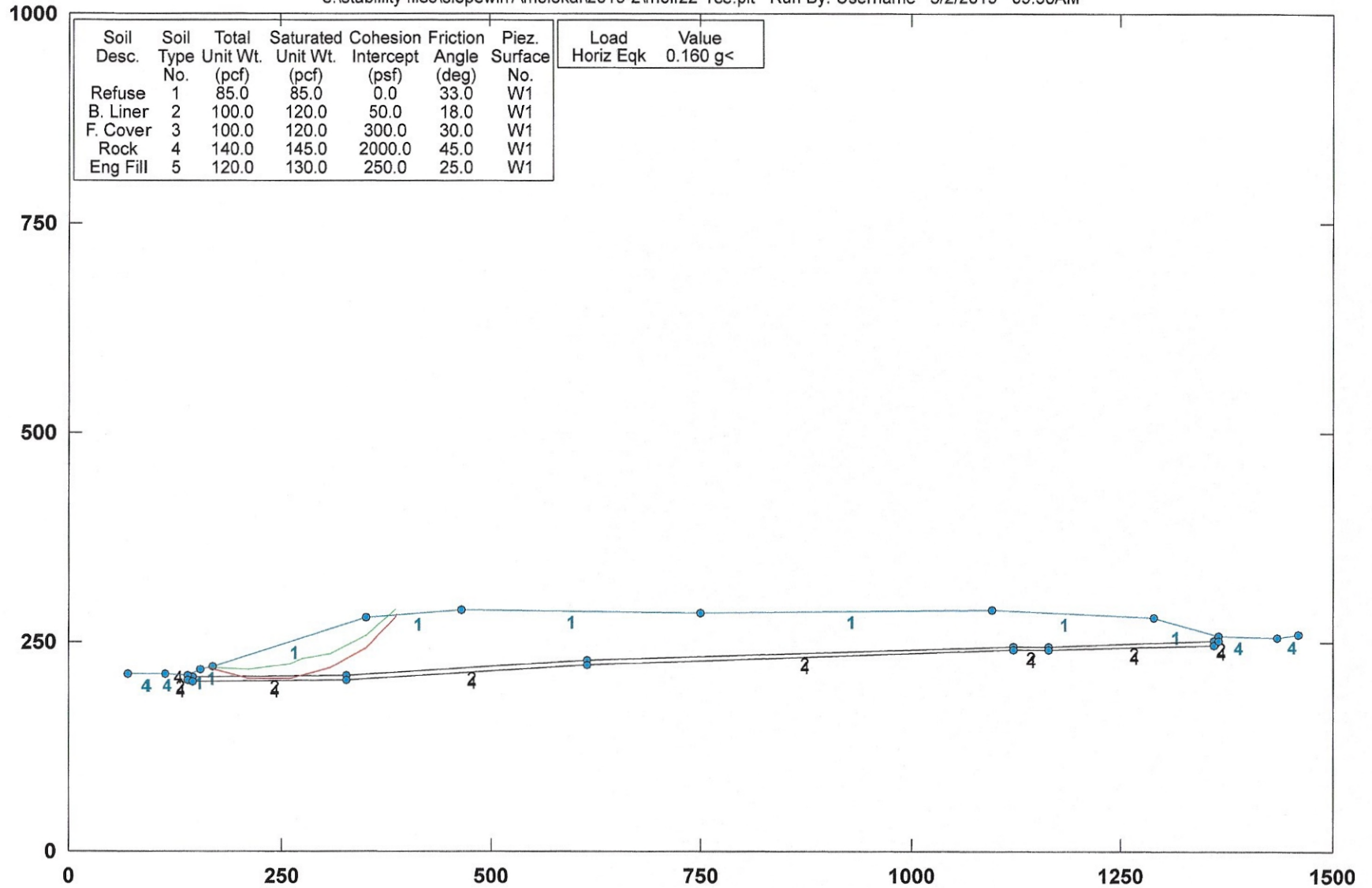


MOLF - Slope Stability Section 2-2 Pseudo-Static

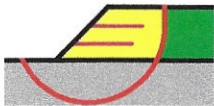
e:\stability files\slopewin7\molokai\2019-2\molff22-1ce.plt Run By: Username 5/2/2019 09:50AM



PCSTABL5M/si FSmin=1.29

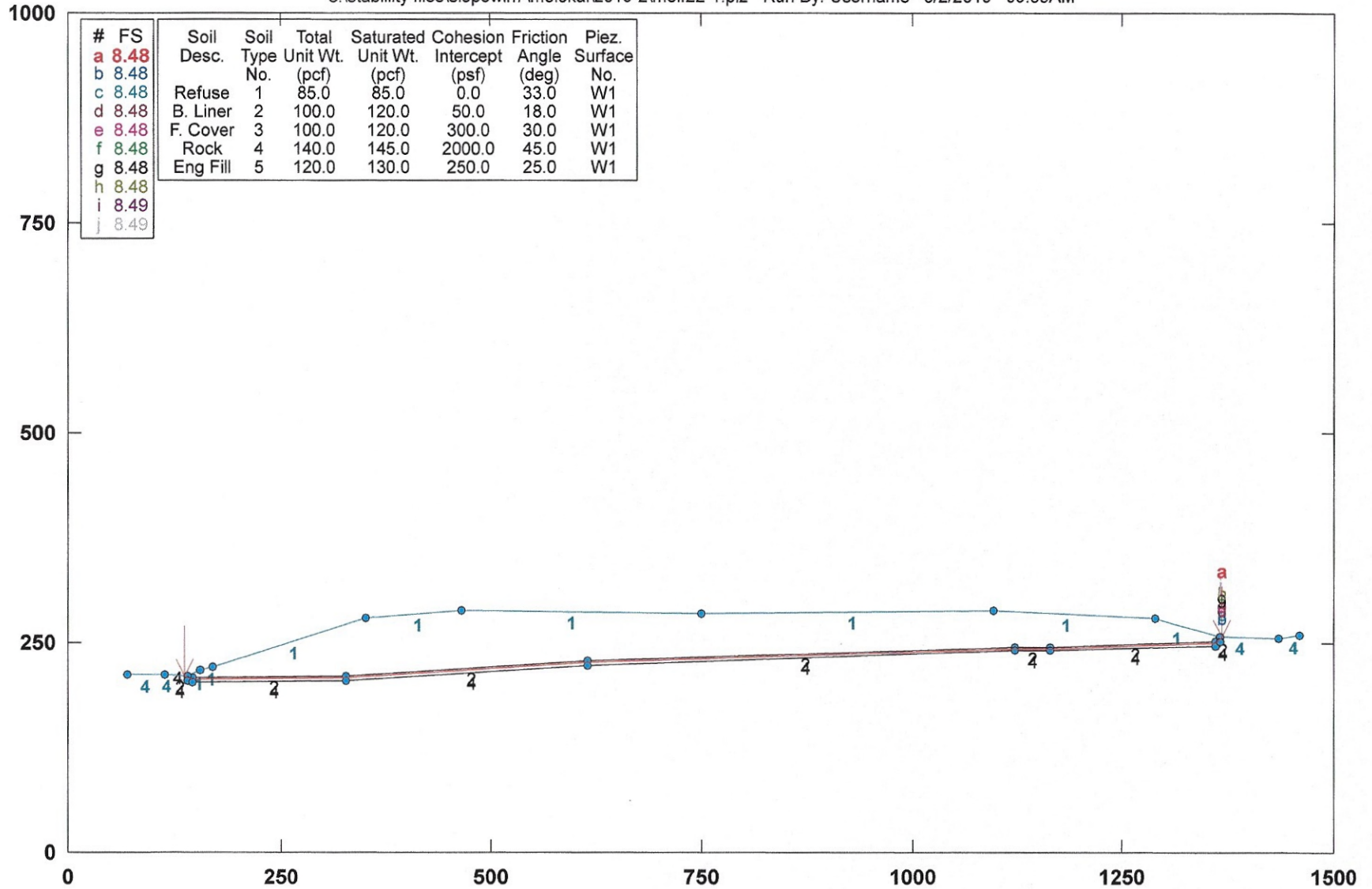
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

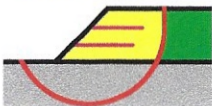
e:\stability files\slopewin7\molokai\2019-2\mol22-1.pl2 Run By: Username 5/2/2019 09:39AM



