



January 7, 2014  
SGS #13067.2

Jonathan Culley  
Redfern Munjoy, LLC  
P.O. Box 8816  
Portland, Maine 04104

Reference: Slope Stability Analysis, Munjoy Heights  
Walnut Street, Portland, Maine

Dear Jonathan

Summit performed a global slope stability analysis at the two critical locations for the Munjoy Heights project. The locations, labeled Section 1 and Section 2 are shown on the attached site grading plan. The pictorial and numerical results of the stability analyses are also attached.

The global slope stability analysis was performed by Summit using Slide v6, published by Rocscience. All proposed constructed elements intersected by the cross section line were included in the model, including the subsurface detention system (full water level), proposed building foundations, and MSE and CIP retaining walls. Both the static and seismic conditions were analyzed. All possible failure surfaces were analyzed using the Bishop Simplified and Janbu Simplified methods.

We note that the Section 1 stability analysis was performed using the ReCon retaining wall system, previously designed by SGS. If a different wall product is selected, we recommend that a new global stability analysis at Section 1 be performed using the specific block and geogrid properties for the selected retaining wall system.

The critical failure surfaces are shown on the attached figures. The minimum safety factors are summarized below.

ANALYSIS TYPE	LOCATION	SAFETY FACTOR	
		Static	Seismic
Overall Stability	Section 1	1.9	1.6
	Section 2	2.0	1.7
Building Foundation & Retaining Wall	Section 1	1.4	1.3
	Section 2	1.5	1.4

In all cases the minimum requirements of 1.3 for static conditions and 1.1 for seismic conditions were met.

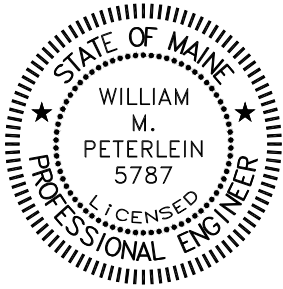


We appreciate the opportunity to assist you with this phase of the project. If there are any questions, please do not hesitate to contact me.

Respectfully Submitted  
**Summit Geoengineering Services, Inc.**

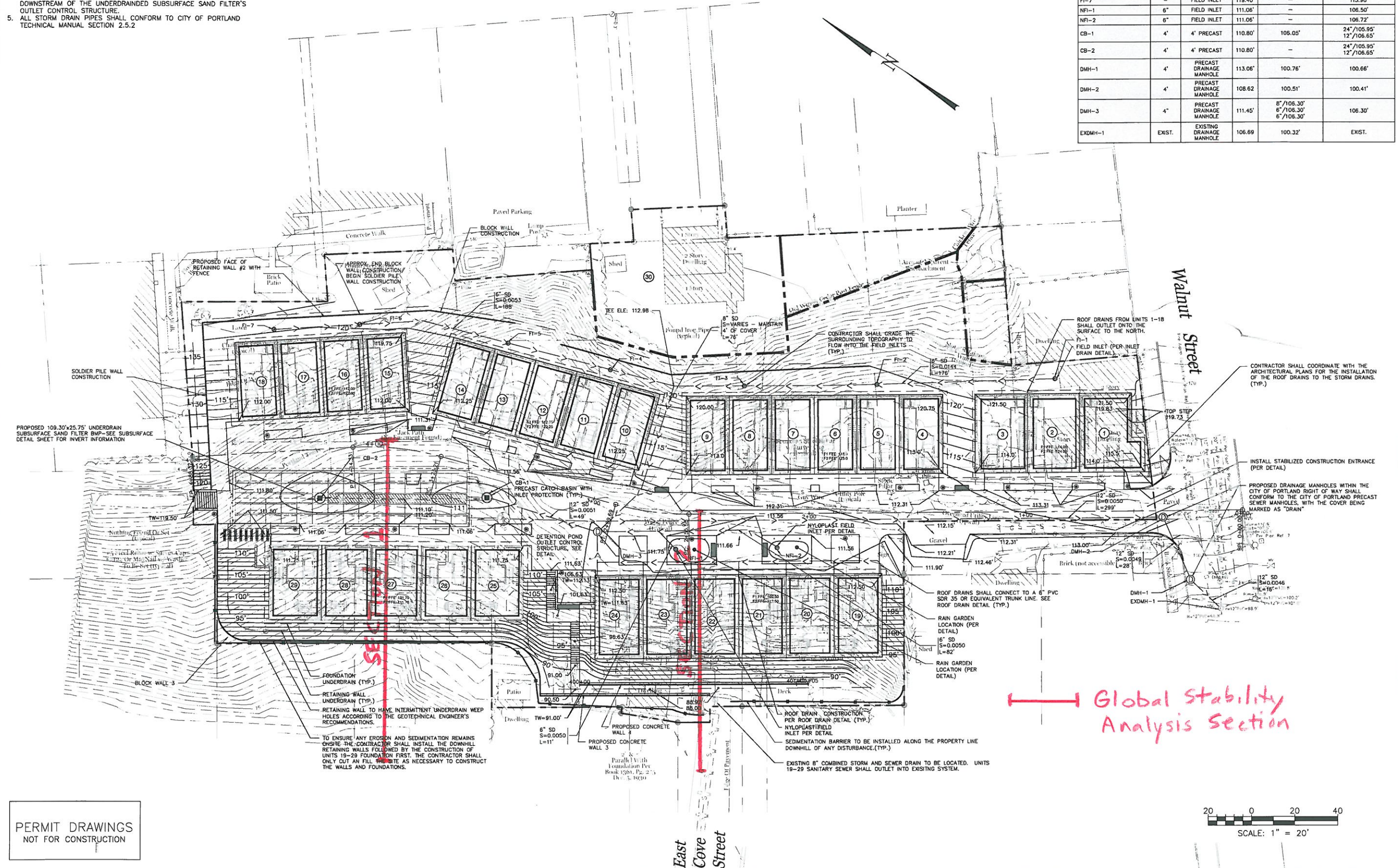
A handwritten signature in blue ink that reads "William M. Peterlein".

William M. Peterlein, P.E.  
President & Principal Engineer



- NOTE:
1. ALL DISTURBED AND PROPOSED SLOPES NOT COVERED WITH MULCH AND GREATER THAN 3:1 SHALL BE STABILIZED WITH 4" OF LOAM SEED AND EROSION CONTROL BLANKETS SC150BN BY NORTH AMERICAN GREEN OR APPROVED EQUAL.
  2. ALL DISTURBED AND PROPOSED SLOPES TO BE COVERED WITH MULCH AND GREATER THAN 3:1 SHALL BE TEMPORARILY STABILIZED WITH EROSION CONTROL BLANKETS SC150BN BY NORTH AMERICAN GREEN OR APPROVED EQUAL.
  - 3.
  4. THE UNDERDRAIN ASSOCIATED WITH THE UPHILL RETAINING WALLS AND FOUNDATION UNDERDRAIN FOR UNITS 1-18 SHALL OUTLET DOWNSTREAM OF THE UNDERDRAINED SUBSURFACE SAND FILTER'S OUTLET CONTROL STRUCTURE.
  5. ALL STORM DRAIN PIPES SHALL CONFORM TO CITY OF PORTLAND TECHNICAL MANUAL SECTION 2.5.2

DRAINAGE STRUCTURE SCHEDULE					
STRUCTURE	SIZE	TYPE	RIM	INV. IN	INV. OUT
FI-1	-	FIELD INLET	121.00'	-	115.50'
FI-2	-	FIELD INLET	120.40'	114.90'	114.90'
FI-3	-	FIELD INLET	120.40'	114.30'	114.30'
FI-4	-	FIELD INLET	121.90'	113.16'	113.16'
FI-5	-	FIELD INLET	121.90'	113.32'	113.32'
FI-6	-	FIELD INLET	119.40'	113.70'	113.70'
FI-7	-	FIELD INLET	119.40'	-	113.90'
NFI-1	6"	FIELD INLET	111.06'	-	106.50'
NFI-2	6"	FIELD INLET	111.06'	-	106.72'
CB-1	4'	4' PRECAST	110.80'	106.05'	24"/105.95' 12"/106.65'
CB-2	4'	4' PRECAST	110.80'	-	24"/105.95' 12"/106.65'
DMH-1	4'	PRECAST DRAINAGE MANHOLE	113.06'	100.76'	100.66'
DMH-2	4'	PRECAST DRAINAGE MANHOLE	108.62	100.51'	100.41'
DMH-3	4'	PRECAST DRAINAGE MANHOLE	111.45'	8"/106.30' 6"/106.30'	106.30'
EXDMH-1	EXIST.	EXISTING DRAINAGE MANHOLE	106.69	100.32'	EXIST.



ISSUED FOR	DATE	BY
CITY SUBMISSION	9/23/13	WHS
WORKSHOP #2	11/12/13	WHS
FINAL SUBMISSION	12/2/13	WHS
MAINE DEP MCGP	12/16/13	WHS

DRAWING NAME: GRADING, DRAINAGE & EROSION CONTROL PLAN  
 PROJECT NAME: MUNJOY HEIGHTS  
 CLIENT: REDFERN MUNJOY, LLC.  
 P.O. BOX 8816, PORTLAND, MAINE 04104

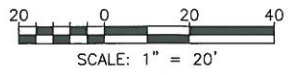
ACCOR ENGINEERING, INC.  
 ENGINEERING, INC.  
 1000 WASHINGTON ST., PORTLAND, ME 04104  
 P.O. BOX 3372 PORTLAND, MAINE 04104  
 (207) 775-2655

FILE: 1047\_CIVIL  
 DATE: 11/05/13  
 JN: 1047  
 SCALE: 1"=20'  
 DESIGN BY: WHS  
 DRAWN BY: ZRJ  
 CHECKED BY: WHS



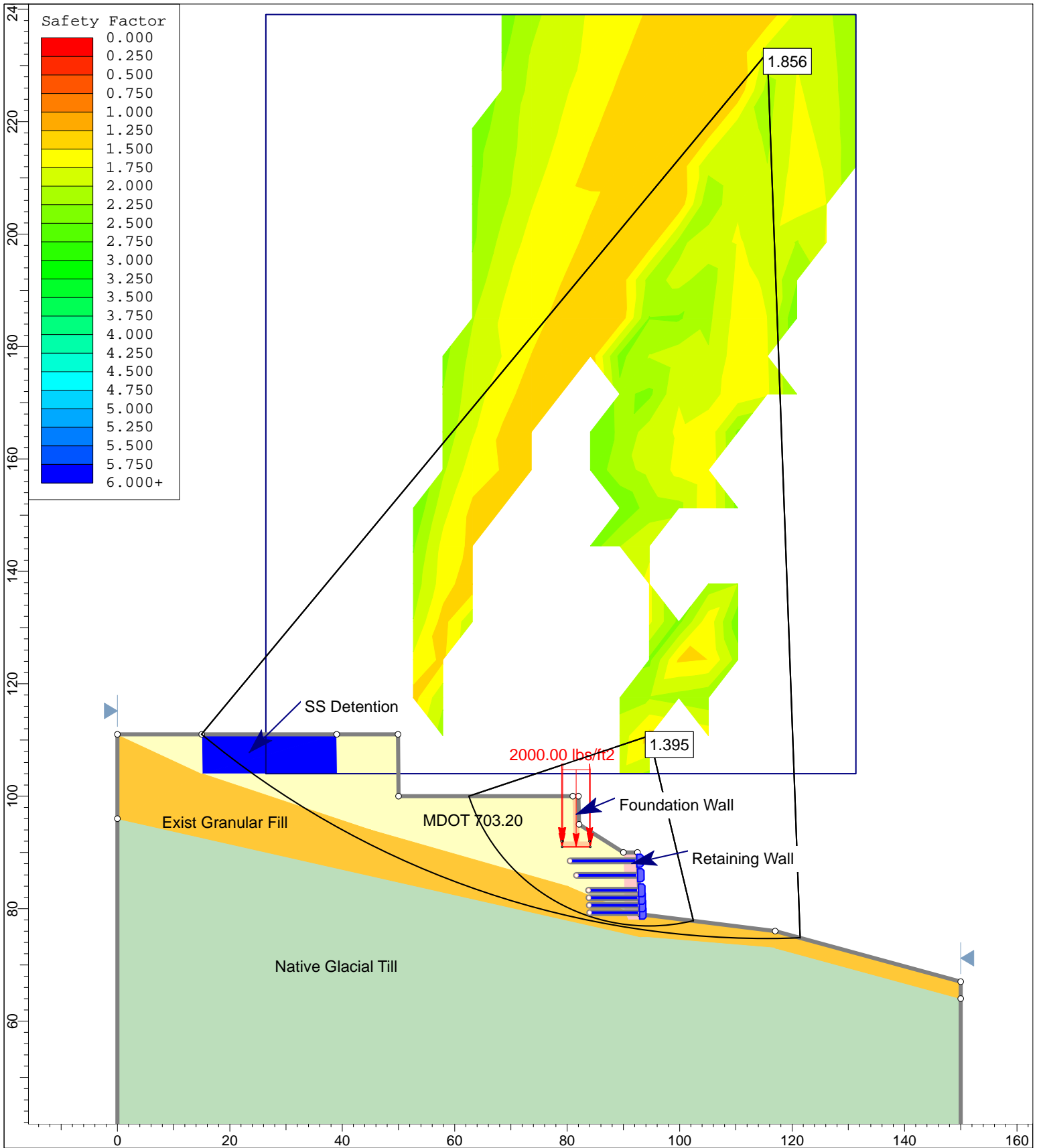
DRAWING NO. C-30


PERMIT DRAWINGS  
 NOT FOR CONSTRUCTION





**SLOPE STABILITY ANALYSIS RESULTS**  
**SECTION 1**



	Project			Munjoy Heights #13067.1	
	Analysis Description			SECTION 1	
	Drawn By	Scale	1:275	Company	Summit Geoenengineering Services
	Date	1/7/2014, 8:33:22 AM		File Name	Section 1 - template.slim

# Slide Analysis Information

## Munjoy Heights #13067.1

### Project Summary

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File Name: Section 1 - template  
Slide Modeler Version: 6.025  
Project Title: Munjoy Heights #13067.1  
Analysis: SECTION 1  
Company: Summit Geoengineering Services  
Date Created: 1/7/2014, 8:33:22 AM

### General Settings

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Units of Measurement: Imperial Units  
Time Units: days  
Permeability Units: feet/second  
Failure Direction: Left to Right  
Data Output: Maximum  
Maximum Material Properties: 20  
Maximum Support Properties: 20

### Analysis Options

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#### Analysis Methods Used


Bishop simplified  
Janbu simplified

Number of slices: 25  
Tolerance: 0.005  
Maximum number of iterations: 50  
Check  $m\alpha < 0.2$ : Yes  
Apply support forces to interslice boundaries: Yes  
Discard data for surfaces with FS below: 1.3  
Discard data for surfaces with FS above: 2.5  
Initial trial value of FS: 1  
Steffensen Iteration: Yes

### Groundwater Analysis

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Groundwater Method: Water Surfaces

	<i>Project</i>			Munjoy Heights #13067.1
	<i>Analysis Description</i>			SECTION 1
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
	<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - template.slim

Pore Fluid Unit Weight: 62.4 lbs/ft<sup>3</sup>  
 Advanced Groundwater Method: None

## Random Numbers

Pseudo-random Seed: 10116  
 Random Number Generation Method: Park and Miller v.3

## 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 1

Distribution: Constant  
 Magnitude [psf]: 2000  
 Orientation: Vertical

## Material Properties

Property	Inported Fill (MDOT 703.20)	Native Glacial Till	Foundation Wall	Existing Granular Fill - Proofrolled	Retaining Wall	water
Color						
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft <sup>3</sup> ]	130	124	150	130	145	62.4
Cohesion [psf]	0.02	2000	10000	0.02	1370	0.02
Friction Angle [deg]	35	35	45	32	24	1
Water Surface	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0

<i>Project</i>		Munjoy Heights #13067.1	
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<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - template.slim



## Support Properties

### Support 1

Support Type: GeoTextile  
Force Application: Active  
Force Orientation: Parallel to Reinforcement  
Anchorage: Slope Face  
Shear Strength Model: Linear  
Strip Coverage: 100 percent  
Tensile Strength: 4700 lb/ft  
Pullout Strength Adhesion: 0.8 psf  
Pullout Strength Friction Angle: 40 degrees

## Global Minimums

### Method: bishop simplified

FS: 1.300850  
Center: 89.366, 185.045  
Radius: 85.513  
Left Slip Surface Endpoint: 46.589, 111.000  
Right Slip Surface Endpoint: 49.917, 109.175  
Resisting Moment=21102.6 lb-ft  
Driving Moment=16222.1 lb-ft  
Total Slice Area=3.07546 ft<sup>2</sup>

### Method: janbu simplified


FS: 1.302820  
Center: 63.129, 137.774  
Radius: 35.284  
Left Slip Surface Endpoint: 40.150, 111.000  
Right Slip Surface Endpoint: 49.954, 105.043  
Resisting Horizontal Force=2305.49 lb  
Driving Horizontal Force=1769.62 lb  
Total Slice Area=32.6298 ft<sup>2</sup>

## Valid / Invalid Surfaces

### Method: bishop simplified

Number of Valid Surfaces: 580  
Number of Invalid Surfaces: 4271

#### Error Codes:

	<i>Project</i>			Munjoy Heights #13067.1	
	<i>Analysis Description</i>			SECTION 1	
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services	
	<i>Date</i>	1/7/2014, 8:33:22 AM		<i>File Name</i>	Section 1 - template.slim



Error Code -97 reported for 3636 surfaces  
 Error Code -100 reported for 1 surface  
 Error Code -103 reported for 12 surfaces  
 Error Code -106 reported for 24 surfaces  
 Error Code -107 reported for 349 surfaces  
 Error Code -108 reported for 85 surfaces  
 Error Code -112 reported for 164 surfaces

### Method: janbu simplified

Number of Valid Surfaces: 641  
 Number of Invalid Surfaces: 4210

#### Error Codes:

Error Code -97 reported for 3575 surfaces  
 Error Code -100 reported for 1 surface  
 Error Code -103 reported for 12 surfaces  
 Error Code -106 reported for 24 surfaces  
 Error Code -107 reported for 349 surfaces  
 Error Code -108 reported for 85 surfaces  
 Error Code -112 reported for 164 surfaces


#### Error Codes

The following errors were encountered during the computation:


- 97 = Factor of safety is out of valid range set by user.
- 100 = Both surface / slope intersections are on the same horizontal surface. In general, this will give a very high or infinite factor of safety (zero driving force), if calculated.
- 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  $0.0001 * (\text{maximum horizontal extent of soil region})$ . 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).
- 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.

### Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.30085

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion	Base Friction Angle	Shear Stress	Shear Strength	Base Normal Stress	Pore Pressure	Effective Normal Stress
			<i>Project</i> Munjoy Heights #13067.1							
			<i>Analysis Description</i> SECTION 1							
			<i>Drawn By</i>				<i>Scale</i>		<i>Company</i> Summit Geoengineering Services	
			<i>Date</i> 1/7/2014, 8:33:22 AM				<i>File Name</i> Section 1 - template.slim			

					[degrees]				[psf]			[psf]
1	0.133119	0.664069	Inported Fill (MDOT 703.20)	0.02	35	2.0627	2.68326	3.80353	0	3.80353		
2	0.133119	1.98945	Inported Fill (MDOT 703.20)	0.02	35	6.16214	8.01602	11.4195	0	11.4195		
3	0.133119	3.30934	Inported Fill (MDOT 703.20)	0.02	35	10.2526	13.3371	19.0187	0	19.0187		
4	0.133119	4.62375	Inported Fill (MDOT 703.20)	0.02	35	14.334	18.6464	26.6013	0	26.6013		
5	0.133119	5.93269	Inported Fill (MDOT 703.20)	0.02	35	18.4064	23.944	34.167	0	34.167		
6	0.133119	7.23618	Inported Fill (MDOT 703.20)	0.02	35	22.4698	29.2298	41.716	0	41.716		
7	0.133119	8.53424	Inported Fill (MDOT 703.20)	0.02	35	26.5241	34.5039	49.2481	0	49.2481		
8	0.133119	9.82689	Inported Fill (MDOT 703.20)	0.02	35	30.5694	39.7662	56.7635	0	56.7635		
9	0.133119	11.1141	Inported Fill (MDOT 703.20)	0.02	35	34.6056	45.0167	64.262	0	64.262		
10	0.133119	12.396	Inported Fill (MDOT 703.20)	0.02	35	38.6327	50.2554	71.7436	0	71.7436		
11	0.133119	13.6725	Inported Fill (MDOT 703.20)	0.02	35	42.6508	55.4823	79.2082	0	79.2082		
12	0.133119	14.9436	Inported Fill (MDOT 703.20)	0.02	35	46.6598	60.6974	86.656	0	86.656		
13	0.133119	16.2095	Inported Fill (MDOT 703.20)	0.02	35	50.6596	65.9006	94.087	0	94.087		
14	0.133119	17.4699	Inported Fill (MDOT 703.20)	0.02	35	54.6503	71.0919	101.502	0	101.502		
15	0.133119	18.7251	Inported Fill (MDOT 703.20)	0.02	35	58.632	76.2714	108.898	0	108.898		
16	0.133119	19.975	Inported Fill (MDOT 703.20)	0.02	35	62.6045	81.439	116.279	0	116.279		
17	0.133119	21.2197	Inported Fill (MDOT 703.20)	0.02	35	66.5678	86.5947	123.642	0	123.642		
18	0.133119	22.459	Inported Fill (MDOT 703.20)	0.02	35	70.522	91.7385	130.987	0	130.987		
19	0.133119	23.6932	Inported Fill (MDOT 703.20)	0.02	35	74.467	96.8704	138.317	0	138.317		
20	0.133119	24.9221	Inported Fill (MDOT 703.20)	0.02	35	78.4026	101.99	145.628	0	145.628		
21	0.133119	26.1457	Inported Fill (MDOT 703.20)	0.02	35	82.3292	107.098	152.924	0	152.924		
22	0.133119	27.3642	Inported Fill (MDOT 703.20)	0.02	35	86.2467	112.194	160.201	0	160.201		
23	0.133119	28.5775	Inported Fill (MDOT 703.20)	0.02	35	90.1549	117.278	167.462	0	167.462		

	<i>Project</i>		Munjoy Heights #13067.1	
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	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 8:33:22 AM		<i>File Name</i> Section 1 - template.slim	

24	0.133119	29.7856	Inported Fill (MDOT 703.20)	0.02	35	94.0539	122.35	174.706	0	174.706
25	0.133119	29.0197	Inported Fill (MDOT 703.20)	0.02	35	91.7216	119.316	170.373	0	170.373

**Query 1 (bishop simplified) - Safety Factor: 1.39467**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.67541	445.453	Inported Fill (MDOT 703.20)	0.02	35	60.0053	83.6876	119.49	0	119.49
2	1.67541	1220.8	Inported Fill (MDOT 703.20)	0.02	35	191.835	267.547	382.068	0	382.068
3	1.67541	1817.31	Inported Fill (MDOT 703.20)	0.02	35	314.238	438.258	625.871	0	625.871
4	1.67541	2308.09	Inported Fill (MDOT 703.20)	0.02	35	427.909	596.792	852.28	0	852.28
5	1.67541	2724.87	Inported Fill (MDOT 703.20)	0.02	35	533.842	744.533	1063.28	0	1063.28
6	1.57845	2897.93	Existing Granular Fill - Proofrolled	0.02	32	582.27	812.075	1299.56	0	1299.56
7	1.57845	3179.01	Existing Granular Fill - Proofrolled	0.02	32	661.427	922.472	1476.23	0	1476.23
8	1.57845	3427.44	Existing Granular Fill - Proofrolled	0.02	32	735.644	1025.98	1641.88	0	1641.88
9	1.57845	3647.41	Existing Granular Fill - Proofrolled	0.02	32	805.316	1123.15	1797.38	0	1797.38
10	1.57845	3842.05	Existing Granular Fill - Proofrolled	0.02	32	870.744	1214.4	1943.42	0	1943.42
11	1.57845	4039.82	Existing Granular Fill - Proofrolled	0.02	32	2079.97	2900.87	4642.33	0	4642.33
12	1.57845	4329.02	Existing Granular Fill - Proofrolled	0.02	32	1779.35	2481.61	3971.38	0	3971.38
13	1.57845	3317.96	Existing Granular Fill - Proofrolled	0.02	32	1573.56	2194.6	3512.07	0	3512.07
14	1.57845	3107.11	Existing Granular Fill - Proofrolled	0.02	32	1573.57	2194.61	3512.08	0	3512.08
15	1.57845	2986.38	Existing Granular Fill - Proofrolled	0.02	32	757.161	1055.99	1689.9	0	1689.9
16	1.57845	2859.66	Existing Granular Fill - Proofrolled	0.02	32	740.06	1032.14	1651.74	0	1651.74
17	1.57845	2716.75	Existing Granular Fill - Proofrolled	0.02	32	717.496	1000.67	1601.37	0	1601.37
18	1.57845	2864.76	Existing Granular Fill - Proofrolled	0.02	32	772.046	1076.75	1723.12	0	1723.12
19	1.57845	2583.92	Existing Granular Fill - Proofrolled	0.02	32	710.638	991.106	1586.07	0	1586.07
20	1.57845	408.194	Existing Granular Fill - Proofrolled	0.02	32	114.601	159.831	255.75	0	255.75
21	1.57845	367.358	Existing Granular Fill - Proofrolled	0.02	32	105.312	146.876	235.018	0	235.018


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<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - template.slim



22	1.57845	312.262	Existing Granular Fill - Proofrolled	0.02	32	91.4539	127.548	204.088	0	204.088
23	1.57845	241.941	Existing Granular Fill - Proofrolled	0.02	32	72.4422	101.033	161.655	0	161.655
24	1.57845	156.196	Existing Granular Fill - Proofrolled	0.02	32	47.8586	66.747	106.786	0	106.786
25	1.57845	54.718	Existing Granular Fill - Proofrolled	0.02	32	17.1836	23.9655	38.3208	0	38.3208

**Query 2 (bishop simplified) - Safety Factor: 1.85639**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.0542271	0.15754	Inported Fill (MDOT 703.20)	0.02	35	0.843045	1.56502	2.20651	0	2.20651
2	4.51817	521.237	water	0.02	1	1.08735	2.01855	114.497	0	114.497
3	4.51817	1501.67	water	0.02	1	3.11419	5.78115	330.057	0	330.057
4	4.55536	2917.06	Inported Fill (MDOT 703.20)	0.02	35	191.836	356.123	508.568	0	508.568
5	4.55536	4704.31	Inported Fill (MDOT 703.20)	0.02	35	314.057	583.013	832.6	0	832.6
6	4.41491	6142.2	Existing Granular Fill - Proofrolled	0.02	32	390.588	725.084	1160.35	0	1160.35
7	4.41491	8972.28	Existing Granular Fill - Proofrolled	0.02	32	577.476	1072.02	1715.56	0	1715.56
8	4.41491	11015.4	Existing Granular Fill - Proofrolled	0.02	32	717.225	1331.45	2130.75	0	2130.75
9	4.41491	11028.4	Existing Granular Fill - Proofrolled	0.02	32	726.135	1347.99	2157.2	0	2157.2
10	4.41491	7084.25	Existing Granular Fill - Proofrolled	0.02	32	471.511	875.308	1400.75	0	1400.75
11	4.41491	8135.53	Existing Granular Fill - Proofrolled	0.02	32	547.191	1015.8	1625.59	0	1625.59
12	4.41491	9098.32	Existing Granular Fill - Proofrolled	0.02	32	618.238	1147.69	1836.66	0	1836.66
13	4.41491	9975.61	Existing Granular Fill - Proofrolled	0.02	32	684.662	1271	2034	0	2034
14	4.41491	10770	Existing Granular Fill - Proofrolled	0.02	32	746.47	1385.74	2217.63	0	2217.63
15	4.41491	11483.7	Existing Granular Fill - Proofrolled	0.02	32	803.662	1491.91	2387.51	0	2387.51
16	4.41491	12269.9	Existing Granular Fill - Proofrolled	0.02	32	1406.17	2610.4	4177.48	0	4177.48
17	4.41491	9463.91	Existing Granular Fill - Proofrolled	0.02	32	1161.9	2156.94	3451.79	0	3451.79
			Existing Granular Fill -							

	Project		Munjoy Heights #13067.1	
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	Date	1/7/2014, 8:33:22 AM	File Name	Section 1 - template.slim

			Proofrolled								
19	4.41491	5039.99	Existing Granular Fill - Proofrolled	0.02	32	366.221	679.849	1087.95	0	1087.95	
20	4.41491	1551.03	Existing Granular Fill - Proofrolled	0.02	32	113.758	211.179	337.927	0	337.927	
21	4.41491	1496.71	Existing Granular Fill - Proofrolled	0.02	32	110.795	205.678	329.122	0	329.122	
22	4.41491	1370.53	Existing Granular Fill - Proofrolled	0.02	32	102.4	190.094	304.182	0	304.182	
23	4.41491	1172.95	Existing Granular Fill - Proofrolled	0.02	32	88.4582	164.213	262.764	0	262.764	
24	4.41491	904.241	Existing Granular Fill - Proofrolled	0.02	32	68.8379	127.79	204.475	0	204.475	
25	4.41491	374.76	Existing Granular Fill - Proofrolled	0.02	32	28.807	53.477	85.5491	0	85.5491	

**Global Minimum Query (janbu simplified) - Safety Factor: 1.30282**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.392175	8.45457	Inported Fill (MDOT 703.20)	0.02	35	7.98061	10.3973	14.8204	0	14.8204
2	0.392175	25.1186	Inported Fill (MDOT 703.20)	0.02	35	23.906	31.1452	44.4514	0	44.4514
3	0.392175	41.3008	Inported Fill (MDOT 703.20)	0.02	35	39.6498	51.6565	73.7445	0	73.7445
4	0.392175	57.0179	Inported Fill (MDOT 703.20)	0.02	35	55.2089	71.9272	102.694	0	102.694
5	0.392175	72.2849	Inported Fill (MDOT 703.20)	0.02	35	70.5809	91.9542	131.296	0	131.296
6	0.392175	87.1161	Inported Fill (MDOT 703.20)	0.02	35	85.7632	111.734	159.545	0	159.545
7	0.392175	101.525	Inported Fill (MDOT 703.20)	0.02	35	100.755	131.265	187.438	0	187.438
8	0.392175	115.523	Inported Fill (MDOT 703.20)	0.02	35	115.553	150.545	214.972	0	214.972
9	0.392175	129.123	Inported Fill (MDOT 703.20)	0.02	35	130.157	169.571	242.145	0	242.145
10	0.392175	142.335	Inported Fill (MDOT 703.20)	0.02	35	144.566	188.343	268.952	0	268.952
11	0.392175	155.169	Inported Fill (MDOT 703.20)	0.02	35	158.777	206.858	295.395	0	295.395
12	0.392175	167.634	Inported Fill (MDOT 703.20)	0.02	35	172.791	225.116	321.47	0	321.47
13	0.392175	179.741	Inported Fill (MDOT 703.20)	0.02	35	186.606	243.114	347.175	0	347.175


<i>Project</i>		Munjoy Heights #13067.1	
<i>Analysis Description</i>		SECTION 1	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - template.slim



14	0.392175	191.496	Inported Fill (MDOT 703.20)	0.02	35	200.222	260.853	372.508	0	372.508
15	0.392175	202.908	Inported Fill (MDOT 703.20)	0.02	35	213.637	278.331	397.469	0	397.469
16	0.392175	213.985	Inported Fill (MDOT 703.20)	0.02	35	226.852	295.547	422.056	0	422.056
17	0.392175	224.733	Inported Fill (MDOT 703.20)	0.02	35	239.864	312.5	446.267	0	446.267
18	0.392175	235.159	Inported Fill (MDOT 703.20)	0.02	35	252.675	329.19	470.103	0	470.103
19	0.392175	245.269	Inported Fill (MDOT 703.20)	0.02	35	265.284	345.617	493.562	0	493.562
20	0.392175	255.069	Inported Fill (MDOT 703.20)	0.02	35	277.688	361.778	516.643	0	516.643
21	0.392175	264.566	Inported Fill (MDOT 703.20)	0.02	35	289.89	377.674	539.345	0	539.345
22	0.392175	273.763	Inported Fill (MDOT 703.20)	0.02	35	301.886	393.303	561.666	0	561.666
23	0.392175	282.666	Inported Fill (MDOT 703.20)	0.02	35	313.678	408.666	583.608	0	583.608
24	0.392175	291.28	Inported Fill (MDOT 703.20)	0.02	35	325.264	423.761	605.165	0	605.165
25	0.392175	278.641	Inported Fill (MDOT 703.20)	0.02	35	313.085	407.893	582.504	0	582.504

Query 1 (janbu simplified) - Safety Factor: 2.47459


Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0	150.183	Inported Fill (MDOT 703.20)	0.02	35	25.5912	63.3278	224.622	0	224.622
2	0	423.43	Inported Fill (MDOT 703.20)	0.02	35	77.5474	191.898	580.418	0	580.418
3	0	651.65	Inported Fill (MDOT 703.20)	0.02	35	125.552	310.69	836.694	0	836.694
4	0	848.832	Inported Fill (MDOT 703.20)	0.02	35	170.028	420.749	1035.02	0	1035.02
5	0	1022.62	Inported Fill (MDOT 703.20)	0.02	35	211.392	523.108	1195.61	0	1195.61
6	0	1177.78	Inported Fill (MDOT 703.20)	0.02	35	249.995	618.635	1329.79	0	1329.79
7	0	1317.48	Inported Fill (MDOT 703.20)	0.02	35	286.121	708.032	1444.54	0	1444.54
8	0	1444.01	Inported Fill (MDOT 703.20)	0.02	35	320	791.87	1544.43	0	1544.43
			Inported Fill (MDOT 703.20)							

	Project		Munjoy Heights #13067.1	
	Analysis Description		SECTION 1	
	Drawn By	Scale	Company	Summit Geoengineering Services
	Date	1/7/2014, 8:33:22 AM	File Name	Section 1 - template.slim

10	0	1663.89	Inported Fill (MDOT 703.20)	0.02	35	381.74	944.651	1711.42	0	1711.42
11	0	1759.54	Inported Fill (MDOT 703.20)	0.02	35	409.886	1014.3	1782.46	0	1782.46
12	0	1864.22	Inported Fill (MDOT 703.20)	0.02	35	1397.37	3457.91	5914.88	0	5914.88
13	0	1946.76	Inported Fill (MDOT 703.20)	0.02	35	954.566	2362.16	3944.74	0	3944.74
14	0	2156.73	Inported Fill (MDOT 703.20)	0.02	35	1017.59	2518.13	4116.41	0	4116.41
15	0	1465.82	Inported Fill (MDOT 703.20)	0.02	35	860.341	2128.99	3414.88	0	3414.88
16	0	1364.44	Inported Fill (MDOT 703.20)	0.02	35	855.2	2116.27	3337.84	0	3337.84
17	0	1312.68	Inported Fill (MDOT 703.20)	0.02	35	884.45	2188.65	3401.05	0	3401.05
18	0	1273.52	Inported Fill (MDOT 703.20)	0.02	35	323.168	799.708	1226.54	0	1226.54
19	0	1229.81	Inported Fill (MDOT 703.20)	0.02	35	315.37	780.411	1183.38	0	1183.38
20	0	1180.73	Inported Fill (MDOT 703.20)	0.02	35	305.911	757.005	1136.65	0	1136.65
21	0	1126.43	Inported Fill (MDOT 703.20)	0.02	35	294.807	729.526	1086.28	0	1086.28
22	0	1074.7	Inported Fill (MDOT 703.20)	0.02	35	284.086	702.996	1039.54	0	1039.54
23	0	1058.38	Retaining Wall	1370	24	742.378	1837.08	972.119	0	972.119
24	0	1073.56	Retaining Wall	1370	24	749.54	1854.81	1005.01	0	1005.01
25	0	863.87	Retaining Wall	1370	24	713.245	1764.99	816.428	0	816.428

Query 2 (janbu simplified) - Safety Factor: 1.81206

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.0542271	0.15754	Inported Fill (MDOT 703.20)	0.02	35	0.858548	1.55574	2.19325	0	2.19325
2	4.51817	521.237	water	0.02	1	1.11375	2.01818	114.476	0	114.476
3	4.51817	1501.67	water	0.02	1	3.18982	5.78015	329.998	0	329.998
4	4.55536	2917.06	Inported Fill (MDOT 703.20)	0.02	35	195.521	354.296	505.959	0	505.959
5	4.55536	4704.31	Inported Fill (MDOT 703.20)	0.02	35	320.186	580.197	828.579	0	828.579
6	4.41491	6142.2	Existing Granular Fill - Proofrolled	0.02	32	398.487	722.082	1155.54	0	1155.54


	Project		Munjoy Heights #13067.1	
	Analysis Description		SECTION 1	
	Drawn By	Scale	Company	Summit Geoengineering Services
	Date	1/7/2014, 8:33:22 AM	File Name	Section 1 - template.slim

