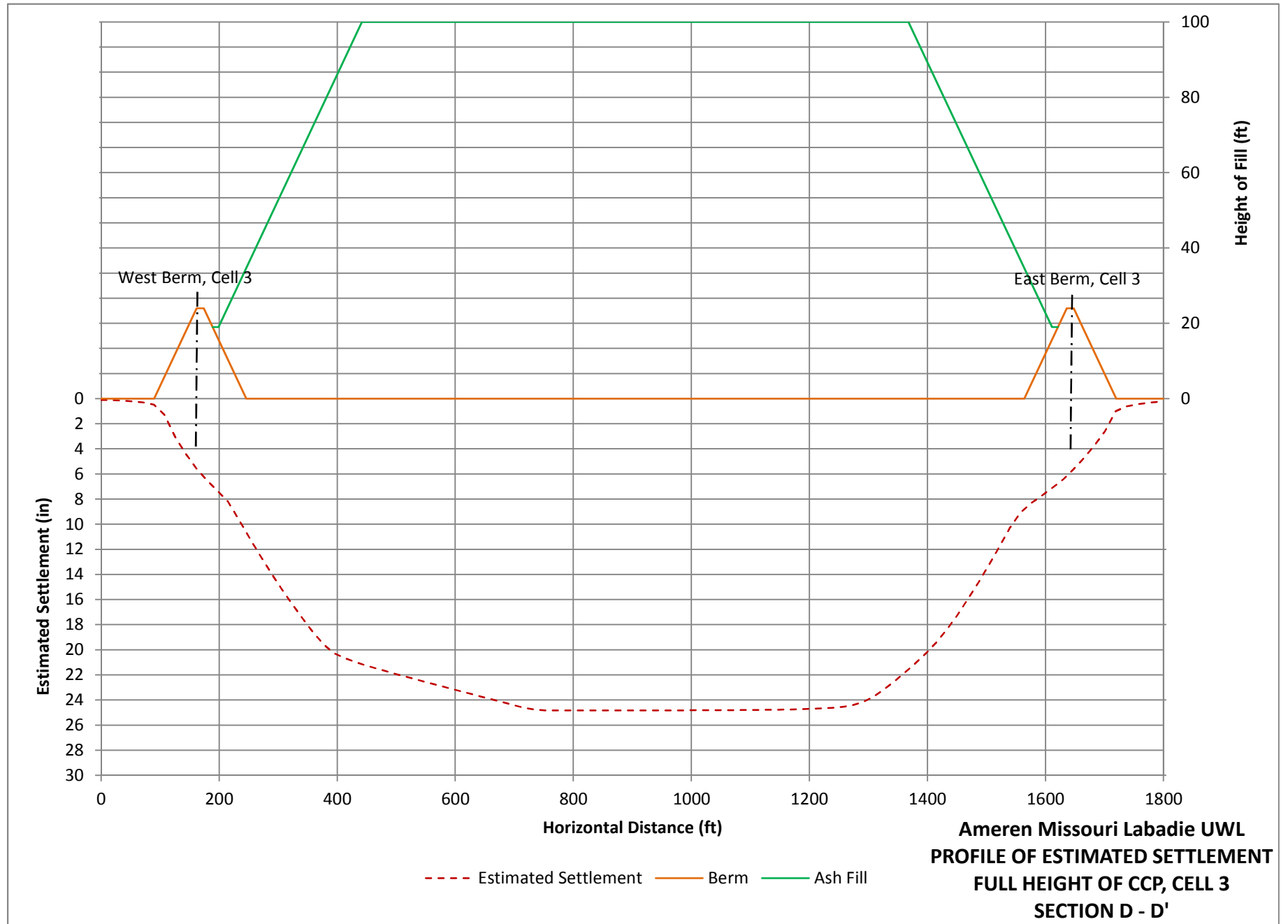
Ameren Missouri Labadie UWL
LOCATIONS OF SETTLEMENT CALCULATIONS
AND PROFILES OF ESTIMATED SETTLEMENT

Figure F-1
SCHEDULE CJG-ST1

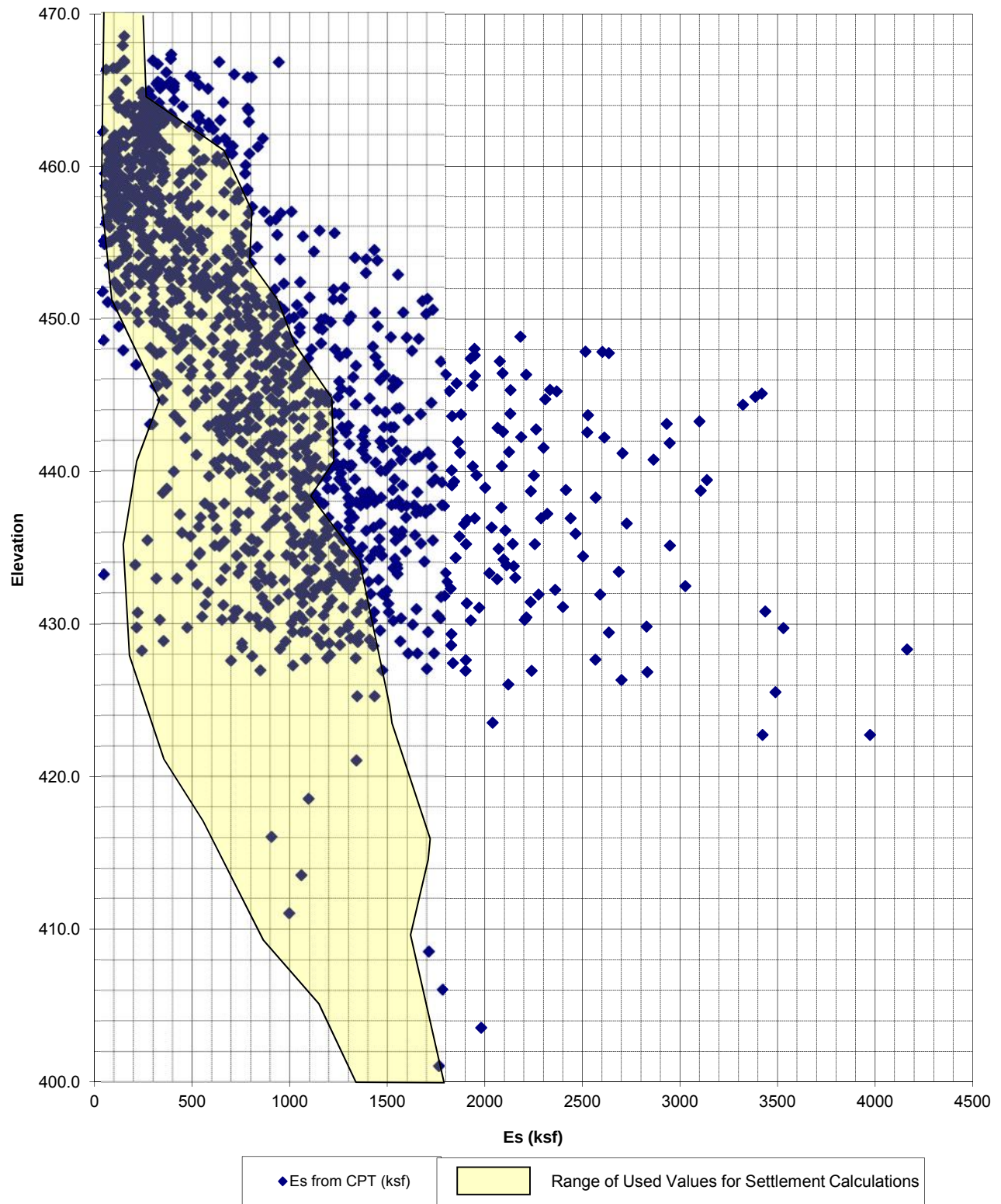


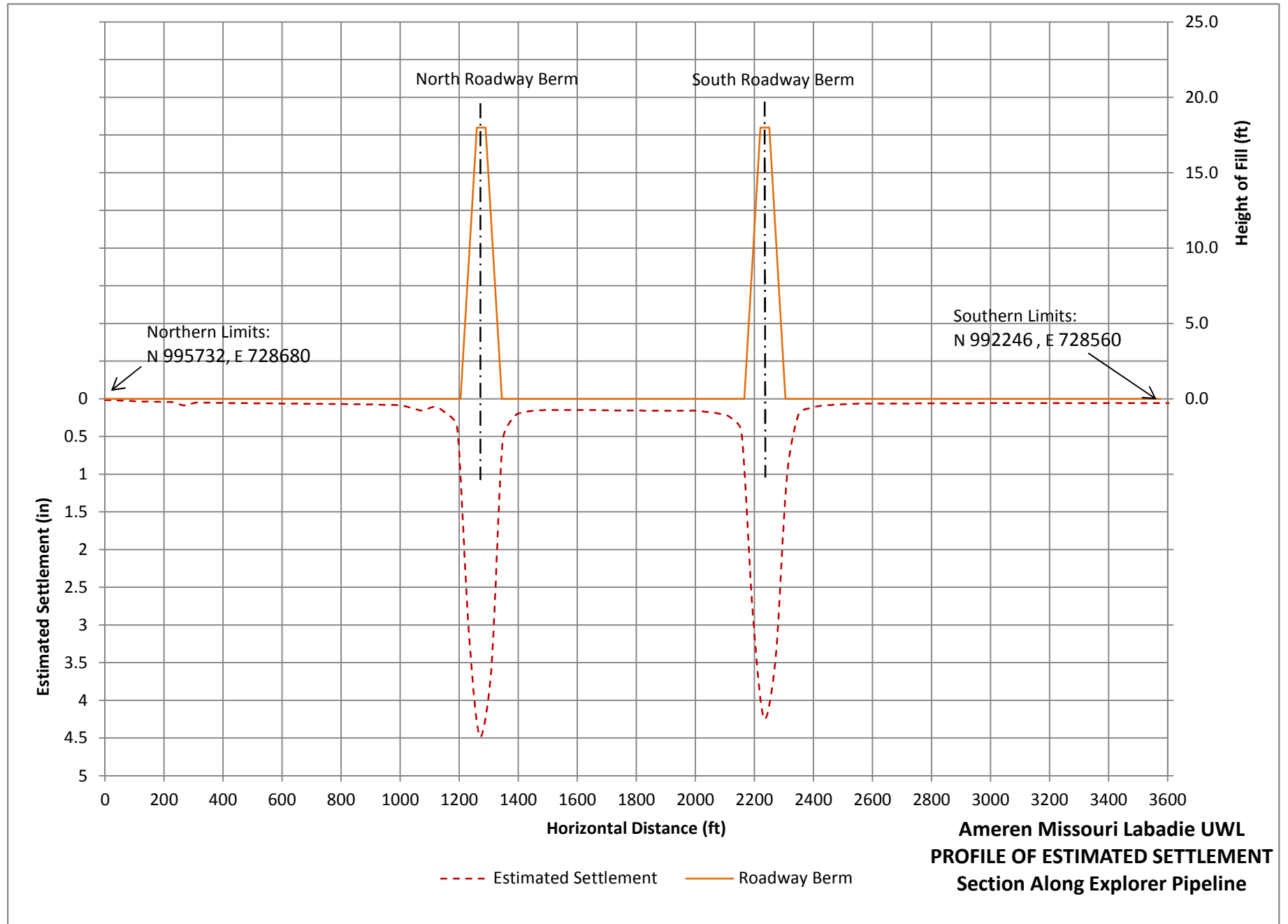






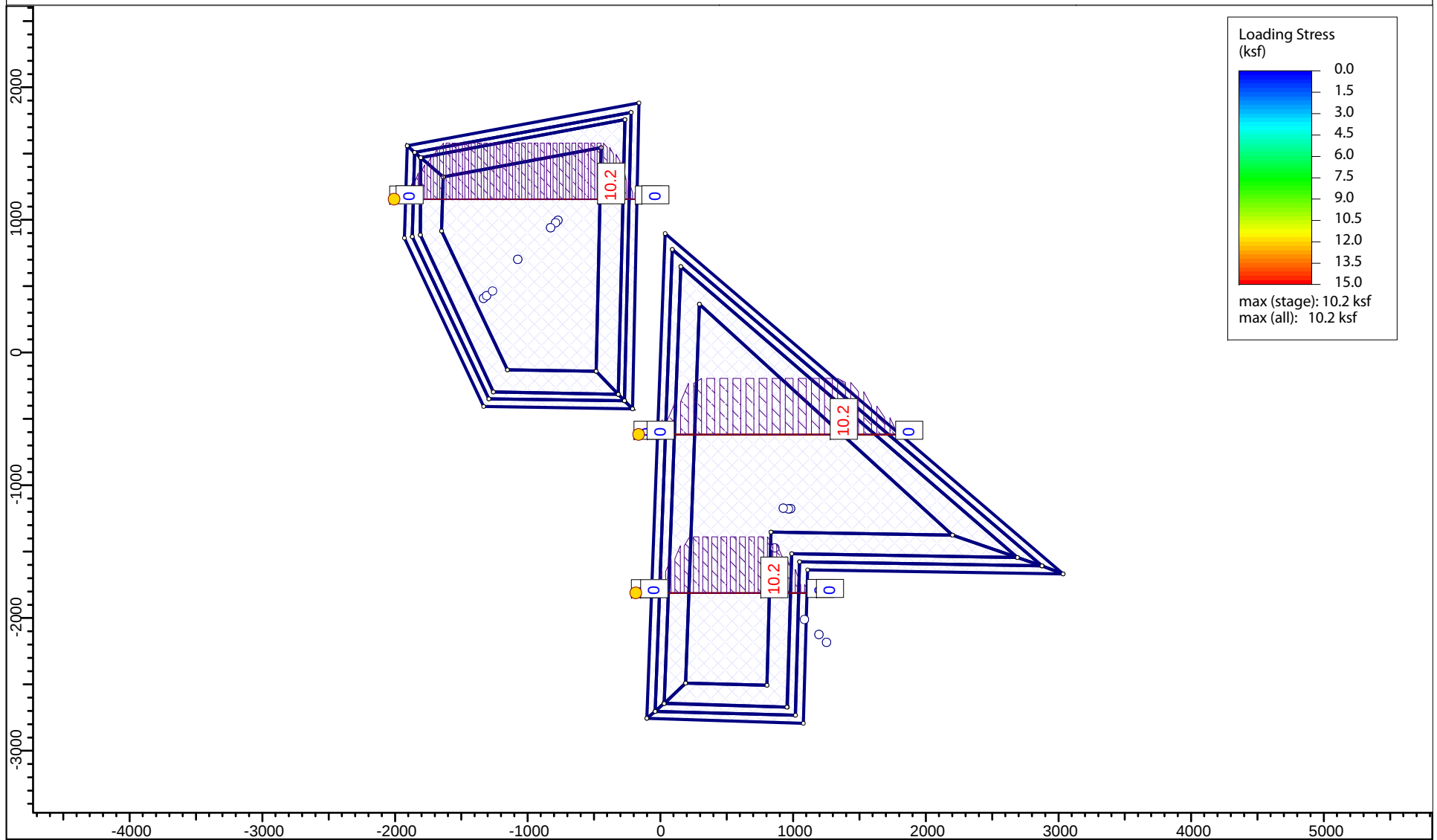
Ameren Missouri: Labadie UWL
Es (ksf) vs Elevation





Stage 1

Data Type: Loading Stress



SETTLE3D 2.016

Project		Ameren Labadie UWL	
Analysis Description		Settlement for Final UWL Configuration	
Drawn By	Christopher Cook	Company	Reitz & Jens, Inc
Date	10/17/2012, 11:48:36 AM	File Name	Base.s3z



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CONSULTING ENGINEERS

PROJECT

LABADIE UWL

SUBJECT

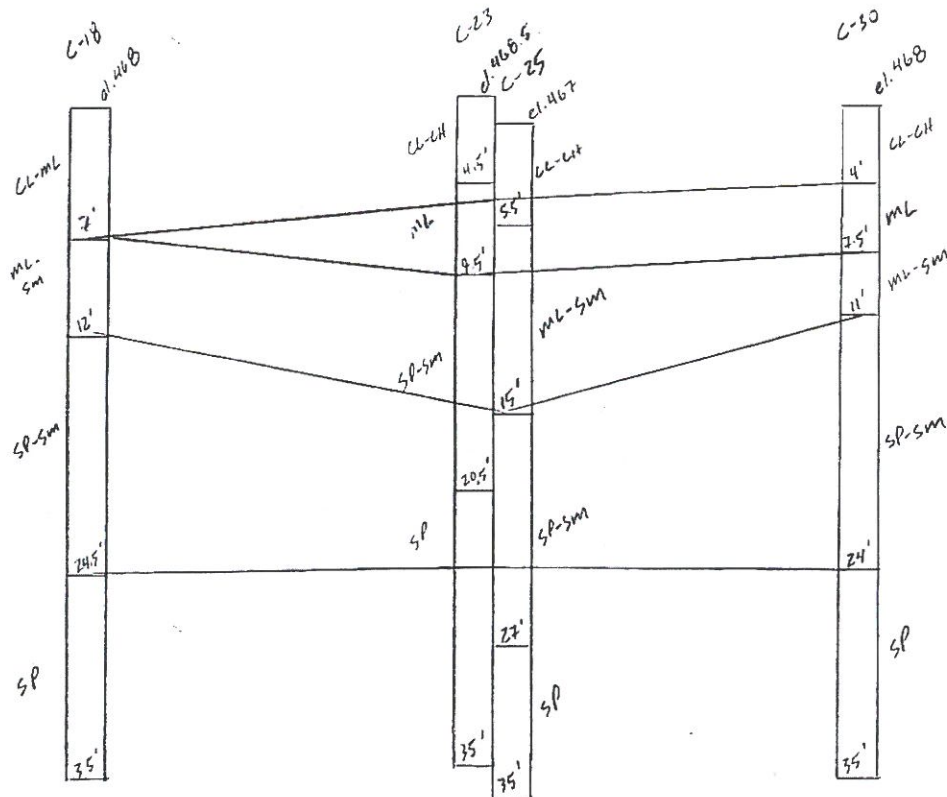
DATE 3-25-2011 BY JDB

Proj. Number

SHEET OF

SECTION ~~B-B~~ A-A'

CIRCLE 7



SETTLEMENT PROFILE

0-5.5'	CLAY	$\gamma_T = 113 \text{ PCF}$		
		$C_c = 0.30$	$C_s = 0.05$	$\theta_o = 0.917$
5.5-9.5'	SILT	$\gamma_T = 117 \text{ PCF}$	$E_{s \text{ top}} = 180 \text{ KSF}$	$E_{s \text{ bot.}} = 350 \text{ KSF}$
9.5-20.5'	SILT & SAND	$\gamma_T = 120 \text{ PCF}$	$E_s = 600 \text{ KSF}$	
20.5-24.5'	SAND & SILT	$\gamma_T = 120 \text{ PCF}$	$E_s = 800 \text{ KSF}$	
24.5-35'	SAND	$\gamma_T = 122 \text{ PCF}$	$E_s = 1200 \text{ KSF}$	
35-103'	SAND & GRAVEL	$\gamma_T = 124 \text{ PCF}$	$E_s = 1400 \text{ KSF}$	* ASSUMED FROM P-1