PCSTABL5M/si FSmin=8.48

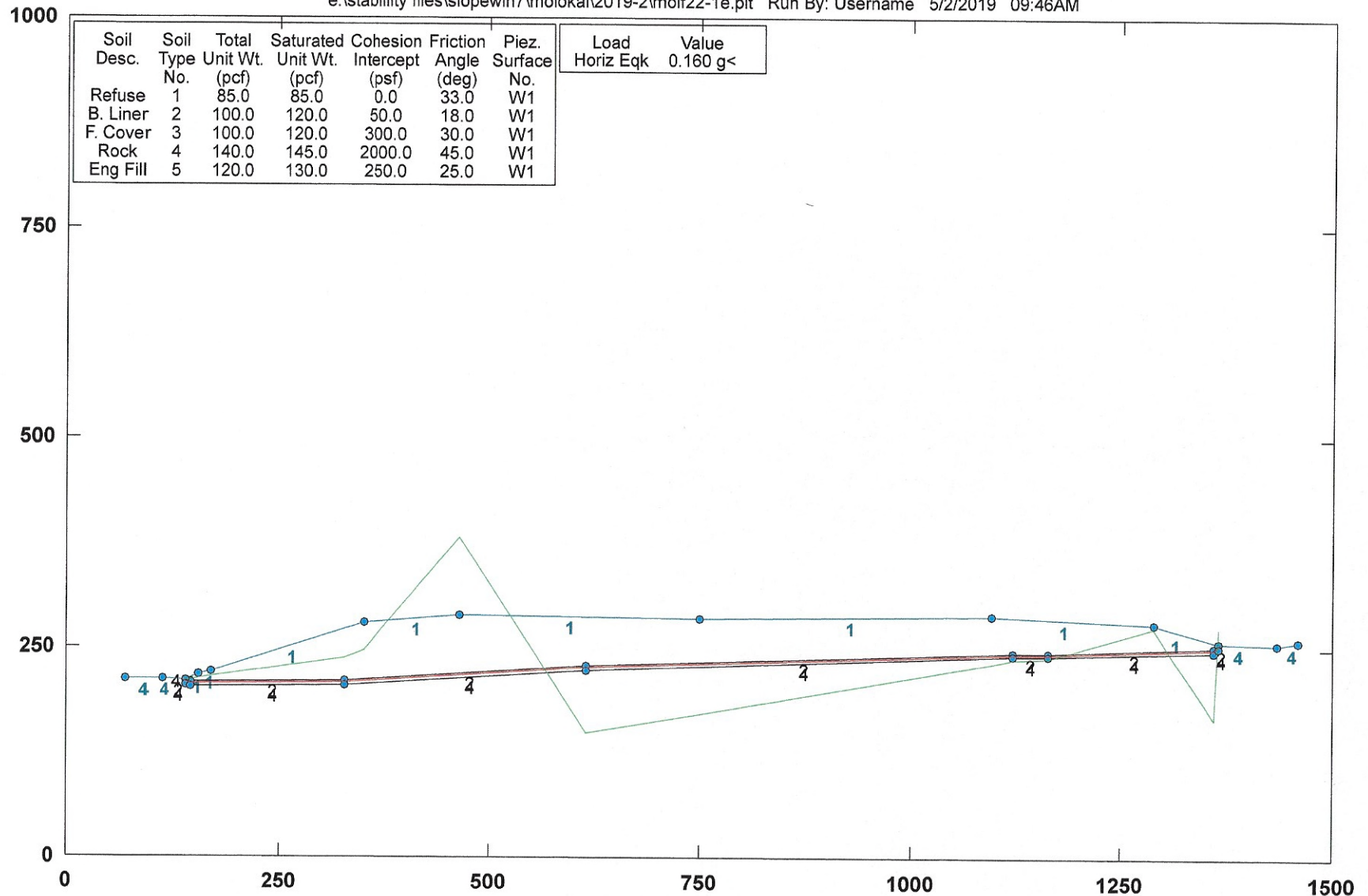
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

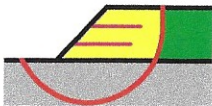
e:\stability files\slopewin7\molokai\2019-2\molf22-1e.plt Run By: Username 5/2/2019 09:46AM



PCSTABL5M/si FSmin=1.71

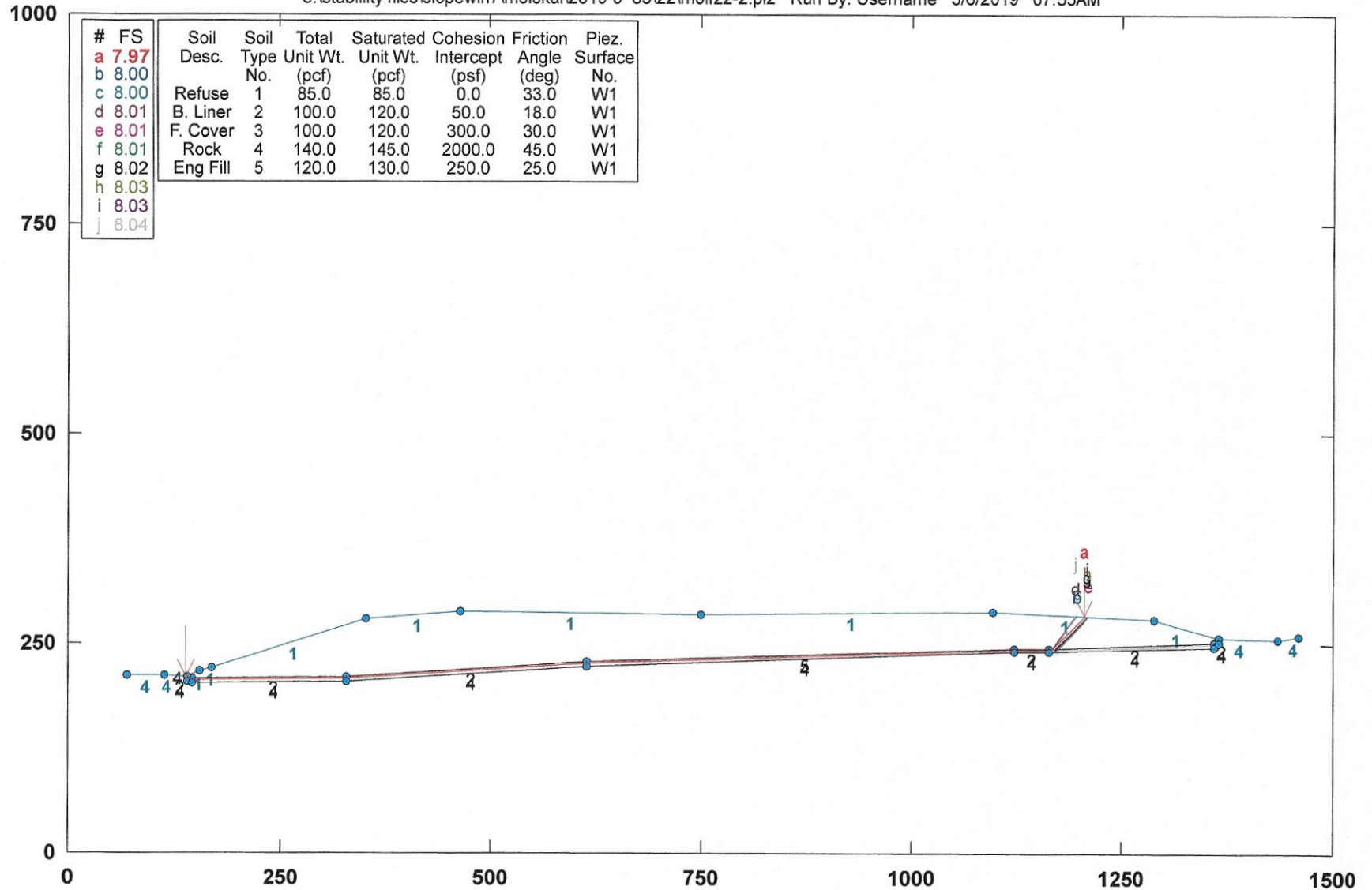
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

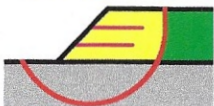
e:\stability files\slopewin7\molokai\2019-3 85\22\molf22-2.pl2 Run By: Username 5/6/2019 07:55AM



PCSTABL5M/si FSmin=7.97

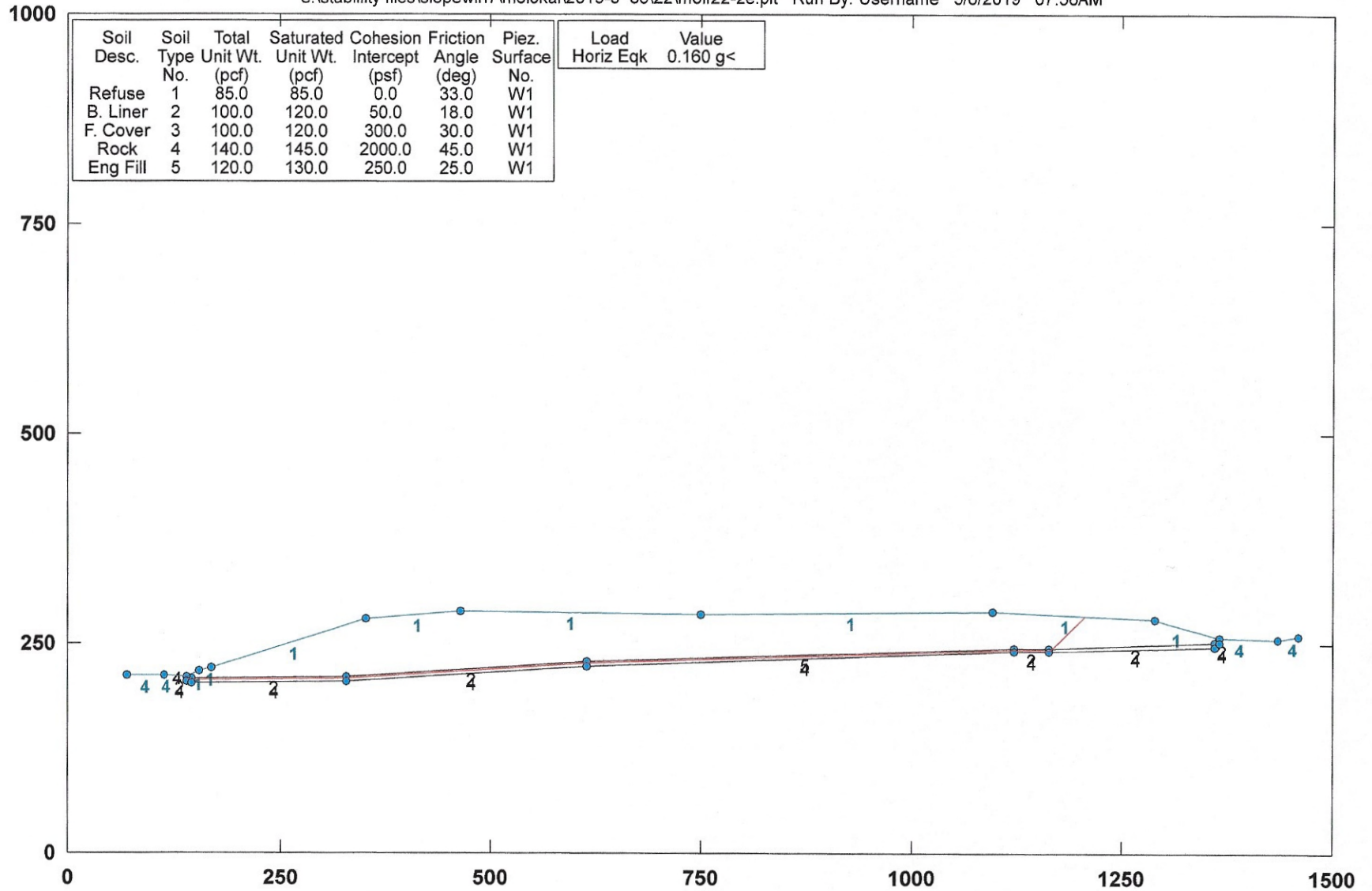
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

e:\stability files\slopewin7\molokai\2019-3 85\22\mol22-2e.plt Run By: Username 5/6/2019 07:56AM