7	4.41491	8972.28	Existing Granular Fill - Proofrolled	0.02	32	589.302	1067.85	1708.88	0	1708.88
8	4.41491	11015.4	Existing Granular Fill - Proofrolled	0.02	32	732.095	1326.6	2122.97	0	2122.97
9	4.41491	11028.4	Existing Granular Fill - Proofrolled	0.02	32	741.361	1343.39	2149.84	0	2149.84
10	4.41491	7084.25	Existing Granular Fill - Proofrolled	0.02	32	481.513	872.531	1396.31	0	1396.31
11	4.41491	8135.53	Existing Granular Fill - Proofrolled	0.02	32	558.927	1012.81	1620.81	0	1620.81
12	4.41491	9098.32	Existing Granular Fill - Proofrolled	0.02	32	631.64	1144.57	1831.67	0	1831.67
13	4.41491	9975.61	Existing Granular Fill - Proofrolled	0.02	32	699.662	1267.83	2028.93	0	2028.93
14	4.41491	10770	Existing Granular Fill - Proofrolled	0.02	32	762.999	1382.6	2212.57	0	2212.57
15	4.41491	11483.7	Existing Granular Fill - Proofrolled	0.02	32	821.634	1488.85	2382.63	0	2382.63
16	4.41491	12269.9	Existing Granular Fill - Proofrolled	0.02	32	1437.93	2605.61	4169.81	0	4169.81
17	4.41491	9463.91	Existing Granular Fill - Proofrolled	0.02	32	1188.4	2153.45	3446.22	0	3446.22
18	4.41491	8111.15	Existing Granular Fill - Proofrolled	0.02	32	597.375	1082.48	1732.3	0	1732.3
19	4.41491	5039.99	Existing Granular Fill - Proofrolled	0.02	32	374.739	679.05	1086.67	0	1086.67
20	4.41491	1551.03	Existing Granular Fill - Proofrolled	0.02	32	116.43	210.978	337.603	0	337.603
21	4.41491	1496.71	Existing Granular Fill - Proofrolled	0.02	32	113.422	205.528	328.881	0	328.881
22	4.41491	1370.53	Existing Granular Fill - Proofrolled	0.02	32	104.852	189.998	304.029	0	304.029
23	4.41491	1172.95	Existing Granular Fill - Proofrolled	0.02	32	90.5974	164.168	262.692	0	262.692
24	4.41491	904.241	Existing Granular Fill - Proofrolled	0.02	32	70.5192	127.785	204.467	0	204.467
25	4.41491	374.76	Existing Granular Fill - Proofrolled	0.02	32	29.5175	53.4875	85.5658	0	85.5658

### Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.30085

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]


	Project			Munjoy Heights #13067.1		
	Analysis Description			SECTION 1		
	Drawn By		Scale	Company		
	Date		1/7/2014, 8:33:22 AM	Summit Geoengineering Services		
File Name			Section 1 - template.slim			



1	46.5886	111	0	0	0
2	46.7217	110.923	0.0182935	0	0
3	46.8549	110.847	0.0736666	0	0
4	46.988	110.771	0.161212	0	0
5	47.1211	110.695	0.276062	0	0
6	47.2542	110.619	0.413383	0	0
7	47.3873	110.544	0.568383	0	0
8	47.5205	110.469	0.736304	0	0
9	47.6536	110.395	0.912426	0	0
10	47.7867	110.321	1.09207	0	0
11	47.9198	110.247	1.27058	0	0
12	48.0529	110.173	1.44334	0	0
13	48.186	110.1	1.60579	0	0
14	48.3192	110.027	1.75339	0	0
15	48.4523	109.954	1.88161	0	0
16	48.5854	109.882	1.98601	0	0
17	48.7185	109.81	2.06213	0	0
18	48.8516	109.738	2.10558	0	0
19	48.9848	109.666	2.11199	0	0
20	49.1179	109.595	2.07702	0	0
21	49.251	109.524	1.99637	0	0
22	49.3841	109.454	1.86578	0	0
23	49.5172	109.384	1.68101	0	0
24	49.6504	109.314	1.43785	0	0
25	49.7835	109.244	1.13214	0	0
26	49.9166	109.175	0	0	0

**Query 1 (bishop simplified) - Safety Factor: 1.39467**


Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	62.5055	100	0	0	0
2	64.181	95.9096	388.306	0	0
3	65.8564	92.8803	1224.55	0	0
4	67.5318	90.4321	2230.71	0	0
5	69.2072	88.3736	3268.75	0	0
6	70.8826	86.605	4255.58	0	0
7	72.461	85.1498	5228.27	0	0
8	74.0395	83.8655	6081.03	0	0
9	75.6179	82.7284	6787.6	0	0
10	77.1964	81.7214	7327.4	0	0
11	78.7748	80.8313	7683.89	0	0
12	80.3533	80.0479	8040.02	0	0

	<i>Project</i> Munjoy Heights #13067.1					
	<i>Analysis Description</i> SECTION 1					
	<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services		
	<i>Date</i> 1/7/2014, 8:33:22 AM			<i>File Name</i> Section 1 - template.slim		

13	81.9317	79.3633	7952.56	0	0
14	83.5102	78.771	7550.7	0	0
15	85.0886	78.2661	6842.07	0	0
16	86.6671	77.8446	6360.28	0	0
17	88.2455	77.5031	5756.97	0	0
18	89.824	77.2394	5047.61	0	0
19	91.4024	77.0516	4153.57	0	0
20	92.9809	76.9384	3212.28	0	0
21	94.5593	76.899	3041.59	0	0
22	96.1378	76.9333	2867.43	0	0
23	97.7162	77.0414	2701.12	0	0
24	99.2947	77.2241	2557.33	0	0
25	100.873	77.4825	2454.25	0	0
26	102.452	77.8186	0	0	0

**Query 2 (bishop simplified) - Safety Factor: 1.85639**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	14.9464	111	0	0	0
2	15.0006	110.955	0.0535478	0	0
3	19.5188	107.347	408.209	0	0
4	24.037	104	1498.97	0	0
5	28.5923	100.868	2218.34	0	0
6	33.1477	97.964	3206.87	0	0
7	37.5626	95.3523	4514.04	0	0
8	41.9775	92.9293	6123.07	0	0
9	46.3924	90.6853	7740.2	0	0
10	50.8073	88.6119	9009.44	0	0
11	55.2223	86.7017	9604.86	0	0
12	59.6372	84.9485	10040.7	0	0
13	64.0521	83.3467	10255.1	0	0
14	68.467	81.8914	10194.5	0	0
15	72.8819	80.5785	9812.69	0	0
16	77.2968	79.4042	9070.55	0	0
17	81.7117	78.3655	7205.97	0	0
18	86.1266	77.4596	5206.97	0	0
19	90.5415	76.6841	3976.02	0	0
20	94.9564	76.0371	3064.17	0	0
21	99.3714	75.5171	2738.02	0	0
22	103.786	75.1227	2379	0	0
23	108.201	74.853	2009.25	0	0
24	112.616	74.7075	1657.24	0	0

	<i>Project</i> Munjoy Heights #13067.1				
	<i>Analysis Description</i> SECTION 1				
	<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 8:33:22 AM			<i>File Name</i> Section 1 - template.slim	


25	117.031	74.6856	1358	0	0
26	121.446	74.7875	0	0	0

**Global Minimum Query (janbu simplified) - Safety Factor: 1.30282**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.1498	111	0	0	0
2	40.542	110.668	1.79088	0	0
3	40.9341	110.346	6.74693	0	0
4	41.3263	110.034	14.2885	0	0
5	41.7185	109.73	23.8717	0	0
6	42.1107	109.435	34.9857	0	0
7	42.5028	109.148	47.1498	0	0
8	42.895	108.869	59.9116	0	0
9	43.2872	108.599	72.8442	0	0
10	43.6794	108.336	85.5451	0	0
11	44.0715	108.08	97.634	0	0
12	44.4637	107.832	108.752	0	0
13	44.8559	107.591	118.558	0	0
14	45.2481	107.357	126.731	0	0
15	45.6402	107.13	132.966	0	0
16	46.0324	106.91	136.974	0	0
17	46.4246	106.696	138.482	0	0
18	46.8168	106.488	137.229	0	0
19	47.2089	106.287	132.971	0	0
20	47.6011	106.092	125.473	0	0
21	47.9933	105.902	114.514	0	0
22	48.3855	105.719	99.8844	0	0
23	48.7776	105.542	81.3839	0	0
24	49.1698	105.37	58.824	0	0
25	49.562	105.204	32.0254	0	0
26	49.9542	105.043	0	0	0

**Query 1 (janbu simplified) - Safety Factor: 2.47459**


Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	0	0	0	0	0
2	0	0	178.723	0	0
3	0	0	608.335	0	0
4	0	0	1184.06	0	0
5	0	0	1844.75	0	0
6	0	0	2550.56	0	0

	<i>Project</i> Munjoy Heights #13067.1					
	<i>Analysis Description</i> SECTION 1					
	<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services		
	<i>Date</i> 1/7/2014, 8:33:22 AM			<i>File Name</i> Section 1 - template.slim		

7	0	0	3273.58	0	0
8	0	0	3993.3	0	0
9	0	0	4694.06	0	0
10	0	0	5363.58	0	0
11	0	0	5991.99	0	0
12	0	0	6571.24	0	0
13	0	0	8247.36	0	0
14	0	0	9203.35	0	0
15	0	0	10034.2	0	0
16	0	0	10586.9	0	0
17	0	0	10995.1	0	0
18	0	0	11278.2	0	0
19	0	0	10927.3	0	0
20	0	0	10287.4	0	0
21	0	0	9604.24	0	0
22	0	0	8881.93	0	0
23	0	0	8124.29	0	0
24	0	0	6996	0	0
25	0	0	4126.68	0	0
26	0	0	0	0	0

Query 2 (janbu simplified) - Safety Factor: 1.81206

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	14.9464	111	0	0	0
2	15.0006	110.955	0.052085	0	0
3	19.5188	107.347	408.007	0	0
4	24.037	104	1498.23	0	0
5	28.5923	100.868	2192.14	0	0
6	33.1477	97.964	3140.25	0	0
7	37.5626	95.3523	4399.03	0	0
8	41.9775	92.9293	5938.23	0	0
9	46.3924	90.6853	7470.48	0	0
10	50.8073	88.6119	8655.42	0	0
11	55.2223	86.7017	9197.01	0	0
12	59.6372	84.9485	9571.3	0	0
13	64.0521	83.3467	9716.99	0	0
14	68.467	81.8914	9581	0	0
15	72.8819	80.5785	9117.76	0	0
16	77.2968	79.4042	8288.5	0	0
17	81.7117	78.3655	6272.22	0	0
18	86.1266	77.4596	4148.24	0	0

	<i>Project</i> Munjoy Heights #13067.1				
	<i>Analysis Description</i> SECTION 1				
	<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 8:33:22 AM			<i>File Name</i> Section 1 - template.slim	

19	90.5415	76.6841	2854.56	0	0
20	94.9564	76.0371	1903.36	0	0
21	99.3714	75.5171	1564.96	0	0
22	103.786	75.1227	1193.97	0	0
23	108.201	74.853	813.096	0	0
24	112.616	74.7075	451.403	0	0
25	117.031	74.6856	144.567	0	0
26	121.446	74.7875	0	0	0


## List Of Coordinates

### Line Load

X	Y
79.1998	92
79	92
79.1	91
84.1	91
84	92
83.9796	92

### External Boundary

X	Y
0	96
0	40
150	40
150	64
150	67
117	76
93	79
92.5	90
90	90
82.1	95
82	100
81	100
50	100
49.9	111
39	111
15	111
0	111

	<i>Project</i>			Munjoy Heights #13067.1
	<i>Analysis Description</i>			SECTION 1
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - template.slim

### Material Boundary

X	Y
15	111
15.1	104
39.1	104
39	111

### Material Boundary

X	Y
0	96
93	75
117	73
150	64

### Material Boundary

X	Y
81	100
81.2	92
79	92
79.1	91
84.1	91
84	92
82.1	92
82.1	95

### Material Boundary

X	Y
90	90
90.156	79.684


### Material Boundary

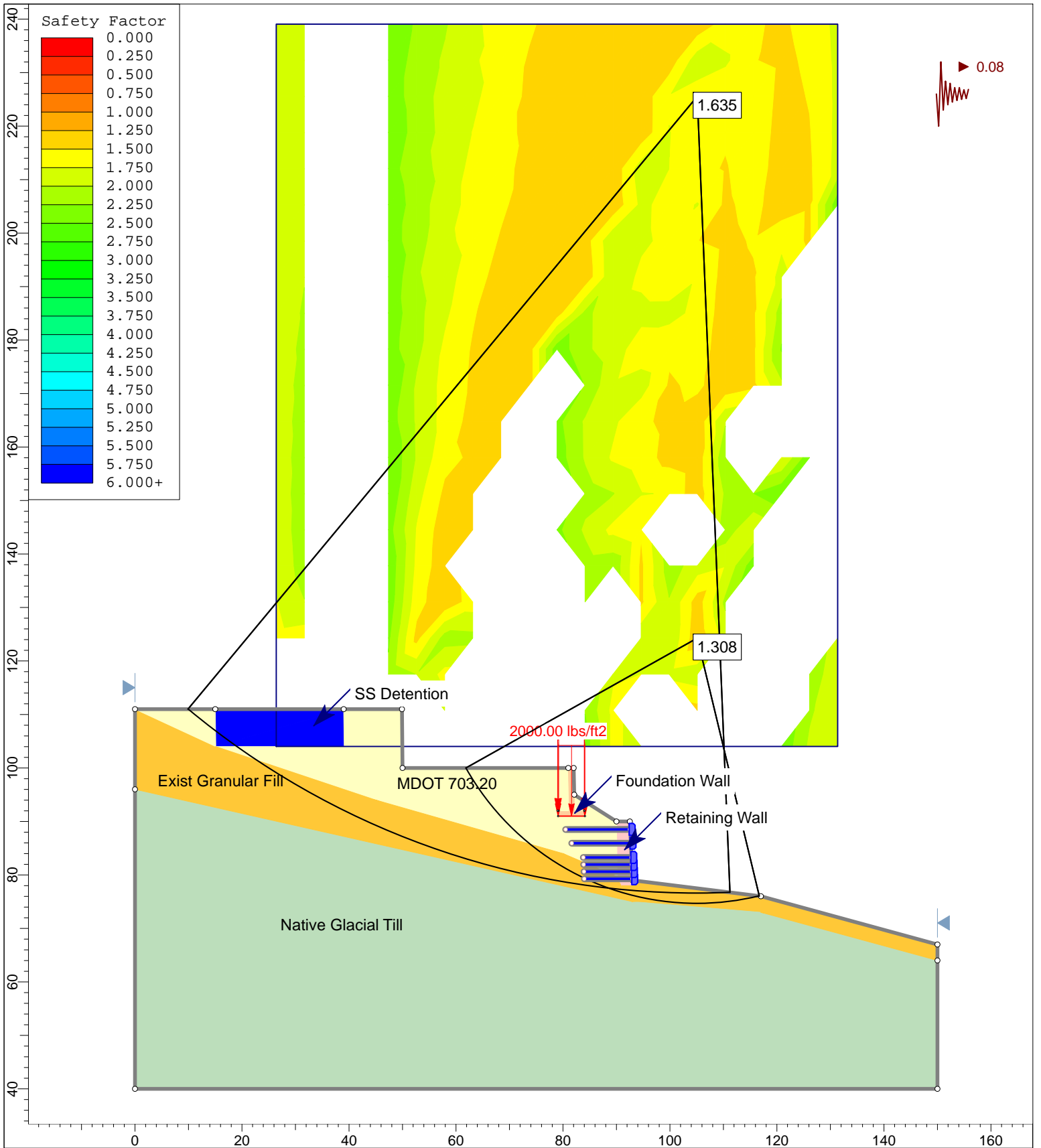
X	Y
0	111
15.1	104
45	94
80	84
90.156	79.684
91	78

<i>Project</i>			
Munjoy Heights #13067.1			
<i>Analysis Description</i>			
SECTION 1			
<i>Drawn By</i>		<i>Scale</i>	<i>Company</i>
			Summit Geoengineering Services
<i>Date</i>		<i>File Name</i>	
1/7/2014, 8:33:22 AM		Section 1 - template.slim	



93	78
93	79

	<i>Project</i>			Munjoy Heights #13067.1
	<i>Analysis Description</i>			SECTION 1
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
	<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - template.slim



	Project			Munjoy Heights #13067.1		
	Analysis Description			SECTION 1 - SEISMIC ANALYSIS		
	Drawn By	Scale	Company	Summit Geoengineering Services		
	Date	1/7/2014, 8:33:22 AM		File Name	Section 1 - SEISMIC.slim	



# Slide Analysis Information

## Munjoy Heights #13067.1

### Project Summary

File Name: Section 1 - SEISMIC  
Slide Modeler Version: 6.025  
Project Title: Munjoy Heights #13067.1  
Analysis: SECTION 1 - SEISMIC ANALYSIS  
Company: Summit Geoengineering Services  
Date Created: 1/7/2014, 8:33:22 AM

### General Settings

Units of Measurement: Imperial Units  
Time Units: days  
Permeability Units: feet/second  
Failure Direction: Left to Right  
Data Output: Maximum  
Maximum Material Properties: 20  
Maximum Support Properties: 20

### Analysis Options


#### Analysis Methods Used

Bishop simplified  
Janbu simplified

Number of slices: 25  
Tolerance: 0.005  
Maximum number of iterations: 50  
Check  $m\alpha < 0.2$ : Yes  
Apply support forces to interslice boundaries: Yes  
Discard data for surfaces with FS below: 1.3  
Discard data for surfaces with FS above: 2.5  
Initial trial value of FS: 1  
Steffensen Iteration: Yes

### Groundwater Analysis

Groundwater Method: Water Surfaces

	<i>Project</i>	Munjoy Heights #13067.1		
	<i>Analysis Description</i>	SECTION 1 - SEISMIC ANALYSIS		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
	<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - SEISMIC.slim

Pore Fluid Unit Weight: 62.4 lbs/ft<sup>3</sup>  
 Advanced Groundwater Method: None

## Random Numbers

Pseudo-random Seed: 10116  
 Random Number Generation Method: Park and Miller v.3

## 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): 0.08  
 1 Distributed Load present

### Distributed Load 1

Distribution: Constant  
 Magnitude [psf]: 2000  
 Orientation: Vertical

## Material Properties

Property	Inported Fill (MDOT 703.20)	Native Glacial Till	Foundation Wall	Existing Granular Fill - Proofrolled	Retaining Wall	water
Color						
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft <sup>3</sup> ]	130	124	150	130	145	62.4
Cohesion [psf]	0.02	2000	10000	0.02	1370	0.02
Friction Angle [deg]	35	35	45	32	24	1
Water Surface	None	None	None	None	None	None
Ru Value	0	0	0	0	0	0

	<i>Project</i> Munjoy Heights #13067.1		
	<i>Analysis Description</i> SECTION 1 - SEISMIC ANALYSIS		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 8:33:22 AM	<i>File Name</i> Section 1 - SEISMIC.slim	

## Support Properties

### Support 1

Support Type: GeoTextile  
Force Application: Active  
Force Orientation: Parallel to Reinforcement  
Anchorage: Slope Face  
Shear Strength Model: Linear  
Strip Coverage: 100 percent  
Tensile Strength: 4700 lb/ft  
Pullout Strength Adhesion: 0.8 psf  
Pullout Strength Friction Angle: 40 degrees

## Global Minimums

### Method: bishop simplified

FS: 1.300340  
Center: 73.624, 198.551  
Radius: 100.419  
Left Slip Surface Endpoint: 24.443, 111.000  
Right Slip Surface Endpoint: 49.991, 100.953  
Resisting Moment=764888 lb-ft  
Driving Moment=588220 lb-ft  
Total Slice Area=145.129 ft<sup>2</sup>


### Method: janbu simplified

FS: 1.301640  
Center: 94.614, 137.774  
Radius: 60.343  
Left Slip Surface Endpoint: 40.535, 111.000  
Right Slip Surface Endpoint: 101.961, 77.880  
Resisting Horizontal Force=54999.8 lb  
Driving Horizontal Force=42254.4 lb  
Total Slice Area=685.869 ft<sup>2</sup>

## Valid / Invalid Surfaces

### Method: bishop simplified

Number of Valid Surfaces: 962  
Number of Invalid Surfaces: 3889

	<i>Project</i>	Munjoy Heights #13067.1		
	<i>Analysis Description</i>	SECTION 1 - SEISMIC ANALYSIS		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
	<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - SEISMIC.slim

**Error Codes:**

Error Code -97 reported for 3570 surfaces  
Error Code -100 reported for 1 surface  
Error Code -103 reported for 12 surfaces  
Error Code -106 reported for 24 surfaces  
Error Code -107 reported for 111 surfaces  
Error Code -112 reported for 171 surfaces

**Method: janbu simplified**

Number of Valid Surfaces: 1068  
Number of Invalid Surfaces: 3783

**Error Codes:**

Error Code -97 reported for 3463 surfaces  
Error Code -100 reported for 1 surface  
Error Code -103 reported for 12 surfaces  
Error Code -106 reported for 24 surfaces  
Error Code -107 reported for 111 surfaces  
Error Code -112 reported for 172 surfaces

**Error Codes**


The following errors were encountered during the computation:

- 97 = Factor of safety is out of valid range set by user.
- 100 = Both surface / slope intersections are on the same horizontal surface. In general, this will give a very high or infinite factor of safety (zero driving force), if calculated.
- 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.
- 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.