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CONSULTING ENGINEERS

PROJECT LABADIE UWL

SUBJECT _____

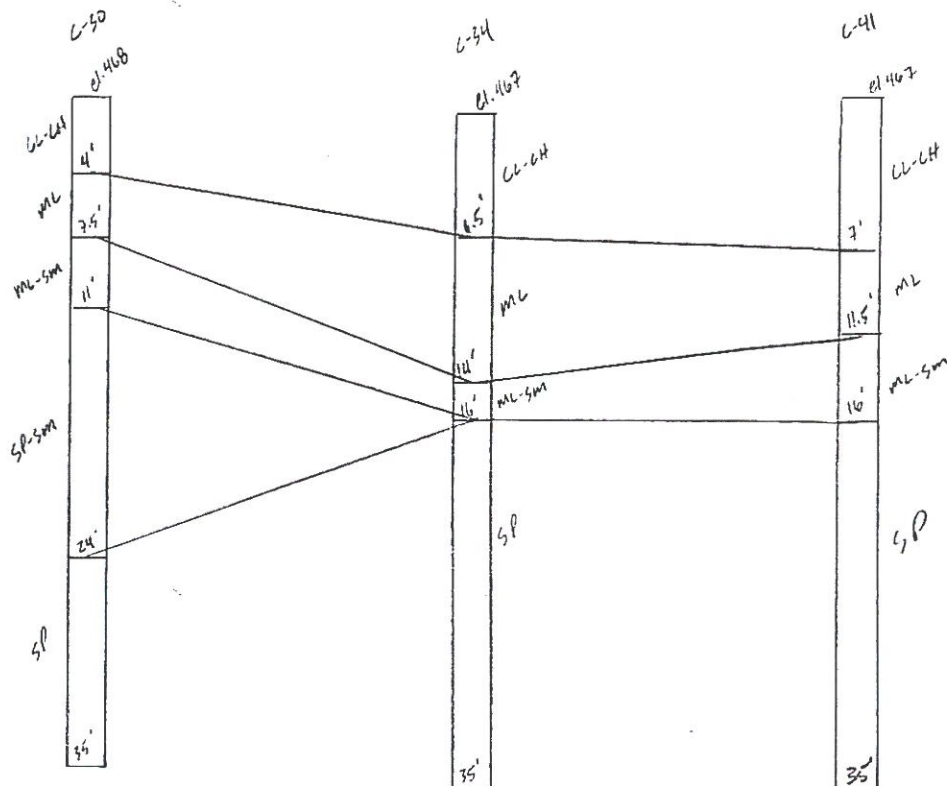
DATE 3-25-2011 BY JDB

Proj. Number _____

SHEET _____ OF _____

SECTION ~~B-B~~ **A-A'**

CIRCLE 8



SETTLEMENT PROFILE

0-7' CLAY

$$\gamma_T = 113 \text{ PCF}$$

$$C_c = 0.30 \quad C_s = 0.05 \quad e_0 = 0.917$$

7-14' SILT

$$\gamma_T = 117 \text{ PCF}$$

$$E_s = 250 \text{ KSF}$$

14-24' SILT & SAND

$$\gamma_T = 120 \text{ PCF}$$

$$E_{s \text{ top}} = 600 \text{ KSF}$$

$$E_{s \text{ bot.}} = 900 \text{ KSF}$$

24-35' SAND

$$\gamma_T = 122 \text{ PCF}$$

$$E_s = 1100 \text{ KSF}$$

35-103' SAND & GRAVEL

$$\gamma_T = 124 \text{ PCF}$$

$$E_s = 1400 \text{ KSF}$$



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PROJECT
SUBJECT

LABADIE UWL

DATE 3-25-2011

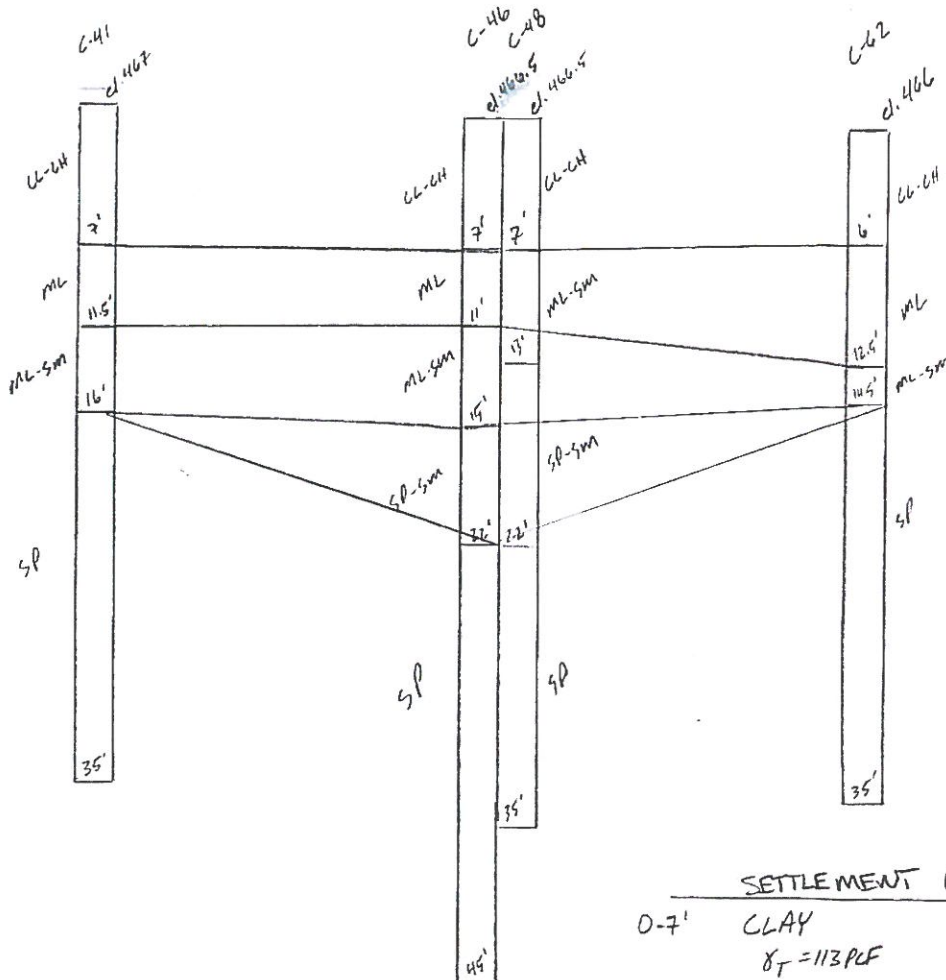
BY JDB

Proj. Number

SHEET OF

SECTION B-B' A-A'

CIRCLE 9



SETTLEMENT PROFILE

0-7' CLAY

$$\gamma_T = 113 \text{ PCF}$$

$$C_L = 0.30 \quad C_s = 0.05 \quad e_0 = 0.917$$

7-16' SILT

$$\gamma_T = 117 \text{ PCF}$$

$$E_s = 300 \text{ KSF}$$

16-22' SILT + SAND

$$\gamma_T = 120 \text{ PCF}$$

$$E_s = 400 \text{ KSF}$$

22-35' SAND

$$\gamma_T = 122 \text{ PCF}$$

$$E_s = 1100 \text{ KSF}$$

35-45' LOWER SAND

$$\gamma_T = 124 \text{ PCF}$$

$$E_s = 1300 \text{ KSF}$$

45-103' SAND + GRAVEL

$$\gamma_T = 124 \text{ PCF}$$

$$E_s = 1400 \text{ KSF}$$

* ASSUMED FROM P-1



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LABADIE UWL

SUBJECT

DATE 3-25-2011

BY JDB

Proj. Number

SHEET OF

SECTION ~~B-B'~~ A-A'

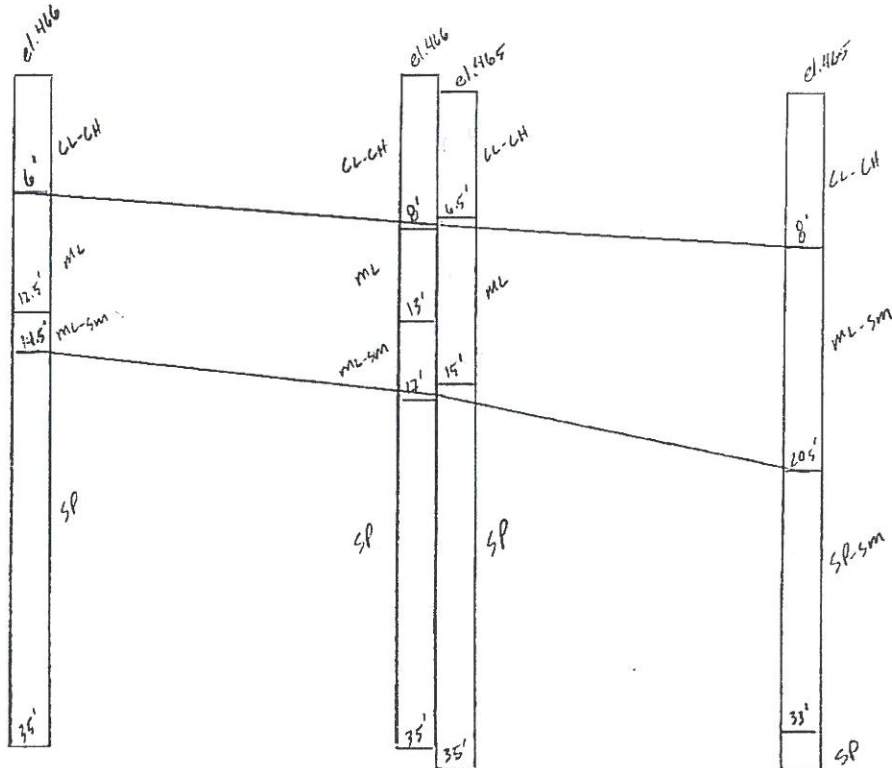
CIRCLE 10

C-62

C-76

C-78

C-91



SETTLEMENT PROFILE

0-8' CLAY

$$\gamma_T = 118 \text{ PCF}$$

$$C_c = 0.32 \quad C_s = 0.04 \quad e_0 = 0.862$$

8-14.5' SILT

$$\gamma_T = 115 \text{ PCF}$$

$$E_s = 200 \text{ KSF}$$

14.5-33' SILT & SAND

$$\gamma_T = 117 \text{ PCF}$$

$$E_s = 550 \text{ KSF}$$

33-35' SAND

$$\gamma_T = 122 \text{ PCF}$$

$$E_s = 1300 \text{ KSF}$$

45-103' SAND & GRAVEL

$$\gamma_T = 124 \text{ PCF}$$

$$E_s = 1400 \text{ KSF}$$

* ASSUME FROM P-1



REITZ & JENS, INC.
CONSULTING ENGINEERS

PROJECT LABADIE UWL

SUBJECT _____

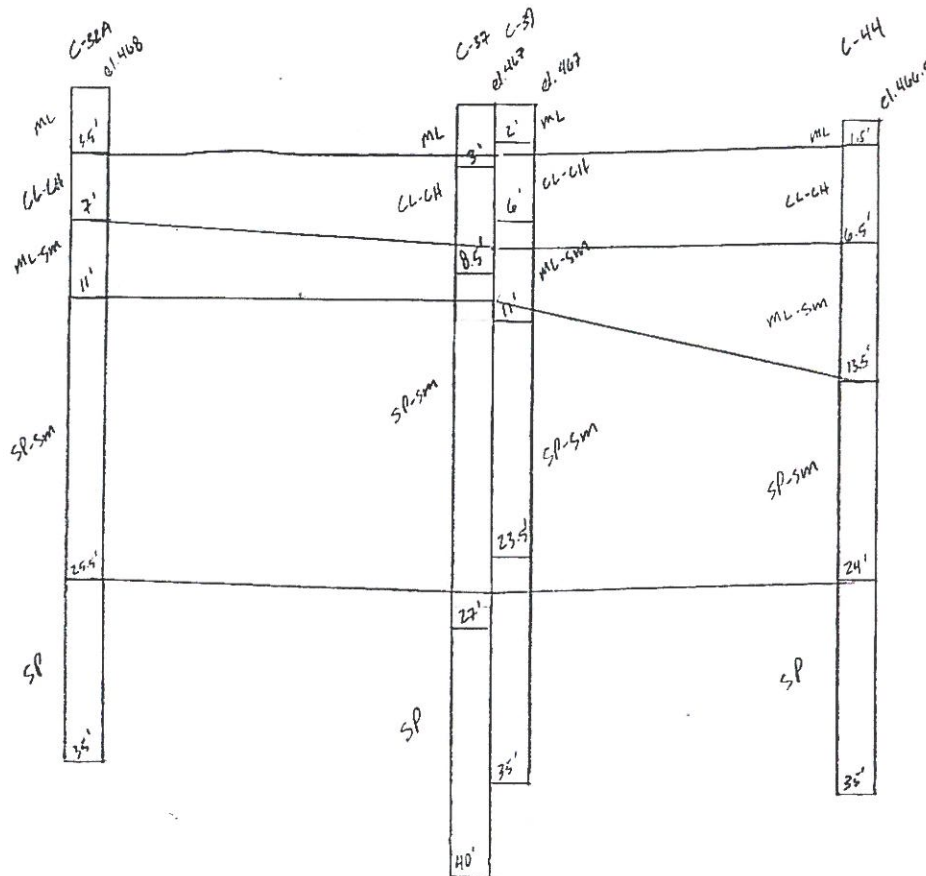
DATE 3-15-2011

BY JDB

Proj. Number _____

SHEET _____ OF _____

SECTION ~~A-A'~~ **B-B'**
CIRCLE 3



SETTLEMENT PROFILE

- 0 - 3.5' SILT
 $\gamma_T = 115$ PCF $E_s = 150$ KSF
- 3.5' - 8.5' CLAY
 $\gamma_T = 113$ PCF
 $C_L = 0.30$ $C_s = 0.05$ $c_0 = 0.917$
- 8.5' - 13.5' SILT & SAND
 $\gamma_T = 120$ PCF $E_{s\text{ top}} = 300$ KSF
 $E_{s\text{ bot}} = 500$ KSF
- 13.5' - 27' SAND & SILT
 $\gamma_T = 122$ PCF $E_s = 700$ KSF
- 27' - 40' SAND
 $\gamma_T = 124$ PCF $E_s = 1200$ KSF
- 40' - 103 SAND & GRAVEL *
 $\gamma_T = 125$ PCF $E_s = 1400$ KSF

* ASSUMED FROM P-1



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PROJECT

LABADIE UWL

SUBJECT

DATE 4-1-2011

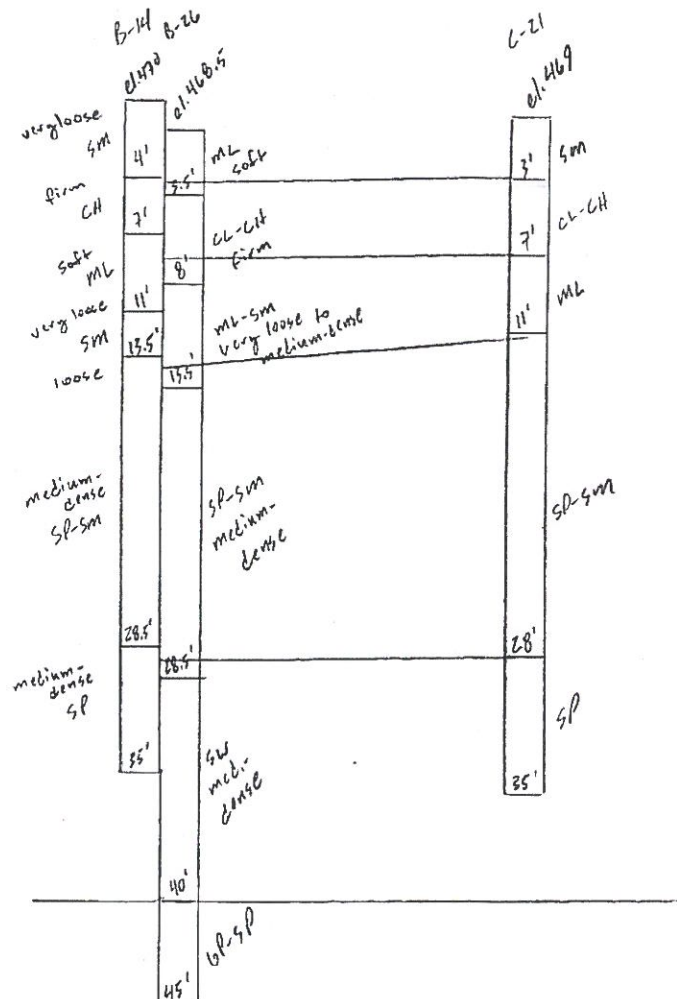
BY JDB

Proj. Number

SHEET 01 OF 01

SECTION ~~E-E~~ B-B'

CIRCLE 47



SETTLEMENT PROFILE

0-4' SILT

$\gamma_T = 116 \text{ PCF}$

$E_s = 150 \text{ KSF}$

4-8' CLAY

$\gamma_T = 113 \text{ PCF}$

$C_L = 0.30$ $C_s = 0.05$ $e_0 = 0.917$

8-13.5' SILT

$\gamma_T = 119 \text{ PCF}$

$E_{s_{top}} = 200 \text{ KSF}$ $E_{s_{bot}} = 400 \text{ KSF}$

13.5-28.5' SAND + SILT

$\gamma_T = 122 \text{ PCF}$

$E_s = 800 \text{ KSF}$

28.5-40' SAND

$\gamma_T = 122 \text{ PCF}$

$E_s = 950 \text{ KSF}$

40-103' SAND + GRAVEL

$\gamma_T = 124 \text{ PCF}$

$E_s = 1400 \text{ KSF}$



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SUBJECT

LABADIE UWL

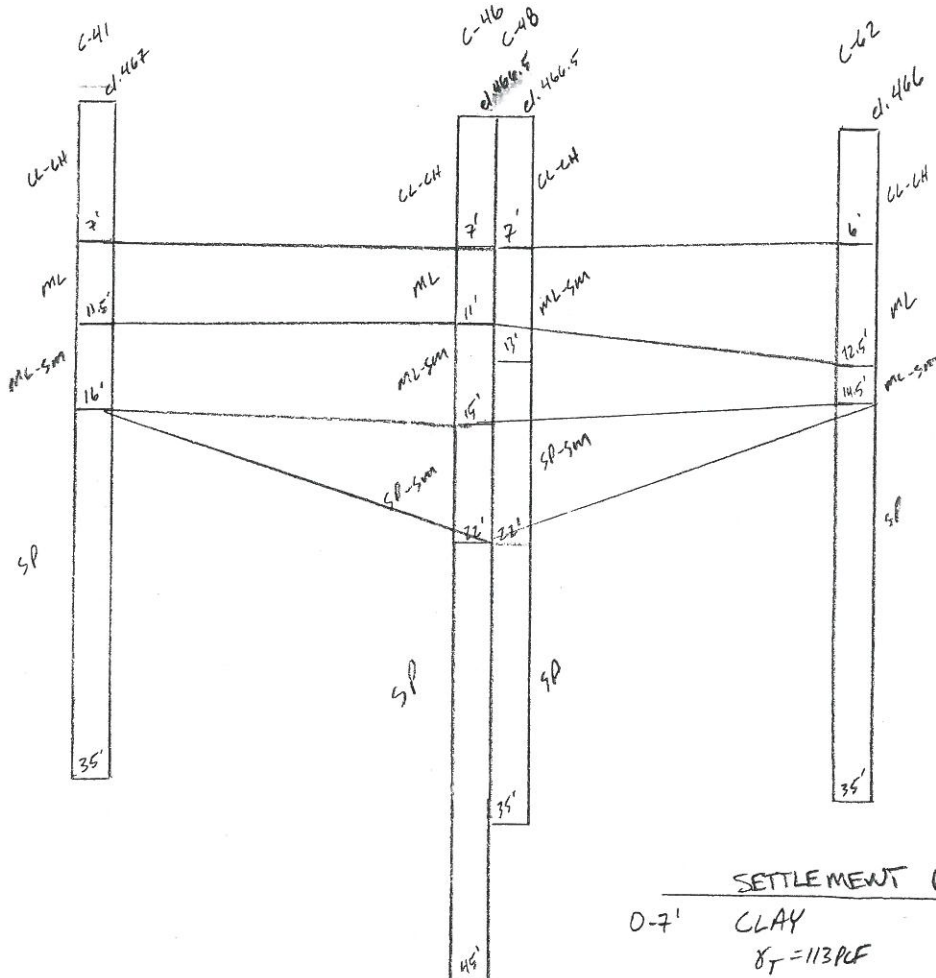
DATE 3-25-2011 BY JDB

Proj. Number

SHEET OF

SECTION B-B'

CIRCLE 89



SETTLEMENT PROFILE

0-7'	CLAY	$\gamma_T = 113 \text{ PCF}$	
		$C_L = 0.30$	$C_s = 0.05$
			$e_0 = 0.917$
7-16'	SILT	$\gamma_T = 117 \text{ PCF}$	$E_s = 300 \text{ KSF}$
16-22'	SILT & SAND	$\gamma_T = 120 \text{ PCF}$	$E_s = 400 \text{ KSF}$
22-35'	SAND	$\gamma_T = 122 \text{ PCF}$	$E_s = 1100 \text{ KSF}$
35-45'	LOWER SAND	$\gamma_T = 124 \text{ PCF}$	$E_s = 1300 \text{ KSF}$
45-103'	SAND & GRAVEL	$\gamma_T = 124 \text{ PCF}$	$E_s = 1400 \text{ KSF}$

* ASSUMED FROM P-1

SCHEDULE C/G-SIT
CHECKED: C. G. SITI



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PROJECT

LABADIE IWL

SUBJECT

DATE 4-5-2011

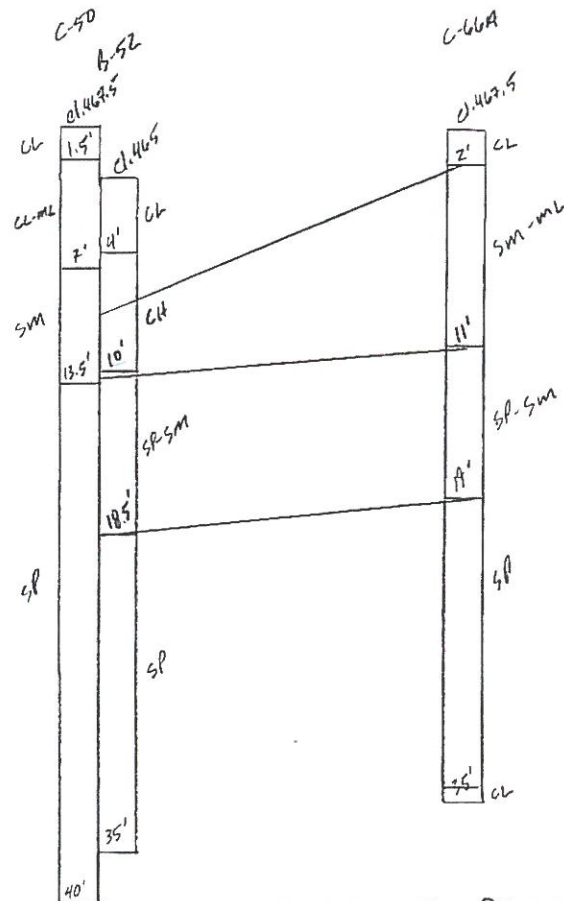
BY JDB

Proj. Number

SHEET OF

SECTION C-C'

CIRCLE 40



SETTLEMENT PROFILE

0-10'	CLAY	$\gamma_T = 118 \text{ PCF}$	$C_c = 0.32$	$C_s = 0.04$	$e_0 = 0.862$
10-18.5'	SILT & SAND	$\gamma_T = 119 \text{ PCF}$	$E_{sL} = 200 \text{ KSF}$	$E_{sD} = 600 \text{ KSF}$	
18.5-32'	SAND & SILT	$\gamma_T = 120 \text{ PCF}$	$E_s = 850 \text{ KSF}$		
32-35'	SILT & CLAY	$\gamma_T = 120 \text{ PCF}$	$E_s = 200 \text{ KSF}$		
35-42'	SAND	$\gamma_T = 122 \text{ PCF}$	$E_s = 1000 \text{ KSF}$		
42-77'	SAND & GRAVEL	$\gamma_T = 124 \text{ PCF}$	$E_s = 1000 \text{ KSF}$		*
77-105'	SAND (Z)	$\gamma_T = 125 \text{ PCF}$	$E_s = 1200 \text{ KSF}$		*