PCSTABL5M/si FSmin=2.02

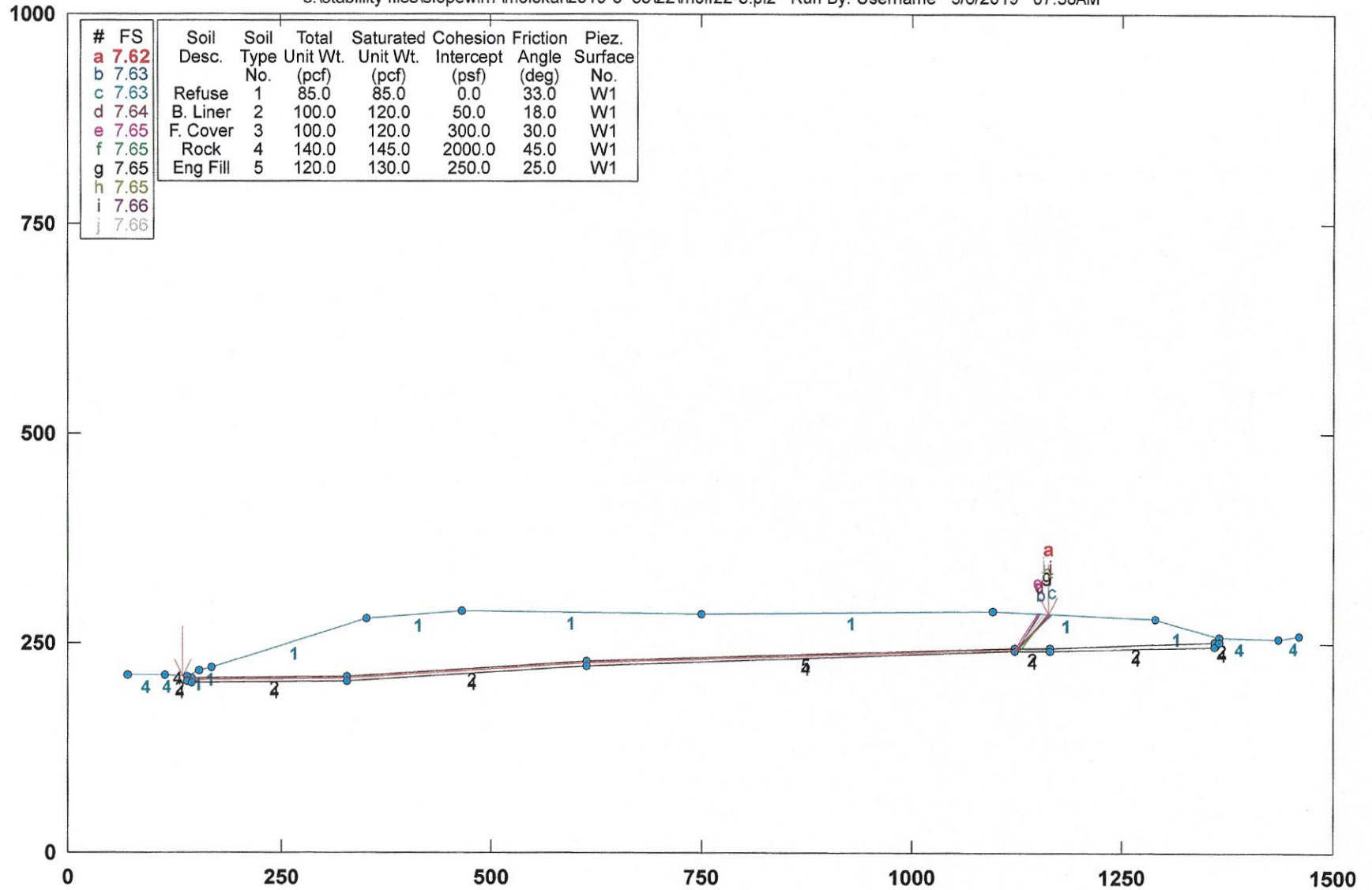
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

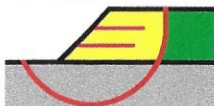
e:\stability files\slopewin7\molokai\2019-3 85\22\mol2-3.pl2 Run By: Username 5/6/2019 07:58AM



PCSTABL5M/si FSmin=7.62

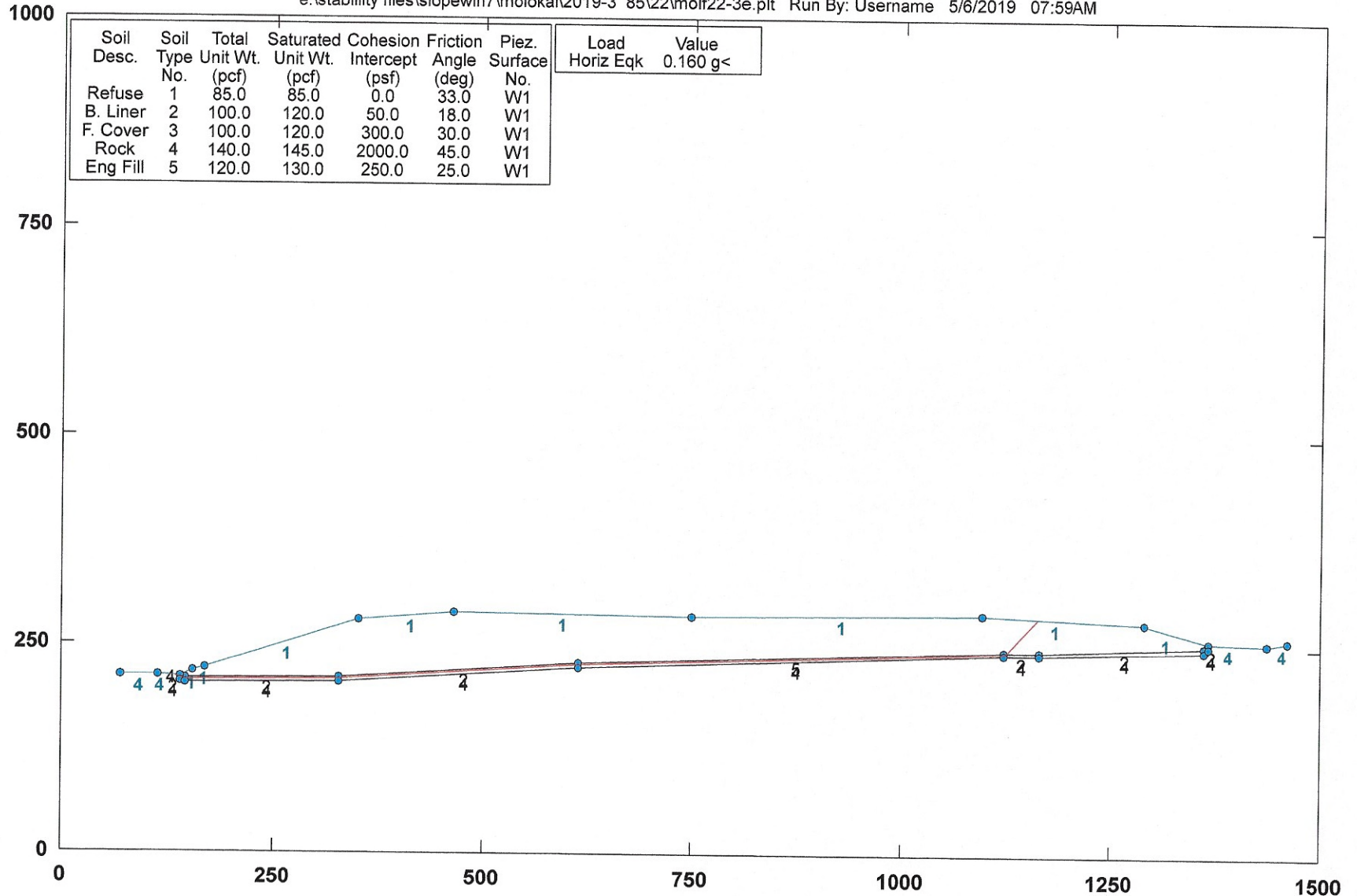
Safety Factors Are Calculated By The Modified Janbu Method

STED



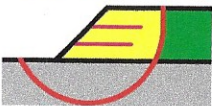
MOLF - Slope Stability Section 2-2 Pseudo-Static

e:\stability files\slopewin7\molokai\2019-3 85\22\molf22-3e.plt Run By: Username 5/6/2019 07:59AM