**Slice Data**

Global Minimum Query (bishop simplified) - Safety Factor: 1.30034


Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.04667	18.9336	water	0.02	1	0.2563	0.333277	17.9476	0	17.9476

	<i>Project</i>		Munjoy Heights #13067.1	
	<i>Analysis Description</i>		SECTION 1 - SEISMIC ANALYSIS	
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
	<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - SEISMIC.slim

2	1.04667	56.2738	water	0.02	1	0.731805	0.951595	53.371	0	53.371
3	1.04667	92.5699	water	0.02	1	1.1942	1.55287	87.818	0	87.818
4	1.04667	127.841	water	0.02	1	1.64372	2.1374	121.306	0	121.306
5	1.04667	162.106	water	0.02	1	2.0806	2.70549	153.851	0	153.851
6	1.04667	195.382	water	0.02	1	2.50504	3.2574	185.471	0	185.471
7	1.04667	227.687	water	0.02	1	2.91724	3.7934	216.177	0	216.177
8	1.04667	259.034	water	0.02	1	3.31739	4.31373	245.988	0	245.988
9	1.04667	289.44	water	0.02	1	3.70567	4.81863	274.913	0	274.913
10	1.04667	318.92	water	0.02	1	4.08226	5.30833	302.968	0	302.968
11	1.04667	347.485	water	0.02	1	4.44732	5.78303	330.164	0	330.164
12	1.04667	375.149	water	0.02	1	4.80101	6.24295	356.513	0	356.513
13	1.04667	401.925	water	0.02	1	5.14347	6.68826	382.024	0	382.024
14	1.04667	449.794	water	0.02	1	5.75521	7.48373	427.597	0	427.597
15	0.990453	891.496	Inported Fill (MDOT 703.20)	0.02	35	406.047	527.999	754.033	0	754.033
16	0.990453	936.685	Inported Fill (MDOT 703.20)	0.02	35	428.904	557.721	796.48	0	796.48
17	0.990453	980.38	Inported Fill (MDOT 703.20)	0.02	35	451.292	586.833	838.057	0	838.057
18	0.990453	1022.6	Inported Fill (MDOT 703.20)	0.02	35	473.209	615.332	878.757	0	878.757
19	0.990453	1063.35	Inported Fill (MDOT 703.20)	0.02	35	494.651	643.214	918.576	0	918.576
20	0.990453	1102.66	Inported Fill (MDOT 703.20)	0.02	35	515.616	670.476	957.51	0	957.51
21	0.990453	1140.53	Inported Fill (MDOT 703.20)	0.02	35	536.101	697.113	995.553	0	995.553
22	0.990453	1176.98	Inported Fill (MDOT 703.20)	0.02	35	556.101	723.121	1032.7	0	1032.7
23	0.990453	1212.02	Inported Fill (MDOT 703.20)	0.02	35	575.616	748.497	1068.94	0	1068.94
24	0.990453	1245.66	Inported Fill (MDOT 703.20)	0.02	35	594.641	773.236	1104.27	0	1104.27
25	0.990453	1218.27	Inported Fill (MDOT 703.20)	0.02	35	584.551	760.115	1085.53	0	1085.53

**Query 1 (bishop simplified) - Safety Factor: 1.63486**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	
1	5.1655	1369.56	Inported Fill (MDOT 703.20)	0.02	35	84.7479	138.551	197.844	0	197.844	
2	3.95056	1368.56	water	0.02	1	3.68208	6.01968	343.721	0	343.721	
3	3.72146	2242.86	Inported Fill (MDOT 703.20)	0.02	35	199.553	326.241	465.893	0	465.893	
			Existing Granular Fill -								

	<i>Project</i>		Munjoy Heights #13067.1	
	<i>Analysis Description</i>		SECTION 1 - SEISMIC ANALYSIS	
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 8:33:22 AM		<i>File Name</i> Section 1 - SEISMIC.slim	


				Proofrolled							
5	4.02207	5066.67	Existing Granular Fill - Proofrolled	0.02	32	392.076	640.989	1025.76	0	1025.76	
6	4.02207	6278.4	Existing Granular Fill - Proofrolled	0.02	32	492.197	804.674	1287.72	0	1287.72	
7	4.02207	7405.02	Existing Granular Fill - Proofrolled	0.02	32	587.822	961.007	1537.9	0	1537.9	
8	4.02207	10244.5	Existing Granular Fill - Proofrolled	0.02	32	823.104	1345.66	2153.47	0	2153.47	
9	4.02207	11322	Existing Granular Fill - Proofrolled	0.02	32	920.391	1504.71	2407.99	0	2407.99	
10	4.02207	10878.7	Existing Granular Fill - Proofrolled	0.02	32	894.474	1462.34	2340.2	0	2340.2	
11	4.02207	7286.62	Existing Granular Fill - Proofrolled	0.02	32	605.824	990.438	1585	0	1585	
12	4.02207	8039.72	Existing Granular Fill - Proofrolled	0.02	32	675.746	1104.75	1767.94	0	1767.94	
13	4.02207	8725.74	Existing Granular Fill - Proofrolled	0.02	32	741.281	1211.89	1939.39	0	1939.39	
14	4.02207	9346.52	Existing Granular Fill - Proofrolled	0.02	32	802.405	1311.82	2099.32	0	2099.32	
15	4.02207	9903.69	Existing Granular Fill - Proofrolled	0.02	32	859.101	1404.51	2247.66	0	2247.66	
16	4.02207	10398.6	Existing Granular Fill - Proofrolled	0.02	32	911.344	1489.92	2384.33	0	2384.33	
17	4.02207	10832.7	Existing Granular Fill - Proofrolled	0.02	32	1036.56	1694.63	2711.95	0	2711.95	
18	4.02207	10745.9	Existing Granular Fill - Proofrolled	0.02	32	1806.99	2954.17	4727.62	0	4727.62	
19	4.02207	7942.98	Existing Granular Fill - Proofrolled	0.02	32	1090.5	1782.82	2853.07	0	2853.07	
20	4.02207	7071.31	Existing Granular Fill - Proofrolled	0.02	32	645.334	1055.03	1688.37	0	1688.37	
21	4.02207	3610.28	Existing Granular Fill - Proofrolled	0.02	32	332.825	544.123	870.747	0	870.747	
22	4.02207	866.899	Existing Granular Fill - Proofrolled	0.02	32	80.7402	131.999	211.211	0	211.211	
23	4.02207	688.237	Existing Granular Fill - Proofrolled	0.02	32	64.7591	105.872	169.399	0	169.399	
24	4.02207	452.708	Existing Granular Fill - Proofrolled	0.02	32	43.0412	70.3663	112.578	0	112.578	
25	4.02207	160.371	Existing Granular Fill - Proofrolled	0.02	32	15.4142	25.2001	40.2966	0	40.2966	

**Query 2 (bishop simplified) - Safety Factor: 1.30833**

Slice	Width	Weight	Base	Base	Base Friction	Shear	Shear	Base Normal	Pore	Effective Normal	
			<i>Project</i> Munjoy Heights #13067.1								
			<i>Analysis Description</i> SECTION 1 - SEISMIC ANALYSIS								
			<i>Drawn By</i>			<i>Scale</i>		<i>Company</i> Summit Geoengineering Services			
			<i>Date</i> 1/7/2014, 8:33:22 AM				<i>File Name</i> Section 1 - SEISMIC.slim				



Number	[ft]	[lbs]	Material	[psf]	Angle [degrees]	[psf]	[psf]	Stress [psf]	[psf]	Stress [psf]
1	2.39864	600.546	Inported Fill (MDOT 703.20)	0.02	35	72.1702	94.4225	134.821	0	134.821
2	2.39864	1700.2	Inported Fill (MDOT 703.20)	0.02	35	221.576	289.895	413.984	0	413.984
3	2.39864	2625.66	Inported Fill (MDOT 703.20)	0.02	35	364.267	476.581	680.598	0	680.598
4	2.39864	3422.01	Inported Fill (MDOT 703.20)	0.02	35	499.726	653.806	933.704	0	933.704
5	2.39864	4116.1	Inported Fill (MDOT 703.20)	0.02	35	628.013	821.648	1173.41	0	1173.41
6	2.14324	4196.65	Existing Granular Fill - Proofrolled	0.02	32	684.826	895.978	1433.83	0	1433.83
7	2.14324	4630.76	Existing Granular Fill - Proofrolled	0.02	32	777.816	1017.64	1628.54	0	1628.54
8	2.14324	5042.96	Existing Granular Fill - Proofrolled	0.02	32	1688.39	2208.97	3535.06	0	3535.06
9	2.14324	5324.02	Existing Granular Fill - Proofrolled	0.02	32	1699.66	2223.71	3558.64	0	3558.64
10	2.14324	4068.3	Existing Granular Fill - Proofrolled	0.02	32	1719.65	2249.87	3600.52	0	3600.52
11	2.14324	3929.81	Existing Granular Fill - Proofrolled	0.02	32	727.712	952.088	1523.63	0	1523.63
12	2.14324	3790.85	Existing Granular Fill - Proofrolled	0.02	32	717.311	938.479	1501.85	0	1501.85
13	2.14324	3810.67	Existing Granular Fill - Proofrolled	0.02	32	736.331	963.364	1541.67	0	1541.67
14	2.14324	3564.93	Existing Granular Fill - Proofrolled	0.02	32	703.099	919.885	1472.09	0	1472.09
15	2.14324	824.725	Existing Granular Fill - Proofrolled	0.02	32	165.977	217.153	347.486	0	347.486
16	2.14324	871.034	Existing Granular Fill - Proofrolled	0.02	32	178.827	233.965	374.389	0	374.389
17	2.14324	890.246	Existing Granular Fill - Proofrolled	0.02	32	186.438	243.922	390.326	0	390.326
18	2.14324	882.919	Existing Granular Fill - Proofrolled	0.02	32	188.621	246.779	394.898	0	394.898
19	2.14324	849.439	Existing Granular Fill - Proofrolled	0.02	32	185.149	242.236	387.627	0	387.627
20	2.14324	790.043	Existing Granular Fill - Proofrolled	0.02	32	175.745	229.933	367.937	0	367.937
21	2.14324	704.816	Existing Granular Fill - Proofrolled	0.02	32	160.079	209.436	335.135	0	335.135
22	2.14324	593.698	Existing Granular Fill - Proofrolled	0.02	32	137.75	180.222	288.383	0	288.383
23	2.14324	456.482	Existing Granular Fill - Proofrolled	0.02	32	108.275	141.659	226.67	0	226.67
24	2.14324	292.807	Existing Granular Fill - Proofrolled	0.02	32	71.0669	92.979	148.765	0	148.765
			Existing Granular Fill -							

	<i>Project</i>		Munjoy Heights #13067.1	
	<i>Analysis Description</i>		SECTION 1 - SEISMIC ANALYSIS	
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 8:33:22 AM		<i>File Name</i> Section 1 - SEISMIC.slim	

Global Minimum Query (janbu simplified) - Safety Factor: 1.30164

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.35677	660.181	Inported Fill (MDOT 703.20)	0.02	35	75.9745	98.8915	141.203	0	141.203
2	2.35677	1875.09	Inported Fill (MDOT 703.20)	0.02	35	234.334	305.019	435.584	0	435.584
3	2.35677	2909.46	Inported Fill (MDOT 703.20)	0.02	35	387.323	504.155	719.981	0	719.981
4	2.35677	3783.29	Inported Fill (MDOT 703.20)	0.02	35	530.23	690.169	985.636	0	985.636
5	2.35677	1248.32	Inported Fill (MDOT 703.20)	0.02	35	182.751	237.876	339.694	0	339.694
6	2.35677	1949.81	Inported Fill (MDOT 703.20)	0.02	35	296.499	385.935	551.145	0	551.145
7	2.35677	2588.85	Inported Fill (MDOT 703.20)	0.02	35	407.246	530.088	757.017	0	757.017
8	2.496	3367.94	Existing Granular Fill - Proofrolled	0.02	32	475.543	618.986	990.552	0	990.552
9	2.496	3947.85	Existing Granular Fill - Proofrolled	0.02	32	572.966	745.795	1193.49	0	1193.49
10	2.496	4468.44	Existing Granular Fill - Proofrolled	0.02	32	665.27	865.942	1385.76	0	1385.76
11	2.496	4935.12	Existing Granular Fill - Proofrolled	0.02	32	752.537	979.532	1567.55	0	1567.55
12	2.496	5352.19	Existing Granular Fill - Proofrolled	0.02	32	834.847	1086.67	1738.99	0	1738.99
13	2.496	5723.12	Existing Granular Fill - Proofrolled	0.02	32	912.257	1187.43	1900.25	0	1900.25
14	2.496	6050.72	Existing Granular Fill - Proofrolled	0.02	32	984.819	1281.88	2051.41	0	2051.41
15	2.496	6337.28	Existing Granular Fill - Proofrolled	0.02	32	1052.58	1370.08	2192.56	0	2192.56
16	2.496	6593.62	Existing Granular Fill - Proofrolled	0.02	32	1659.63	2160.24	3457.08	0	3457.08
17	2.496	6987.2	Existing Granular Fill - Proofrolled	0.02	32	2069.37	2693.57	4310.59	0	4310.59
18	2.496	5201.42	Existing Granular Fill - Proofrolled	0.02	32	2019.43	2628.57	4206.58	0	4206.58
19	2.496	4736.6	Existing Granular Fill - Proofrolled	0.02	32	850.304	1106.79	1771.2	0	1771.2
20	2.496	4327.32	Existing Granular Fill - Proofrolled	0.02	32	791.87	1030.73	1649.48	0	1649.48
21	2.496	4373.75	Existing Granular Fill - Proofrolled	0.02	32	815.955	1062.08	1699.66	0	1699.66
22	2.496	1731.12	Existing Granular Fill - Proofrolled	0.02	32	329.326	428.664	685.973	0	685.973
23	2.496	391.276	Existing Granular Fill - Proofrolled	0.02	32	75.9398	98.8463	158.155	0	158.155

<i>Project</i>		Munjoy Heights #13067.1	
<i>Analysis Description</i>		SECTION 1 - SEISMIC ANALYSIS	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoen지니어링 Services
<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - SEISMIC.slim






24	2.496	258.38	Existing Granular Fill - Proofrolled	0.02	32	51.1804	66.6184	106.58	0	106.58
25	2.496	91.7671	Existing Granular Fill - Proofrolled	0.02	32	18.5711	24.1729	38.6527	0	38.6527

**Query 1 (janbu simplified) - Safety Factor: 1.5778**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	5.1655	1369.56	Inported Fill (MDOT 703.20)	0.02	35	86.9445	137.181	195.885	0	195.885
2	3.95056	1368.56	water	0.02	1	3.81407	6.01784	343.617	0	343.617
3	3.72146	2242.86	Inported Fill (MDOT 703.20)	0.02	35	204.939	323.352	461.766	0	461.766
4	4.02207	3765.1	Existing Granular Fill - Proofrolled	0.02	32	295.537	466.299	746.201	0	746.201
5	4.02207	5066.67	Existing Granular Fill - Proofrolled	0.02	32	403.306	636.336	1018.32	0	1018.32
6	4.02207	6278.4	Existing Granular Fill - Proofrolled	0.02	32	506.507	799.166	1278.9	0	1278.9
7	4.02207	7405.02	Existing Granular Fill - Proofrolled	0.02	32	605.157	954.817	1527.99	0	1527.99
8	4.02207	10244.5	Existing Granular Fill - Proofrolled	0.02	32	847.712	1337.52	2140.45	0	2140.45
9	4.02207	11322	Existing Granular Fill - Proofrolled	0.02	32	948.276	1496.19	2394.37	0	2394.37
10	4.02207	10878.7	Existing Granular Fill - Proofrolled	0.02	32	921.929	1454.62	2327.86	0	2327.86
11	4.02207	7286.62	Existing Granular Fill - Proofrolled	0.02	32	624.656	985.583	1577.23	0	1577.23
12	4.02207	8039.72	Existing Granular Fill - Proofrolled	0.02	32	697.015	1099.75	1759.94	0	1759.94
13	4.02207	8725.74	Existing Granular Fill - Proofrolled	0.02	32	764.894	1206.85	1931.33	0	1931.33
14	4.02207	9346.52	Existing Granular Fill - Proofrolled	0.02	32	828.274	1306.85	2091.37	0	2091.37
15	4.02207	9903.69	Existing Granular Fill - Proofrolled	0.02	32	887.128	1399.71	2239.97	0	2239.97
16	4.02207	10398.6	Existing Granular Fill - Proofrolled	0.02	32	941.418	1485.37	2377.06	0	2377.06
17	4.02207	10832.7	Existing Granular Fill - Proofrolled	0.02	32	1071.17	1690.09	2704.68	0	2704.68
18	4.02207	10745.9	Existing Granular Fill - Proofrolled	0.02	32	1868.01	2947.34	4716.7	0	4716.7
19	4.02207	7942.98	Existing Granular Fill - Proofrolled	0.02	32	1127.75	1779.37	2847.56	0	2847.56
20	4.02207	7071.31	Existing Granular Fill - Proofrolled	0.02	32	667.632	1053.39	1685.74	0	1685.74