* ASSUMED FROM B-100

SCHEDULE C10 ST1

C10 ST1



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PROJECT LABADIE UWL

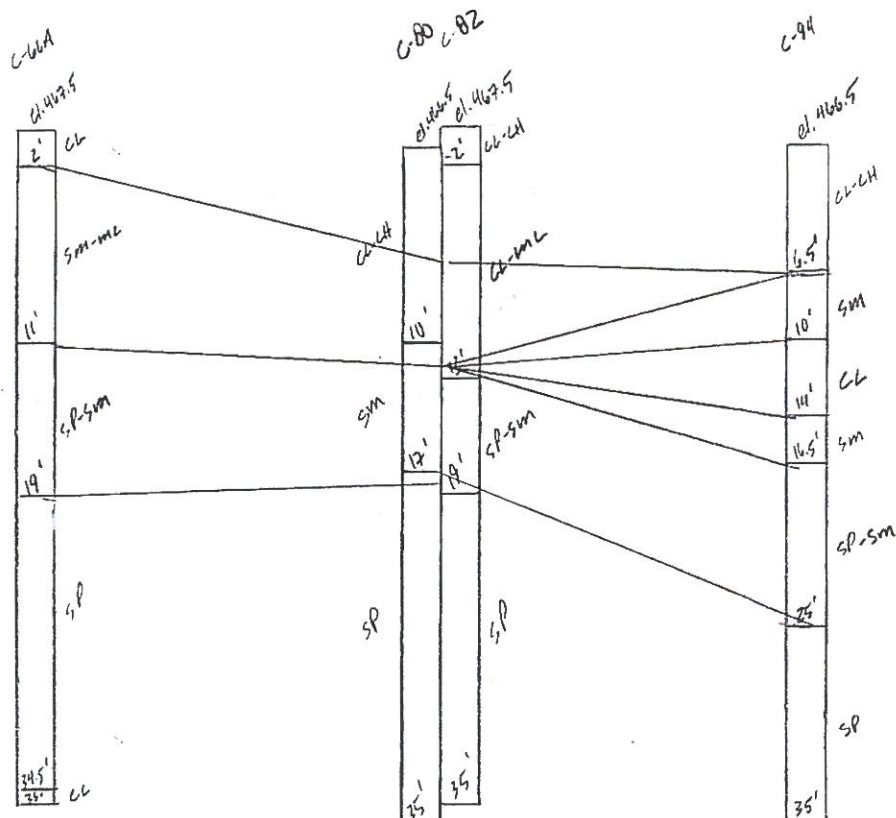
SUBJECT

DATE 4-5-2011 BY JDB

Proj. Number

SHEET OF

SECTION C-C'
CIRCLE 41



SETTLEMENT PROFILE

- 0-11' CLAY
 $\gamma_T = 118 \text{ PCF}$
 $C_c = 0.32 \quad C_s = 0.04 \quad e_0 = 0.862$
- 11-18' SILT
 $\gamma_T = 117 \text{ PCF} \quad E_s = 500 \text{ KSF}$
- 18-32' SAND
 $\gamma_T = 120 \text{ PCF} \quad E_s = 1000 \text{ KSF}$
- 32-37' SILT & CLAY
 $\gamma_T = 120 \text{ PCF} \quad E_s = 200 \text{ KSF}$
- 37-77' SAND & GRAVEL *
 $\gamma_T = 124 \text{ PCF} \quad E_s = 1000 \text{ KSF}$
- 77-105' SAND (2) *
 $\gamma_T = 125 \text{ PCF} \quad E_s = 1200 \text{ KSF}$

* ASSUMED FROM B-100



REITZ & JENS, INC.
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PROJECT

LABADIE UWL

SUBJECT

DATE 4-5-2011 BY JDB

Proj. Number

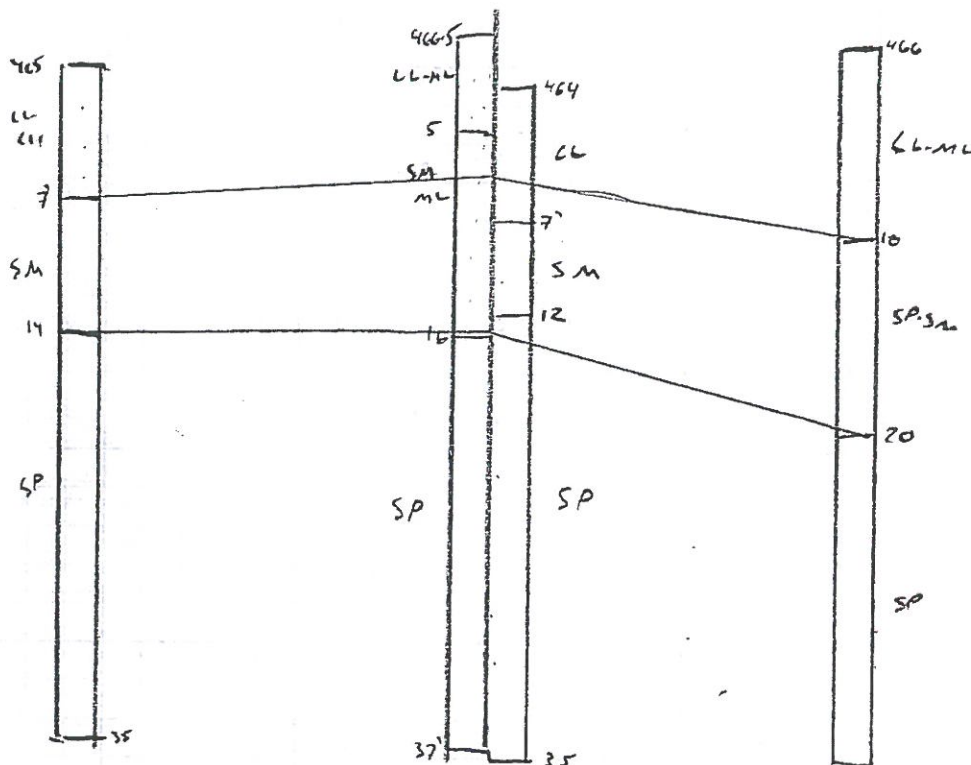
SHEET OF

SECTION ~~G-G~~ C-C'
CRUCE 24

C-107A

C-94 C-121

C-109



SETTLEMENT PROFILE

- 0-10' CLAY
 $\gamma_T = 118 \text{ PCF}$
 $C_L = 0.32 \quad C_s = 0.04 \quad e_0 = 0.862$
- 10-20' SILT & SAND
 $\gamma_T = 120 \text{ PCF} \quad E_{st} = 300 \text{ KSF} \quad E_s = 675 \text{ KSF}$
- 20-32' SAND
 $\gamma_T = 122 \text{ PCF} \quad E_s = 800 \text{ KSF}$
- 32-37' SAND (2)
 $\gamma_T = 122 \text{ PCF} \quad E_s = 1000 \text{ KSF}$
- 37-103' SAND & GRAVEL
 $\gamma_T = 124 \text{ PCF} \quad E_s = 1400 \text{ KSF} \quad *$

* ASSUMED FROM B-7



REITZ & JENS, INC.
CONSULTING ENGINEERS

PROJECT

LABADIE UWL

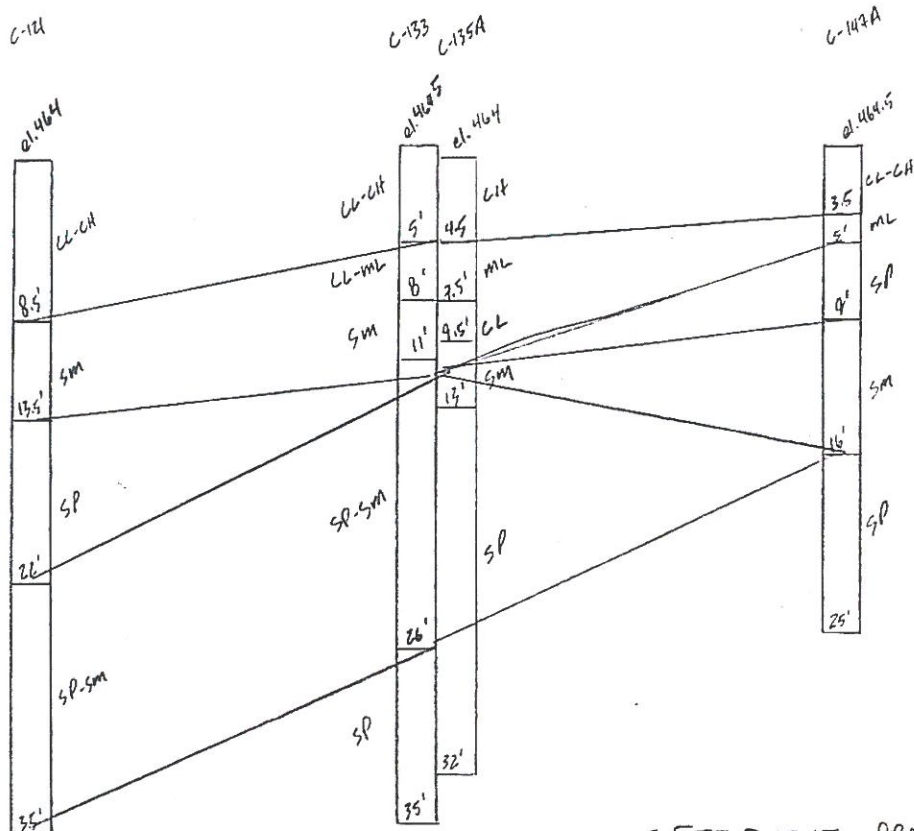
SUBJECT

DATE 4-5-2011 BY JDB

Proj. Number

SHEET OF

SECTION C-C'
CIRCLE 42



SETTLEMENT PROFILE

- 0-8.5' CLAY
 $\gamma_T = 118 \text{ PCF}$
 $C_L = 0.32 \quad C_s = 0.04 \quad C_g = 0.862$
- 8.5-13.5' SILT
 $\gamma_T = 117 \text{ PCF} \quad E_{st} = 100 \text{ KSF} \quad E_{sb} = 450 \text{ KSF}$
- 13.5-22' SILT + SAND
 $\gamma_T = 120 \text{ PCF} \quad E_s = 800 \text{ KSF}$
- 22-32' SAND
 $\gamma_T = 122 \text{ PCF} \quad E_s = 650 \text{ KSF}$
- 32-37' SAND (2)
 $\gamma_T = 122 \text{ PCF} \quad E_s = 1200 \text{ KSF}$
- 37-77' SAND & GRAVEL
 $\gamma_T = 124 \text{ PCF} \quad E_s = 1000 \text{ KSF} \times$
- 77-105' SAND (3)
 $\gamma_T = 125 \text{ PCF} \quad E_s = 1200 \text{ KSF} \times$

* ASSUMED FROM B-100

SCHEDULE C/C-S/M

CLAY (CL) = 118 PCF (CL) = 118 PCF



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PROJECT

LABADIE UWL

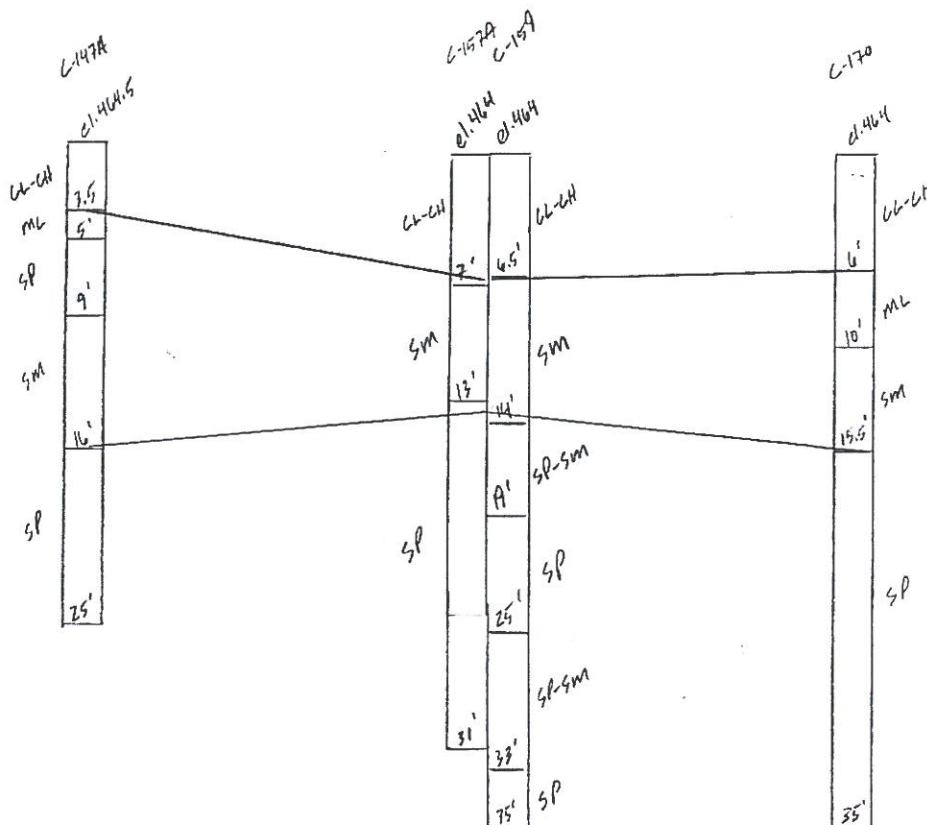
SUBJECT

DATE 4-5-2011 BY JDB

Proj. Number

SHEET OF

SECTION C-C'
CIRCLE 43



SETTLEMENT PROFILE

0-7' CLAY

$\gamma_T = 110 \text{ PCF}$

$C_c = 0.37$ $C_s = 0.07$ $e_0 = 1.092$

7-16' SILT

$\gamma_T = 117 \text{ PCF}$ $E_{stop} = 150 \text{ KSF}$ $E_{bot.} = 550 \text{ KSF}$

16-37' SILT & SAND

$\gamma_T = 120 \text{ PCF}$ $E_s = 750 \text{ KSF}$

37-77' SAND & GRAVEL

$\gamma_T = 124 \text{ PCF}$ $E_s = 1000 \text{ KSF}$ *

77-105' SAND

$\gamma_T = 125 \text{ PCF}$ $E_s = 1200 \text{ KSF}$ *

* ASSUMED FROM B-100



REITZ & JENS, INC.
CONSULTING ENGINEERS

PROJECT

LABADIE UWL

SUBJECT

DATE 4-5-2011

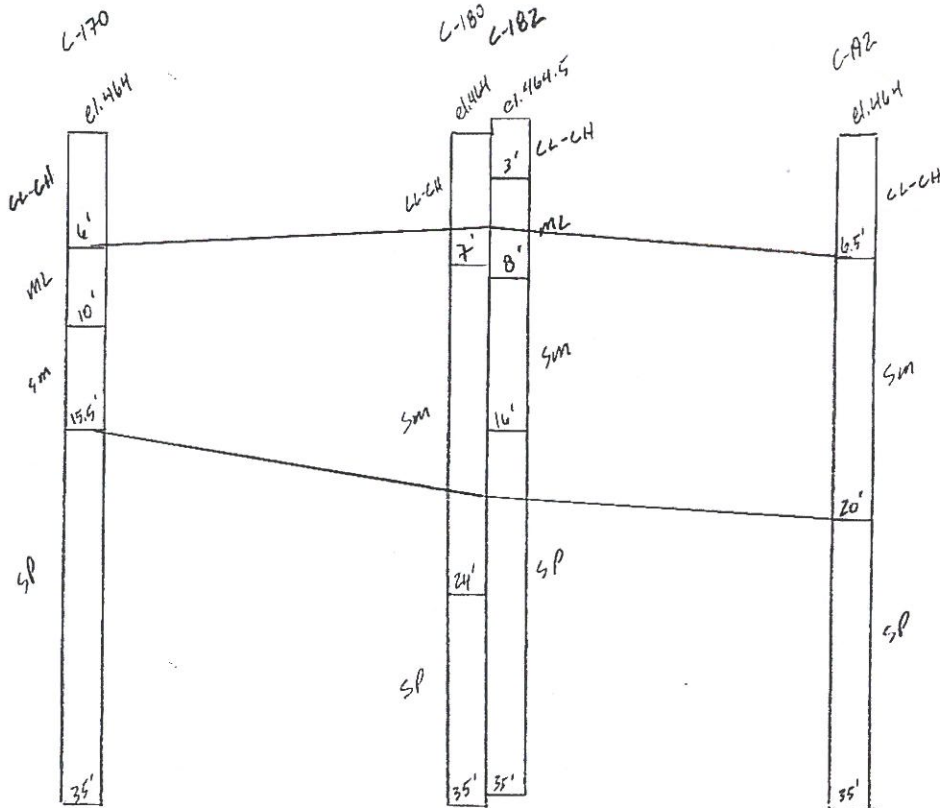
BY JDB

Proj. Number

SHEET OF

SECTION C-C'

CIRCLE 35



SETTLEMENT PROFILE

0-7' CLAY

$$\gamma_T = 110 \text{ PCF}$$

$$C_c = 0.37 \quad C_s = 0.07 \quad e_0 = 1.092$$

7-22' SILT & SAND

$$\gamma_T = 114 \text{ PCF} \quad E_s = 300 \text{ KSF}$$

22-37' SAND

$$\gamma_T = 122 \text{ PCF} \quad E_s = 1000 \text{ KSF}$$

37-77' SAND & GRAVEL

$$\gamma_T = 124 \text{ PCF} \quad E_s = 1000 \text{ KSF} \quad *$$

77-105' SAND (2)

$$\gamma_T = 125 \text{ PCF} \quad E_s = 1200 \text{ KSF} \quad *$$

* ASSUMED FROM B-100



REITZ & JENS, INC.
CONSULTING ENGINEERS

PROJECT
SUBJECT

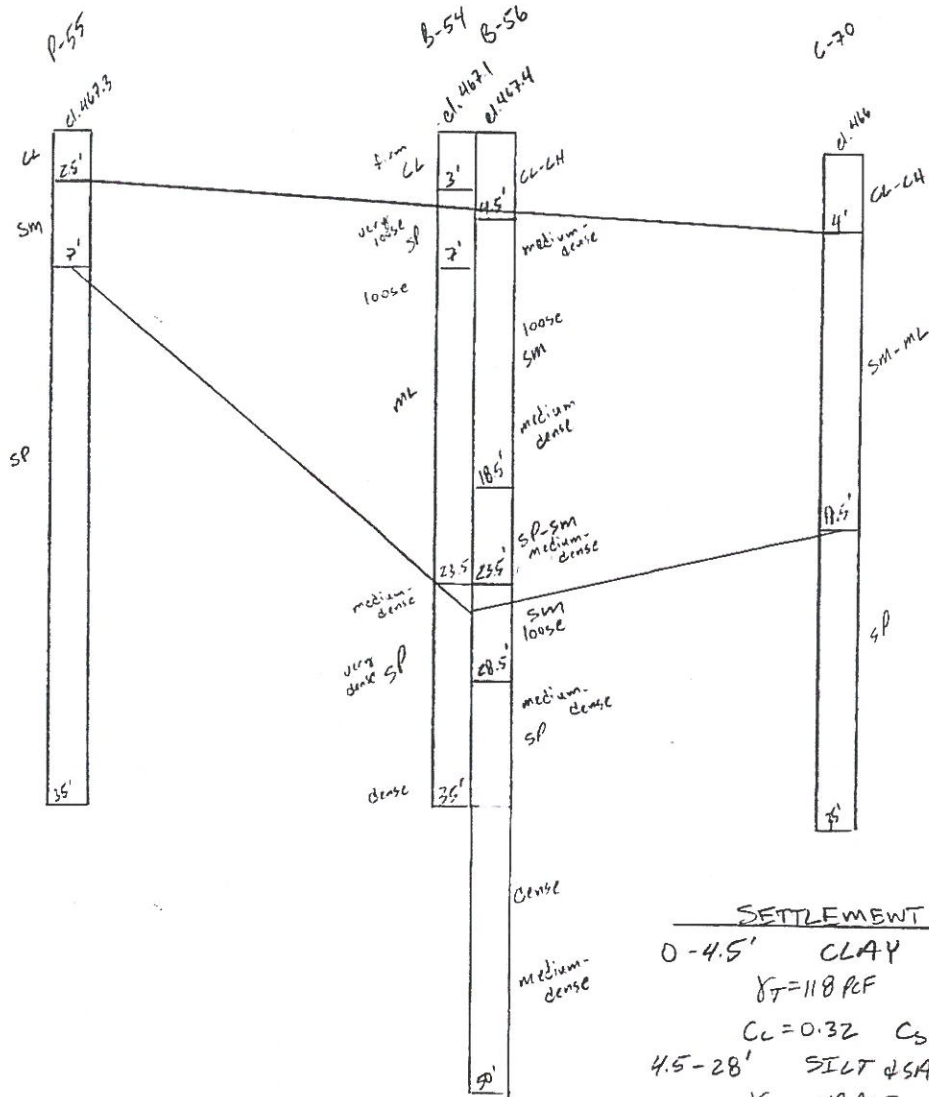
LABADIE UWL

DATE 4-8-2011 BY JOB

Proj. Number

SHEET OF

SECTION D-D'
CIRCLE 48



SETTLEMENT PROFILE

0-4.5' CLAY

$\gamma_T = 118 \text{ PCF}$

$C_L = 0.32$ $C_S = 0.04$ $C_0 = 0.862$

4.5-28' SILT & SAND

$\gamma_T = 119 \text{ PCF}$ $E_S = 2500 \text{ KSF}$

28-50' SAND

$\gamma_T = 120 \text{ PCF}$ $E_S = 6000 \text{ KSF}$

50-77' SAND & GRAVEL

$\gamma_T = 124 \text{ PCF}$ $E_S = 10000 \text{ KSF}$ *

77-105' SAND (2)