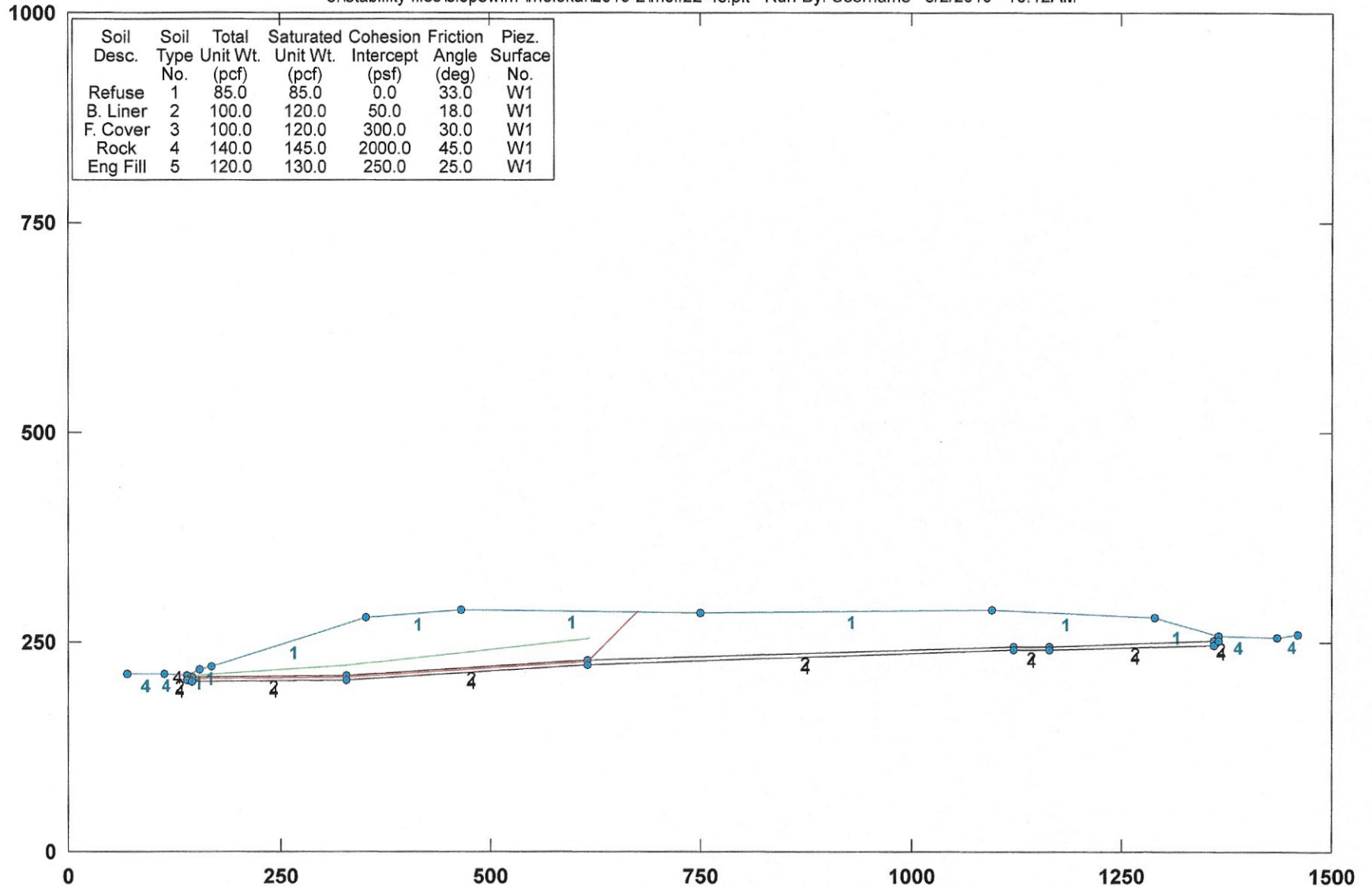
PCSTABL5M/si FSmin=2.15
 Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

e:\stability files\slopewin7\molokai\2019-2\molf22-4s.plt Run By: Username 5/2/2019 10:12AM

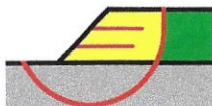


Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

PCSTABL5M/si FSmin=3.65

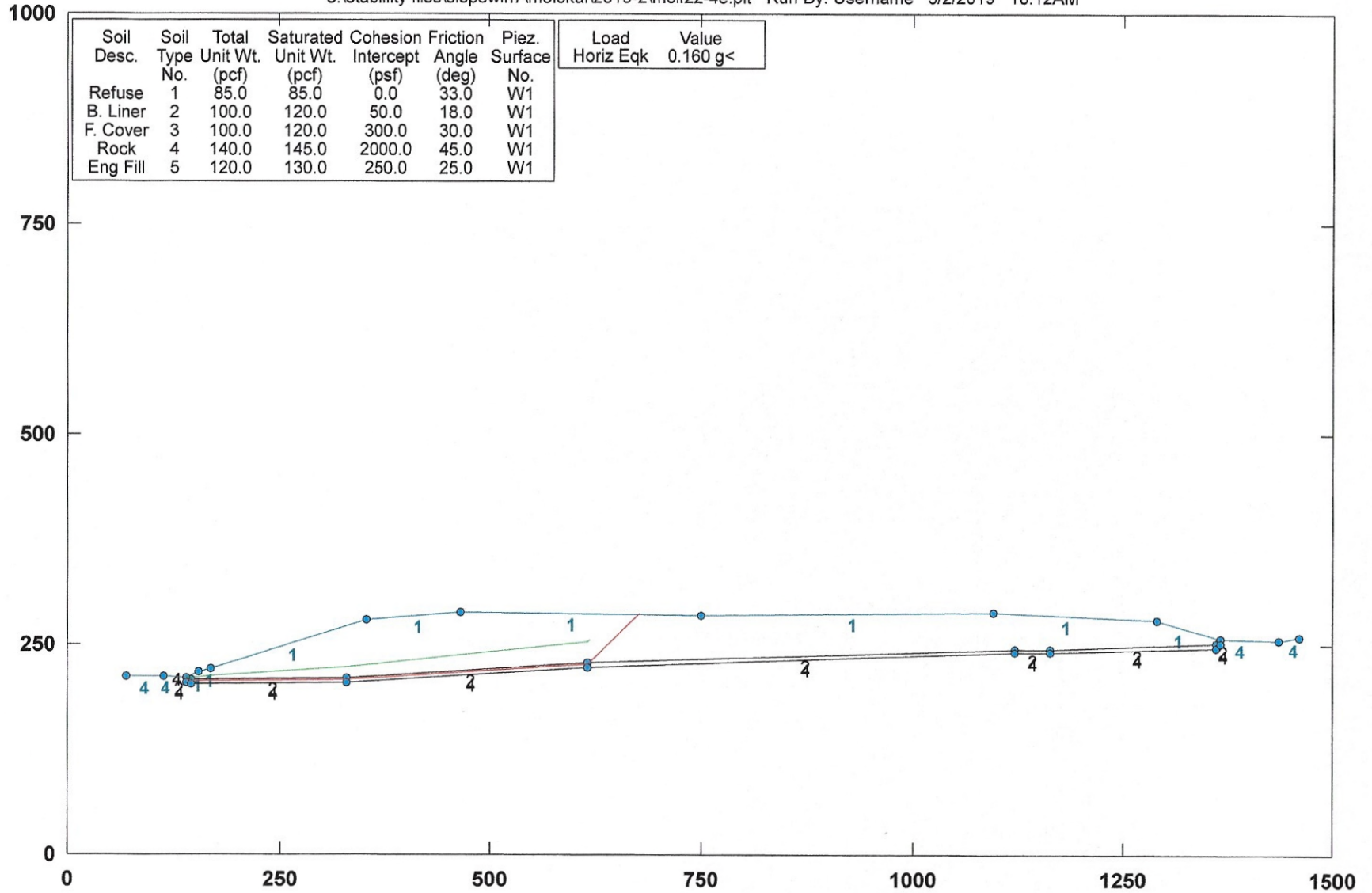
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

e:\stability files\slopewin7\molokai\2019-2\molf22-4e.plt Run By: Username 5/2/2019 10:12AM



PCSTABL5M/si FSmin=1.41

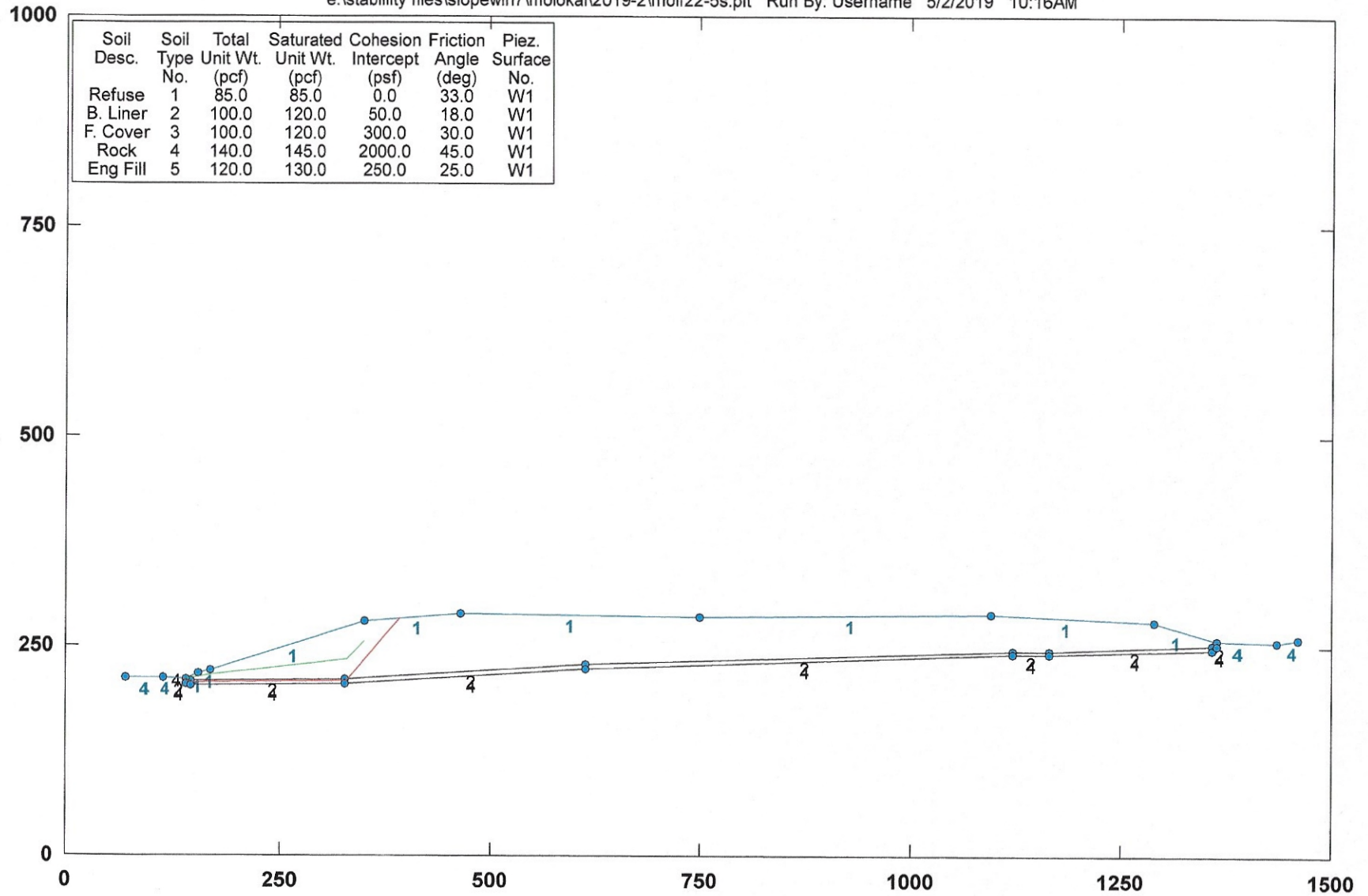
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