	Project		Munjoy Heights #13067.1	
	Analysis Description		SECTION 1 - SEISMIC ANALYSIS	
	Drawn By	Scale	Company Summit Geoengineering Services	
	Date	1/7/2014, 8:33:22 AM	File Name	Section 1 - SEISMIC.slim

21	4.02207	3610.28	Existing Granular Fill - Proofrolled	0.02	32	344.456	543.482	869.721	0	869.721
22	4.02207	866.899	Existing Granular Fill - Proofrolled	0.02	32	83.5942	131.895	211.045	0	211.045
23	4.02207	688.237	Existing Granular Fill - Proofrolled	0.02	32	67.075	105.831	169.332	0	169.332
24	4.02207	452.708	Existing Granular Fill - Proofrolled	0.02	32	44.598	70.3668	112.578	0	112.578
25	4.02207	160.371	Existing Granular Fill - Proofrolled	0.02	32	15.9784	25.2107	40.3135	0	40.3135

**Query 2 (janbu simplified) - Safety Factor: 2.15176**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0	120.874	Inported Fill (MDOT 703.20)	0.02	35	23.845	51.3088	147.747	0	147.747
2	0	352.074	Inported Fill (MDOT 703.20)	0.02	35	71.5238	153.902	416.48	0	416.48
3	0	563.871	Inported Fill (MDOT 703.20)	0.02	35	117.503	252.839	648.34	0	648.34
4	0	759.199	Inported Fill (MDOT 703.20)	0.02	35	161.794	348.142	851.517	0	851.517
5	0	940.261	Inported Fill (MDOT 703.20)	0.02	35	204.435	439.896	1031.79	0	1031.79
6	0	1108.76	Inported Fill (MDOT 703.20)	0.02	35	245.481	528.217	1193.37	0	1193.37
7	0	1266.03	Inported Fill (MDOT 703.20)	0.02	35	284.988	613.226	1339.44	0	1339.44
8	0	1413.18	Inported Fill (MDOT 703.20)	0.02	35	323.014	695.049	1472.43	0	1472.43
9	0	1551.09	Inported Fill (MDOT 703.20)	0.02	35	359.614	773.802	1594.26	0	1594.26
10	0	1680.5	Inported Fill (MDOT 703.20)	0.02	35	394.838	849.596	1706.44	0	1706.44
11	0	1802.05	Inported Fill (MDOT 703.20)	0.02	35	428.735	922.535	1810.23	0	1810.23
12	0	1918.12	Inported Fill (MDOT 703.20)	0.02	35	1035.23	2227.56	4278.39	0	4278.39
13	0	2045.59	Inported Fill (MDOT 703.20)	0.02	35	1061.28	2283.61	4300.37	0	4300.37
14	0	2185.26	Inported Fill (MDOT 703.20)	0.02	35	1079.2	2322.17	4294.16	0	4294.16
15	0	2097.57	Inported Fill (MDOT 703.20)	0.02	35	1068.6	2299.38	4181.21	0	4181.21
			Inported Fill (MDOT							

<i>Project</i>		Munjoy Heights #13067.1	
<i>Analysis Description</i>		SECTION 1 - SEISMIC ANALYSIS	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
<i>Date</i> 1/7/2014, 8:33:22 AM		<i>File Name</i> Section 1 - SEISMIC.slim	




17	0	1506.46	Inported Fill (MDOT 703.20)	0.02	35	1185.05	2549.94	4500.62	0	4500.62
18	0	1474.78	Inported Fill (MDOT 703.20)	0.02	35	377.49	812.268	1414.8	0	1414.8
19	0	1448.14	Inported Fill (MDOT 703.20)	0.02	35	374.036	804.836	1384.86	0	1384.86
20	0	1416.56	Inported Fill (MDOT 703.20)	0.02	35	369.115	794.246	1351.37	0	1351.37
21	0	1380.2	Inported Fill (MDOT 703.20)	0.02	35	362.747	780.544	1314.41	0	1314.41
22	0	1349.85	Inported Fill (MDOT 703.20)	0.02	35	357.769	769.832	1284.14	0	1284.14
23	0	1290.29	Retaining Wall	1370	24	861.444	1853.62	1076.37	0	1076.37
24	0	1331.31	Retaining Wall	1370	24	873.884	1880.39	1128.19	0	1128.19
25	0	1028.2	Retaining Wall	1370	24	814.871	1753.41	842.171	0	842.171

### Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.30034

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	24.443	111	0	0	0
2	25.4896	110.42	11.6526	0	0
3	26.5363	109.857	45.4721	0	0
4	27.583	109.309	99.7374	0	0
5	28.6296	108.776	172.814	0	0
6	29.6763	108.259	263.149	0	0
7	30.723	107.757	369.266	0	0
8	31.7697	107.27	489.76	0	0
9	32.8163	106.798	623.295	0	0
10	33.863	106.339	768.597	0	0
11	34.9097	105.895	924.456	0	0
12	35.9563	105.464	1089.72	0	0
13	37.003	105.048	1263.28	0	0
14	38.0497	104.645	1444.09	0	0
15	39.0964	104.255	1640.77	0	0
16	40.0868	103.898	1579.54	0	0
17	41.0773	103.553	1505.17	0	0
18	42.0677	103.219	1416.83	0	0
19	43.0582	102.897	1313.74	0	0
20	44.0486	102.586	1195.15	0	0

	<i>Project</i> Munjoy Heights #13067.1				
	<i>Analysis Description</i> SECTION 1 - SEISMIC ANALYSIS				
	<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 8:33:22 AM			<i>File Name</i> Section 1 - SEISMIC.slim	

21	45.0391	102.286	1060.36	0	0
22	46.0295	101.998	908.692	0	0
23	47.02	101.72	739.53	0	0
24	48.0104	101.454	552.284	0	0
25	49.0009	101.198	346.403	0	0
26	49.9913	100.953	0	0	0

**Query 1 (bishop simplified) - Safety Factor: 1.63486**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	9.89312	111	0	0	0
2	15.0586	106.897	483.769	0	0
3	19.0092	104	1574.4	0	0
4	22.7306	101.448	2200.48	0	0
5	26.7527	98.8703	3284.4	0	0
6	30.7748	96.4694	4576.22	0	0
7	34.7968	94.2354	5976.36	0	0
8	38.8189	92.16	7397.21	0	0
9	42.841	90.2359	9051.04	0	0
10	46.863	88.4567	10540.7	0	0
11	50.8851	86.8169	11652.4	0	0
12	54.9072	85.3115	12185.7	0	0
13	58.9293	83.9362	12543.4	0	0
14	62.9513	82.6874	12683.2	0	0
15	66.9734	81.5617	12568.1	0	0
16	70.9955	80.5562	12166.4	0	0
17	75.0175	79.6685	11450.8	0	0
18	79.0396	78.8964	10243.8	0	0
19	83.0617	78.2382	6950.63	0	0
20	87.0837	77.6922	4759.46	0	0
21	91.1058	77.2573	3464.95	0	0
22	95.1279	76.9324	2698.53	0	0
23	99.1499	76.7169	2488.78	0	0
24	103.172	76.6103	2301.54	0	0
25	107.194	76.6123	2164.49	0	0
26	111.216	76.723	0	0	0

**Query 2 (bishop simplified) - Safety Factor: 1.30833**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	61.8446	100	0	0	0
2	64.2433	96.1482	394.756	0	0


<i>Project</i>	Munjoy Heights #13067.1		
<i>Analysis Description</i>	SECTION 1 - SEISMIC ANALYSIS		
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - SEISMIC.slim



3	66.6419	92.947	1326.13	0	0
4	69.0406	90.2124	2526.18	0	0
5	71.4392	87.8392	3820.67	0	0
6	73.8378	85.7606	5087.13	0	0
7	75.9811	84.115	6319.02	0	0
8	78.1243	82.6444	7422.26	0	0
9	80.2676	81.3309	8861.17	0	0
10	82.4108	80.1605	9820.5	0	0
11	84.554	79.1219	10040.4	0	0
12	86.6973	78.2063	9081.99	0	0
13	88.8405	77.4064	7940.88	0	0
14	90.9838	76.7165	6623.08	0	0
15	93.127	76.1318	5226.36	0	0
16	95.2702	75.6485	5105.61	0	0
17	97.4135	75.2636	4937.27	0	0
18	99.5567	74.9748	4722.83	0	0
19	101.7	74.7804	4467.17	0	0
20	103.843	74.6793	4178.68	0	0
21	105.986	74.6709	3869.42	0	0
22	108.13	74.7552	3555.47	0	0
23	110.273	74.9327	3257.44	0	0
24	112.416	75.2044	3001.01	0	0
25	114.559	75.5718	2817.91	0	0
26	116.703	76.0372	0	0	0

**Global Minimum Query (janbu simplified) - Safety Factor: 1.30164**


Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	40.5352	111	0	0	0
2	42.892	106.69	482.295	0	0
3	45.2488	103.069	1657.4	0	0
4	47.6055	99.9382	3231.64	0	0
5	49.9623	97.1838	4999.58	0	0
6	52.3191	94.7337	5501.07	0	0
7	54.6758	92.5383	6168.29	0	0
8	57.0326	90.5621	6911.65	0	0
9	59.5286	88.6788	7859.68	0	0
10	62.0246	86.9877	8763.81	0	0
11	64.5206	85.4701	9563.94	0	0
12	67.0166	84.1112	10210.6	0	0
13	69.5126	82.8994	10662.5	0	0
14	72.0086	81.8249	10885.2	0	0

	<i>Project</i> Munjoy Heights #13067.1					
	<i>Analysis Description</i> SECTION 1 - SEISMIC ANALYSIS					
	<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services		
	<i>Date</i> 1/7/2014, 8:33:22 AM			<i>File Name</i> Section 1 - SEISMIC.slim		

15	74.5046	80.8802	10849.5	0	0
16	77.0006	80.0586	10530.6	0	0
17	79.4966	79.3552	9347.7	0	0
18	81.9926	78.7656	7283.29	0	0
19	84.4886	78.2865	4674.63	0	0
20	86.9846	77.9152	3588.98	0	0
21	89.4806	77.6497	2396.69	0	0
22	91.9765	77.4887	983.826	0	0
23	94.4725	77.4312	339.796	0	0
24	96.9685	77.477	174.319	0	0
25	99.4645	77.6263	51.3351	0	0
26	101.961	77.8799	0	0	0

**Query 1 (janbu simplified) - Safety Factor: 1.5778**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	9.89312	111	0	0	0
2	15.0586	106.897	463.008	0	0
3	19.0092	104	1552.76	0	0
4	22.7306	101.448	2145.92	0	0
5	26.7527	98.8703	3178.68	0	0
6	30.7748	96.4694	4402.45	0	0
7	34.7968	94.2354	5719.08	0	0
8	38.8189	92.16	7042.14	0	0
9	42.841	90.2359	8561.44	0	0
10	46.863	88.4567	9902.96	0	0
11	50.8851	86.8169	10872.6	0	0
12	54.9072	85.3115	11310.7	0	0
13	58.9293	83.9362	11563.2	0	0
14	62.9513	82.6874	11588.4	0	0
15	66.9734	81.5617	11350.1	0	0
16	70.9955	80.5562	10816.9	0	0
17	75.0175	79.6685	9962.27	0	0
18	79.0396	78.8964	8597.19	0	0
19	83.0617	78.2382	5028.25	0	0
20	87.0837	77.6922	2670.28	0	0
21	91.1058	77.2573	1276.68	0	0
22	95.1279	76.9324	458.883	0	0
23	99.1499	76.7169	236.589	0	0
24	103.172	76.6103	39.1975	0	0
25	107.194	76.6123	-104.672	0	0
26	111.216	76.723	0	0	0

	<i>Project</i> Munjoy Heights #13067.1		
	<i>Analysis Description</i> SECTION 1 - SEISMIC ANALYSIS		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 8:33:22 AM		<i>File Name</i> Section 1 - SEISMIC.slim


Query 2 (janbu simplified) - Safety Factor: 2.15176

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	0	0	0	0	0
2	0	0	107.301	0	0
3	0	0	395.986	0	0
4	0	0	824.383	0	0
5	0	0	1359.97	0	0
6	0	0	1976.7	0	0
7	0	0	2653.28	0	0
8	0	0	3372.01	0	0
9	0	0	4117.95	0	0
10	0	0	4878.36	0	0
11	0	0	5642.26	0	0
12	0	0	6400.07	0	0
13	0	0	7877.57	0	0
14	0	0	9246.59	0	0
15	0	0	10501.1	0	0
16	0	0	11600.9	0	0
17	0	0	12426.8	0	0
18	0	0	13060.7	0	0
19	0	0	12890.3	0	0
20	0	0	12675.6	0	0
21	0	0	11612.8	0	0
22	0	0	10443.9	0	0
23	0	0	9236.41	0	0
24	0	0	6441.47	0	0
25	0	0	3150.53	0	0
26	0	0	0	0	0

**List Of Coordinates**

**Line Load**

X	Y
79.1998	92
79	92
79.1	91
84.1	91
84	92

	<i>Project</i> Munjoy Heights #13067.1		
	<i>Analysis Description</i> SECTION 1 - SEISMIC ANALYSIS		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 8:33:22 AM		<i>File Name</i> Section 1 - SEISMIC.slim

83.9796 92

### External Boundary

X	Y
0	96
0	40
150	40
150	64
150	67
117	76
93	79
92.5	90
90	90
82.1	95
82	100
81	100
50	100
49.9	111
39	111
15	111
0	111

### Material Boundary

X	Y
15	111
15.1	104
39.1	104
39	111

### Material Boundary

X	Y
0	96
93	75
117	73
150	64

### Material Boundary

X	Y
81	100

<i>Project</i>				Munjoy Heights #13067.1	
<i>Analysis Description</i>				SECTION 1 - SEISMIC ANALYSIS	
<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services		
<i>Date</i>		1/7/2014, 8:33:22 AM		<i>File Name</i> Section 1 - SEISMIC.slim	





81.2	92
79	92
79.1	91
84.1	91
84	92
82.1	92
82.1	95

**Material Boundary**

X	Y
90	90
90.156	79.684

**Material Boundary**

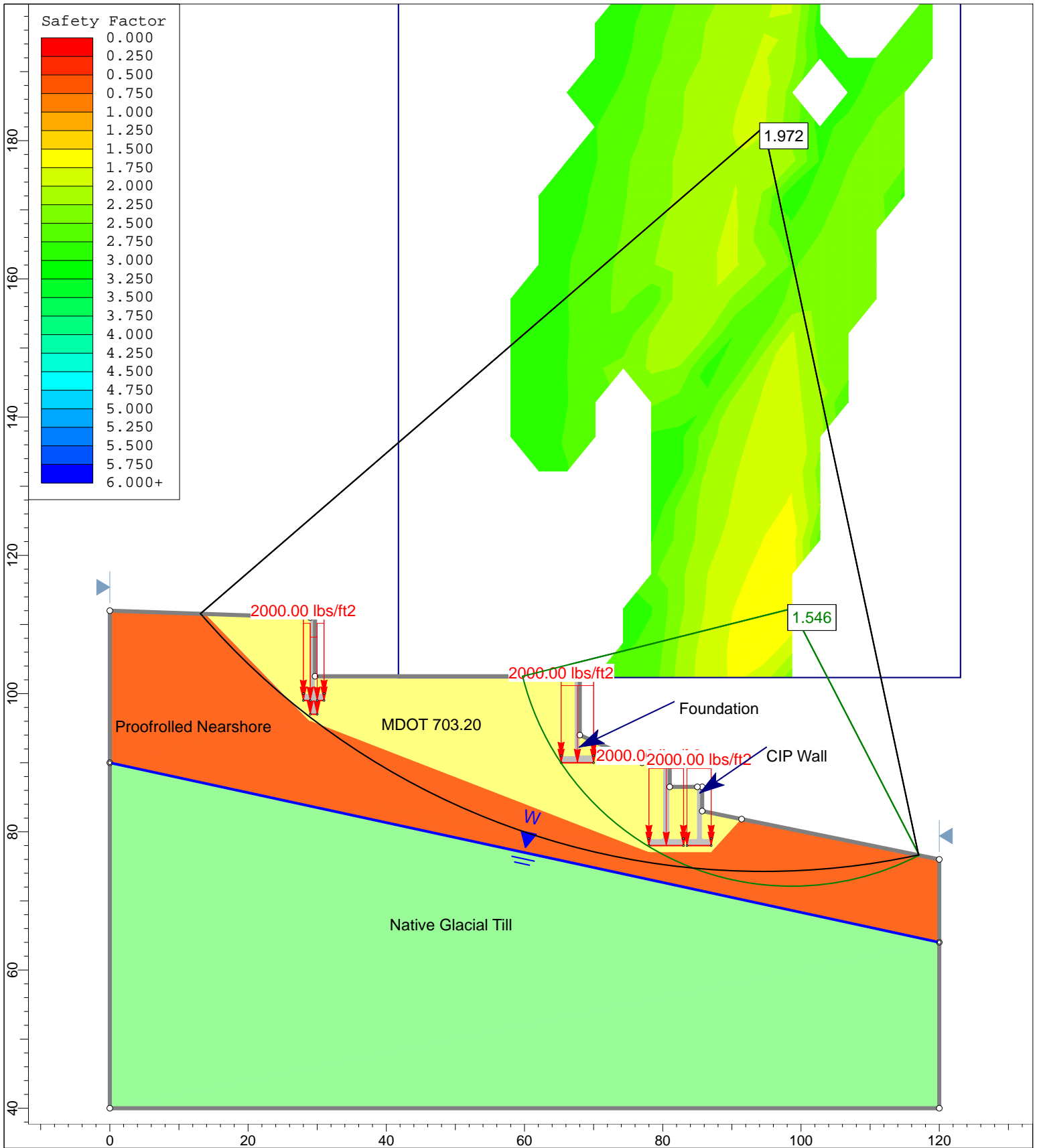
X	Y
0	111
15.1	104
45	94
80	84
90.156	79.684
91	78
93	78
93	79



<i>Project</i>	Munjoy Heights #13067.1		
<i>Analysis Description</i>	SECTION 1 - SEISMIC ANALYSIS		
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
<i>Date</i>	1/7/2014, 8:33:22 AM	<i>File Name</i>	Section 1 - SEISMIC.slim



**SLOPE STABILITY ANALYSIS RESULTS**  
**SECTION 2**



	Project			Munjoy Heights #13067.2		
	Analysis Description			SECTION 2 - STATIC		
	Drawn By	Scale	1:223	Company	Summit Geoengineering Services	
	Date	1/7/2014, 11:50:15 AM		File Name	Section 2 - Static.slim	

# Slide Analysis Information

## Munjoy Heights #13067.2

### Project Summary

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File Name: Section 2 - Static  
Slide Modeler Version: 6.025  
Project Title: Munjoy Heights #13067.2  
Analysis: SECTION 2 - STATIC  
Company: Summit Geoengineering Services  
Date Created: 1/7/2014, 11:50:15 AM