$\gamma_T = 125 \text{ PCF}$ $E_S = 1200 \text{ KSF}$ *

* ASSUMED FROM B-100



REITZ & JENS, INC.
CONSULTING ENGINEERS

PROJECT

LABADIE UWL

SUBJECT

DATE 4-4-2011

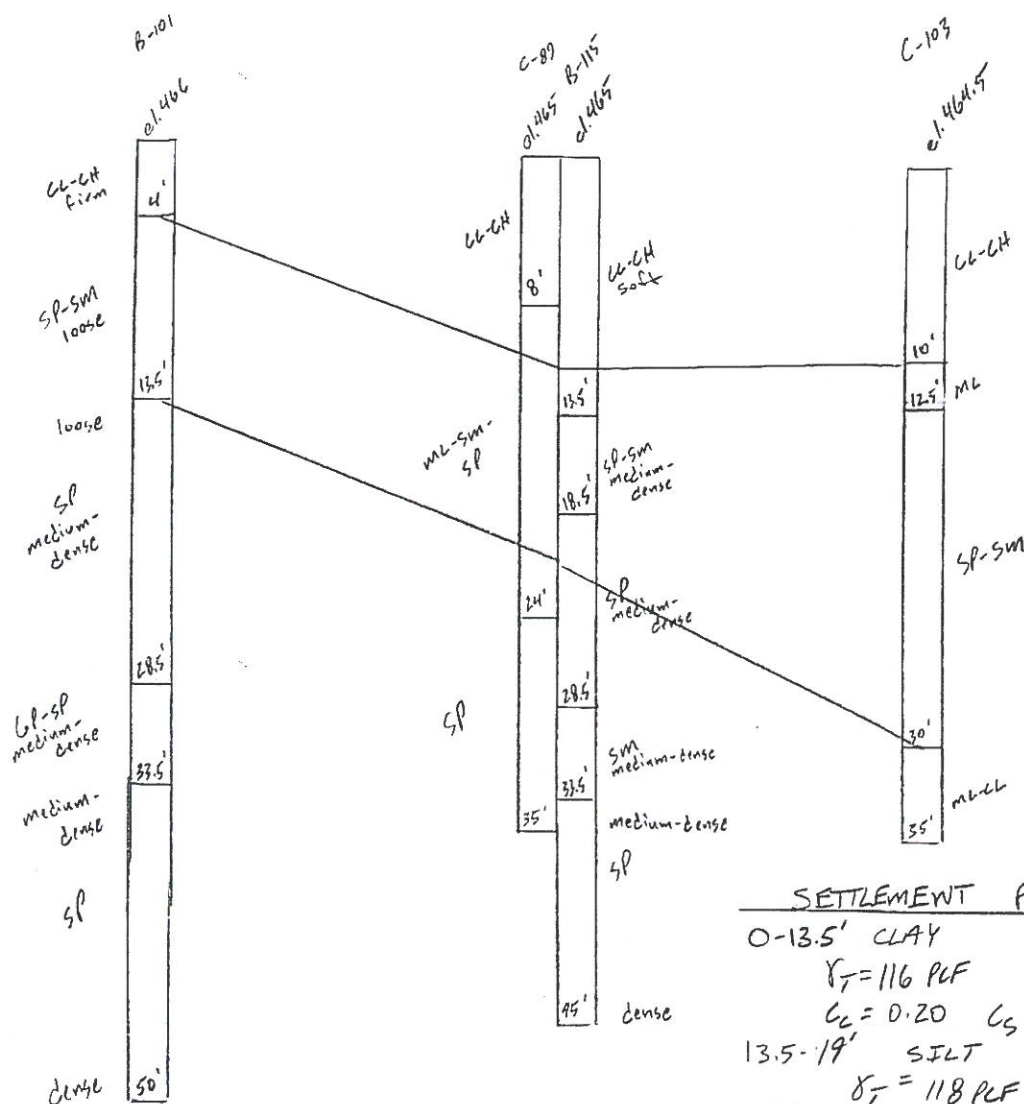
BY JOB

Proj. Number

SHEET OF

SECTION ~~6-6'~~ D-D'

CIRCLE 49



SETTLEMENT PROFILE

0-13.5' CLAY

$\gamma_T = 116 \text{ PCF}$

$C_c = 0.20$ $C_s = 0.02$ $e_0 = 0.900$

13.5-19' SILT

$\gamma_T = 118 \text{ PCF}$ $E_s = 350 \text{ KSF}$

19'-28.5' SAND & SILT

$\gamma_T = 120 \text{ PCF}$ $E_{st} = 450 \text{ KSF}$ $E_{sb} = 650 \text{ Ks.}$

28.5-36' SILT & SAND

$\gamma_T = 119 \text{ PCF}$ $E_s = 250 \text{ KSF}$

36-45' SAND

$\gamma_T = 122 \text{ PCF}$ $E_s = 600 \text{ KSF}$

45-103' SAND & GRAVEL

$\gamma_T = 124 \text{ PCF}$ $E_s = 1400 \text{ KSF}$

* ASSUMED FROM
B-7



REITZ & JENS, INC.
CONSULTING ENGINEERS

PROJECT

LABADIE UWL

SUBJECT

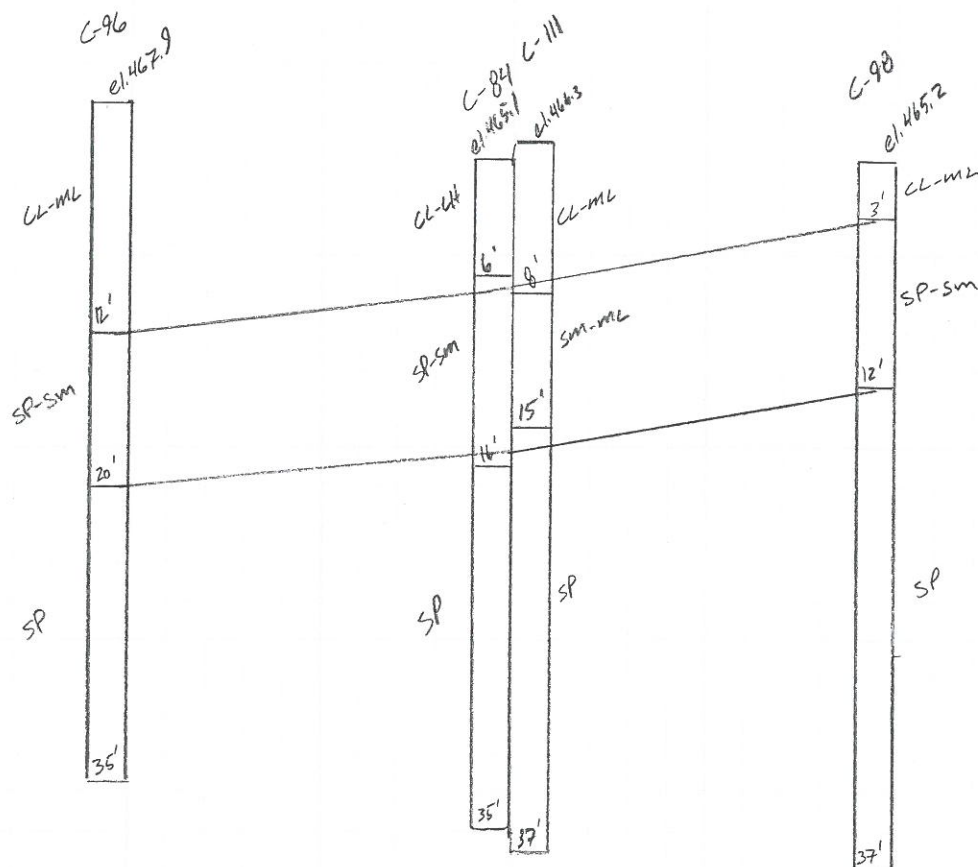
DATE 6/11/2012

BY JDB

Proj. Number

SHEET OF

SECTION ~~E-E'~~ D-D'
CIRCLE 50



SETTLEMENT PROFILE

0-12' CLAY

$\gamma_f = 118 \text{ PCF}$

$C_c = 0.32$

$C_s = 0.04$

$e_o = 0.862$

12-20' SILT & SAND

$\gamma_f = 120 \text{ PCF}$

$E_s = 300 \text{ KSF (TOP)}$

$E_s = 500 \text{ KSF (BOTTOM)}$

20-37' SAND

$\gamma_f = 122 \text{ PCF}$

$E_s = 900 \text{ KSF}$

37-77' SAND & GRAVEL

$\gamma_f = 124 \text{ PCF}$

$E_s = 1000 \text{ KSF}$

77-105' SAND (2)

$\gamma_f = 125 \text{ PCF}$

$E_s = 1200 \text{ KSF}$

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 3.s3z
 Project Title: Labadie UWL
 Analysis: Settlement
 Author: Christopher Cook
 Company: Reitz & Jens, Inc
 Date Created: 10/17/2012, 11:48:36 AM
 Stress Computation Method: Boussinesq
 Use average properties to calculate layered stresses
 Groundwater method: Water Table
 Water Unit Weight: 0.0624 kips/ft³
 Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	18.586
Consolidation Settlement [in]	0	5.1702
Immediate Settlement [in]	0	13.4187
Loading Stress [ksf]	0	10.3292
Effective Stress [ksf]	0	16.4779
Total Stress [ksf]	0	22.8427
Total Strain	0	0.0883972
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0503125	16.4464
Over-consolidation Ratio	1	15.2292
Void Ratio	0	0.916999
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

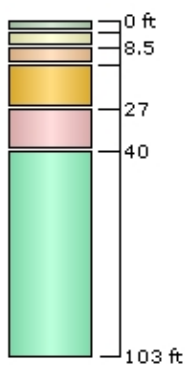
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	SILT	3.5	0
2	CLAY	5	3.5
3	SILT & SAND	5	8.5
4	SAND & SILT	13.5	13.5
5	SAND	13	27
6	SAND & GRAVEL	63	40



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND & SILT	SAND	SAND & GRAVEL
Color						
Unit Weight [kips/ft ³]	0.115	0.115	0.12	0.122	0.125	0.124
Saturated Unit Weight [kips/ft ³]	0.115	0.115	0.12	0.122	0.125	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		150	300	700	1400	1400
Es bottom [ksf]			500			
E _{sur} [ksf]		150	300	700	1400	1400
E _{sur} bottom [ksf]			500			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear					
C _c	0.3					
C _r	0.05					
e ₀	0.917					
P _c [ksf]	4.52					
OCR		1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled
C _{ae} /C _a	0.005					
C _{ar} /C _{ae}	0.005					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-2058.82, 801.176	-110.756, 801.176	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 7.s3z
 Project Title: Labadie UWL
 Analysis: Settlement
 Author: Christopher Cook
 Company: Reitz & Jens, Inc
 Date Created: 10/17/2012, 11:48:36 AM
 Stress Computation Method: Boussinesq
 Use average properties to calculate layered stresses
 Groundwater method: Water Table
 Water Unit Weight: 0.0624 kips/ft³
 Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	17.9701
Consolidation Settlement [in]	0	6.20633
Immediate Settlement [in]	0	11.7765
Loading Stress [ksf]	0	10.3777
Effective Stress [ksf]	0	15.7989
Total Stress [ksf]	0	22.1637
Total Strain	1.6997e-008	0.107355
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.395357	15.7722
Over-consolidation Ratio	1	87.2726
Void Ratio	0	0.917
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

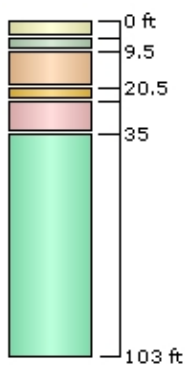
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	5.5	0
2	SILT	4	5.5
3	SILT & SAND	11	9.5
4	SAND & SILT	4	20.5
5	SAND	10.5	24.5
6	SAND & GRAVEL	68	35



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND & SILT	SAND	SAND & GRAVEL
Color						
Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.12	0.122	0.115
Saturated Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.12	0.122	0.115
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		180	600	800	1200	1400
Es bottom [ksf]		350				
E _{sur} [ksf]		180	600	800	1200	1400
E _{sur} bottom [ksf]		350				
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear					
C _c	0.3					
C _r	0.05					
e ₀	0.917					
P _c [ksf]	4.52					
OCR		1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled
C _{ae} /C _a	0.005					
C _{ar} /C _{are}	0.005					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-767.609, 1911.57	-767.609, -555.741	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 8.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	19.9785
Consolidation Settlement [in]	0	7.74089
Immediate Settlement [in]	0	12.2445
Loading Stress [ksf]	0	10.3777
Effective Stress [ksf]	0	16.3924
Total Stress [ksf]	0	22.7572
Total Strain	2.02229e-008	0.106378
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.471306	16.3611
Over-consolidation Ratio	1	79.9999
Void Ratio	0	0.917
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

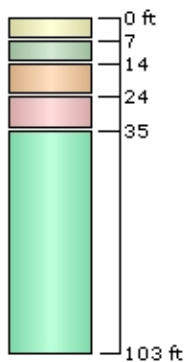
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT	7	7
3	SILT & SAND	10	14
4	SAND	11	24
5	SAND & GRAVEL	68	35



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL
Color					
Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124
Saturated Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		250	600	1100	1400
Es bottom [ksf]			900		
Esur [ksf]		250	600	1100	1400
Esur bottom [ksf]			900		
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
Cc	0.3				
Cr	0.05				
e0	0.917				
Pc [ksf]	4.52				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.005				
Car/Care	0.005				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-767.609, 1911.57	-767.609, -555.741	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 8&9.s3z
 Project Title: Labadie UWL
 Analysis: Settlement
 Author: Christopher Cook
 Company: Reitz & Jens, Inc
 Date Created: 10/17/2012, 11:48:36 AM
 Stress Computation Method: Boussinesq
 Use average properties to calculate layered stresses
 Groundwater method: Water Table
 Water Unit Weight: 0.0624 kips/ft³
 Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	20.7832
Consolidation Settlement [in]	0	7.77249
Immediate Settlement [in]	0	13.0492
Loading Stress [ksf]	0	10.3292
Effective Stress [ksf]	0	16.3944
Total Stress [ksf]	0	22.7592
Total Strain	1.24418e-008	0.106171
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.471273	16.3625
Over-consolidation Ratio	1	79.9999
Void Ratio	0	0.917
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

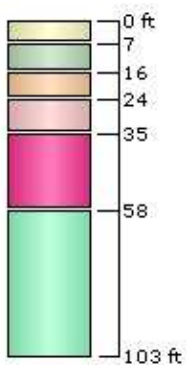
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT	9	7
3	SILT & SAND	8	16
4	SAND	11	24
5	LOWER SAND	23	35
6	SAND & GRAVEL	45	58



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL	LOWER SAND
Color						
Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124	0.124
Saturated Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		250	600	1100	1400	1300
Es bottom [ksf]			900			
Esur [ksf]		250	600	1100	1400	1300
Esur bottom [ksf]			900			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear					
Cc	0.3					
Cr	0.05					
e0	0.917					
Pc [ksf]	4.52					
OCR		1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.005					
Car/Care	0.005					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-2058.82, 801.176	-110.756, 801.176	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 9.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	19.675
Consolidation Settlement [in]	0	7.74089
Immediate Settlement [in]	0	11.941
Loading Stress [ksf]	0	10.3777
Effective Stress [ksf]	0	16.3904
Total Stress [ksf]	0	22.7552
Total Strain	2.02229e-008	0.106378
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.471306	16.3589
Over-consolidation Ratio	1	79.9999
Void Ratio	0	0.917
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

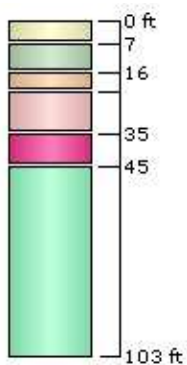
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT	9	7
3	SILT & SAND	6	16
4	SAND	13	22
5	LOWER SAND	10	35
6	SAND & GRAVEL	58	45



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL	LOWER SAND
Color						
Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124	0.124
Saturated Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		300	900	1100	1400	1300
E _{sur} [ksf]		300	900	1100	1400	1300
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear					
C _c	0.3					
C _r	0.05					
e ₀	0.917					
P _c [ksf]	4.52					
OCR		1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled
C _{ae} /C _a	0.005					
C _{ar} /C _{ae}	0.005					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-767.609, 1911.57	-767.609, -555.741	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 10.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	22.5594
Consolidation Settlement [in]	0	8.33957
Immediate Settlement [in]	0	14.2226
Loading Stress [ksf]	0	10.3777
Effective Stress [ksf]	0	16.3404
Total Stress [ksf]	0	22.7052
Total Strain	1.59504e-008	0.0994291
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.556189	16.3091
Over-consolidation Ratio	1	80.6778
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
 Area of Load: 183389 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
 Area of Load: 234768 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
 Area of Load: 156632 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

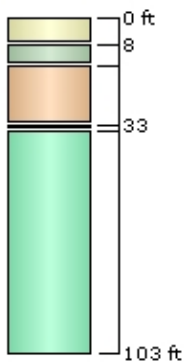
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	8	0
2	SILT	6.5	8
3	SILT & SAND	18.5	14.5
4	SAND	2	33
5	SAND & GRAVEL	68	35



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL
Color					
Unit Weight [kips/ft ³]	0.118	0.115	0.117	0.122	0.124
Saturated Unit Weight [kips/ft ³]	0.118	0.115	0.117	0.122	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		200	550	1300	1400
E _{sur} [ksf]		200	550	1300	1400
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
C _c	0.32				
C _r	0.04				
e ₀	0.862				
P _c [ksf]	4.76				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
C _{ae} /C _a	0.004				
C _{ar} /C _{are}	0.004				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-767.609, 1911.57	-767.609, -555.741	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 24.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	21.1299
Consolidation Settlement [in]	0	10.2799
Immediate Settlement [in]	0	10.8534
Loading Stress [ksf]	0	10.2108
Effective Stress [ksf]	0	16.4296
Total Stress [ksf]	0	22.7944
Total Strain	5.83503e-008	0.0983151
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.676898	16.3985
Over-consolidation Ratio	1	80.6775
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
 Area of Load: 451309 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
 Area of Load: 238713 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
 Area of Load: 567821 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
 Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

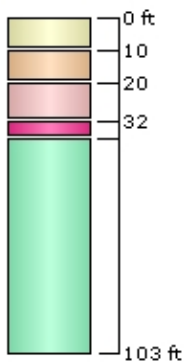
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	10	0
2	SILT & SAND	10	10
3	SAND	12	20
4	SAND (2)	5	32
5	SAND & GRAVEL	66	37



Soil Properties

Property	CLAY	SILT & SAND	SAND	SAND & GRAVEL	SAND (2)
Color					
Unit Weight [kips/ft ³]	0.118	0.12	0.122	0.124	0.122
Saturated Unit Weight [kips/ft ³]	0.118	0.12	0.122	0.124	0.122
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		300	800	1400	1000
Es bottom [ksf]		675			
Esur [ksf]		300	800	1400	1000
Esur bottom [ksf]		675			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
Cc	0.32				
Cr	0.04				
e0	0.862				
Pc [ksf]	4.76				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004				
Car/Care	0.004				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	559.525, 509.589	447.919, -2857.73	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: CIRCLE 35.s3z
 Project Title: Labadie UWL
 Analysis: Settlement
 Author: Christopher Cook
 Company: Reitz & Jens, Inc
 Date Created: 10/17/2012, 11:48:36 AM
 Stress Computation Method: Boussinesq
 Use average properties to calculate layered stresses
 Groundwater method: Water Table
 Water Unit Weight: 0.0624 kips/ft³
 Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	26.4523
Consolidation Settlement [in]	0	10.7611
Immediate Settlement [in]	0	15.6947
Loading Stress [ksf]	0	10.2108
Effective Stress [ksf]	0	16.5094
Total Stress [ksf]	0	22.999
Total Strain	9.74964e-008	0.145139
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.452551	16.4764
Over-consolidation Ratio	1	61.4541
Void Ratio	0	1.092
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
 Area of Load: 417396 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
 Area of Load: 941302 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
 Area of Load: 551990 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

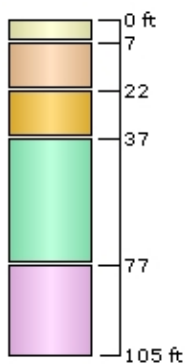
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT & SAND	15	7
3	SAND	15	22
4	SAND & GRAVEL	40	37
5	SAND (3)	28	77



Soil Properties

Property	CLAY	SILT & SAND	SAND	SAND & GRAVEL	SAND (3)
Color					
Unit Weight [kips/ft ³]	0.11	0.119	0.122	0.124	0.125
Saturated Unit Weight [kips/ft ³]	0.11	0.119	0.122	0.124	0.125
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		300	1000	1000	1200
E _{sur} [ksf]		300	1000	1000	1200
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
C _c	0.37				
C _r	0.07				
e ₀	1.092				
P _c [ksf]	3.38				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
C _{ae} /C _a	0.009				
C _{ar} /C _{are}	0.009				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	559.525, 509.589	447.919, -2857.73	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 40.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	24.8926
Consolidation Settlement [in]	0	10.2799
Immediate Settlement [in]	0	14.6161
Loading Stress [ksf]	0	10.2108
Effective Stress [ksf]	0	16.5299
Total Stress [ksf]	0	23.0195
Total Strain	5.83503e-008	0.0983151
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.672739	16.4969
Over-consolidation Ratio	1	80.6775
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