e:\stability files\slopewin7\molokai\2019-2\mol22-5s.plt Run By: Username 5/2/2019 10:16AM

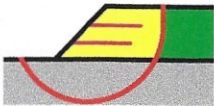


Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

PCSTABL5M/si FSmin=2.16

Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

e:\stability files\slopewin7\molokai\2019-2\molf22-5e.plt Run By: Username 5/2/2019 10:17AM

1000

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

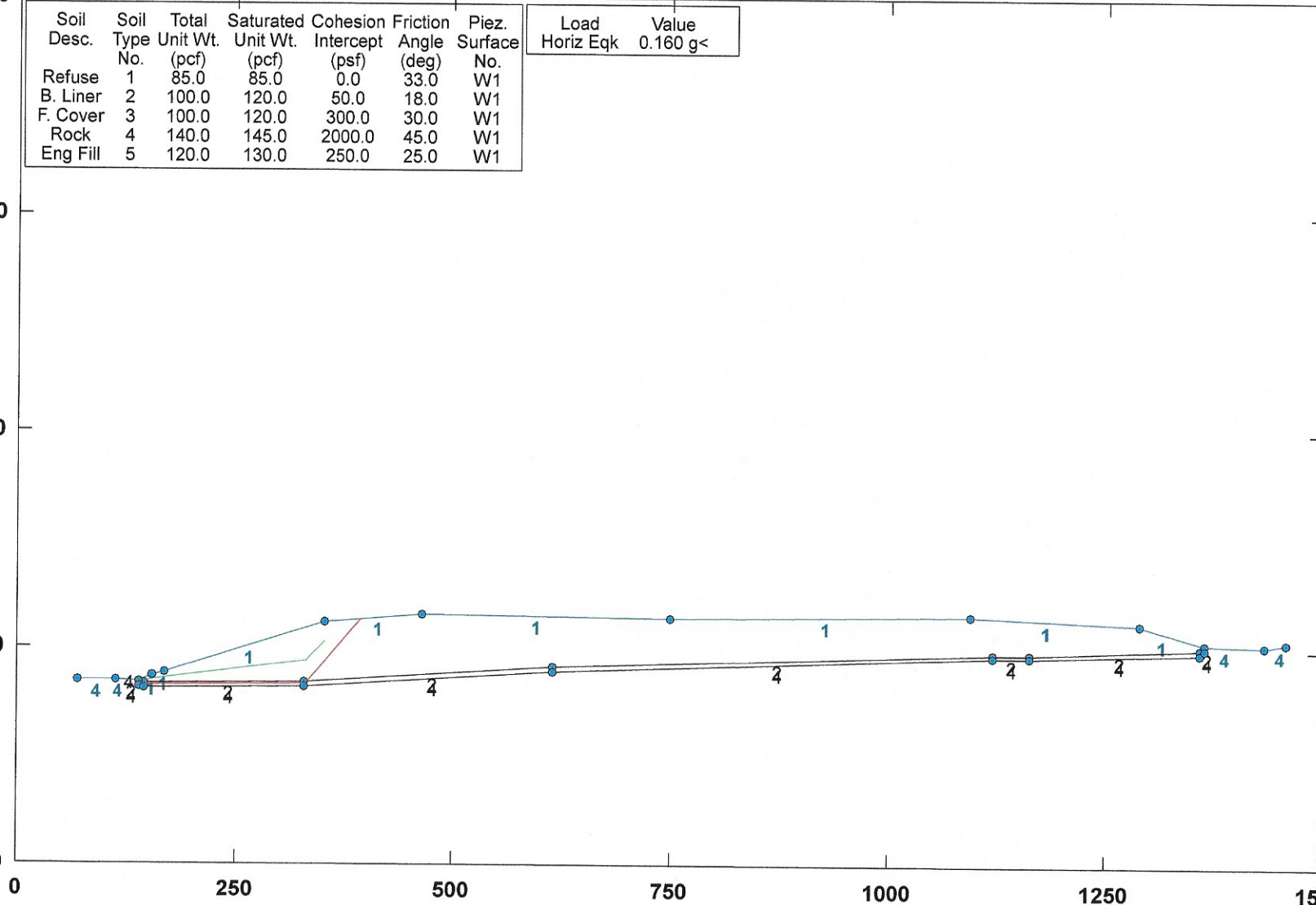
Load Horiz Eqk	Value
	0.160 g<

750

500

250

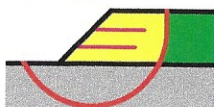
0



PCSTABL5M/si FSmin=1.37

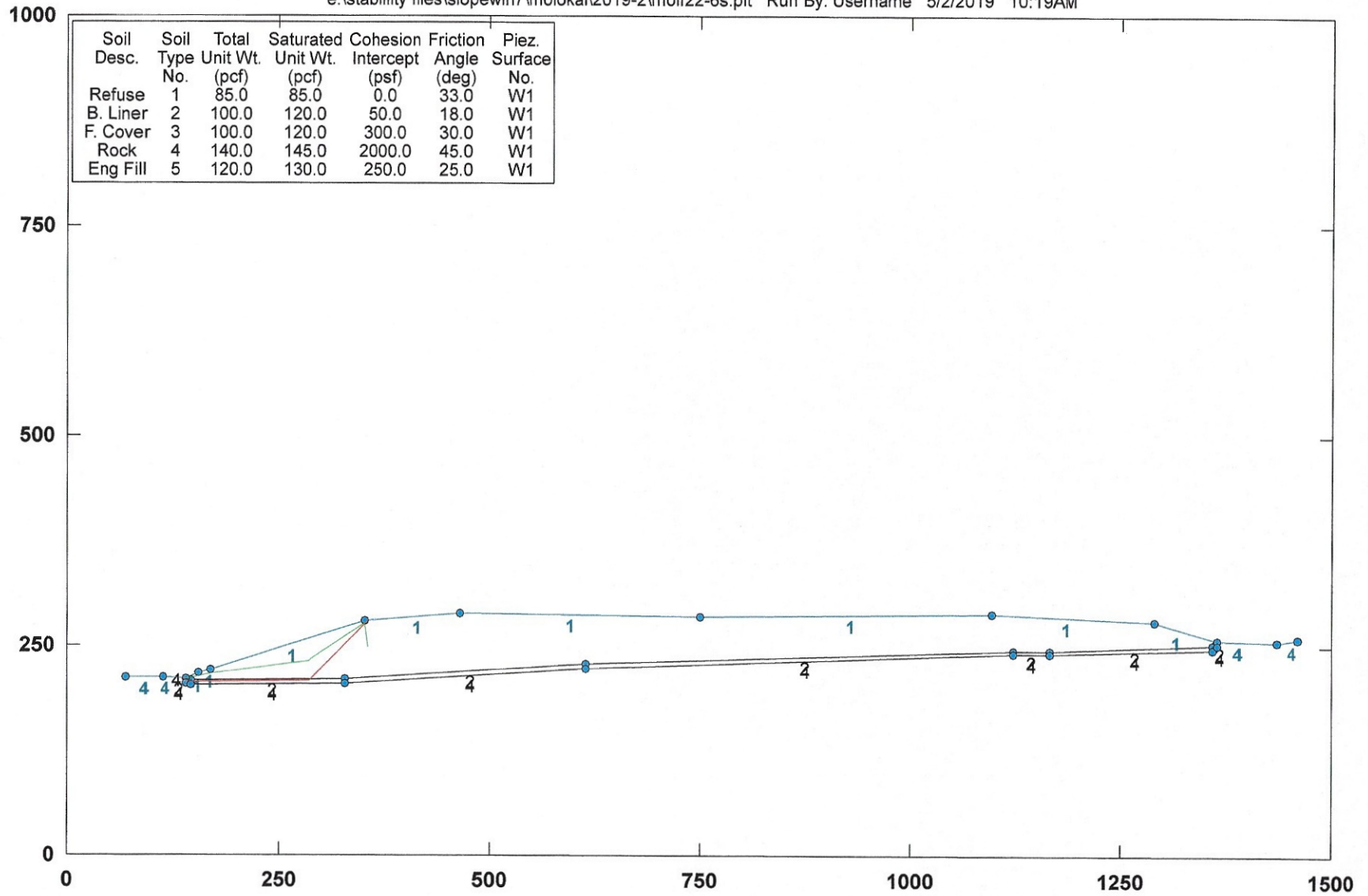
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