### General Settings

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Units of Measurement: Imperial Units  
Time Units: days  
Permeability Units: feet/second  
Failure Direction: Left to Right  
Data Output: Maximum  
Maximum Material Properties: 20  
Maximum Support Properties: 20

### Analysis Options

---

#### Analysis Methods Used


Bishop simplified  
Janbu simplified

Number of slices: 25  
Tolerance: 0.005  
Maximum number of iterations: 50  
Check  $m\alpha < 0.2$ : Yes  
Discard data for surfaces with FS below: 0.5  
Discard data for surfaces with FS above: 3  
Initial trial value of FS: 1  
Steffensen Iteration: Yes

### Groundwater Analysis

---

Groundwater Method: Water Surfaces  
Pore Fluid Unit Weight: 62.4 lbs/ft<sup>3</sup>

	<i>Project</i>	Munjoy Heights #13067.2		
	<i>Analysis Description</i>	SECTION 2 - STATIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
	<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim

Advanced Groundwater Method: None

## Random Numbers

Pseudo-random Seed: 10116  
Random Number Generation Method: Park and Miller v.3

## 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

4 Distributed Loads present

### Distributed Load 1

Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

### Distributed Load 2


Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

### Distributed Load 3





Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

### Distributed Load 4

Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

	<i>Project</i> Munjoy Heights #13067.2		
	<i>Analysis Description</i> SECTION 2 - STATIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 11:50:15 AM	<i>File Name</i> Section 2 - Static.slim	

## Material Properties

Property	Foundation	Proofrolled Nearshore	Imported Fill (MDOT 703.20)	Glacial Till
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	150	130	130	140
Cohesion [psf]	10000	0.02	0.02	2000
Friction Angle [deg]	45	32	35	35
Water Surface	None	None	None	Water Table
Hu Value				1
Ru Value	0	0	0	

## Global Minimums

### Method: bishop simplified

FS: 1.545680  
 Center: 98.678, 112.283  
 Radius: 40.175  
 Left Slip Surface Endpoint: 59.713, 102.500  
 Right Slip Surface Endpoint: 117.115, 76.589  
 Resisting Moment=2.63517e+006 lb-ft  
 Driving Moment=1.70487e+006 lb-ft  
 Total Slice Area=476.881 ft<sup>2</sup>


### Method: janbu simplified

FS: 1.385050  
 Center: 90.547, 102.326  
 Radius: 29.699  
 Left Slip Surface Endpoint: 60.847, 102.326  
 Right Slip Surface Endpoint: 108.163, 78.416  
 Left Slope Intercept: 60.847 102.500  
 Right Slope Intercept: 108.163 78.416  
 Resisting Horizontal Force=52018.8 lb  
 Driving Horizontal Force=37557.5 lb  
 Total Slice Area=478.366 ft<sup>2</sup>

## Valid / Invalid Surfaces

### Method: bishop simplified

Number of Valid Surfaces: 537

	Project			Munjoy Heights #13067.2
	Analysis Description			SECTION 2 - STATIC
	Drawn By	Scale	Company	Summit Geoengineering Services
	Date	1/7/2014, 11:50:15 AM	File Name	Section 2 - Static.slim

Number of Invalid Surfaces: 4314

**Error Codes:**

- Error Code -97 reported for 4151 surfaces
- Error Code -106 reported for 41 surfaces
- Error Code -107 reported for 5 surfaces
- Error Code -108 reported for 55 surfaces
- Error Code -109 reported for 1 surface
- Error Code -112 reported for 60 surfaces
- Error Code -113 reported for 1 surface

**Method: janbu simplified**

Number of Valid Surfaces: 707  
Number of Invalid Surfaces: 4144

**Error Codes:**

- Error Code -97 reported for 3981 surfaces
- Error Code -106 reported for 41 surfaces
- Error Code -107 reported for 5 surfaces
- Error Code -108 reported for 55 surfaces
- Error Code -109 reported for 1 surface
- Error Code -112 reported for 60 surfaces
- Error Code -113 reported for 1 surface


**Error Codes**

The following errors were encountered during the computation:

- 97 = Factor of safety is out of valid range set by user.
- 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).
- 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.
- 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.
- 113 = Surface intersects outside slope limits.

**Slice Data**


Global Minimum Query (bishop simplified) - Safety Factor: 1.54568

	<i>Project</i> Munjoy Heights #13067.2		
	<i>Analysis Description</i> SECTION 2 - STATIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 11:50:15 AM	<i>File Name</i> Section 2 - Static.slim	

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.102619	3.07857	Foundation	10000	45	1844.3	2850.69	-7149.3	0	-7149.3
2	2.45634	1233.81	Imported Fill (MDOT 703.20)	0.02	35	100.991	156.1	222.904	0	222.904
3	2.45634	3037.52	Imported Fill (MDOT 703.20)	0.02	35	306.555	473.836	676.678	0	676.678
4	2.45634	4345.37	Imported Fill (MDOT 703.20)	0.02	35	1138.96	1760.47	2514.17	0	2514.17
5	2.45634	3611.45	Imported Fill (MDOT 703.20)	0.02	35	1034.55	1599.09	2283.71	0	2283.71
6	2.45634	3004.26	Imported Fill (MDOT 703.20)	0.02	35	735.644	1137.07	1623.87	0	1623.87
7	2.45634	3344.73	Imported Fill (MDOT 703.20)	0.02	35	450.755	696.723	994.993	0	994.993
8	2.45634	3587.88	Imported Fill (MDOT 703.20)	0.02	35	503.541	778.313	1111.52	0	1111.52
9	2.45634	3948.57	Imported Fill (MDOT 703.20)	0.02	35	1292.12	1997.2	2852.27	0	2852.27
10	2.35304	4051.88	Proofrolled Nearshore	0.02	32	1250.82	1933.36	3093.99	0	3093.99
11	2.35304	3457.62	Proofrolled Nearshore	0.02	32	1344.17	2077.65	3324.91	0	3324.91
12	2.35304	3467.38	Proofrolled Nearshore	0.02	32	1229.58	1900.54	3041.46	0	3041.46
13	2.35304	2742.68	Proofrolled Nearshore	0.02	32	877.29	1356.01	2170.04	0	2170.04
14	2.35304	2767.69	Proofrolled Nearshore	0.02	32	436.751	675.077	1080.32	0	1080.32
15	2.35304	2756.82	Proofrolled Nearshore	0.02	32	445.236	688.193	1101.31	0	1101.31
16	2.35304	2702.09	Proofrolled Nearshore	0.02	32	446.578	690.267	1104.63	0	1104.63
17	2.35304	2604.5	Proofrolled Nearshore	0.02	32	440.55	680.949	1089.71	0	1089.71
18	2.35304	2464.56	Proofrolled Nearshore	0.02	32	426.826	659.737	1055.77	0	1055.77
19	2.35304	2282.35	Proofrolled Nearshore	0.02	32	404.967	625.949	1001.69	0	1001.69
20	2.35304	2057.5	Proofrolled Nearshore	0.02	32	374.383	578.676	926.042	0	926.042
21	2.35304	1789.17	Proofrolled Nearshore	0.02	32	334.299	516.719	826.891	0	826.891
22	2.35304	1476.03	Proofrolled Nearshore	0.02	32	283.685	438.487	701.694	0	701.694
23	2.35304	1116.15	Proofrolled Nearshore	0.02	32	221.164	341.848	547.04	0	547.04
24	2.35304	706.912	Proofrolled Nearshore	0.02	32	144.846	223.885	358.258	0	358.258
25	2.35304	244.787	Proofrolled Nearshore	0.02	32	52.0789	80.4973	128.79	0	128.79

**Query 1 (bishop simplified) - Safety Factor: 1.97182**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.0986396	0.70899	Imported Fill (MDOT 703.20)	0.02	35	1.81743	3.58365	5.08942	0	5.08942

	<i>Project</i>		Munjoy Heights #13067.2								
	<i>Analysis Description</i>		SECTION 2 - STATIC								
	<i>Drawn By</i>				<i>Scale</i>		<i>Company</i>				
							Summit Geoenvironmental Services				
<i>Date</i>						1/7/2014, 11:50:15 AM		<i>File Name</i>			Section 2 - Static.slim



2	4.41517	1396.02	Proofrolled Nearshore	0.02	32	74.5743	147.047	235.291	0	235.291
3	4.41517	3909.02	Proofrolled Nearshore	0.02	32	214.901	423.746	678.103	0	678.103
4	4.41517	6140.23	Proofrolled Nearshore	0.02	32	346.117	682.481	1092.17	0	1092.17
5	0.240991	395.337	Foundation	10000	45	4178.46	8239.17	-1760.83	0	-1760.83
6	3.80061	6513.32	Imported Fill (MDOT 703.20)	0.02	35	1574.96	3105.53	4435.14	0	4435.14
7	4.55313	5181.62	Proofrolled Nearshore	0.02	32	466.913	920.669	1473.35	0	1473.35
8	4.55313	6963.35	Proofrolled Nearshore	0.02	32	404.247	797.102	1275.6	0	1275.6
9	4.55313	8566.82	Proofrolled Nearshore	0.02	32	506.237	998.209	1597.44	0	1597.44
10	4.55313	9997.81	Proofrolled Nearshore	0.02	32	600.709	1184.49	1895.55	0	1895.55
11	4.55313	11269.1	Proofrolled Nearshore	0.02	32	687.837	1356.29	2170.48	0	2170.48
12	4.55313	12390.9	Proofrolled Nearshore	0.02	32	767.768	1513.9	2422.71	0	2422.71
13	4.55313	13371.7	Proofrolled Nearshore	0.02	32	840.609	1657.53	2652.56	0	2652.56
14	4.55313	14250.5	Proofrolled Nearshore	0.02	32	1242.14	2449.28	3919.63	0	3919.63
15	4.55313	10943.3	Proofrolled Nearshore	0.02	32	1235.09	2435.38	3897.4	0	3897.4
16	4.55313	8950	Proofrolled Nearshore	0.02	32	586.276	1156.03	1850	0	1850
17	4.55313	8772.49	Proofrolled Nearshore	0.02	32	1057.08	2084.37	3335.67	0	3335.67
18	4.55313	7236.1	Proofrolled Nearshore	0.02	32	1166.48	2300.08	3680.87	0	3680.87
19	4.55313	5188.61	Proofrolled Nearshore	0.02	32	744.941	1468.89	2350.68	0	2350.68
20	4.55313	4383.73	Proofrolled Nearshore	0.02	32	302.757	596.983	955.341	0	955.341
21	4.55313	3843.17	Proofrolled Nearshore	0.02	32	268.999	530.417	848.812	0	848.812
22	4.55313	3188.51	Proofrolled Nearshore	0.02	32	226.231	446.087	713.857	0	713.857
23	4.55313	2419.2	Proofrolled Nearshore	0.02	32	174.048	343.192	549.19	0	549.19
24	4.55313	1534.03	Proofrolled Nearshore	0.02	32	111.954	220.754	353.249	0	353.249
25	4.55313	531.147	Proofrolled Nearshore	0.02	32	39.3463	77.5838	124.128	0	124.128

Global Minimum Query (janbu simplified) - Safety Factor: 1.38505

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.7821	1228.25	Imported Fill (MDOT 703.20)	0.02	35	89.8141	124.397	177.629	0	177.629
2	1.7821	2862.44	Imported Fill (MDOT 703.20)	0.02	35	381.36	528.203	754.323	0	754.323
3	1.7821	3675.68	Imported Fill (MDOT 703.20)	0.02	35	1161.89	1609.28	2298.26	0	2298.26
4	1.7821	4445.3	Imported Fill (MDOT 703.20)	0.02	35	1373.22	1901.98	2716.27	0	2716.27
5	1.7821	2743.14	Imported Fill (MDOT 703.20)	0.02	35	1160.35	1607.14	2295.21	0	2295.21
6	1.7821	2903.64	Imported Fill (MDOT 703.20)	0.02	35	1048.64	1452.42	2074.25	0	2074.25
7	1.92757	3315.62	Proofrolled Nearshore	0.02	32	576.499	798.48	1277.8	0	1277.8

<i>Project</i>		Munjoy Heights #13067.2	
<i>Analysis Description</i>		SECTION 2 - STATIC	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoen지니어링 Services	
<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim



8	1.92757	3442.08	Proofrolled Nearshore	0.02	32	623.435	863.489	1381.84	0	1381.84
9	1.92757	3518.03	Proofrolled Nearshore	0.02	32	660.863	915.328	1464.8	0	1464.8
10	1.92757	3709.58	Proofrolled Nearshore	0.02	32	1594.58	2208.57	3534.42	0	3534.42
11	1.92757	4061.6	Proofrolled Nearshore	0.02	32	1586.66	2197.6	3516.87	0	3516.87
12	1.92757	3204.21	Proofrolled Nearshore	0.02	32	1827.36	2530.98	4050.38	0	4050.38
13	1.92757	3328.62	Proofrolled Nearshore	0.02	32	1359.16	1882.5	3012.61	0	3012.61
14	1.92757	2928.75	Proofrolled Nearshore	0.02	32	1483.78	2055.11	3288.83	0	3288.83
15	1.92757	2453.45	Proofrolled Nearshore	0.02	32	1020.1	1412.89	2261.06	0	2261.06
16	1.92757	2381.16	Proofrolled Nearshore	0.02	32	551.494	763.847	1222.38	0	1222.38
17	1.92757	2278.2	Proofrolled Nearshore	0.02	32	543.442	752.694	1204.53	0	1204.53
18	1.92757	2143.73	Proofrolled Nearshore	0.02	32	527.276	730.304	1168.7	0	1168.7
19	1.92757	1977.28	Proofrolled Nearshore	0.02	32	502.298	695.708	1113.33	0	1113.33
20	1.92757	1777.95	Proofrolled Nearshore	0.02	32	467.546	647.574	1036.3	0	1036.3
21	1.92757	1544.33	Proofrolled Nearshore	0.02	32	421.686	584.056	934.654	0	934.654
22	1.92757	1274.39	Proofrolled Nearshore	0.02	32	362.829	502.536	804.195	0	804.195
23	1.92757	965.345	Proofrolled Nearshore	0.02	32	288.205	399.179	638.787	0	638.787
24	1.92757	613.338	Proofrolled Nearshore	0.02	32	193.56	268.09	429.001	0	429.001
25	1.92757	213.019	Proofrolled Nearshore	0.02	32	71.9033	99.5896	159.345	0	159.345

Query 1 (janbu simplified) - Safety Factor: 1.86171

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.0986396	0.70899	Imported Fill (MDOT 703.20)	0.02	35	1.89304	3.52429	5.00464	0	5.00464
2	4.41517	1396.02	Proofrolled Nearshore	0.02	32	77.8311	144.899	231.856	0	231.856
3	4.41517	3909.02	Proofrolled Nearshore	0.02	32	224.566	418.077	669.03	0	669.03
4	4.41517	6140.23	Proofrolled Nearshore	0.02	32	362.086	674.099	1078.75	0	1078.75
5	0.240991	395.337	Foundation	10000	45	4351.93	8102.03	-1897.97	0	-1897.97
6	3.80061	6513.32	Imported Fill (MDOT 703.20)	0.02	35	1647.5	3067.17	4380.36	0	4380.36
7	4.55313	5181.62	Proofrolled Nearshore	0.02	32	489.376	911.077	1458	0	1458
8	4.55313	6963.35	Proofrolled Nearshore	0.02	32	424.079	789.513	1263.45	0	1263.45
9	4.55313	8566.82	Proofrolled Nearshore	0.02	32	531.53	989.554	1583.59	0	1583.59
10	4.55313	9997.81	Proofrolled Nearshore	0.02	32	631.237	1175.18	1880.65	0	1880.65
11	4.55313	11269.1	Proofrolled Nearshore	0.02	32	723.362	1346.69	2155.12	0	2155.12
12	4.55313	12390.9	Proofrolled Nearshore	0.02	32	808.037	1504.33	2407.4	0	2407.4
13	4.55313	13371.7	Proofrolled Nearshore	0.02	32	885.363	1648.29	2637.77	0	2637.77
14	4.55313	14250.5	Proofrolled Nearshore	0.02	32	1309.23	2437.41	3900.64	0	3900.64
15	4.55313	10943.3	Proofrolled Nearshore	0.02	32	1302.75	2425.35	3881.33	0	3881.33
16	4.55313	8950	Proofrolled Nearshore	0.02	32	618.84	1152.1	1843.72	0	1843.72
17	4.55313	8772.49	Proofrolled Nearshore	0.02	32	1116.61	2078.8	3326.75	0	3326.75
18	4.55313	7236.1	Proofrolled Nearshore	0.02	32	1233.07	2295.61	3673.71	0	3673.71

<i>Project</i>		Munjoy Heights #13067.2	
<i>Analysis Description</i>		SECTION 2 - STATIC	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoenvironmental Services
<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim




19	4.55313	5188.61	Proofrolled Nearshore	0.02	32	788.055	1467.13	2347.86	0	2347.86
20	4.55313	4383.73	Proofrolled Nearshore	0.02	32	320.52	596.715	954.913	0	954.913
21	4.55313	3843.17	Proofrolled Nearshore	0.02	32	285.001	530.59	849.088	0	849.088
22	4.55313	3188.51	Proofrolled Nearshore	0.02	32	239.881	446.588	714.659	0	714.659
23	4.55313	2419.2	Proofrolled Nearshore	0.02	32	184.702	343.862	550.262	0	550.262
24	4.55313	1534.03	Proofrolled Nearshore	0.02	32	118.91	221.376	354.244	0	354.244
25	4.55313	531.147	Proofrolled Nearshore	0.02	32	41.8286	77.8727	124.59	0	124.59

## Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.54568

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	59.7128	102.5	0	0	0
2	59.8155	102.1	-3048.73	0	0
3	62.2718	95.2955	-1779.7	0	0
4	64.7281	90.8029	508.299	0	0
5	67.1845	87.3402	6420.31	0	0
6	69.6408	84.5192	10324.8	0	0
7	72.0972	82.1592	12352.6	0	0
8	74.5535	80.1584	13237.7	0	0
9	77.0099	78.4529	13898.1	0	0
10	79.4662	77	14872.5	0	0
11	81.8192	75.817	15593.3	0	0
12	84.1723	74.8188	15753.8	0	0
13	86.5253	73.9907	15382.8	0	0
14	88.8784	73.3221	14772.3	0	0
15	91.2314	72.8047	14304.9	0	0
16	93.5845	72.4328	13668.3	0	0
17	95.9375	72.2021	12873.6	0	0
18	98.2906	72.1104	11938.3	0	0
19	100.644	72.1566	10886.5	0	0
20	102.997	72.3413	9749.87	0	0
21	105.35	72.6664	8569.1	0	0
22	107.703	73.1353	7395.8	0	0
23	110.056	73.7533	6295.5	0	0
24	112.409	74.5278	5352.12	0	0
25	114.762	75.4685	4674.7	0	0
26	117.115	76.5888	0	0	0