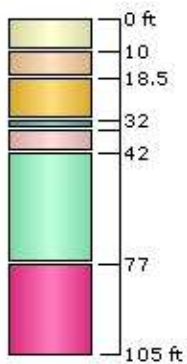
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	10	0
2	SILT & SAND	8.5	10
3	SAND & SILT	13.5	18.5
4	SILT & CLAY	3	32
5	SAND	7	35
6	SAND & GRAVEL	35	42
7	SAND (2)	28	77



Soil Properties

Property	CLAY	SILT & SAND	SAND & SILT	SAND	SAND & GRAVEL	SAND (2)	SILT & CLAY
Color							
Unit Weight [kips/ft ³]	0.118	0.119	0.12	0.122	0.124	0.125	0.12
Saturated Unit Weight [kips/ft ³]	0.118	0.119	0.12	0.122	0.124	0.125	0.12
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		200	850	1000	1000	1200	200
Es bottom [ksf]		600					
Esur [ksf]		200	850	1000	1000	1200	200
Esur bottom [ksf]		600					
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear						
Cc	0.32						
Cr	0.04						
e0	0.862						
Pc [ksf]	4.76						
OCR		1	1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004						
Car/Care	0.004						

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	559.525, 509.589	447.919, -2857.73	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 41.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	25.4632
Consolidation Settlement [in]	0	11.241
Immediate Settlement [in]	0	14.2255
Loading Stress [ksf]	0	10.2108
Effective Stress [ksf]	0	16.5354
Total Stress [ksf]	0	23.025
Total Strain	5.83503e-008	0.0983151
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.73176	16.5024
Over-consolidation Ratio	1	80.6775
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
 Area of Load: 417396 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
 Area of Load: 941302 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
 Area of Load: 551990 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

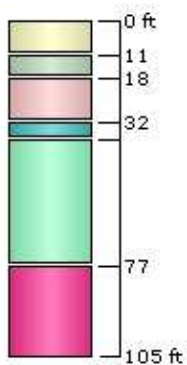
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	11	0
2	.SILT	7	11
3	SAND	14	18
4	SILT & CLAY	5	32
5	SAND & GRAVEL	40	37
6	SAND (2)	28	77



Soil Properties

Property	CLAY	.SILT	SAND	SAND & GRAVEL	SAND (2)	SILT & CLAY
Color						
Unit Weight [kips/ft ³]	0.118	0.119	0.12	0.124	0.125	0.12
Saturated Unit Weight [kips/ft ³]	0.118	0.119	0.12	0.124	0.125	0.12
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		500	1000	1000	1200	200
Esur [ksf]		500	1000	1000	1200	200
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear					
Cc	0.32					
Cr	0.04					
e0	0.862					
Pc [ksf]	4.76					
OCR		1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004					
Car/Care	0.004					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	559.525, 509.589	447.919, -2857.73	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 42.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	22.8582
Consolidation Settlement [in]	0	8.83069
Immediate Settlement [in]	0	14.0309
Loading Stress [ksf]	0	10.2108
Effective Stress [ksf]	0	16.5624
Total Stress [ksf]	0	23.052
Total Strain	5.29238e-008	0.0988246
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.590182	16.5294
Over-consolidation Ratio	1	85.4232
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

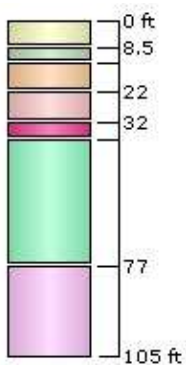
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	8.5	0
2	SILT	5	8.5
3	SILT & SAND	8.5	13.5
4	SAND	10	22
5	SAND (2)	5	32
6	SAND & GRAVEL	40	37
7	SAND (3)	28	77



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL	SAND (2)	SAND (3)
Color							
Unit Weight [kips/ft ³]	0.118	0.117	0.12	0.122	0.124	0.122	0.125
Saturated Unit Weight [kips/ft ³]	0.118	0.117	0.12	0.122	0.124	0.122	0.125
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		100	800	650	1000	1200	1200
Es bottom [ksf]		450					
Esur [ksf]		100	800	650	1000	1200	1200
Esur bottom [ksf]		450					
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear						
Cc	0.32						
Cr	0.04						
e0	0.862						
Pc [ksf]	4.76						
OCR		1	1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004						
Car/Care	0.004						

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	559.525, 509.589	447.919, -2857.73	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 43.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	26.0731
Consolidation Settlement [in]	0	10.7611
Immediate Settlement [in]	0	15.3154
Loading Stress [ksf]	0	10.2108
Effective Stress [ksf]	0	16.4674
Total Stress [ksf]	0	22.957
Total Strain	9.74964e-008	0.145139
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.450551	16.4344
Over-consolidation Ratio	1	61.4541
Void Ratio	0	1.092
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

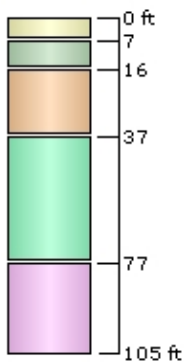
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT	9	7
3	SILT & SAND	21	16
4	SAND & GRAVEL	40	37
5	SAND (3)	28	77



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND & GRAVEL	SAND (3)
Color					
Unit Weight [kips/ft ³]	0.11	0.117	0.12	0.124	0.125
Saturated Unit Weight [kips/ft ³]	0.11	0.117	0.12	0.124	0.125
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		100	750	1000	1200
Es bottom [ksf]		550			
Esur [ksf]		100	750	1000	1200
Esur bottom [ksf]		550			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
Cc	0.37				
Cr	0.07				
e0	1.092				
Pc [ksf]	3.38				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.009				
Car/Care	0.009				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	559.525, 509.589	447.919, -2857.73	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 47.s3z
 Project Title: Labadie UWL
 Analysis: Settlement
 Author: Christopher Cook
 Company: Reitz & Jens, Inc
 Date Created: 10/17/2012, 11:48:36 AM
 Stress Computation Method: Boussinesq
 Use average properties to calculate layered stresses
 Groundwater method: Water Table
 Water Unit Weight: 0.0624 kips/ft³
 Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	20.9532
Consolidation Settlement [in]	0	7.85148
Immediate Settlement [in]	0	13.1102
Loading Stress [ksf]	0	10.3292
Effective Stress [ksf]	0	16.4014
Total Stress [ksf]	0	22.7662
Total Strain	0	0.083698
Pore Water Pressure [ksf]	0	6.3648
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0585001	16.3699
Over-consolidation Ratio	1	9.15019
Void Ratio	0	0.916997
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

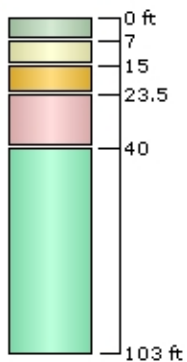
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	SILT	7	0
2	CLAY	8	7
3	SAND & SILT	8.5	15
4	SAND	16.5	23.5
5	SAND & GRAVEL	63	40



Soil Properties

Property	CLAY	SILT	SAND & SILT	SAND	SAND & GRAVEL
Color					
Unit Weight [kips/ft ³]	0.113	0.117	0.122	0.122	0.124
Saturated Unit Weight [kips/ft ³]	0.113	0.117	0.122	0.122	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		200	700	1100	1400
E _{sur} [ksf]		200	700	1100	1400
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
C _c	0.3				
C _r	0.05				
e ₀	0.917				
P _c [ksf]	4.52				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
C _{ae} /C _a	0.005				
C _{ar} /C _{are}	0.005				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-2058.82, 801.176	-110.756, 801.176	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: CIRCLE 48.s3z
 Project Title: Labadie UWL
 Analysis: Settlement
 Author: Christopher Cook
 Company: Reitz & Jens, Inc
 Date Created: 10/17/2012, 11:48:36 AM
 Stress Computation Method: Boussinesq
 Use average properties to calculate layered stresses
 Groundwater method: Water Table
 Water Unit Weight: 0.0624 kips/ft³
 Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	20.4739
Consolidation Settlement [in]	0	7.35604
Immediate Settlement [in]	0	13.1178
Loading Stress [ksf]	0	10.2043
Effective Stress [ksf]	0	16.5216
Total Stress [ksf]	0	23.0112
Total Strain	3.9992e-008	0.0983004
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.506464	16.4897
Over-consolidation Ratio	1	80.6776
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

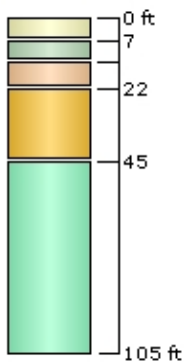
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT	7	7
3	SILT & SAND	8	14
4	SAND	23	22
5	SAND & GRAVEL	60	45



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL
Color					
Unit Weight [kips/ft ³]	0.118	0.117	0.12	0.122	0.124
Saturated Unit Weight [kips/ft ³]	0.118	0.117	0.12	0.122	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		150	700	900	1400
Es bottom [ksf]		400			
Esur [ksf]		150	700	900	1400
Esur bottom [ksf]		400			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
Cc	0.32				
Cr	0.04				
e0	0.862				
Pc [ksf]	4.76				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004				
Car/Care	0.004				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-119.939, -437.96	1670.82, -437.96	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: CIRCLE 49.s3z
 Project Title: Labadie UWL
 Analysis: Settlement
 Author: Christopher Cook
 Company: Reitz & Jens, Inc
 Date Created: 10/17/2012, 11:48:36 AM
 Stress Computation Method: Boussinesq
 Use average properties to calculate layered stresses
 Groundwater method: Water Table
 Water Unit Weight: 0.0624 kips/ft³
 Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	24.8356
Consolidation Settlement [in]	0	12.1942
Immediate Settlement [in]	0	12.6414
Loading Stress [ksf]	0	10.2043
Effective Stress [ksf]	0	16.5846
Total Stress [ksf]	0	23.0742
Total Strain	3.9992e-008	0.0983004
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.788336	16.5514
Over-consolidation Ratio	1	80.6776
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

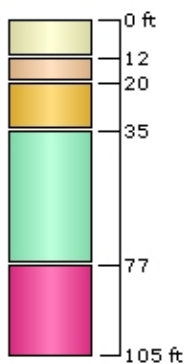
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	12	0
2	SILT & SAND	8	12
3	SAND	15	20
4	SAND & GRAVEL	42	35
5	SAND (2)	28	77



Soil Properties

Property	CLAY	SILT & SAND	SAND	SAND & GRAVEL	SAND (2)
Color					
Unit Weight [kips/ft ³]	0.118	0.12	0.122	0.124	0.125
Saturated Unit Weight [kips/ft ³]	0.118	0.12	0.122	0.124	0.125
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		200	1100	1000	1200
Es bottom [ksf]		500			
Esur [ksf]		200	1100	1000	1200
Esur bottom [ksf]		500			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
Cc	0.32				
Cr	0.04				
e0	0.862				
Pc [ksf]	4.76				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004				
Car/Care	0.004				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-119.939, -437.96	1670.82, -437.96	100	101

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: CIRCLE 50.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	24.747
Consolidation Settlement [in]	0	12.1942
Immediate Settlement [in]	0	12.5528
Loading Stress [ksf]	0	10.2043
Effective Stress [ksf]	0	16.5806
Total Stress [ksf]	0	23.0702
Total Strain	3.9992e-008	0.0983004
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.788336	16.5474
Over-consolidation Ratio	1	80.6776
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
 Area of Load: 417396 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
 Area of Load: 941302 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
 Area of Load: 551990 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

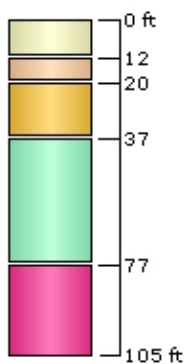
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	12	0
2	SILT & SAND	8	12
3	SAND	17	20
4	SAND & GRAVEL	40	37
5	SAND (2)	28	77



Soil Properties

Property	CLAY	SILT & SAND	SAND	SAND & GRAVEL	SAND (2)
Color					
Unit Weight [kips/ft ³]	0.118	0.12	0.122	0.124	0.125
Saturated Unit Weight [kips/ft ³]	0.118	0.12	0.122	0.124	0.125
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		300	900	1000	1200
Es bottom [ksf]		500			
Esur [ksf]		300	900	1000	1200
Esur bottom [ksf]		500			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
Cc	0.32				
Cr	0.04				
e0	0.862				
Pc [ksf]	4.76				
OCR		1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004				
Car/Care	0.004				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-119.939, -437.96	1670.82, -437.96	100	101

Settle3D Analysis Information

Project Settings

Document Name: circle 12 Labadie.s3z
Date Created: 3/15/2011, 2:21:05 PM
Stress Computation Method: Boussinesq
Include buoyancy effect when material settles below water table
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 0 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.167998
Consolidation Settlement [in]	0	0.0707617
Immediate Settlement [in]	0	0.142156
Loading Stress [ksf]	0	0.531582
Effective Stress [ksf]	0	6.69012
Total Stress [ksf]	0	13.1166
Total Strain	4.27224e-009	0.00181831
Pore Water Pressure [ksf]	0	6.42712
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	1.13095	6.68765
Over-consolidation Ratio	1	171.223
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²

Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible

Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²

Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10
-447.535	1544.49	10
-485.349	-142.076	10
-317.264	-315.23	5
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²
Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1649.21	915.592	10.2
-1153.62	-131.529	10.2
-485.349	-142.076	10.2
-447.535	1544.49	10.2
-1637.57	1323.75	10.2

11. Polygonal Load

Load Type: Flexible

Area of Load: 417396 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10
-1153.62	-131.529	10
-1649.21	915.592	10
-1637.57	1323.75	10
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible

Area of Load: 941302 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10
293.799	364.216	10
2201.69	-1376.73	10
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible

Area of Load: 551990 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10
832.524	-1353.16	10
802.744	-2507.54	10
188.83	-2491.7	10
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

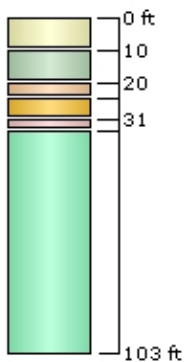
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	10	0
2	SILT	10	10
3	SAND	5	20
4	SILT & SAND	6	25
5	LOWER SAND	4	31
6	SAND & GRAVEL	68	35



Soil Properties

Property	CLAY	SILT	SAND	SILT & SAND	LOWER SAND	SAND & GRAVEL
Color						
Unit Weight [kips/ft ³]	0.118	0.117	0.119	0.12	0.122	0.124
Saturated Unit Weight [kips/ft ³]	0.118	0.117	0.119	0.12	0.122	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		200	800	600	900	1400
Es bottom [ksf]		500				
Esur [ksf]		200	800	600	900	1400
Esur bottom [ksf]		500				
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear					
Cc	0.32					
Cr	0.04					
e0	0.862					
Pc [ksf]	4.76	4.52				
OCR			1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004					
Car/Care	0.004					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-37, 1887	-188, -1959	100	Auto: 61

Settle3D Analysis Information

Project Settings

Document Name: circle 11 Labadie.s3z
Date Created: 3/15/2011, 2:21:05 PM
Stress Computation Method: Boussinesq
Include buoyancy effect when material settles below water table
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 0 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.198016
Consolidation Settlement [in]	0	0.0968068
Immediate Settlement [in]	0	0.148182
Loading Stress [ksf]	0	0.531582
Effective Stress [ksf]	0	6.66916
Total Stress [ksf]	0	13.0956
Total Strain	0	0.00603323
Pore Water Pressure [ksf]	0	6.42712
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	1.1603	6.66669
Over-consolidation Ratio	1	713.429
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²

Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible

Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²

Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10
-447.535	1544.49	10
-485.349	-142.076	10
-317.264	-315.23	5
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²
Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1649.21	915.592	10.2
-1153.62	-131.529	10.2
-485.349	-142.076	10.2
-447.535	1544.49	10.2
-1637.57	1323.75	10.2

11. Polygonal Load

Load Type: Flexible

Area of Load: 417396 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10
-1153.62	-131.529	10
-1649.21	915.592	10
-1637.57	1323.75	10
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible

Area of Load: 941302 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10
293.799	364.216	10
2201.69	-1376.73	10
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible

Area of Load: 551990 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10
832.524	-1353.16	10
802.744	-2507.54	10
188.83	-2491.7	10
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

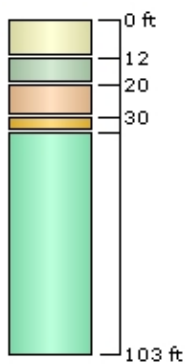
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	12	0
2	SILT	8	12
3	SILT & SAND	10	20
4	CLAY & SILT	5	30
5	SAND & GRAVEL	68	35



Soil Properties

Property	CLAY	SILT	SILT & SAND	CLAY & SILT	SAND & GRAVEL
Color					
Unit Weight [kips/ft ³]	0.118	0.117	0.118	0.12	0.124
Saturated Unit Weight [kips/ft ³]	0.118	0.117	0.118	0.12	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		400	500	225	1400
Esur [ksf]		400	500	225	1400
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				
Cc	0.32				
Cr	0.04				
e0	0.862				
Pc [ksf]	4.76	4.52			
OCR			1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.004				
Car/Care	0.004				

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-37, 1887	-188, -1959	100	Auto: 59

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: circle 9.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible

Area of Load: 156632 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible

Area of Load: 171981 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible

Area of Load: 244557 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
--------	--------	----------------------

-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
 Area of Load: 567821 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
 Area of Load: 1.5903e+006 ft²
 Load: 10.2 ksf
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
 Area of Load: 417396 ft²
 Depth: 0 ft
 Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2

-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible
Area of Load: 2.38333e+006 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2

293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

15. Polygonal Load

Load Type: Flexible
Area of Load: 6368.13 ft²
Load: 2.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-189.163	598.37
24.1777	598.37
25.3044	628.184
-188.546	628.184

16. Polygonal Load

Load Type: Flexible
Area of Load: 36129.2 ft²
Depth: 0 ft
Installation Stage: Stage 1

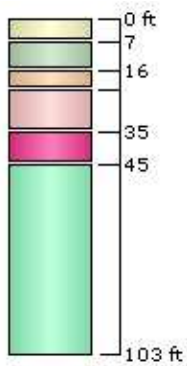
Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-263.883	598.37	0
-190.3	543.421	0
-189.163	598.37	2.2
-188.546	628.184	2.2
25.3044	628.184	2.2
24.1777	598.37	2.2
-189.163	598.37	2.2
-190.3	543.421	0
22.101	543.421	0
100.385	598.37	0
100.385	628.184	0
27.3659	682.733	0
-187.417	682.733	0
-263.883	628.184	0

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT	9	7
3	SILT & SAND	6	16
4	SAND	13	22

5	LOWER SAND	10	35
6	SAND & GRAVEL	58	45



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL	LOWER SAND
Color						
Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124	0.124
Saturated Unit Weight [kips/ft ³]	0.113	0.117	0.12	0.122	0.124	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		300	900	1100	1400	1300
Esur [ksf]		300	900	1100	1400	1300
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear					
Cc	0.3					
Cr	0.05					
e0	0.917					
Pc [ksf]	4.52					
OCR		1	1	1	1	1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled	Disabled	Disabled
Cae/Ca	0.005					
Car/Care	0.005					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-37, 1887	-188, -1959	100	100

Settle3D Analysis Information

Labadie UWL

Project Settings

Document Name: CIRCLE 48.s3z
Project Title: Labadie UWL
Analysis: Settlement
Author: Christopher Cook
Company: Reitz & Jens, Inc
Date Created: 10/17/2012, 11:48:36 AM
Stress Computation Method: Boussinesq
Use average properties to calculate layered stresses
Groundwater method: Water Table
Water Unit Weight: 0.0624 kips/ft³
Depth to water table: 1 [ft]

Stage Settings

Stage #	Name
1	Stage 1

Results

Time taken to compute: 0 seconds

Stage: Stage 1

Data Type	Minimum	Maximum
Total Settlement [in]	0	4.28082
Consolidation Settlement [in]	0	1.93172
Immediate Settlement [in]	0	2.34909
Loading Stress [ksf]	0	2.20022
Effective Stress [ksf]	0	7.76966
Total Stress [ksf]	0	14.2593
Total Strain	2.30708e-009	0.0552686
Pore Water Pressure [ksf]	0	6.4896
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.498421	7.76591
Over-consolidation Ratio	1	806.771
Void Ratio	0	0.862
Hydroconsolidation Settlement [in]	0	0

Loads

1. Polygonal Load

Load Type: Flexible
Area of Load: 183389 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1929.25	862.473	0
-1332.07	-407.189	0
-210.328	-424.303	0
-270.312	-363.597	2.9
-1293.01	-349.297	2.9
-1870.41	874.203	2.9
-1852.31	1508.1	2.9
-1908.21	1557.97	0

2. Polygonal Load

Load Type: Flexible
Area of Load: 234768 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-221.212	1808.9	2.9
-270.312	-363.597	2.9
-210.328	-424.303	0
-162.623	1880.73	0
-1908.21	1557.97	0

3. Polygonal Load

Load Type: Flexible
Area of Load: 156632 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1870.41	874.203	2.9
-1293.01	-349.297	2.9
-270.312	-363.597	2.9
-317.264	-315.23	5
-1259.26	-297.655	5
-1809.13	885.67	5
-1806.79	1469.02	5
-1852.31	1508.1	2.9

4. Polygonal Load

Load Type: Flexible
Area of Load: 171981 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1852.31	1508.1	2.9
-1806.79	1469.02	5
-267.217	1755.15	5
-317.264	-315.23	5
-270.312	-363.597	2.9
-221.212	1808.9	2.9

5. Polygonal Load

Load Type: Flexible
Area of Load: 244557 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-102.643	-2757.4	0
1076.16	-2794.88	0
1109.25	-1637.87	0
3035.41	-1668.34	0
2874.5	-1608.34	2.9
1048.12	-1576.89	2.9
1016.65	-2734.4	2.9
-39.0646	-2705.7	2.9