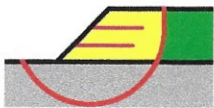
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PCSTABL5M/si FSmin=2.06

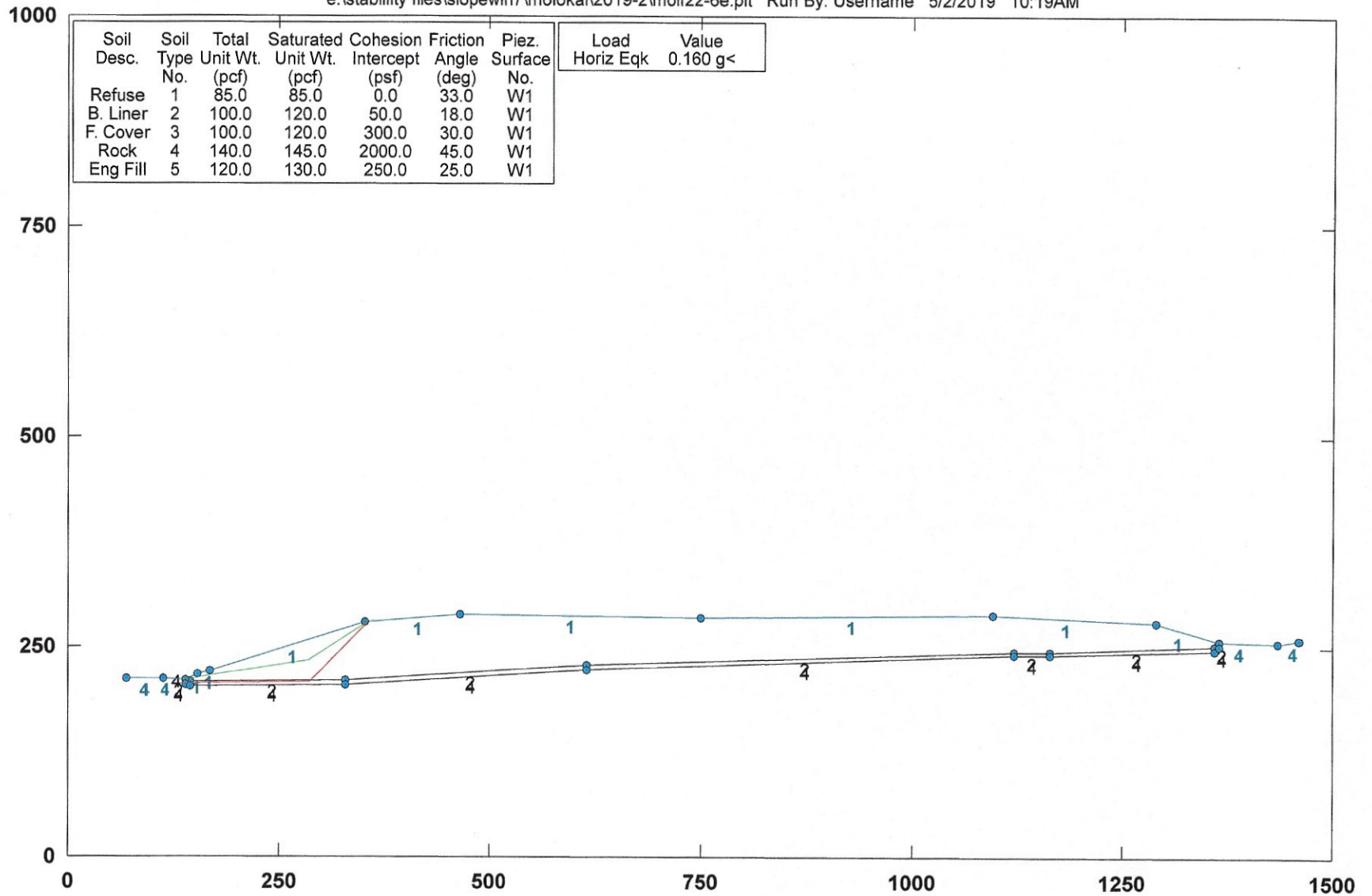
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

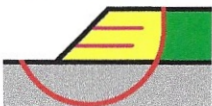
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PCSTABL5M/si FSmin=1.34

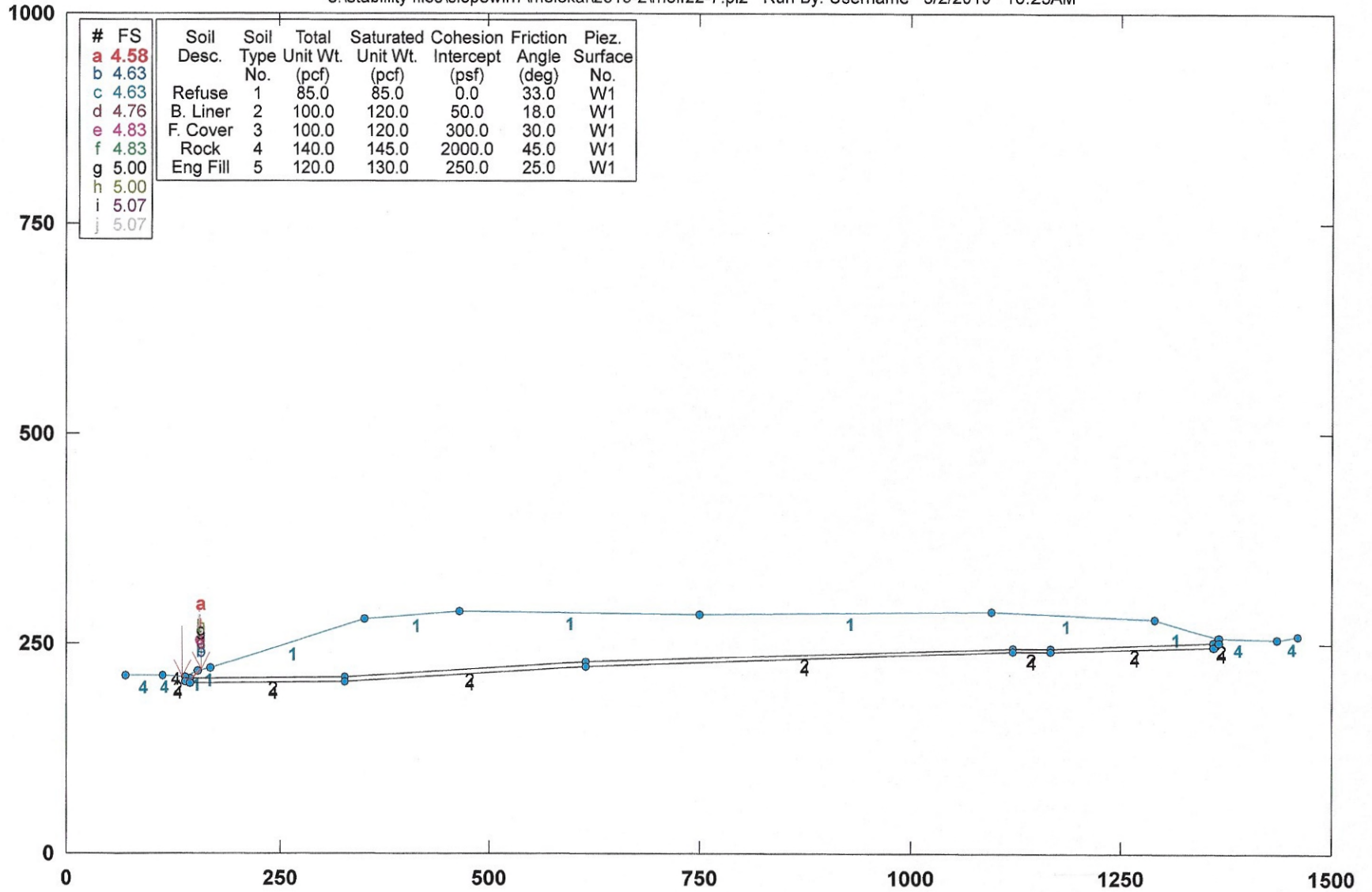
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

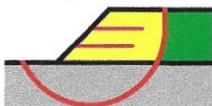
e:\stability files\slopewin7\molokai\2019-2\molof22-7.pl2 Run By: Username 5/2/2019 10:23AM