Query 1 (bishop simplified) - Safety Factor: 1.97182

	Project			Munjoy Heights #13067.2		
	Analysis Description			SECTION 2 - STATIC		
	Drawn By		Scale	Company		
				Summit Geoengineering Services		
Date			1/7/2014, 11:50:15 AM		File Name	Section 2 - Static.slm

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	13.1059	111.548	0	0	0
2	13.2045	111.434	0.400984	0	0
3	17.6197	106.64	799.338	0	0
4	22.0349	102.379	2741.34	0	0
5	26.45	98.5669	5377.49	0	0
6	26.691	98.3706	4025.68	0	0
7	30.4916	95.4216	11124	0	0
8	35.0448	92.2276	13705.9	0	0
9	39.5979	89.3669	15516	0	0
10	44.151	86.8096	17298.2	0	0
11	48.7041	84.5317	18883.3	0	0
12	53.2573	82.5141	20133.5	0	0
13	57.8104	80.7411	20936.2	0	0
14	62.3635	79.2002	21199.7	0	0
15	66.9167	77.8809	20719.9	0	0
16	71.4698	76.775	19411.3	0	0
17	76.0229	75.8759	18407.8	0	0
18	80.576	75.1782	15926.2	0	0
19	85.1292	74.678	12460.7	0	0
20	89.6823	74.3727	9789.65	0	0
21	94.2354	74.2605	8519.57	0	0
22	98.7886	74.3408	7227.67	0	0
23	103.342	74.6141	6003.43	0	0
24	107.895	75.0818	4954.78	0	0
25	112.448	75.7465	4210.66	0	0
26	117.001	76.612	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.38505


Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	60.8471	102.326	0	0	0
2	62.6292	92.1929	1639.59	0	0
3	64.4113	88.2191	3956.37	0	0
4	66.1934	85.3266	8529.84	0	0
5	67.9755	83.023	12335.3	0	0
6	69.7576	81.1157	14641.5	0	0
7	71.5397	79.505	16110.4	0	0
8	73.4672	78.0288	16883.5	0	0
9	75.3948	76.7823	17402.2	0	0

	Project				
	Munjoy Heights #13067.2				
	Analysis Description				
	SECTION 2 - STATIC				
Drawn By			Scale	Company	
				Summit Geoengineering Services	
Date			1/7/2014, 11:50:15 AM		File Name
					Section 2 - Static.slim

10	77.3224	75.7331	17662.8	0	0
11	79.2499	74.8588	17673.9	0	0
12	81.1775	74.143	17127.5	0	0
13	83.1051	73.5739	15904.2	0	0
14	85.0326	73.1429	14578.2	0	0
15	86.9602	72.8438	12696.5	0	0
16	88.8878	72.6729	11113.3	0	0
17	90.8153	72.6277	10103.6	0	0
18	92.7429	72.7078	8957.7	0	0
19	94.6705	72.9142	7698.35	0	0
20	96.598	73.2496	6355.08	0	0
21	98.5256	73.7184	4966.4	0	0
22	100.453	74.3274	3582.9	0	0
23	102.381	75.0861	2272.18	0	0
24	104.308	76.0073	1127.22	0	0
25	106.236	77.1088	280.903	0	0
26	108.163	78.4156	0	0	0

**Query 1 (janbu simplified) - Safety Factor: 1.86171**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	13.1059	111.548	0	0	0
2	13.2045	111.434	0.384084	0	0
3	17.6197	106.64	768.874	0	0
4	22.0349	102.379	2630.71	0	0
5	26.45	98.5669	5147.11	0	0
6	26.691	98.3706	3727.81	0	0
7	30.4916	95.4216	10396.3	0	0
8	35.0448	92.2276	12829.5	0	0
9	39.5979	89.3669	14516.8	0	0
10	44.151	86.8096	16151.3	0	0
11	48.7041	84.5317	17567	0	0
12	53.2573	82.5141	18628.3	0	0
13	57.8104	80.7411	19224.9	0	0
14	62.3635	79.2002	19266.6	0	0
15	66.9167	77.8809	18463.5	0	0
16	71.4698	76.775	16836.1	0	0
17	76.0229	75.8759	15682	0	0
18	80.576	75.1782	12929.2	0	0
19	85.1292	74.678	9163.67	0	0
20	89.6823	74.3727	6299.73	0	0
21	94.2354	74.2605	4950.47	0	0

	<i>Project</i> Munjoy Heights #13067.2					
	<i>Analysis Description</i> SECTION 2 - STATIC					
	<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services		
	<i>Date</i> 1/7/2014, 11:50:15 AM			<i>File Name</i> Section 2 - Static.slim		

22	98.7886	74.3408	3587.24	0	0
23	103.342	74.6141	2301.94	0	0
24	107.895	75.0818	1205.29	0	0
25	112.448	75.7465	429.488	0	0
26	117.001	76.612	0	0	0

**List Of Coordinates**

**Water Table**

X	Y
0	90
120	64

**Line Load**


X	Y
28	100
28	99
29	99
29	97
30	97
30	99
31	99
31	100

**Line Load**

X	Y
65.3	91
65.3	90
70	90
70	91

**Line Load**

X	Y
78	79
78	78
83	78
83	79

	<i>Project</i> Munjoy Heights #13067.2		
	<i>Analysis Description</i> SECTION 2 - STATIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 11:50:15 AM		<i>File Name</i> Section 2 - Static.slim

## Line Load

X	Y
83.5	78
87	78
87	79

## External Boundary

X	Y
0	90
0	40
120	40
120	64
120	76
91.4016	81.8364
85.7	83
85.7	86.5
85	86.5
81	86.5
81	90
80	90
77	90
68	94
68	102.5
29.7	102.5
29.7	112.5
29	112.5
29	111
0	112

## Material Boundary

X	Y
29	111
29	100
28	100
28	99
29	99
29	97
30	97
30	99
31	99

<i>Project</i>		Munjoy Heights #13067.2	
<i>Analysis Description</i>		SECTION 2 - STATIC	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim



31	100
29.7	100
29.7	102.1
29.7	102.5

**Material Boundary**


X	Y
29.7	102.1
67.3	102.1
67.3	91
65.3	91
65.3	90
70	90
70	91
68	91
68	94

**Material Boundary**

X	Y
80	90
80	79
78	79
78	78
83	78
83	79
81	79
81	86.5

**Material Boundary**

X	Y
85	86.5
85	79
83.5	79
83.5	78
87	78
87	79
85.7	79
85.7	83

	<i>Project</i>			Munjoy Heights #13067.2
	<i>Analysis Description</i>			SECTION 2 - STATIC
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 11:50:15 AM		<i>File Name</i> Section 2 - Static.slim	



### Material Boundary


X	Y
14	111.4
27	98
29	96

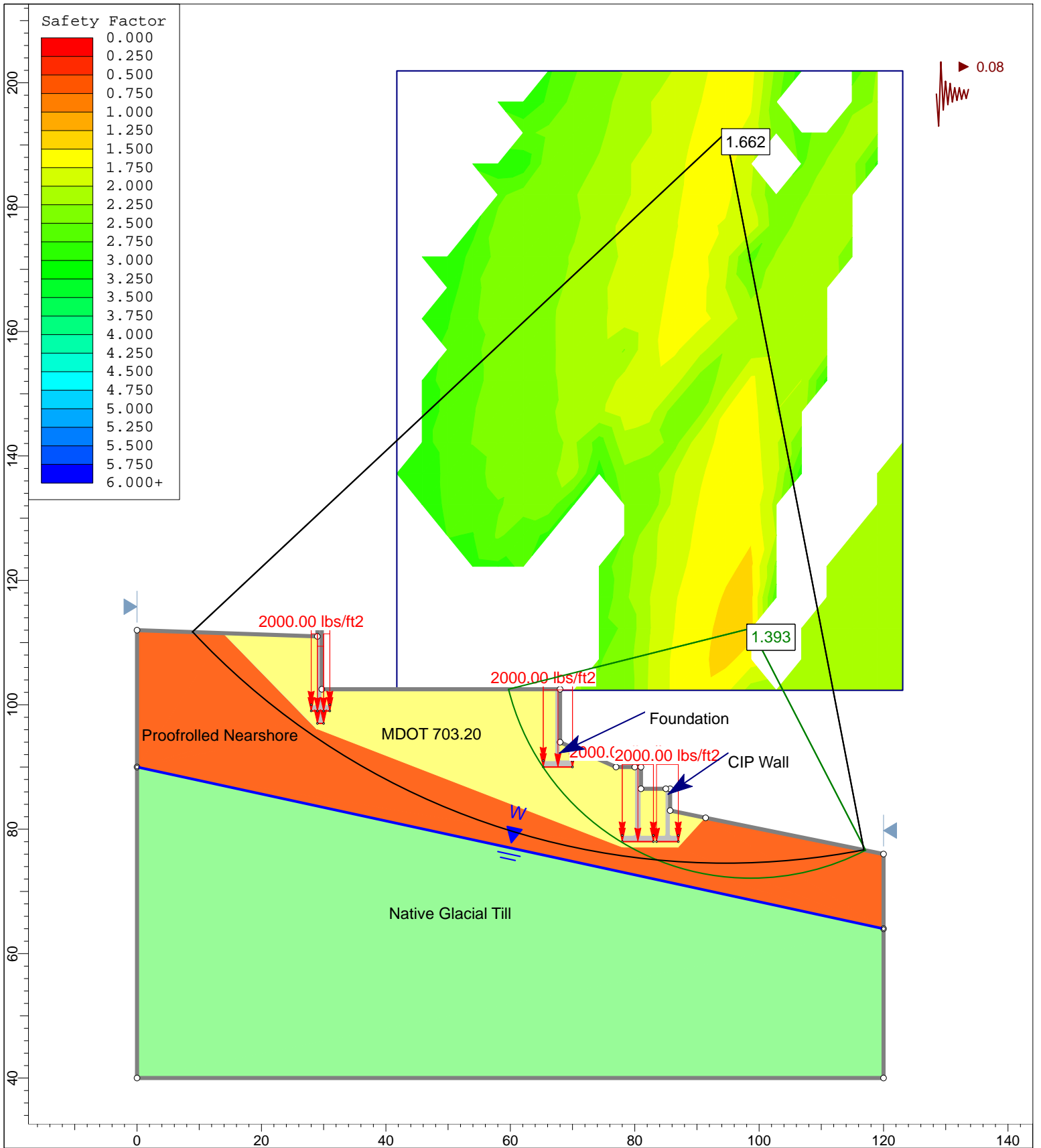
### Material Boundary


X	Y
0	112
14	111.4
29	96
78	77
87	77
91.4016	81.8364

### Material Boundary

X	Y
0	90
120	64

	<i>Project</i> Munjoy Heights #13067.2		
	<i>Analysis Description</i> SECTION 2 - STATIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 11:50:15 AM		<i>File Name</i> Section 2 - Static.slim



	Project			Munjoy Heights #13067.2		
	Analysis Description			SECTION 2 - SEISMIC		
	Drawn By	Scale	Company	Summit Geoengineering Services		
	Date	1/7/2014, 11:50:15 AM		File Name	Section 2 - Static.slim	

# Slide Analysis Information

## Munjoy Heights #13067.2

### Project Summary

File Name: Section 2 - Static  
 Slide Modeler Version: 6.025  
 Project Title: Munjoy Heights #13067.2  
 Analysis: SECTION 2 - SEISMIC  
 Company: Summit Geoengineering Services  
 Date Created: 1/7/2014, 11:50:15 AM

### General Settings

Units of Measurement: Imperial Units  
 Time Units: days  
 Permeability Units: feet/second  
 Failure Direction: Left to Right  
 Data Output: Maximum  
 Maximum Material Properties: 20  
 Maximum Support Properties: 20

### Analysis Options


#### Analysis Methods Used

Bishop simplified  
 Janbu simplified

Number of slices: 25  
 Tolerance: 0.005  
 Maximum number of iterations: 50  
 Check  $m\alpha < 0.2$ : Yes  
 Discard data for surfaces with FS below: 0.5  
 Discard data for surfaces with FS above: 3  
 Initial trial value of FS: 1  
 Steffensen Iteration: Yes

### Groundwater Analysis

Groundwater Method: Water Surfaces  
 Pore Fluid Unit Weight: 62.4 lbs/ft<sup>3</sup>

	<i>Project</i>			Munjoy Heights #13067.2
	<i>Analysis Description</i>			SECTION 2 - SEISMIC
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim

Advanced Groundwater Method: None

## Random Numbers

Pseudo-random Seed: 10116  
Random Number Generation Method: Park and Miller v.3

## 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): 0.08  
4 Distributed Loads present

### Distributed Load 1

Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

### Distributed Load 2


Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

### Distributed Load 3





Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

### Distributed Load 4

Distribution: Constant  
Magnitude [psf]: 2000  
Orientation: Vertical

	<i>Project</i> Munjoy Heights #13067.2		
	<i>Analysis Description</i> SECTION 2 - SEISMIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 11:50:15 AM	<i>File Name</i> Section 2 - Static.slim	

## Material Properties

Property	Foundation	Proofrolled Nearshore	Imported Fill (MDOT 703.20)	Glacial Till
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft <sup>3</sup> ]	150	130	130	140
Cohesion [psf]	10000	0.02	0.02	2000
Friction Angle [deg]	45	32	35	35
Water Surface	None	None	None	Water Table
Hu Value				1
Ru Value	0	0	0	

## Global Minimums

### Method: bishop simplified

FS: 1.392810  
 Center: 98.678, 112.283  
 Radius: 40.175  
 Left Slip Surface Endpoint: 59.713, 102.500  
 Right Slip Surface Endpoint: 117.115, 76.589  
 Resisting Moment=2.57853e+006 lb-ft  
 Driving Moment=1.85132e+006 lb-ft  
 Total Slice Area=476.881 ft<sup>2</sup>


### Method: janbu simplified

FS: 1.245840  
 Center: 90.547, 102.326  
 Radius: 29.699  
 Left Slip Surface Endpoint: 60.847, 102.326  
 Right Slip Surface Endpoint: 108.163, 78.416  
 Left Slope Intercept: 60.847 102.500  
 Right Slope Intercept: 108.163 78.416  
 Resisting Horizontal Force=51236.2 lb  
 Driving Horizontal Force=41126 lb  
 Total Slice Area=478.366 ft<sup>2</sup>

## Valid / Invalid Surfaces

### Method: bishop simplified

Number of Valid Surfaces: 1198

	Project			Munjoy Heights #13067.2
	Analysis Description			SECTION 2 - SEISMIC
	Drawn By	Scale	Company	Summit Geoengineering Services
	Date	1/7/2014, 11:50:15 AM	File Name	Section 2 - Static.slim

Number of Invalid Surfaces: 3653

**Error Codes:**

- Error Code -97 reported for 3539 surfaces
- Error Code -106 reported for 41 surfaces
- Error Code -108 reported for 1 surface
- Error Code -109 reported for 1 surface
- Error Code -112 reported for 70 surfaces
- Error Code -113 reported for 1 surface

**Method: Janbu Simplified**

Number of Valid Surfaces: 1451  
Number of Invalid Surfaces: 3400

**Error Codes:**

- Error Code -97 reported for 3286 surfaces
- Error Code -106 reported for 41 surfaces
- Error Code -108 reported for 1 surface
- Error Code -109 reported for 1 surface
- Error Code -112 reported for 70 surfaces
- Error Code -113 reported for 1 surface

**Error Codes**


The following errors were encountered during the computation:

- 97 = Factor of safety is out of valid range set by user.
- 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.
- 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).
- 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.
- 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.
- 113 = Surface intersects outside slope limits.

**Slice Data**

Global Minimum Query (bishop simplified) - Safety Factor: 1.39281


Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
--------------	------------	--------------	---------------	---------------------	-------------------------------	--------------------	----------------------	--------------------------	---------------------	-------------------------------

	<i>Project</i> Munjoy Heights #13067.2									
	<i>Analysis Description</i> SECTION 2 - SEISMIC									
	<i>Drawn By</i>					<i>Scale</i>		<i>Company</i> Summit Geoengineering Services		
	<i>Date</i> 1/7/2014, 11:50:15 AM						<i>File Name</i> Section 2 - Static.slim			

1	0.102619	3.07857	Foundation	10000	45	1896.9	2642.02	-7357.97	0	-7357.97
2	2.45634	1233.81	Imported Fill (MDOT 703.20)	0.02	35	105.594	147.073	210.014	0	210.014
3	2.45634	3037.52	Imported Fill (MDOT 703.20)	0.02	35	324.013	451.289	644.479	0	644.479
4	2.45634	4345.37	Imported Fill (MDOT 703.20)	0.02	35	1211.9	1687.94	2410.61	0	2410.61
5	2.45634	3611.45	Imported Fill (MDOT 703.20)	0.02	35	1106.37	1540.96	2200.69	0	2200.69
6	2.45634	3004.26	Imported Fill (MDOT 703.20)	0.02	35	789.971	1100.28	1571.33	0	1571.33
7	2.45634	3344.73	Imported Fill (MDOT 703.20)	0.02	35	485.793	676.618	966.282	0	966.282
8	2.45634	3587.88	Imported Fill (MDOT 703.20)	0.02	35	544.448	758.312	1082.95	0	1082.95
9	2.45634	3948.57	Imported Fill (MDOT 703.20)	0.02	35	1401.3	1951.74	2787.34	0	2787.34
10	2.35304	4051.88	Proofrolled Nearshore	0.02	32	1362.73	1898.02	3037.44	0	3037.44
11	2.35304	3457.62	Proofrolled Nearshore	0.02	32	1468.01	2044.66	3272.11	0	3272.11
12	2.35304	3467.38	Proofrolled Nearshore	0.02	32	1346.06	1874.8	3000.28	0	3000.28
13	2.35304	2742.68	Proofrolled Nearshore	0.02	32	962.644	1340.78	2145.67	0	2145.67
14	2.35304	2767.69	Proofrolled Nearshore	0.02	32	480.366	669.058	1070.69	0	1070.69
15	2.35304	2756.82	Proofrolled Nearshore	0.02	32	490.854	683.667	1094.06	0	1094.06
16	2.35304	2702.09	Proofrolled Nearshore	0.02	32	493.52	687.38	1100.01	0	1100.01
17	2.35304	2604.5	Proofrolled Nearshore	0.02	32	488.069	679.787	1087.85	0	1087.85
18	2.35304	2464.56	Proofrolled Nearshore	0.02	32	474.092	660.32	1056.7	0	1056.7
19	2.35304	2282.35	Proofrolled Nearshore	0.02	32	451.043	628.217	1005.33	0	1005.33
20	2.35304	2057.5	Proofrolled Nearshore	0.02	32	418.2	582.473	932.117	0	932.117
21	2.35304	1789.17	Proofrolled Nearshore	0.02	32	374.607	521.756	834.952	0	834.952
22	2.35304	1476.03	Proofrolled Nearshore	0.02	32	318.998	444.303	711	0	711
23	2.35304	1116.15	Proofrolled Nearshore	0.02	32	249.659	347.728	556.45	0	556.45
24	2.35304	706.912	Proofrolled Nearshore	0.02	32	164.231	228.743	366.034	0	366.034
25	2.35304	244.787	Proofrolled Nearshore	0.02	32	59.3532	82.6678	132.264	0	132.264