6. Polygonal Load

Load Type: Flexible
Area of Load: 433982 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0604	-2705.58	2.9
88.9461	776.742	2.9
2874.5	-1608.34	2.9
3035.41	-1668.34	0
35.4746	897.295	0
-102.643	-2757.4	0

7. Polygonal Load

Load Type: Flexible
Area of Load: 451309 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
27.8223	-2642.81	5
153.042	647.667	5
2690.18	-1545.21	5
2874.5	-1608.34	2.9
88.9461	776.742	2.9
-39.0604	-2705.58	2.9

8. Polygonal Load

Load Type: Flexible
Area of Load: 238713 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-39.0644	-2705.7	2.9
1018.23	-2734.44	2.9
1048.12	-1576.89	2.9
2874.5	-1608.34	2.9
2690.18	-1545.21	5
989.752	-1516.32	5
956.638	-2672.65	5
27.8223	-2642.81	5

9. Polygonal Load

Load Type: Flexible
Area of Load: 567821 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-1637.57	1323.75	10.2
-447.535	1544.49	10.2
-485.349	-142.076	10.2
-317.264	-315.23	10.2
-267.217	1755.15	5
-1806.56	1468.98	5

10. Polygonal Load

Load Type: Flexible
Area of Load: 1.5903e+006 ft²

Load: 10.2 ksf
Depth: 0 ft
Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-1649.21	915.592
-1153.62	-131.529
-485.349	-142.076
-447.535	1544.49
-1637.57	1323.75

11. Polygonal Load

Load Type: Flexible
Area of Load: 417396 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-485.349	-142.076	10.2
-1153.62	-131.529	10.2
-1649.21	915.592	10.2
-1637.57	1323.75	10.2
-1806.56	1468.98	5
-1809.13	885.67	5
-1259.26	-297.655	5
-317.264	-315.23	5

12. Polygonal Load

Load Type: Flexible
Area of Load: 941302 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
188.83	-2491.7	10.2
293.799	364.216	10.2
2201.69	-1376.73	10.2
2690.18	-1545.21	5
153.042	647.667	5
27.7015	-2645.99	5

13. Polygonal Load

Load Type: Flexible
Area of Load: 551990 ft²
Depth: 0 ft
Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
952.602	-2672.52	5
989.748	-1516.48	5
2690.18	-1545.21	5
2201.69	-1376.73	10.2
832.524	-1353.16	10.2
802.744	-2507.54	10.2
188.83	-2491.7	10.2
27.7015	-2645.99	5

14. Polygonal Load

Load Type: Flexible

Area of Load: 2.38333e+006 ft²

Depth: 0 ft

Installation Stage: Stage 1

Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
832.524	-1353.16	10.2
2201.69	-1376.73	10.2
293.799	364.216	10.2
188.83	-2491.7	10.2
802.744	-2507.54	10.2

15. Polygonal Load

Load Type: Flexible

Area of Load: 6083.7 ft²

Load: 2.2 ksf

Depth: 0 ft

Installation Stage: Stage 1

Coordinates

X [ft]	Y [ft]
-209.08	-363.999
-12.1921	-363.999
-11.0259	-333.141
-208.441	-333.141

16. Polygonal Load

Load Type: Flexible

Area of Load: 34847 ft²

Depth: 0 ft

Installation Stage: Stage 1

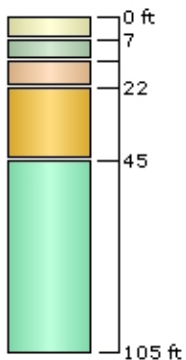
Coordinates and Load

X [ft]	Y [ft]	Load Magnitude [ksf]
-270.312	-363.597	0
-210.328	-424.303	0

-209.08	-363.999	2.2
-208.441	-333.141	2.2
-11.0259	-333.141	2.2
-12.1921	-363.999	2.2
-209.08	-363.999	2.2
-210.328	-424.303	0
-14.4711	-424.303	0
64.675	-363.999	0
64.675	-333.141	0
-8.95688	-278.393	0
-207.308	-278.393	0
-270.312	-333.141	0

Soil Layers

Layer #	Type	Thickness [ft]	Depth [ft]
1	CLAY	7	0
2	SILT	7	7
3	SILT & SAND	8	14
4	SAND	23	22
5	SAND & GRAVEL	60	45



Soil Properties

Property	CLAY	SILT	SILT & SAND	SAND	SAND & GRAVEL
Color					
Unit Weight [kips/ft ³]	0.118	0.117	0.12	0.122	0.124
Saturated Unit Weight [kips/ft ³]	0.118	0.117	0.12	0.122	0.124
Immediate Settlement	Disabled	Enabled	Enabled	Enabled	Enabled
Es [ksf]		150	700	900	1400
Es bottom [ksf]		400			
E _{sur} [ksf]		150	700	900	1400
E _{sur} bottom [ksf]		400			
Primary Consolidation	Enabled	Disabled	Disabled	Disabled	Disabled
Material Type	Non-Linear				

Cc	0.32					
Cr	0.04					
e0	0.862					
Pc [ksf]	4.76					
OCR		1	1	1		1
Secondary Consolidation	Standard	Disabled	Disabled	Disabled		Disabled
Cae/Ca	0.004					
Car/Care	0.004					

Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-37, 1887	-188, -1959	100	101
2	-114.933, -268.397	-121.003, -437.214	100	Auto: 61

Appendix G

**DESIGN OF FABRIC-FORMED CONCRETE MAT (FCM)
Revised August 2013**



REVISED JULY 2013

DESIGN OF FABRIC-FORMED CONCRETE MAT (FCM)

FCM IS FOR EROSION PROTECTION OF PERMANENT EXTERIOR SLOPE OF BERMS. FROM FLOODPLAIN ANALYSIS BY CDG, HIGHEST VELOCITIES OCCUR ALONG WEST BERM AT STA. 57.38 (RM),

MAX. VELOCITY = 1.30 TO 1.40 FPS

DEPTH OF FLOW (Y) = EL 481.6 - 465 = 16.6 FT FOR 100-YR FLOOD

FROM FHWA HEC-23, VOL. 2 (SEPT. 2009), CHAPTER 9

$$\text{FACTOR SAFETY (FS)} = \frac{[\mu(t)(\gamma_c - \gamma_w) \cos \theta \cos \alpha - \tau_{DES}]}{\sqrt{[t(\gamma_c - \gamma_w) \sin \theta]^2 + \tau_{DES}^2}}$$

WHERE μ = COEFF. BASE SHEAR = $\tan \delta$
RECOMMENDED δ FOR FCM ON FILTER GEOFABRIC
OVER COHESIVE SOIL IS 32.5°
 $\therefore \mu = \tan(32.5^\circ) = 0.637$

t = THICKNESS OF FCM, TRY HYDROTEx FILTER POINT (FP)
LINER FP220, WHICH IS 2.2" THICK, OR 0.183 FT

γ_c = UNIT WEIGHT OF FINE AGGREGATE CONCRETE

RECOMMENDED $\gamma_c = 130$ PCF

$\gamma_w = 62.4$ PCF (WATER)

θ = SLOPE ANGLE = 18.435° FOR 1(V)-3(H)

α = SLOPE OF BED, ASSUME 0

$$\text{ASSUME F.S.} = 1.5 = \frac{[(0.637)(0.183)(130 \text{ PCF} - 62.4 \text{ PCF}) \cos(18.435^\circ) \cos(0^\circ) - \tau_{DES}]}{\sqrt{[(0.183)(130 - 62.4) \sin 18.435^\circ]^2 + \tau_{DES}^2}}$$

SOLVING, $\tau_{DES} = 1.294$ PSF FOR F.S. = 1.5

$$\text{DESIGN VELOCITY: } \tau_{DES} = \frac{\gamma_w}{Y^{1/3}} \left(\frac{n V_{DES}}{K_u} \right)^2 \quad \text{WHERE } K_u = 1.486 \text{ (ENG. UNITS)}$$

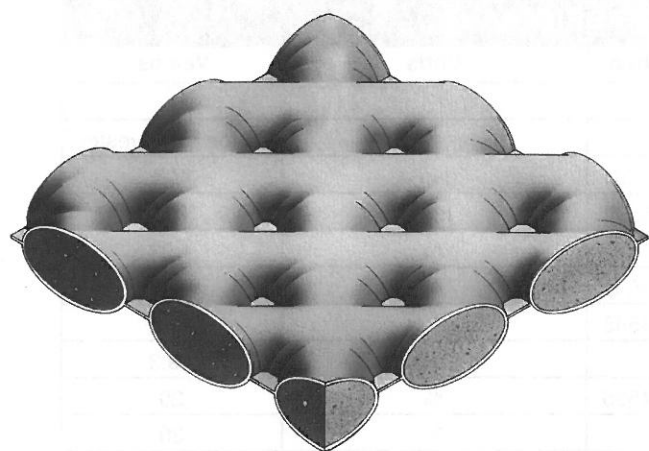
n = MANNING COEFF.
FOR FCM

$n = 0.03$ TO 0.025

$$1.294 \text{ PSF} = \frac{62.4 \text{ PCF}}{(16.6')^{1/3}} \left(\frac{0.03 \cdot V_{DES}}{1.486} \right)^2$$

MAX $V_{DES} = 11.4$ FPS $\gg 1.40$ FPS ESTIMATED

USE: HYDROTEx FP220 OVER GEOFABRIC
OVER COHESIVE BERM FILL



HYDROTEX™

Specification Guideline

Fabric-formed Concrete Erosion Control Systems

Filter Point Lining

Table 1.0 Typical Dimensions and Weights

Filter Point	FP220	FP400	FP600	FP800	FP1000	FP1200
Average Thickness, mm	56	102	152	203	254	305
Mass Per Unit Area, kg/m ²	121	220	330	440	550	661
Filter Point Spacing, mm	127	203	254	305	356	406
Area per Filter Point, cm ²	12.9	12.9	40.7	40.7	78.7	78.7
Perimeter per Filter Point, mm	165	165	279	279	381	381
Concrete Coverage, m ² /m ³	16.6	9.1	6.1	4.6	3.6	3.0
Shear Resistance, kg/m ²	54	98	146	195	244	293

Note: Values shown are typical and will vary with weight of concrete and field conditions.

Product Description

Filter Point Linings with filtering points (drains) provide an erosion resistant, permeable concrete lining for ditches, channels, canals, streams, rivers, ponds, lakes, reservoirs, marinas, and protected port and harbor areas. Filter Point Linings have a cobbled surface and a relatively high coefficient of hydraulic friction in order to achieve lower flow velocities and to reduce wave run-up. The filter points provide for the relief of hydrostatic uplift pressure, increasing the system's stability.

Filter Point Linings are generally used in lieu of stone rip rap or slope paving due to their lower cost and higher performance. Filter Point Linings have greater stability than conventional slope paving because of several factors – they can mitigate uplift pressure from ground water, reduce hydraulic uplift of flowing water by slowing channel velocities, and conform to soil contours during installation to reduce the potential for underscour.

Filter Point forms are woven from multifilament and textured yarns. The double-layer fabric is joined by interwoven filter points on controlled centers to form a lining with a deeply cobbled appearance. The spacing of the filter points determines the lining's thickness and weight, while the specially designed filter points relieve hydrostatic pressure and reduce applied stress to the fabric during pumping. Filter Point Linings are available in a wide range of thicknesses.

1.0 GENERAL

1.1 Scope of Work: The Contractor shall furnish all labor, materials, equipment, and incidentals required to perform all operations in connection with the installation of the proposed Filter Point (FP) Lining in accordance with the lines, grades, design, and dimensions shown on the Contract Drawings and as specified herein.

1.2 Description: The work shall consist of installing an unreinforced concrete lining by positioning specially woven, double-layer synthetic forms on the surface to be protected and filling them with a pumpable, fine aggregate concrete (structural grout) in such a way as to form a stable lining of required thickness, weight and configuration.

2.0 MATERIALS REQUIREMENTS

2.1 Fine Aggregate Concrete: Fine aggregate concrete shall consist of a proportioned mixture of Portland cement, fine aggregate (sand) and water. The consistency of the fine aggregate concrete delivered to the concrete pump shall be proportioned and mixed as to have an efflux time of 9-12 seconds when passed through the 19 mm orifice of the standard flow cone that is described in ASTM C 939. Pozzolan, fluidifier or pumping aid conforming to this Specification may be used at the option of the Contractor. The mix shall exhibit a compressive strength of 13.8 MPa at 28 days, when made and tested in accordance with ASTM C 31 and C 39.

2.1.1 Portland cement shall conform to ASTM C 150, Type I or Type II.

2.1.2 Fine aggregate shall conform to ASTM C 33, except as to grading. Aggregate grading shall be reasonably consistent and shall not exceed the maximum size which can be conveniently handled with available pumping equipment.

PROPERTY REQUIREMENTS - FILTER POINT FABRIC^{1, 2}

Property	Test Method	Units	Values
Physical:			
Composition of Yarns			Nylon or polyester
Mass Per Unit Area (double-layer)	ASTM D 5261	g/m ²	403
Thickness	ASTM D 5199	mm	0.6
Mill Width		m	1.92
Mechanical:			
Wide-Width Strip Tensile Strength - Machine	ASTM D 4595	kN/m	24.5
- Cross		kN/m	19.3
Elongation at Break - Machine	ASTM D 4595	%	20
- Cross		%	30
Trapezoidal Tear Strength - Machine	ASTM D 4533	N	665
- Cross		N	445
Hydraulic:			
Apparent Opening Size (AOS)	ASTM D 4751	mm	0.425
Flow Rate	ASTM D 4491	l/min/m ²	3665
Flow Rate through Filter Point	ASTM D 4491	l/min/m ²	285

Notes:

1. Conformance of fabric to specification property requirements shall be based on ASTM D 4759, "Practice for Determining the Specification Conformance of Geotextiles."
2. All numerical values represent minimum average roll values (i.e., average of test results from any sample roll in a lot shall meet or exceed the minimum values). Lots shall be sampled according to ASTM D 4354, "Practice for Sampling of Geosynthetics for Testing."

2.1.3 Water for mixing shall be clean and free from injurious amounts of oil, acid, salt, alkali, organic matter or other deleterious substances.

2.1.4 Pozzolan, if used, shall conform to ASTM C 618, Class C, F or N.

2.1.5 Plasticizing and air entraining admixtures, if used, shall conform to ASTM C 494 and ASTM C 260, respectively.

2.2 Fabric Forms: The fabric forms shall be as specified, HYDROTEX™ Filter Point ([see Note A](#)) forms as manufactured by Geostar Corporation; 74 Perimeter Center East, Suite 7420; Atlanta, Georgia 30346-1803, Tel: 800.253.0561 (770.399.5051); or approved equal. The fabric forms shall be composed of synthetic yarns formed into a woven fabric. Yarns used in the manufacture of the fabric shall be composed of nylon and/or polyester. Forms shall be woven with a minimum of 50% textured yarns (by weight) to improve adhesion to fine aggregate concrete and to improve filtration. Partially-oriented (POY), draw-textured, and/or staple yarns shall not be used in the manufacture of the fabric. Each layer of fabric shall conform to the physical, mechanical and hydraulic requirements referenced herein. The fabric forms shall be free of defects or flaws which significantly affect their physical, mechanical, or hydraulic properties.

Note A: The engineer shall indicate the Filter Point Lining size required (see Table 1.0). Example: FP400.

2.2.1 Fabric forms shall consist of double-layer woven fabric joined together by spaced, interwoven filter points to form a concrete lining with a finished average thick-

ness of ([see Table 1.0](#)) mm, a nominal mass per unit area of ([see Table 1.0](#)) kg/m², and a deeply cobbled surface appearance. After the form has been filled with fine aggregate concrete, the filter points shall be on approximately ([see Table 1.0](#)) mm spacing when measured along the diagonal. Filter points shall be formed by interweaving the double-layer fabric to form water permeable drains and attachment points for the control of concrete lining thickness. The interweaving of the fabric layers shall form an area of double density, high strength, single-layer fabric with an area of ([see Table 1.0](#)) cm² and a perimeter of ([see Table 1.0](#)) mm. All filter points shall be cross shaped and shall have twill weave centers designed to function as drains to relieve hydrostatic uplift pressure.

2.2.2 Mill widths of fabric shall be a minimum of 1.92 meters. Each selvage edge of the top and bottom layers of fabric shall be reinforced for a width of not less than 35 mm by adding a minimum of 6 warp yarns to each selvage construction. Mill width rolls shall be cut to the length required, and the double-layer fabric separately joined, bottom layer to bottom layer and top layer to top layer, by means of sewing thread, to form multiple mill width panels with sewn seams on not less than 182 cm centers.

2.2.3 All factory-sewn seams shall be downward facing as shown on the Contract Drawings. All seams sewn in the factory shall be not less than 15.7 kN/m when tested in accordance with ASTM D 4884. All sewn seams and zipper attachments shall be made using a double line of U.S. Federal Standard Type 401 stitch. All stitches

shall be sewn simultaneously and be parallel to each other, spaced between 6 and 19 mm apart. Each row of stitching shall consist of 4 to 7 stitches per 25.4 mm. Thread used for seaming shall be nylon and/or polyester.

2.2.4 Baffles shall be installed at predetermined mill width intervals to regulate the distance of lateral flow of fine aggregate concrete. The baffle material shall be non-woven filter fabric. The grab tensile strength of the filter fabric shall be not less than 400 N when tested in accordance with ASTM D 4632.

2.2.5 The fabric forms shall be kept dry and wrapped such that they are protected from the elements during shipping and storage. If stored outdoors, they shall be elevated and protected with a waterproof cover that is opaque to ultraviolet light. The fabric forms shall be labeled as per ASTM D 4873, "Guide for Identification, Storage and Handling of Geosynthetic Rolls."

2.2.6 The Contractor shall submit a manufacturer's certificate that the supplied fabric forms meet the criteria of these Specifications, as measured in full accordance with the test methods and standards referenced herein. The certificates shall include the following information about each fabric form delivered:

Manufacturer's name and current address;
full product name;
style and product code number;
form number(s);
composition of yarns; and
manufacturer's certification statement.

2.3 Filter Fabrics: The filter fabrics shall be composed of synthetic fibers or yarns formed into a nonwoven or woven fabric. Fibers and yarns used in the manufacture of filter fabrics shall be composed of at least 85% by weight of polypropylene, polyester or polyethylene. They shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including selvages. These materials shall conform to the physical requirements shown below. The filter fabric shall be free of defects or flaws which significantly affect its mechanical or hydraulic properties.

PROPERTY REQUIREMENTS - FILTER FABRIC 1, 2

Property	Test Method	Units	Values
Grab Tensile Strength	ASTM D 4632	N	400
Elongation at Break	ASTM D 4632	%	15
Trapezoidal Tear Strength	ASTM D 4533	N	130
Permittivity	ASTM D 4491	sec ⁻¹	0.5

Notes:

1. Conformance of filter fabrics to specification property requirements shall be based on ASTM D 4759, "Practice for Determining the Specification Conformance of Geotextiles."
2. All numerical values represent minimum average roll values (i.e., average of test results from any sample roll in a lot shall meet or exceed the minimum values). Lots shall be sampled according to ASTM D 4354, "Practice for Sampling of Geosynthetics for Testing."

3.0 DESIGN REQUIREMENTS

Note B: Select the appropriate pair of paragraphs for the final specification based upon the type of hydraulic application.

The average thickness, mass per unit area and hydraulic resistance of each concrete lining shall withstand the hydraulic loadings (velocity, depth, duration, shear stress, pressure, and frequency of immersion) for the design discharges along the structure(s). The stability analysis for each concrete lining shall be accomplished using a factor-of-safety methodology. A minimum factor of safety of 1.5 shall be required.

The Contractor shall provide to the Engineer calculations and design details, provided by the manufacturer or a professional engineer, attesting to the suitability of each fabric formed concrete lining for the purpose contemplated. Each concrete lining shall be accepted only when accompanied by the documented hydraulic performance characteristics derived from tests performed under controlled flow conditions. Test conditions shall conform to test protocol as documented in "Hydraulic Stability of Fabric Formed Concrete Lining and Mat Systems During Overtopping Flow."

or

The average thickness, mass per unit area and hydraulic resistance of each concrete lining shall withstand the hydraulic loadings (depth, duration, type of wave, wave height and period, and pressure distribution) for the design wave. The stability analysis for the concrete lining shall be accomplished using the factor-of-safety methodology. A minimum factor of safety of 1.5 shall be required.

The Contractor shall provide to the Engineer calculations and design details, provided by the manufacturer or a professional engineer, attesting to the suitability of each fabric formed concrete lining for the purpose contemplated. Each concrete lining shall be accepted only when accompanied by hydraulic stability calculations derived from mathematical models developed specifically for fabric formed concrete linings and for this purpose.

4.0 CONSTRUCTION AND INSTALLATION REQUIREMENTS

4.1 Site Preparation

4.1.1 Areas on which fabric forms are to be placed shall be constructed to the lines, grades, contours, and dimensions shown on the Contract Drawings. All obstructions such as roots and projecting stones shall be removed. Where such areas are below the allowable grades, they shall be brought to grade by placing compacted layers of select material. The thickness of layers and the amount of compaction shall be as specified by the Engineer. Where required by the Contract Specifications, soft and otherwise unsuitable subgrade soils shall be identified, excavated and replaced with select materials in accordance with the Contract Specifications.

4.1.2 Excavation and preparation of aprons as well as anchor, terminal or toe trenches shall be done in accordance with the lines, grades, contours, and dimensions shown on the Contract Drawings.

- 4.1.3 Immediately prior to placing the fabric forms, the prepared area shall be inspected by the Engineer, and no forms shall be placed thereon until the area has been approved.