PCSTABL5M/si FSmin=4.58

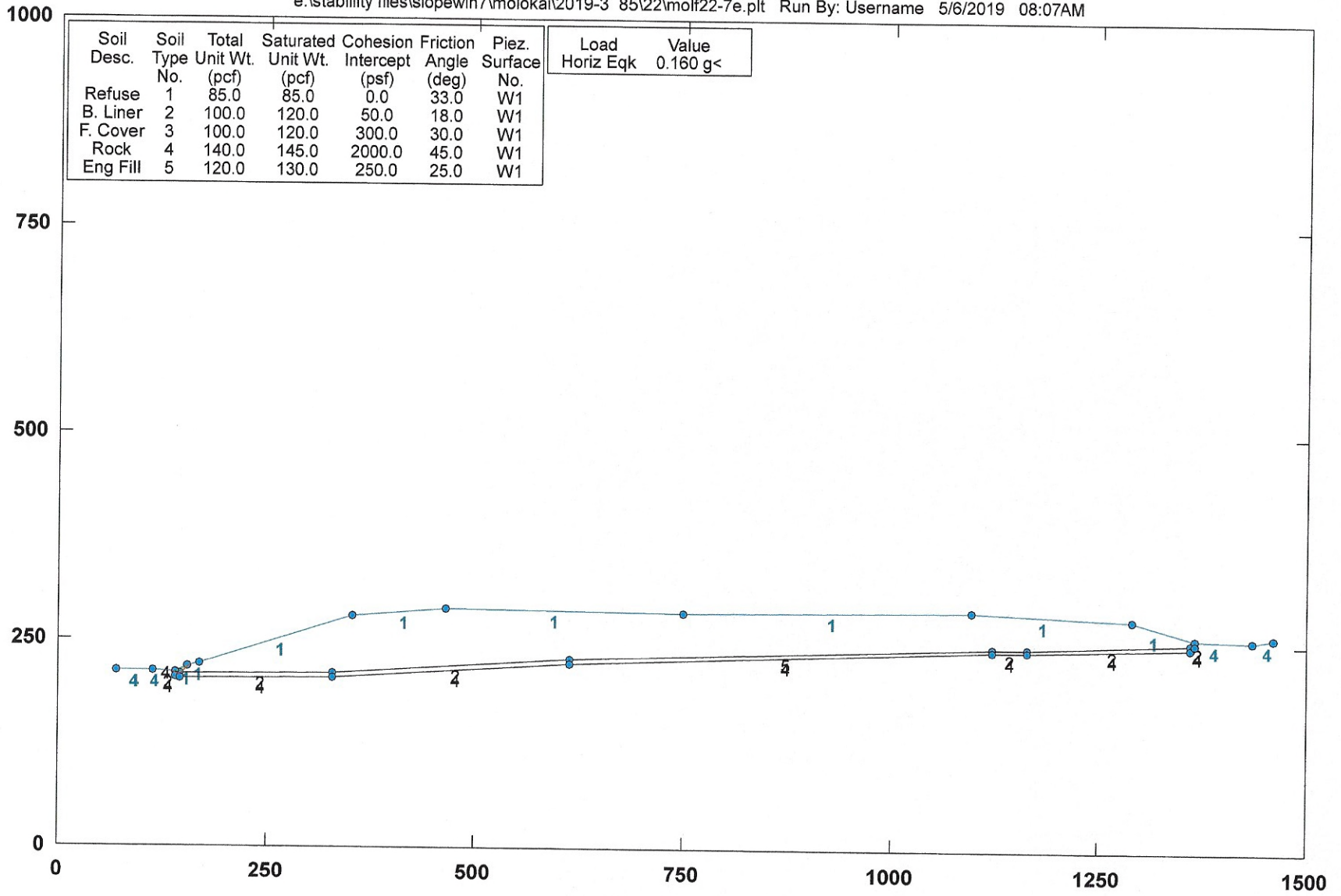
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

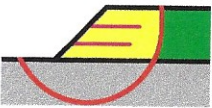
e:\stability files\slopewin7\molokai\2019-3 85\22\molf22-7e.plt Run By: Username 5/6/2019 08:07AM



PCSTABL5M/si FSmin=4.67

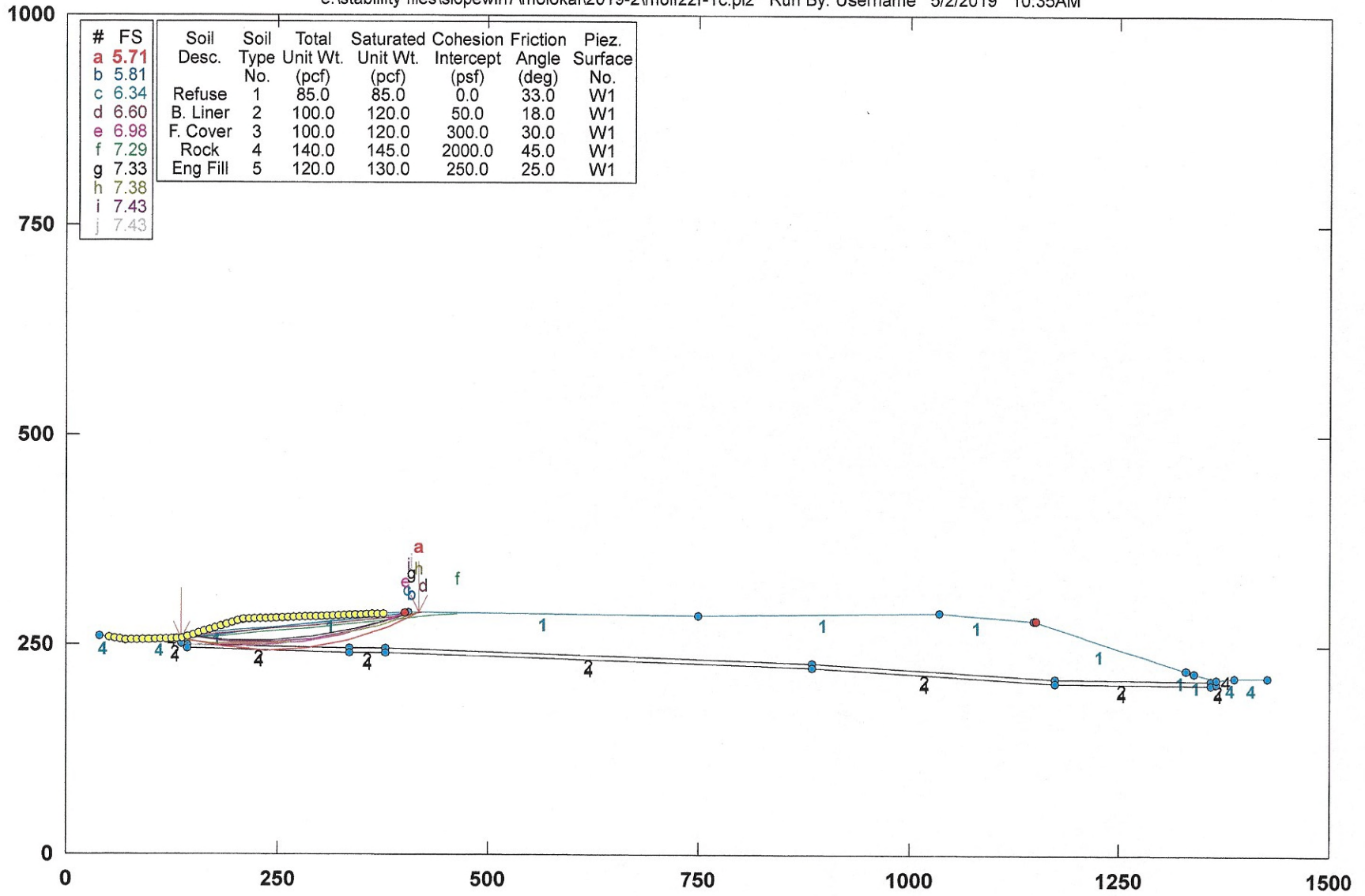
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

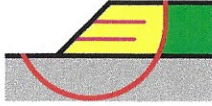
e:\stability files\slopewin7\molokai\2019-2\molf22r-1c.pl2 Run By: Username 5/2/2019 10:35AM



PCSTABL5M/si FSmin=5.71

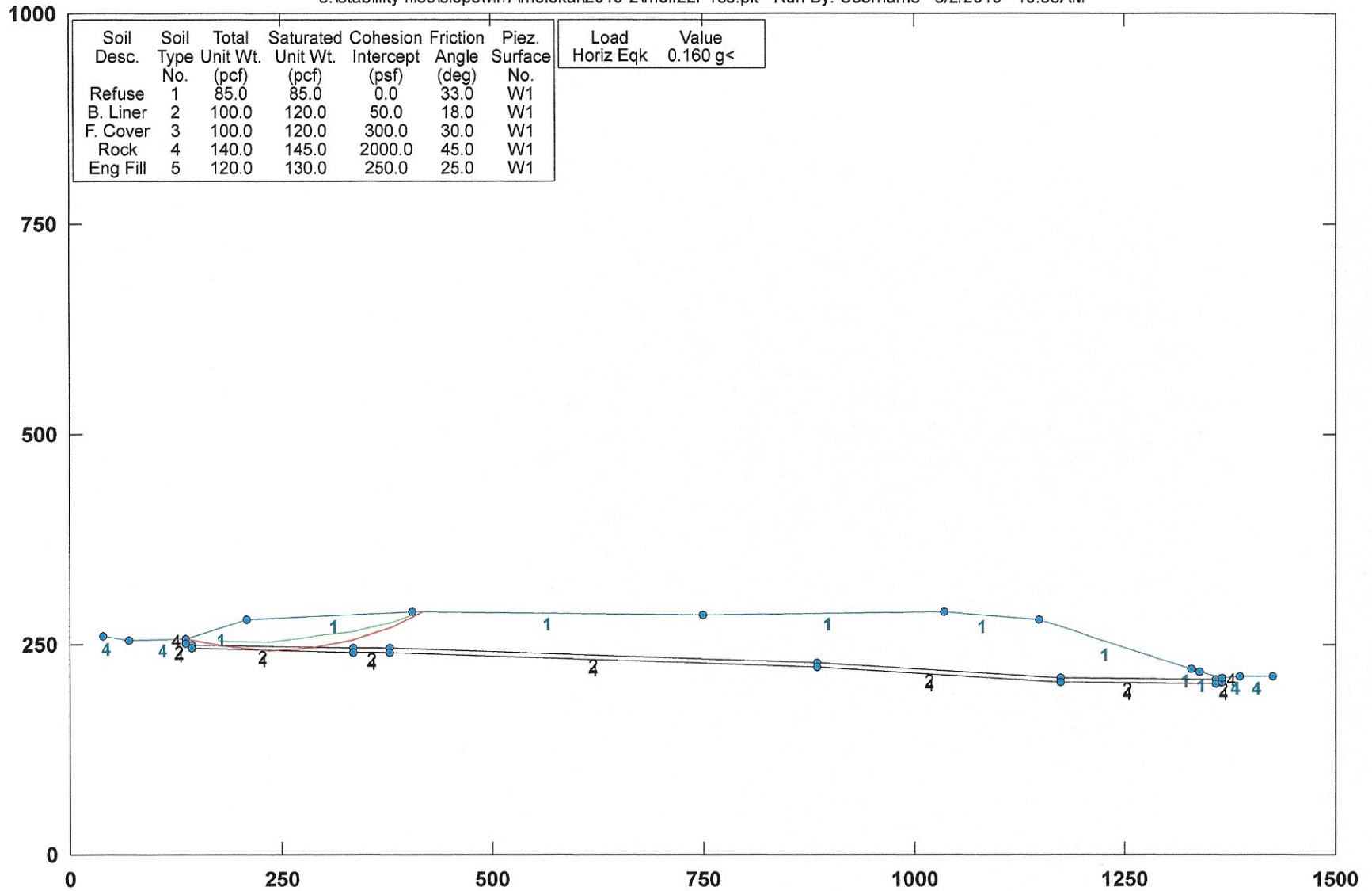
Safety Factors Are Calculated By The Modified Bishop Method