**Query 1 (bishop simplified) - Safety Factor: 1.66205**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.0727103	0.354884	Imported Fill (MDOT 703.20)	0.02	35	1.42699	2.37173	3.35862	0	3.35862
2	4.49476	1324.55	Proofrolled Nearshore	0.02	32	80.3249	133.504	213.619	0	213.619
3	4.49476	3752.87	Proofrolled Nearshore	0.02	32	234.061	389.021	622.531	0	622.531
4	4.49476	5932.52	Proofrolled Nearshore	0.02	32	379.387	630.56	1009.07	0	1009.07
5	4.49476	7893.54	Proofrolled Nearshore	0.02	32	516.388	858.262	1373.48	0	1373.48

	<i>Project</i>		Munjoy Heights #13067.2	
	<i>Analysis Description</i>		SECTION 2 - SEISMIC	
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 11:50:15 AM		<i>File Name</i> Section 2 - Static.slim	

6	4.49476	8170.9	Proofrolled Nearshore	0.02	32	1748.15	2905.52	4649.78	0	4649.78
7	4.49476	6405.88	Proofrolled Nearshore	0.02	32	436.286	725.129	1160.42	0	1160.42
8	4.49476	7923.07	Proofrolled Nearshore	0.02	32	549.532	913.349	1461.63	0	1461.63
9	4.49476	9290.74	Proofrolled Nearshore	0.02	32	655.6	1089.64	1743.76	0	1743.76
10	4.49476	10518.7	Proofrolled Nearshore	0.02	32	754.574	1254.14	2007.01	0	2007.01
11	4.49476	11615	Proofrolled Nearshore	0.02	32	846.509	1406.94	2251.55	0	2251.55
12	4.49476	12586.4	Proofrolled Nearshore	0.02	32	931.458	1548.13	2477.51	0	2477.51
13	4.49476	13438.4	Proofrolled Nearshore	0.02	32	1009.45	1677.75	2684.93	0	2684.93
14	4.49476	14239.5	Proofrolled Nearshore	0.02	32	1557.64	2588.88	4143.04	0	4143.04
15	4.49476	10216.6	Proofrolled Nearshore	0.02	32	1346.93	2238.67	3582.58	0	3582.58
16	4.49476	8722.94	Proofrolled Nearshore	0.02	32	684.113	1137.03	1819.6	0	1819.6
17	4.49476	8655.94	Proofrolled Nearshore	0.02	32	1306.13	2170.86	3474.08	0	3474.08
18	4.49476	6873.35	Proofrolled Nearshore	0.02	32	1360.27	2260.83	3618.05	0	3618.05
19	4.49476	4816.59	Proofrolled Nearshore	0.02	32	823.182	1368.17	2189.5	0	2189.5
20	4.49476	4160.53	Proofrolled Nearshore	0.02	32	345.263	573.845	918.312	0	918.312
21	4.49476	3630.04	Proofrolled Nearshore	0.02	32	305.604	507.929	812.824	0	812.824
22	4.49476	2998.86	Proofrolled Nearshore	0.02	32	256.187	425.796	681.383	0	681.383
23	4.49476	2266.6	Proofrolled Nearshore	0.02	32	196.547	326.671	522.75	0	522.75
24	4.49476	1432.36	Proofrolled Nearshore	0.02	32	126.129	209.633	335.45	0	335.45
25	4.49476	494.808	Proofrolled Nearshore	0.02	32	44.2738	73.5852	117.729	0	117.729

**Global Minimum Query (janbu simplified) - Safety Factor: 1.24584**

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.7821	1228.25	Imported Fill (MDOT 703.20)	0.02	35	92.4998	115.24	164.552	0	164.552
2	1.7821	2862.44	Imported Fill (MDOT 703.20)	0.02	35	401.194	499.824	713.795	0	713.795
3	1.7821	3675.68	Imported Fill (MDOT 703.20)	0.02	35	1232.21	1535.14	2192.37	0	2192.37
4	1.7821	4445.3	Imported Fill (MDOT 703.20)	0.02	35	1464.63	1824.69	2605.9	0	2605.9
5	1.7821	2743.14	Imported Fill (MDOT 703.20)	0.02	35	1243.22	1548.85	2211.96	0	2211.96
6	1.7821	2903.64	Imported Fill (MDOT 703.20)	0.02	35	1127.9	1405.18	2006.78	0	2006.78
7	1.92757	3315.62	Proofrolled Nearshore	0.02	32	623.746	777.088	1243.57	0	1243.57
8	1.92757	3442.08	Proofrolled Nearshore	0.02	32	676.713	843.076	1349.17	0	1349.17
9	1.92757	3518.03	Proofrolled Nearshore	0.02	32	719.501	896.383	1434.48	0	1434.48
10	1.92757	3709.58	Proofrolled Nearshore	0.02	32	1741.04	2169.06	3471.2	0	3471.2
11	1.92757	4061.6	Proofrolled Nearshore	0.02	32	1737.22	2164.3	3463.58	0	3463.58
12	1.92757	3204.21	Proofrolled Nearshore	0.02	32	2006.25	2499.47	3999.96	0	3999.96

<i>Project</i>	Munjoy Heights #13067.2		
<i>Analysis Description</i>	SECTION 2 - SEISMIC		
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoenengineering Services	
<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim





13	1.92757	3328.62	Proofrolled Nearshore	0.02	32	1496.33	1864.19	2983.29	0	2983.29
14	1.92757	2928.75	Proofrolled Nearshore	0.02	32	1638.08	2040.79	3265.92	0	3265.92
15	1.92757	2453.45	Proofrolled Nearshore	0.02	32	1129.42	1407.08	2251.77	0	2251.77
16	1.92757	2381.16	Proofrolled Nearshore	0.02	32	612.431	762.991	1221.01	0	1221.01
17	1.92757	2278.2	Proofrolled Nearshore	0.02	32	605.406	754.239	1207	0	1207
18	1.92757	2143.73	Proofrolled Nearshore	0.02	32	589.402	734.301	1175.1	0	1175.1
19	1.92757	1977.28	Proofrolled Nearshore	0.02	32	563.573	702.122	1123.6	0	1123.6
20	1.92757	1777.95	Proofrolled Nearshore	0.02	32	526.754	656.251	1050.19	0	1050.19
21	1.92757	1544.33	Proofrolled Nearshore	0.02	32	477.317	594.661	951.627	0	951.627
22	1.92757	1274.39	Proofrolled Nearshore	0.02	32	412.936	514.452	823.263	0	823.263
23	1.92757	965.345	Proofrolled Nearshore	0.02	32	330.147	411.31	658.203	0	658.203
24	1.92757	613.338	Proofrolled Nearshore	0.02	32	223.52	278.47	445.614	0	445.614
25	1.92757	213.019	Proofrolled Nearshore	0.02	32	83.9056	104.533	167.256	0	167.256

Query 1 (janbu simplified) - Safety Factor: 1.56655

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	0.0727103	0.354884	Imported Fill (MDOT 703.20)	0.02	35	1.48575	2.3275	3.29546	0	3.29546
2	4.49476	1324.55	Proofrolled Nearshore	0.02	32	83.809	131.291	210.078	0	210.078
3	4.49476	3752.87	Proofrolled Nearshore	0.02	32	244.518	383.049	612.974	0	612.974
4	4.49476	5932.52	Proofrolled Nearshore	0.02	32	396.789	621.59	994.721	0	994.721
5	4.49476	7893.54	Proofrolled Nearshore	0.02	32	540.648	846.952	1355.37	0	1355.37
6	4.49476	8170.9	Proofrolled Nearshore	0.02	32	1832.11	2870.09	4593.08	0	4593.08
7	4.49476	6405.88	Proofrolled Nearshore	0.02	32	457.672	716.966	1147.35	0	1147.35
8	4.49476	7923.07	Proofrolled Nearshore	0.02	32	576.991	903.886	1446.49	0	1446.49
9	4.49476	9290.74	Proofrolled Nearshore	0.02	32	688.966	1079.3	1727.2	0	1727.2
10	4.49476	10518.7	Proofrolled Nearshore	0.02	32	793.648	1243.29	1989.64	0	1989.64
11	4.49476	11615	Proofrolled Nearshore	0.02	32	891.086	1395.93	2233.93	0	2233.93
12	4.49476	12586.4	Proofrolled Nearshore	0.02	32	981.309	1537.27	2460.12	0	2460.12
13	4.49476	13438.4	Proofrolled Nearshore	0.02	32	1064.33	1667.33	2668.26	0	2668.26
14	4.49476	14239.5	Proofrolled Nearshore	0.02	32	1643.66	2574.87	4120.62	0	4120.62
15	4.49476	10216.6	Proofrolled Nearshore	0.02	32	1422.45	2228.34	3566.06	0	3566.06
16	4.49476	8722.94	Proofrolled Nearshore	0.02	32	723.054	1132.7	1812.66	0	1812.66
17	4.49476	8655.94	Proofrolled Nearshore	0.02	32	1381.6	2164.35	3463.66	0	3463.66
18	4.49476	6873.35	Proofrolled Nearshore	0.02	32	1440.05	2255.91	3610.17	0	3610.17
19	4.49476	4816.59	Proofrolled Nearshore	0.02	32	872.197	1366.34	2186.57	0	2186.57
20	4.49476	4160.53	Proofrolled Nearshore	0.02	32	366.134	573.567	917.867	0	917.867
21	4.49476	3630.04	Proofrolled Nearshore	0.02	32	324.362	508.13	813.147	0	813.147
22	4.49476	2998.86	Proofrolled Nearshore	0.02	32	272.16	426.352	682.273	0	682.273
23	4.49476	2266.6	Proofrolled Nearshore	0.02	32	208.998	327.406	523.926	0	523.926

<i>Project</i>		Munjoy Heights #13067.2	
<i>Analysis Description</i>		SECTION 2 - SEISMIC	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoen지니어링 Services
<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim



24	4.49476	1432.36	Proofrolled Nearshore	0.02	32	134.252	210.312	336.538	0	336.538
25	4.49476	494.808	Proofrolled Nearshore	0.02	32	47.1735	73.8996	118.232	0	118.232


### Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.39281

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	59.7128	102.5	0	0	0
2	59.8155	102.1	-3137.45	0	0
3	62.2718	95.2955	-1868.86	0	0
4	64.7281	90.8029	474.233	0	0
5	67.1845	87.3402	6194.71	0	0
6	69.6408	84.5192	9976.27	0	0
7	72.0972	82.1592	11986.1	0	0
8	74.5535	80.1584	12994.8	0	0
9	77.0099	78.4529	13792.5	0	0
10	79.4662	77	14718.8	0	0
11	81.8192	75.817	15432.2	0	0
12	84.1723	74.8188	15523.7	0	0
13	86.5253	73.9907	15120.6	0	0
14	88.8784	73.3221	14511.4	0	0
15	91.2314	72.8047	14157.4	0	0
16	93.5845	72.4328	13630.8	0	0
17	95.9375	72.2021	12940.3	0	0
18	98.2906	72.1104	12101	0	0
19	100.644	72.1566	11134.6	0	0
20	102.997	72.3413	10071.1	0	0
21	105.35	72.6664	8949.44	0	0
22	107.703	73.1353	7820.3	0	0
23	110.056	73.7533	6748.96	0	0
24	112.409	74.5278	5820.31	0	0
25	114.762	75.4685	5146.38	0	0
26	117.115	76.5888	0	0	0

Query 1 (bishop simplified) - Safety Factor: 1.66205

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	8.89381	111.693	0	0	0
2	8.96652	111.616	0.185299	0	0

	Project				
	Munjoy Heights #13067.2				
	Analysis Description				
	SECTION 2 - SEISMIC				
Drawn By			Scale	Company	
				Summit Geoengineering Services	
Date			1/7/2014, 11:50:15 AM		File Name
					Section 2 - Static.slim

3	13.4613	107.077	714.783	0	0
4	17.956	102.996	2503.97	0	0
5	22.4508	99.3124	4991.44	0	0
6	26.9455	95.9798	7880.18	0	0
7	31.4403	92.9631	14707.3	0	0
8	35.9351	90.234	16426.5	0	0
9	40.4298	87.7701	18192.9	0	0
10	44.9246	85.5528	19857.2	0	0
11	49.4193	83.567	21294	0	0
12	53.9141	81.8003	22398	0	0
13	58.4089	80.2422	23080.5	0	0
14	62.9036	78.884	23266.9	0	0
15	67.3984	77.7188	22235.9	0	0
16	71.8931	76.7405	20506.7	0	0
17	76.3879	75.9445	19579.4	0	0
18	80.8826	75.327	16548.9	0	0
19	85.3774	74.8853	12585.8	0	0
20	89.8722	74.6173	9859.65	0	0
21	94.3669	74.5218	8729.01	0	0
22	98.8617	74.5985	7584.13	0	0
23	103.356	74.8476	6503.33	0	0
24	107.851	75.2703	5580.69	0	0
25	112.346	75.8684	4927.98	0	0
26	116.841	76.6448	0	0	0

**Global Minimum Query (janbu simplified) - Safety Factor: 1.24584**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	60.8471	102.326	0	0	0
2	62.6292	92.1929	1601.23	0	0
3	64.4113	88.2191	3953.55	0	0
4	66.1934	85.3266	8398.52	0	0
5	67.9755	83.023	12153.2	0	0
6	69.7576	81.1157	14381.5	0	0
7	71.5397	79.505	15841	0	0
8	73.4672	78.0288	16742.7	0	0
9	75.3948	76.7823	17398.6	0	0
10	77.3224	75.7331	17801.5	0	0
11	79.2499	74.8588	17785.4	0	0
12	81.1775	74.143	17249.2	0	0
13	83.1051	73.5739	15924.3	0	0
14	85.0326	73.1429	14599.3	0	0


<i>Project</i>		Munjoy Heights #13067.2	
<i>Analysis Description</i>		SECTION 2 - SEISMIC	
<i>Drawn By</i>	<i>Scale</i>	<i>Company</i>	Summit Geoengineering Services
<i>Date</i>	1/7/2014, 11:50:15 AM	<i>File Name</i>	Section 2 - Static.slim



15	86.9602	72.8438	12660.4	0	0
16	88.8878	72.6729	11070	0	0
17	90.8153	72.6277	10138	0	0
18	92.7429	72.7078	9059.47	0	0
19	94.6705	72.9142	7855.13	0	0
20	96.598	73.2496	6552.86	0	0
21	98.5256	73.7184	5189.86	0	0
22	100.453	74.3274	3816.02	0	0
23	102.381	75.0861	2499.39	0	0
24	104.308	76.0073	1335.47	0	0
25	106.236	77.1088	463.885	0	0
26	108.163	78.4156	0	0	0

**Query 1 (janbu simplified) - Safety Factor: 1.56655**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	8.89381	111.693	0	0	0
2	8.96652	111.616	0.176094	0	0
3	13.4613	107.077	682.932	0	0
4	17.956	102.996	2385.8	0	0
5	22.4508	99.3124	4741.67	0	0
6	26.9455	95.9798	7460.36	0	0
7	31.4403	92.9631	13736.7	0	0
8	35.9351	90.234	15323.6	0	0
9	40.4298	87.7701	16928.5	0	0
10	44.9246	85.5528	18405.2	0	0
11	49.4193	83.567	19631	0	0
12	53.9141	81.8003	20502.4	0	0
13	58.4089	80.2422	20932.4	0	0
14	62.9036	78.884	20848.2	0	0
15	67.3984	77.7188	19402.4	0	0
16	71.8931	76.7405	17315.7	0	0
17	76.3879	75.9445	16207	0	0
18	80.8826	75.327	12829.2	0	0
19	85.3774	74.8853	8502.19	0	0
20	89.8722	74.6173	5553.86	0	0
21	94.3669	74.5218	4328.91	0	0
22	98.8617	74.5985	3099.29	0	0
23	103.356	74.8476	1946.14	0	0
24	107.851	75.2703	966.774	0	0
25	112.346	75.8684	276.739	0	0
26	116.841	76.6448	0	0	0

	<i>Project</i> Munjoy Heights #13067.2		
	<i>Analysis Description</i> SECTION 2 - SEISMIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 11:50:15 AM		<i>File Name</i> Section 2 - Static.slim

## List Of Coordinates

### Water Table

X	Y
0	90
120	64

### Line Load

X	Y
28	100
28	99
29	99
29	97
30	97
30	99
31	99
31	100

### Line Load

X	Y
65.3	91
65.3	90
70	90
70	91

### Line Load

X	Y
78	79
78	78
83	78
83	79

### Line Load

X	Y
83.5	78
87	78

<i>Project</i>				Munjoy Heights #13067.2	
<i>Analysis Description</i>				SECTION 2 - SEISMIC	
<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services		
<i>Date</i>			<i>File Name</i>		
1/7/2014, 11:50:15 AM			Section 2 - Static.slim		




**External Boundary**

X	Y
0	90
0	40
120	40
120	64
120	76
91.4016	81.8364
85.7	83
85.7	86.5
85	86.5
81	86.5
81	90
80	90
77	90
68	94
68	102.5
29.7	102.5
29.7	112.5
29	112.5
29	111
0	112

**Material Boundary**

X	Y
29	111
29	100
28	100
28	99
29	99
29	97
30	97
30	99
31	99
31	100
29.7	100
29.7	102.1
29.7	102.5

	<i>Project</i>			Munjoy Heights #13067.2
	<i>Analysis Description</i>			SECTION 2 - SEISMIC
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services	
	<i>Date</i> 1/7/2014, 11:50:15 AM		<i>File Name</i> Section 2 - Static.slim	

### Material Boundary

X	Y
29.7	102.1
67.3	102.1
67.3	91
65.3	91
65.3	90
70	90
70	91
68	91
68	94

### Material Boundary

X	Y
80	90
80	79
78	79
78	78
83	78
83	79
81	79
81	86.5

### Material Boundary

X	Y
85	86.5
85	79
83.5	79
83.5	78
87	78
87	79
85.7	79
85.7	83

### Material Boundary

X	Y
14	111.4
27	98

<i>Project</i>				Munjoy Heights #13067.2	
<i>Analysis Description</i>				SECTION 2 - SEISMIC	
<i>Drawn By</i>		<i>Scale</i>	<i>Company</i> Summit Geoengineering Services		
<i>Date</i> 1/7/2014, 11:50:15 AM			<i>File Name</i> Section 2 - Static.slim		




29	96
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### Material Boundary

X	Y
0	112
14	111.4
29	96
78	77
87	77
91.4016	81.8364

### Material Boundary

X	Y
0	90
120	64

	<i>Project</i> Munjoy Heights #13067.2		
	<i>Analysis Description</i> SECTION 2 - SEISMIC		
	<i>Drawn By</i>	<i>Scale</i>	<i>Company</i> Summit Geoengineering Services
	<i>Date</i> 1/7/2014, 11:50:15 AM	<i>File Name</i> Section 2 - Static.slim	