4.2 Fabric Form Placement

- 4.2.1 A filter fabric shall be placed on the graded surface approved by the Engineer.
- 4.2.2 Fabric forms shall be placed over the filter fabric and within the limits shown on the Contract Drawings. Anchoring of the fabric forms shall be accomplished through the use of anchor, terminal and toe trenches.
- 4.2.3 Adjacent fabric forms shall be joined before filling with fine aggregate concrete by field sewing or zippering the two bottom layers of fabric together and the two top layers of fabric together. All field seams shall be made using two lines of U.S. Federal Standard Type 101 stitches. All sewn seams shall be downward facing, and all zipper seams shall be fastened as shown on the Contract Drawings, except with the approval of the Engineer.
- 4.2.4 When conventional joining of fabric forms is impractical or where called for on the Contract Drawings, adjacent forms may be overlapped a minimum of one meter to form a lap joint, pending approval by the Engineer. Based on the predominant flow direction, the downstream edge of the form shall overlap the upstream edge of the next form. In no case shall simple butt joints between forms be permitted.
- 4.2.5 Expansion joints shall be provided as shown on the Contract Drawings, or as specified by the Engineer.
- 4.2.6 Immediately prior to filling with fine aggregate concrete, the assembled fabric forms shall be inspected by the Engineer, and no fine aggregate concrete shall be pumped therein until the fabric seams have been approved. At no time shall the unfilled fabric forms be exposed to ultraviolet light (including direct sunlight) for a period exceeding five days.

4.3 Fine Aggregate Concrete Placement

- 4.3.1 Following the placement of the fabric forms, small slits shall be cut in the top layer of the fabric form to allow the insertion of the filling pipe at the end of the fine aggregate concrete pump hose. These slits shall be of the minimum length to allow proper insertion of the filling pipe. Fine aggregate concrete shall be pumped between the top and bottom layers of fabric, filling the forms to the recommended thickness and configuration.
- 4.3.2 Fine aggregate concrete shall be pumped in such a way that excessive pressure on the fabric forms and cold joints are avoided. A cold joint is defined as one in which the pumping of the fine aggregate concrete into a given form is discontinued or interrupted for an interval of forty-five or more minutes.
- 4.3.3 Holes in the fabric forms left by the removal of the filling pipe shall be temporarily closed by inserting a piece of nonwoven fabric or similar material. The nonwoven fabric shall be removed when the concrete is no longer fluid and the concrete surface at the hole shall be cleaned and smoothed by hand. Foot traffic on the filled form shall be restricted to an absolute minimum for one hour after filling.
- 4.3.4 After the fine aggregate concrete has set, all anchor, terminal and toe trenches shall be backfilled and compacted, as specified by the Engineer.
- 4.3.5 The Filter Point Lining shall be measured by the number of square meters computed from the payment lines shown on the Contract Drawings or from payment lines established in writing by the Engineer. This includes Filter Point fabric forms, fine aggregate concrete, and filter fabric used in the aprons, overlaps, and anchor, terminal, or toe trenches. Slope preparation, excavation and backfilling, and bedding are separate pay items.

Spec: FP (siu)
Revised December 2001

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Appendix H

**APPENDIX 2, SUB-APPENDIX D FROM
DETAILED SITE INVESTIGATION:
ANALYSIS OF CPT SOUNDINGS
AND COMPARISON WITH BORINGS
Added November 2013**

Ameren Missouri Labadie Power Plant
Utility Waste Landfill Detailed Site Investigation
Summary of Geotechnical Investigation

Appendix D – Analysis of CPT Soundings and Comparison with Borings

The Cone Penetration Test (CPT) data, which appear in Appendix C, have been processed using the program CPT-Pro by GeoSoft in order for the soundings to be easily interpreted visually. This processing includes smoothing the raw data and interpretation for both geologic and geotechnical parameters. The raw data generated by the cone penetrometer include: the cone tip pressure (q_c), skin friction (f_s), and porewater pressure measured behind the cone tip (u_2). The tip pressure and skin friction are corrected by CPT-Pro to account for static pore water pressure (q_t and f_t respectively).

A smoothing function is used to clean up the raw data, to correct for the sensitivity of the CPT equipment and the normal errors that are generated during penetration. This smoothing function removes any erroneous data, and evens out any micro-scale features such as those caused by individual gravel fragments or thin layering which are beyond the ability of the cone penetrometer to reasonably detect due to the probe geometry. By smoothing the data, we ensure that it represents the soil behavior of a soil stratum and not individual anomalies. This smoothing of the data has been shown to have little impact on the soil stratigraphy that is created from the data.

After the data has been smoothed, interpretations can be made. Based upon the pore water pressure data, the ground water depth is approximated manually. Knowing the depth to ground water, the software calculates the static pore water pressure (u_0). From the smoothed data of q_t and f_t , CPT-Pro automatically calculates the friction ratio (R_f), which is defined as (f_t/q_t) or alternately as (f_s/q_t) . In general, a high R_f is indicative of fine-grain and low sensitivity soils. CPT-Pro also calculates the pore pressure ratio (B_q), which is defined as $(u_2 - u_0)/(q_t - \sigma_{vo})$. In general, higher pore pressure ratios correspond to more sensitive soils, that is, soils which lose significant undrained shear strength when disturbed. Very sensitive soils are typically found in marine deposits in saltwater environments, not in the St. Louis area.

The soil stratigraphy can be determined with this base information, which is derived solely from the data collected from the cone penetrometer as it is pushed, because there are no soil cuttings or soil samples. The primary classification system that we used is the “ R_f and q_t based Robertson 1986”, which determines the soil type based upon the corrected cone tip pressure and the friction ratio. The chart used for this method is shown in Figure D-1, which we copied from the CPT-Pro manual. This method is one of 5 that are part of the CPT-Pro program. Coarse-grain soils generally have high q_t and low R_f , and fine-grain soils (silts and clays) have low q_t and high R_f . These relative values are the basis of soil classification under the R_f & q_t method. In order to account for the limits of data acquisition due to probe geometry, a minimum layer thickness of 6 inches was used for soil classification.

In some cases, we used a second classification system where unexpected or anomalous classifications were produced by the R_f & q_t method – specifically where either “sensitive fine grained” or “organic material” classifications were selected by CPT-Pro. The term “sensitive fine grained” was not useful as it does not descriptive of a soil type. A few CPT logs were developed in our initial analyses using the

R_f & q_t method that had very thick layers (greater than 5 feet) of “organic material.” None of the standard borings on the site encountered anything more than laminations of organics, so we questioned the validity of this classification. The second classification system employed was “ B_q and q_t based Robertson 1986,” which determines the soil type based upon the corrected cone tip pressure and the pore pressure ratio. The chart for this classification method is shown in Figure D-2, also from the CPT-Pro manual. A reasonable soil classification resulted using the B_q & q_t method in each case where a questionable classification from the R_f & q_t method was re-analyzed. Our engineering judgment, and CPT soundings correlated with geotechnical borings with soil samples on this project and from other projects, led to our choice of the above two methods of the 5 available in CPT-Pro. We tried the other methods of analyses in the CPT-Pro program, but this yielded the best results.

Five extra temporary geotechnical borings were made next to selected CPT soundings to verify that the CPT sounding produced similar or better results than a standard boring. The pairs of CPT logs and boring logs are depicted in Figures D-3 through D-7. Some logs, specifically C-100 and B-100 in Figure D-6, demonstrate that the CPT probe can detect finer soil layering than a standard geotechnical boring in which soil samples are taken at intervals. In addition to the geotechnical borings, we made CPT soundings next to 3 selected piezometer borings. These are depicted in Figures D-8 through D-10. The general soil classifications in each of these pairs of logs are very similar for practical purposes, with the exception of laminated soils. Laminated soils have been identified in the CPT logs as an average of the soil types in that interval because of the scale limitations of the probe’s size and geometry.

Nine extra confirmation CPT soundings were made next to the planned CPT soundings to demonstrate the repeatability of the results. These comparisons are depicted in Figures D-11 through D-19. The distance in feet between the soundings is shown at the bottom in each figure. The results for each pair are very similar.

Based on the soil type and generated parameters (B_q , R_f , etc.), geotechnical soil parameters were then developed by CPT-Pro. These parameters include: undrained shear strength (s_u), internal effective friction angle (ϕ'), a pseudo corrected SPT blow count (N_{60}), relative density (D_r or I_D), Young’s modulus (E_s), and wet unit weight (γ). Some of these are calculated by CPT-Pro using internal equations, and some are calculated with user-input equations from other sources. The references for the equations used are listed below. The data are plotted on the CPT sounding logs and/or are listed in the CPT reports. The CPT reports list the means of data and calculated parameters within each 2.5-foot depth interval. Each CPT report follows the corresponding CPT log in Appendix C.

We noted that the N_{60} -values from the standard borings were drastically different from the N_{60} -values which were calculated by CPT-Pro for the pairs of borings and CPT soundings. Therefore, the N_{60} -values from CPT-Pro have been corrected with factors developed by Reitz & Jens for this site. The factors depend upon the soil type. The corrected N_{60} -values are listed in the CPT reports. The correlations which we used are plotted in Figure D-20.

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Use of piezometer cone data.

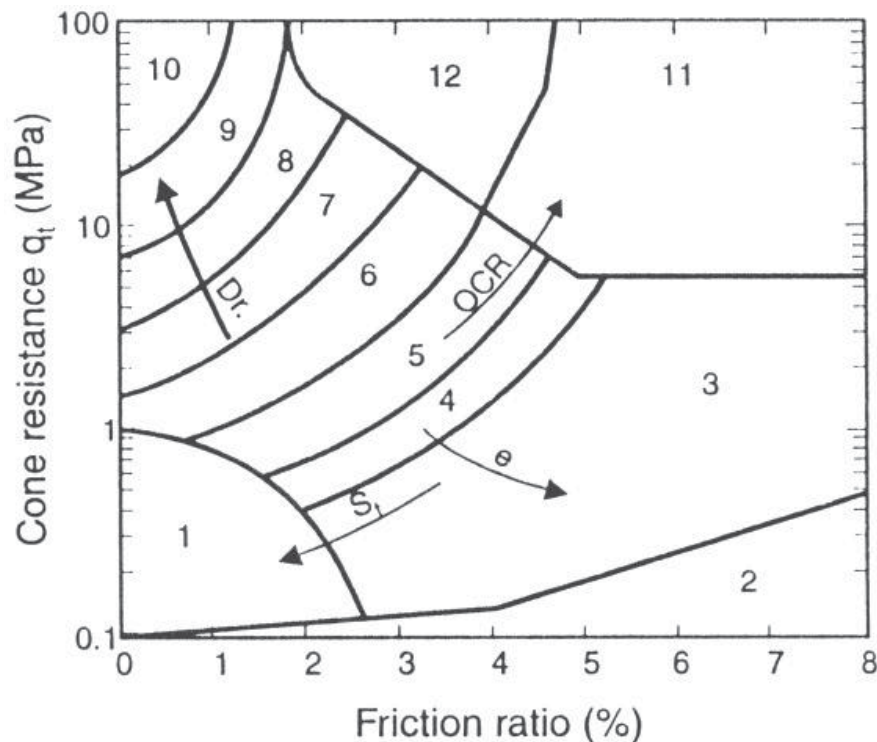
Proceedings of the ASCE Specialty Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering. ASCE. 1986.

Also quoted in:

Lunne, T., Robertson P.K. and Powell J.J.M. (1997).

Cone Penetration Testing in Geotechnical Practice.

Blackie Academic & Professional.



Classification system from CPTU data (quoted after Lunne, Robertson and Powell, 1997).

Zone	Soil Behaviour Type	Zone	Soil Behaviour Type
1	Sensitive fine grained	7	Silty sand to silty clay
2	Organic material	8	Sand to silty sand
3	Clay	9	Sand
4	Silty clay to clay	10	Gravelly sand to sand
5	Clayey silt to silty clay	11	Very stiff fine grained *
6	Sandy silt to clayey silt	12	Sand to clayey sand *

* Overconsolidated or cemented.

Soil classification method based on B_q and q_t . Robertson 1986.

Source paper.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J.

Use of piezometer cone data.

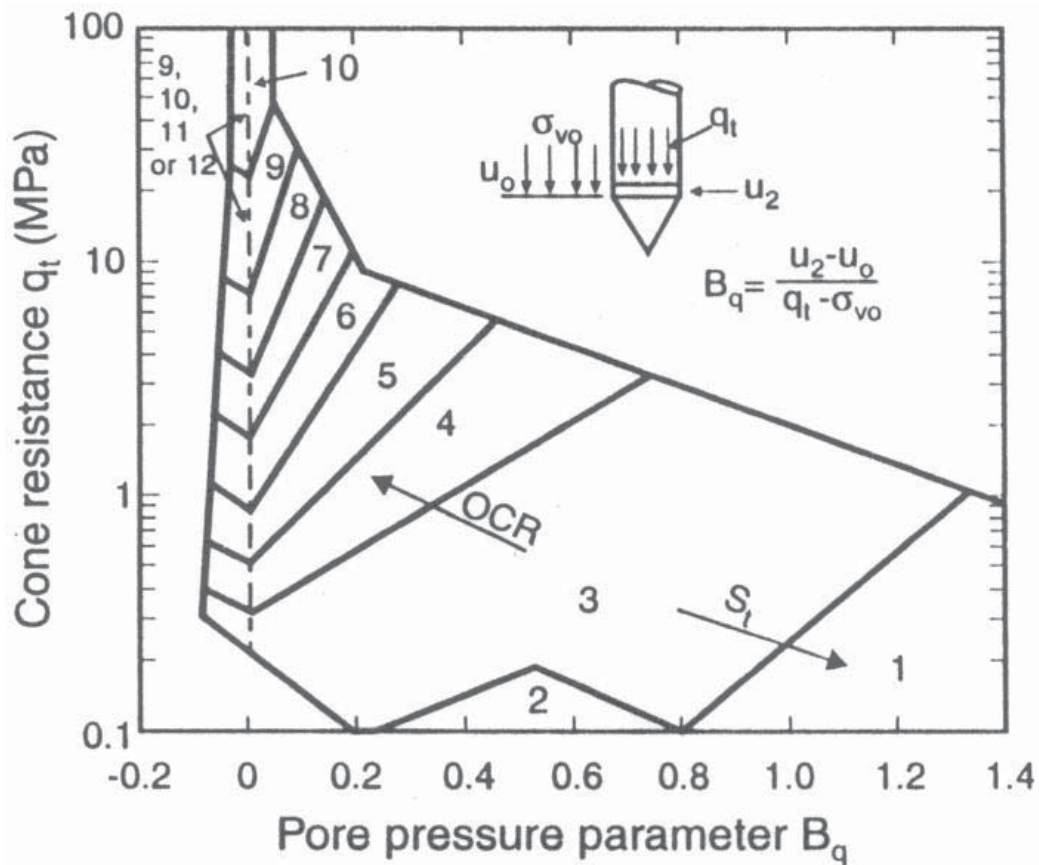
Proceedings of the ASCE Specialty Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering. ASCE. 1986.

Also quoted in:

Lunne, T., Robertson P.K. and Powell J.J.M. (1997).

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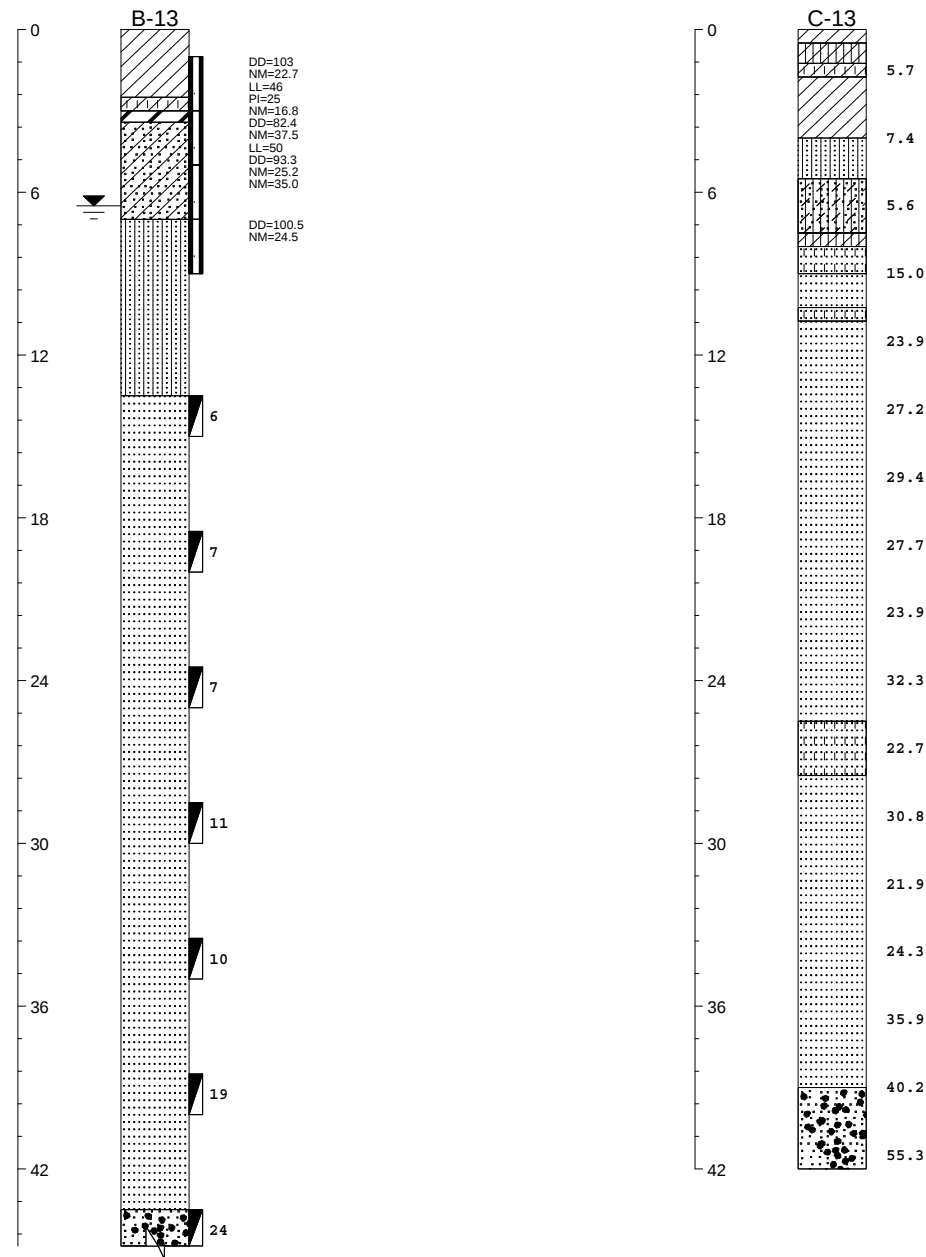


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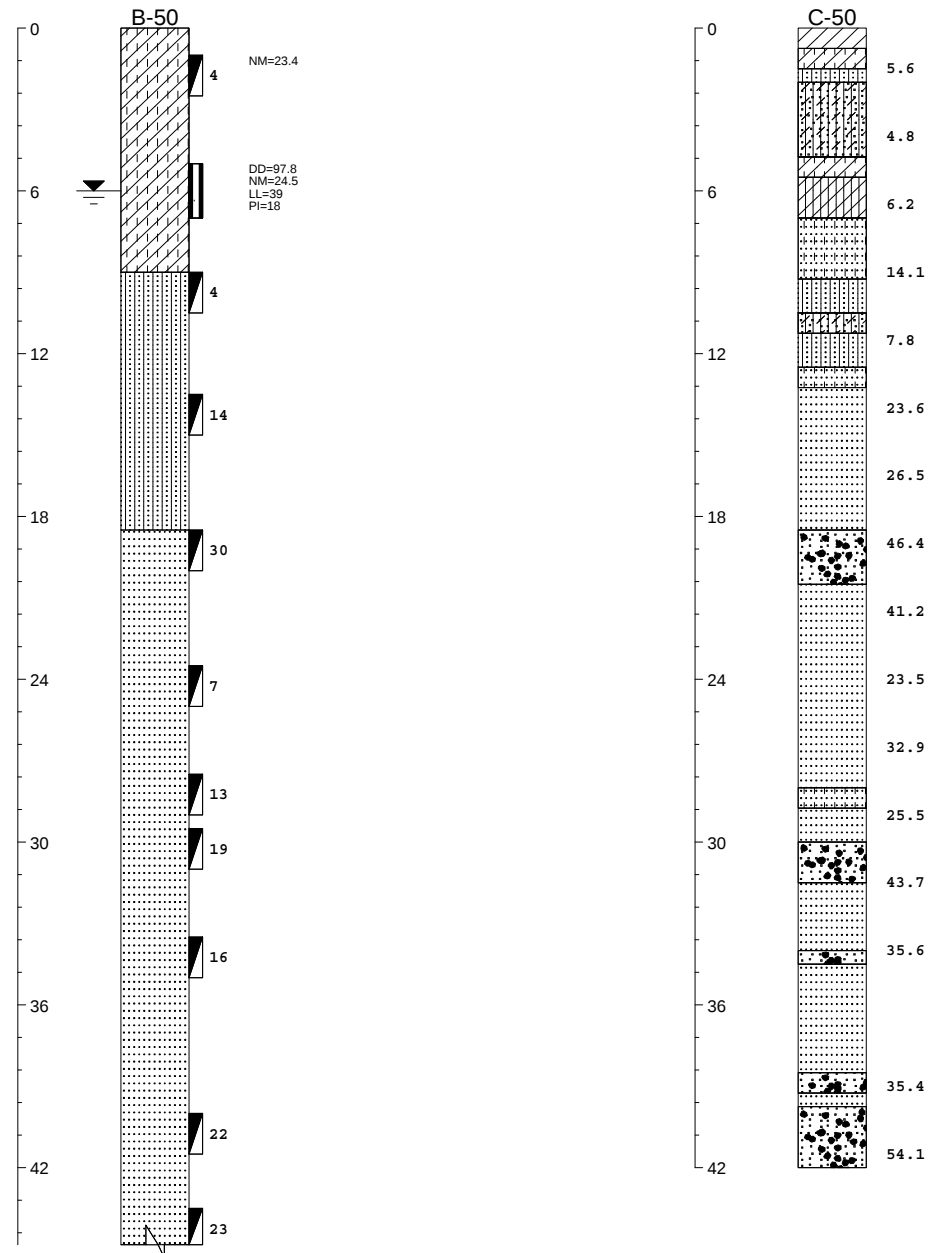
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REITZ & JENS, INC.

LOG OF BORINGS

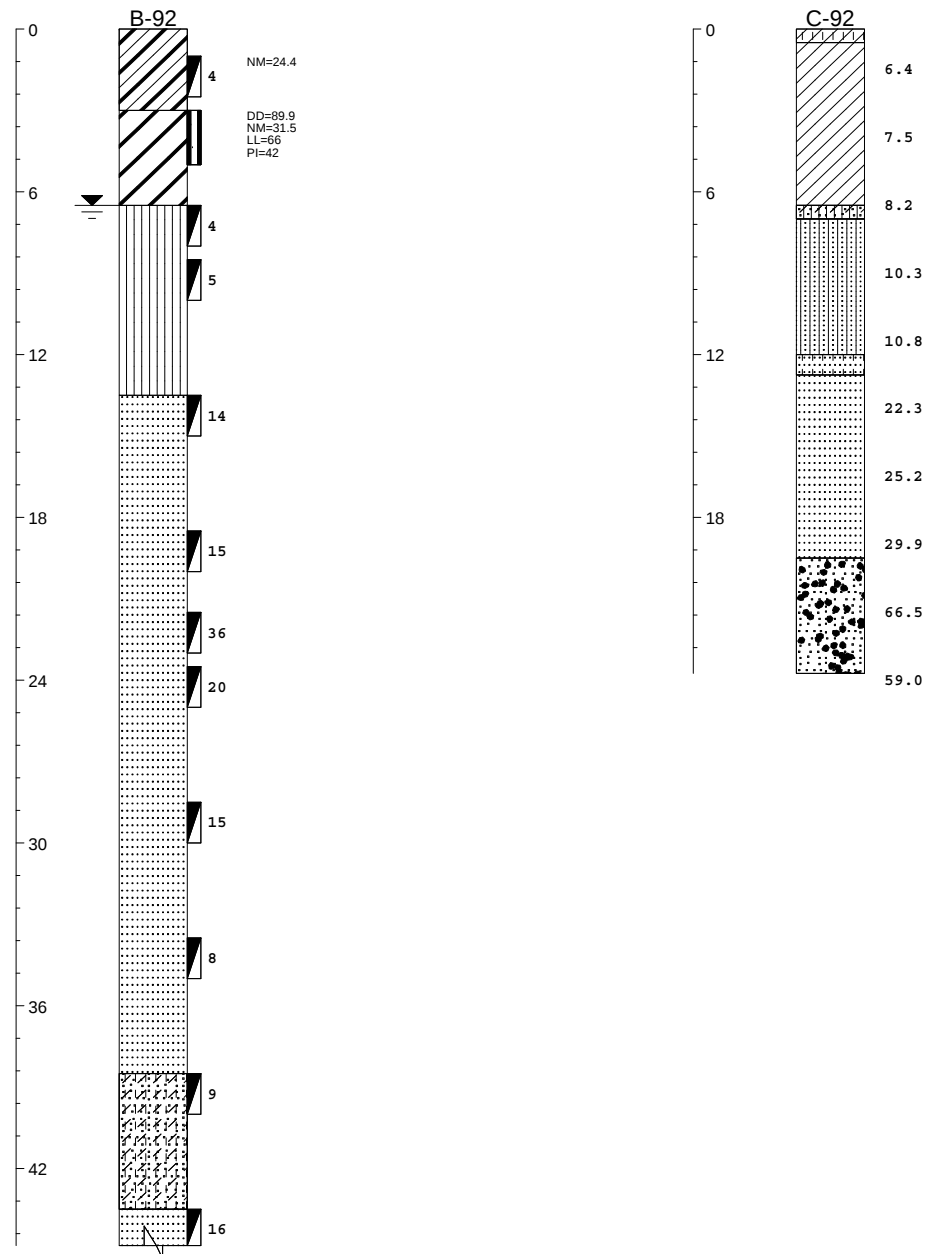
Labadie Power Plant UWL DSI



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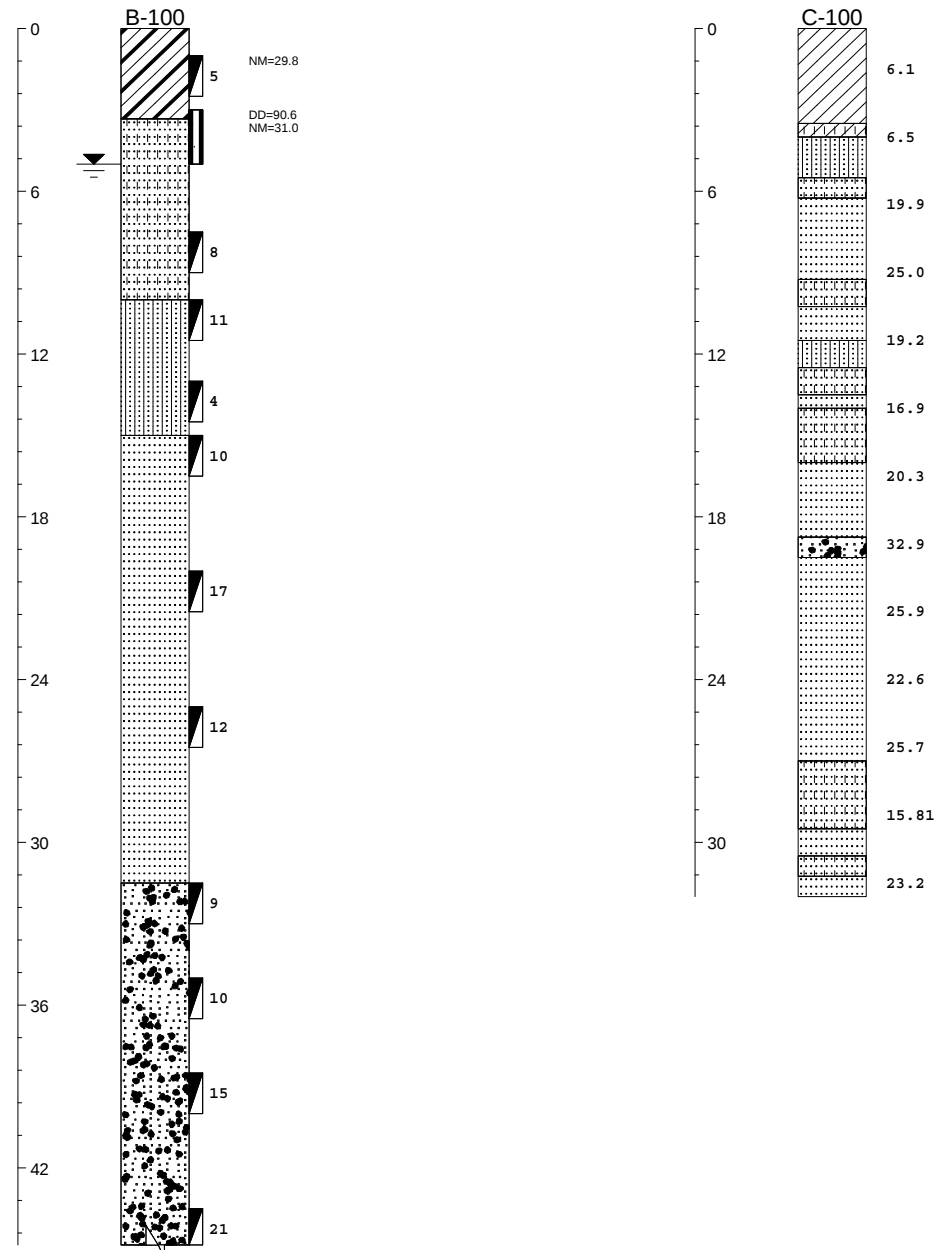
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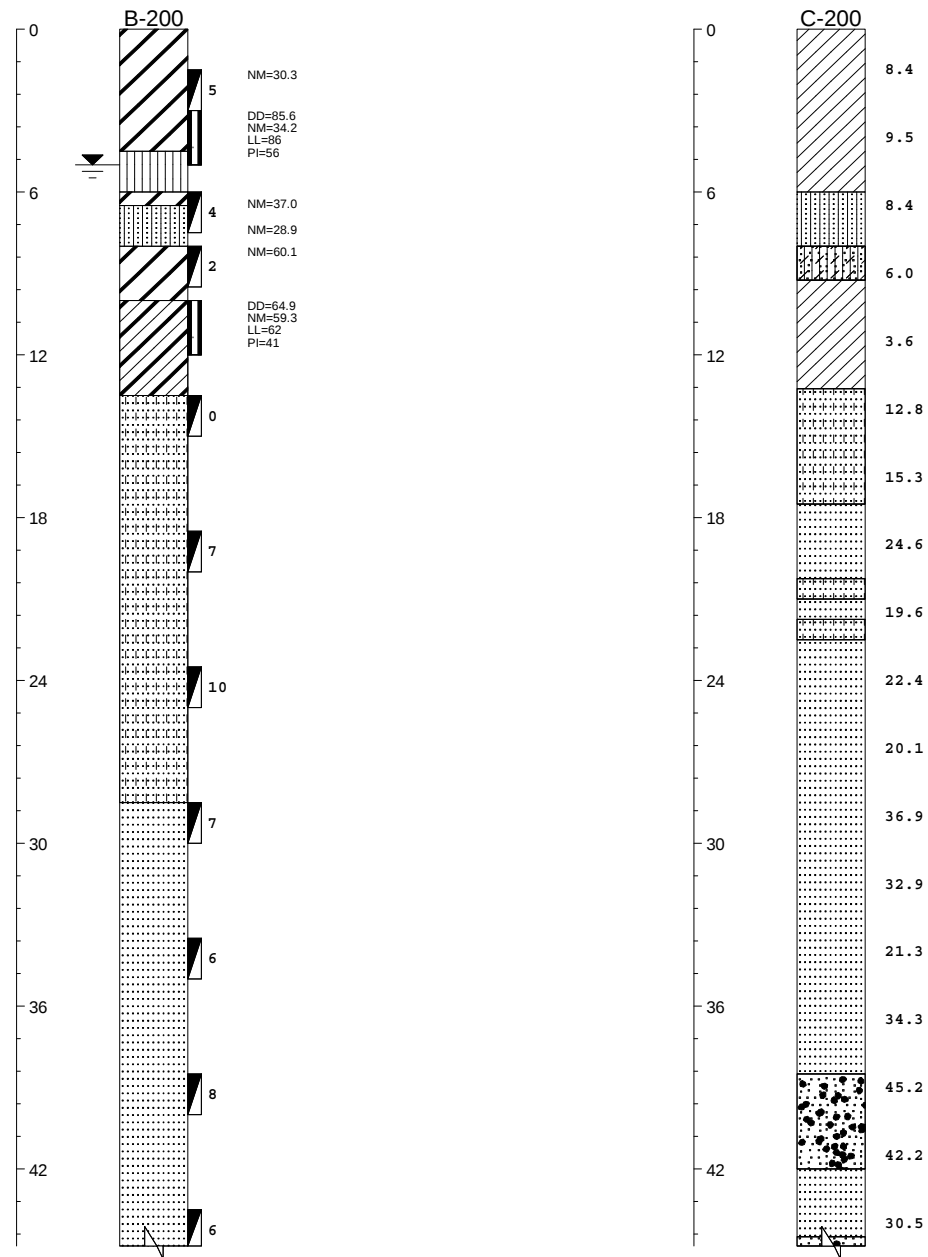
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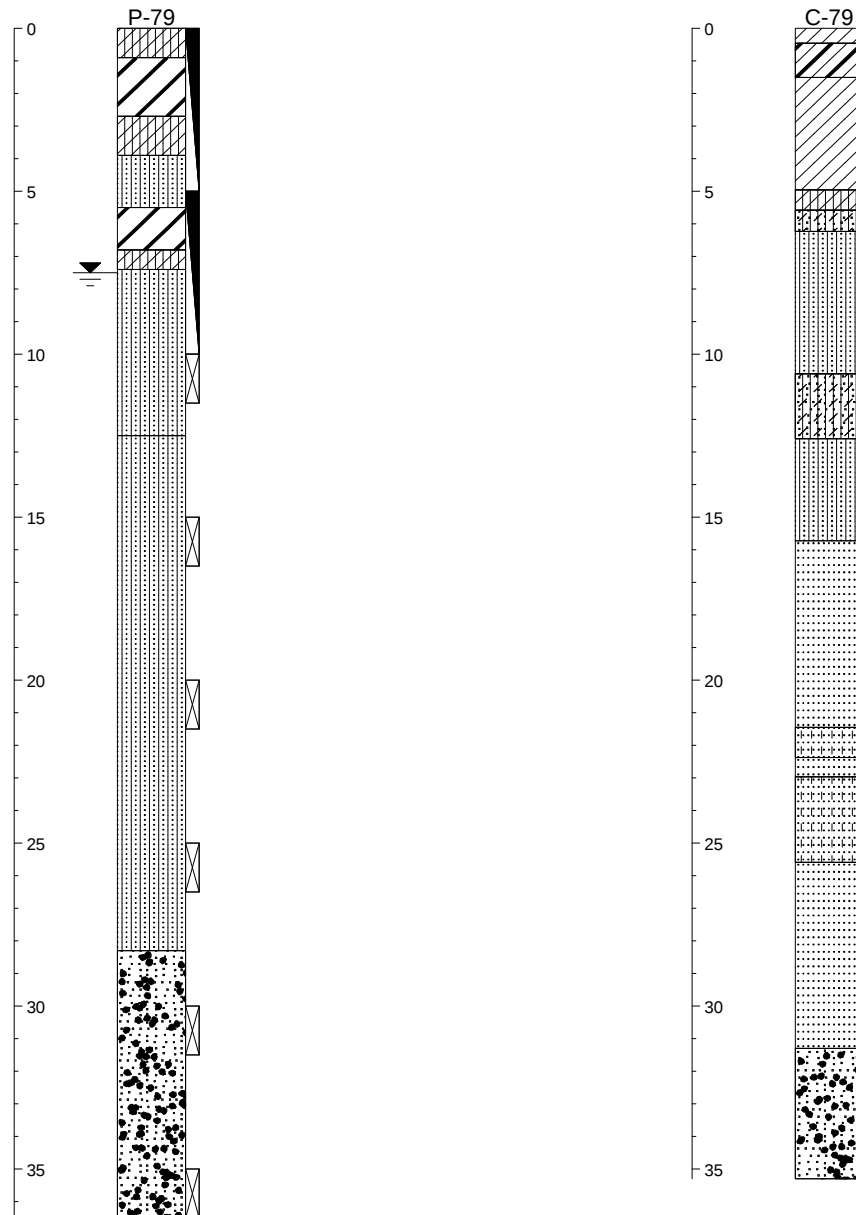
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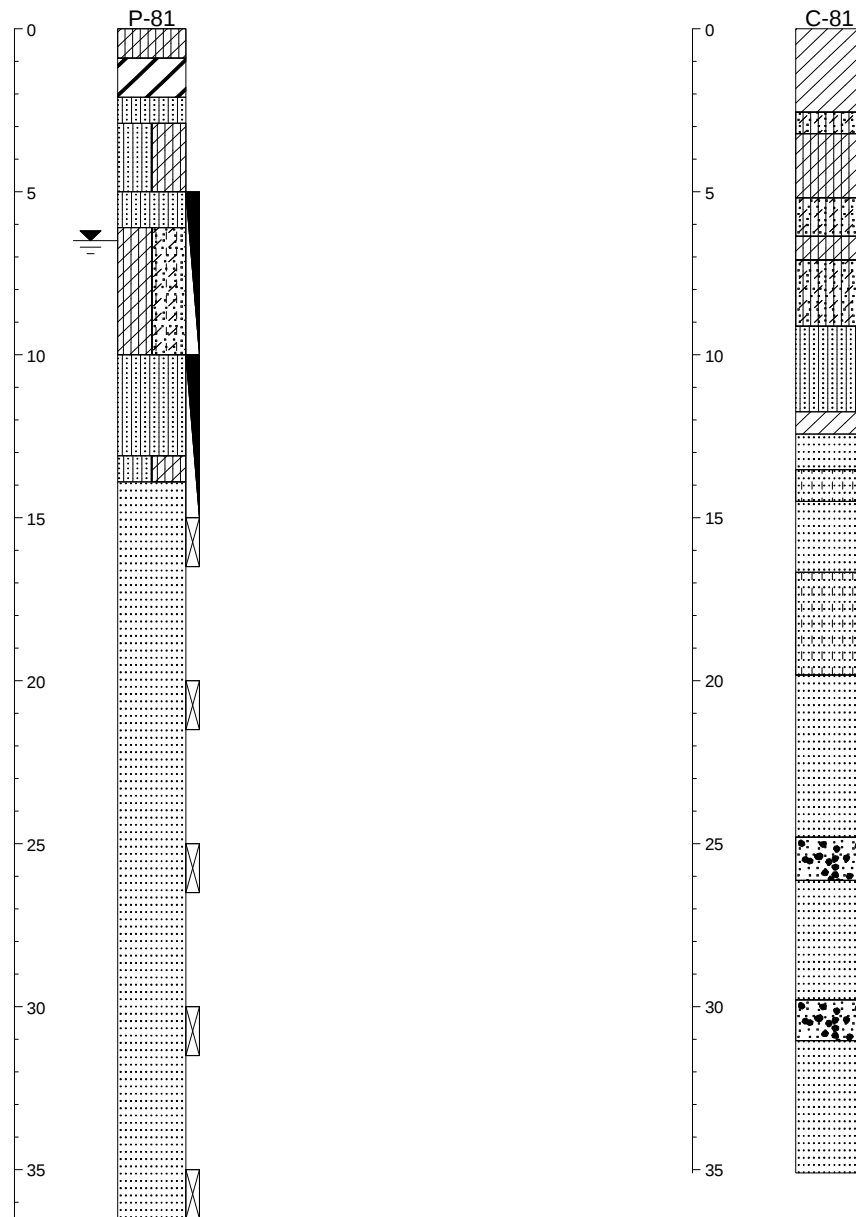
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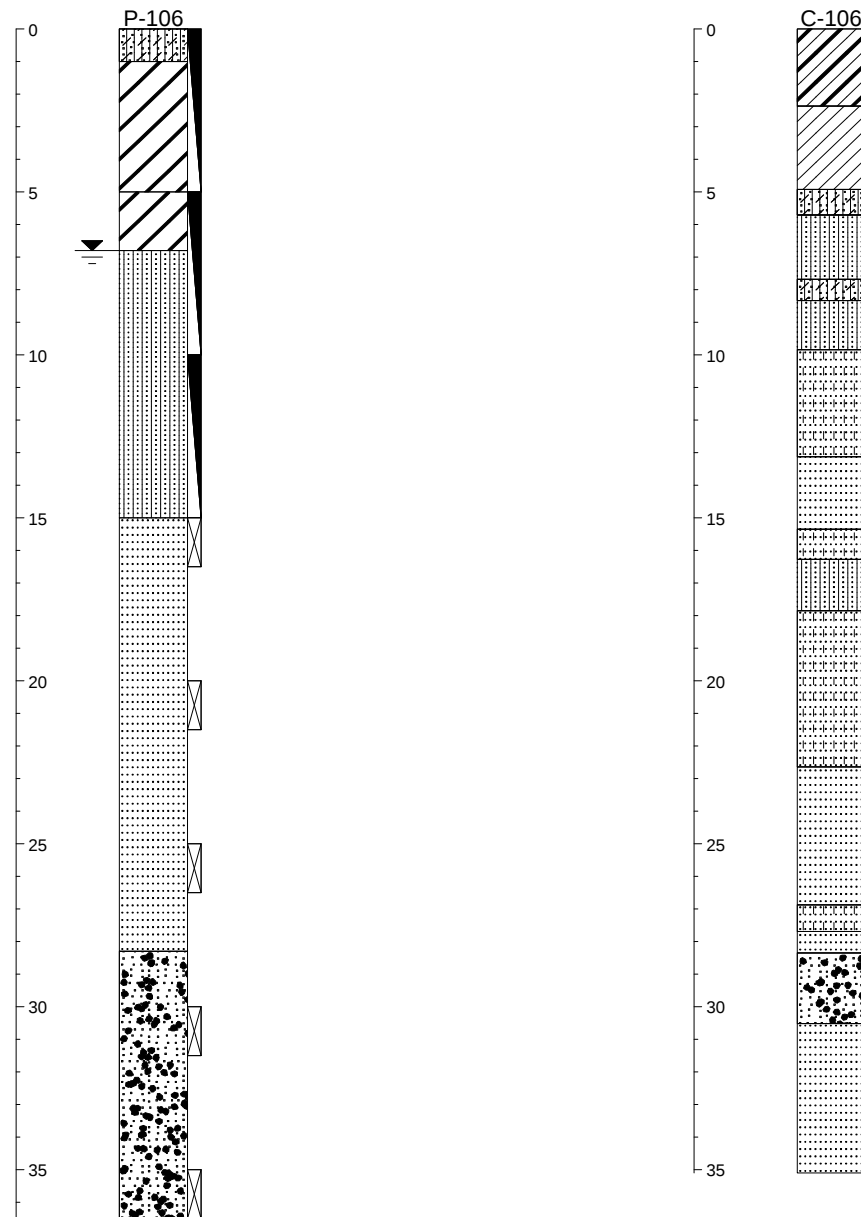
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