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

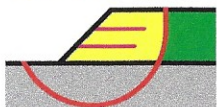
e:\stability files\slopedwin7\molokai\2019-2\molf22r-1ce.plt Run By: Username 5/2/2019 10:36AM



PCSTABL5M/si FSmin=1.95

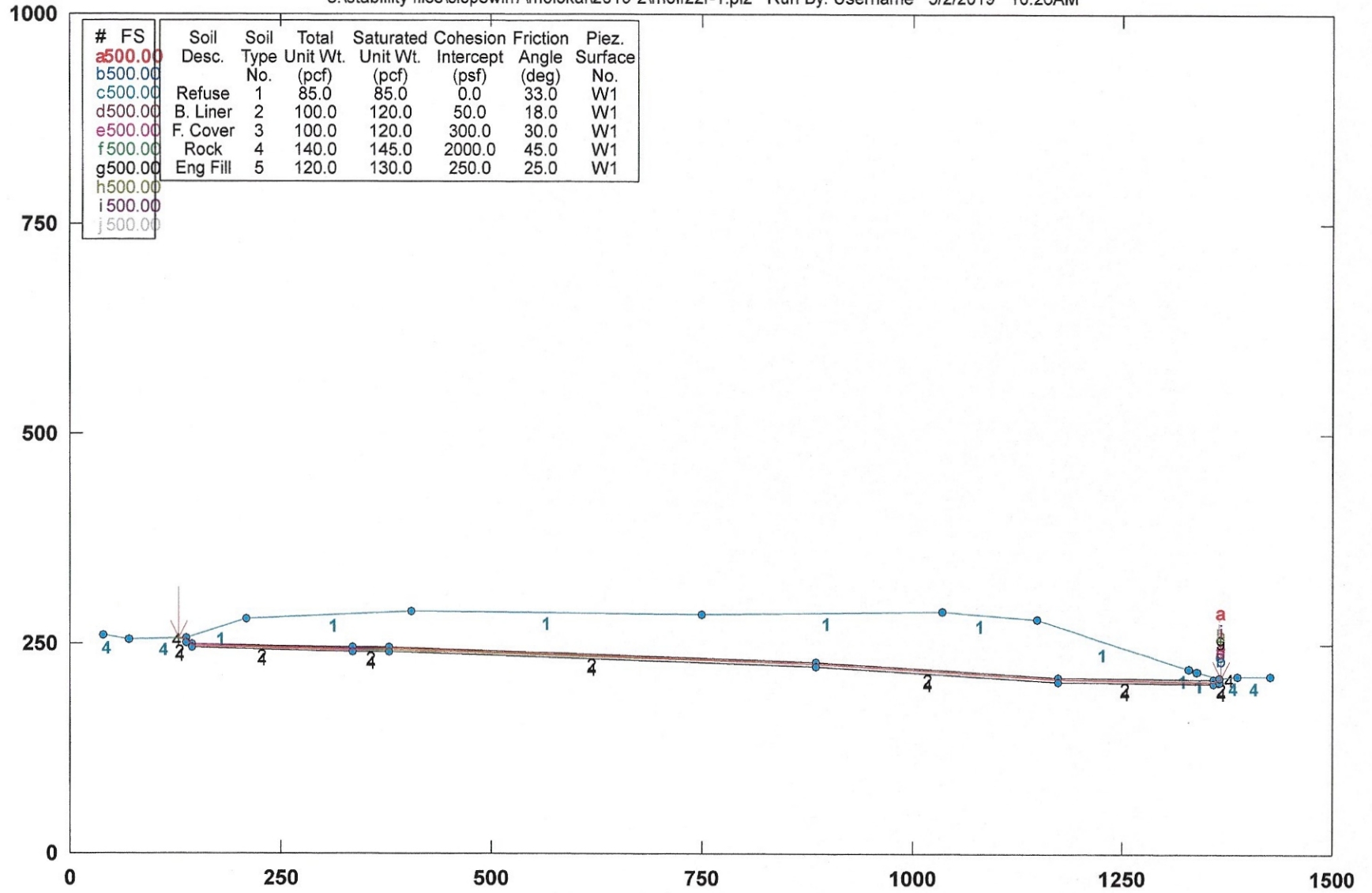
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

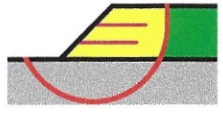
e:\stability files\slopewin7\molokai\2019-2\molof22r-1.pl2 Run By: Username 5/2/2019 10:26AM



PCSTABL5M/si FSmin=500.00

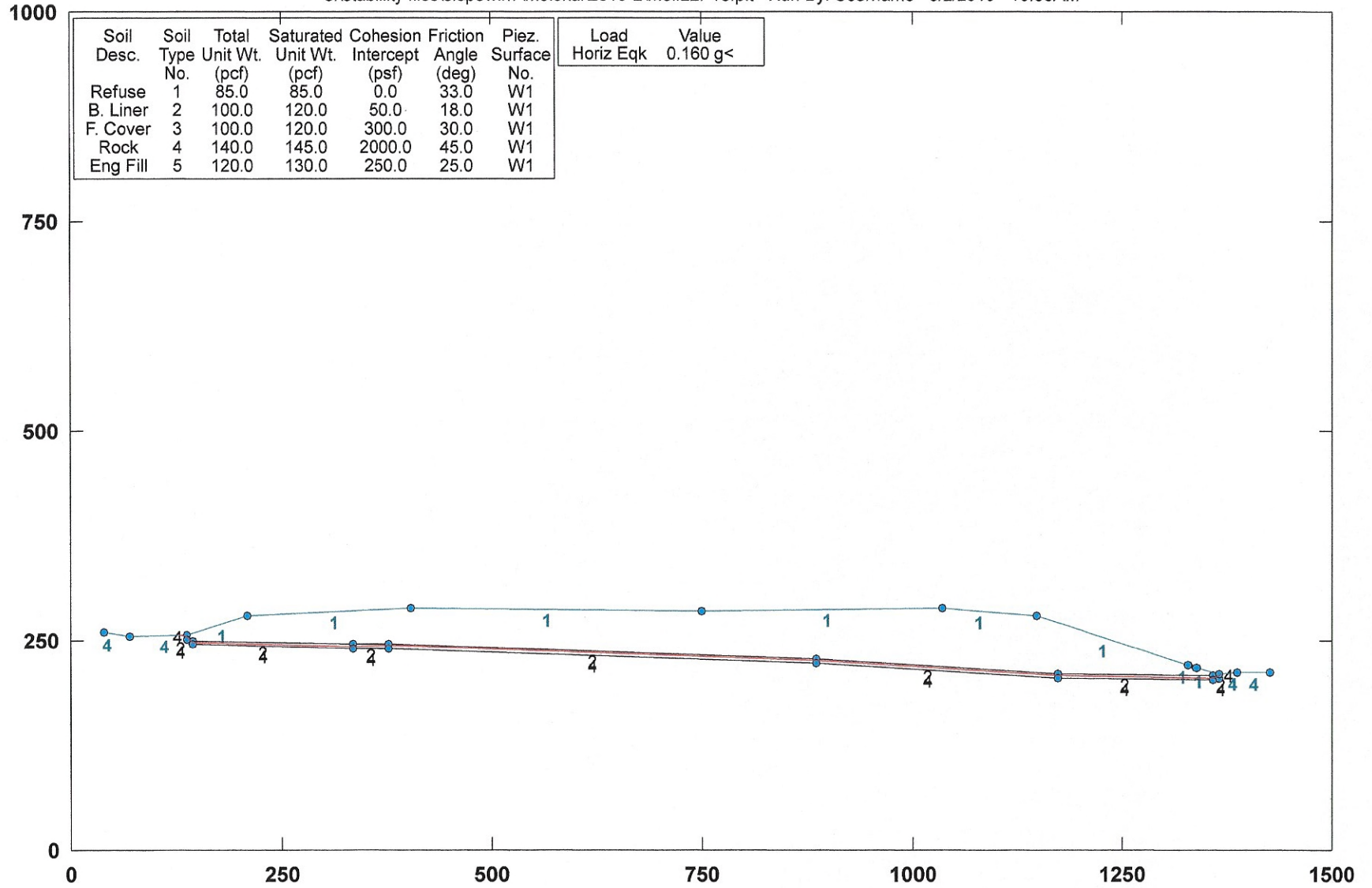
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

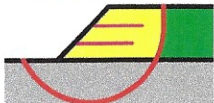
e:\stability files\slopewin7\molokai\2019-2\molf22r-1e.plt Run By: Username 5/2/2019 10:33AM



PCSTABL5M/si FSmin=2.90

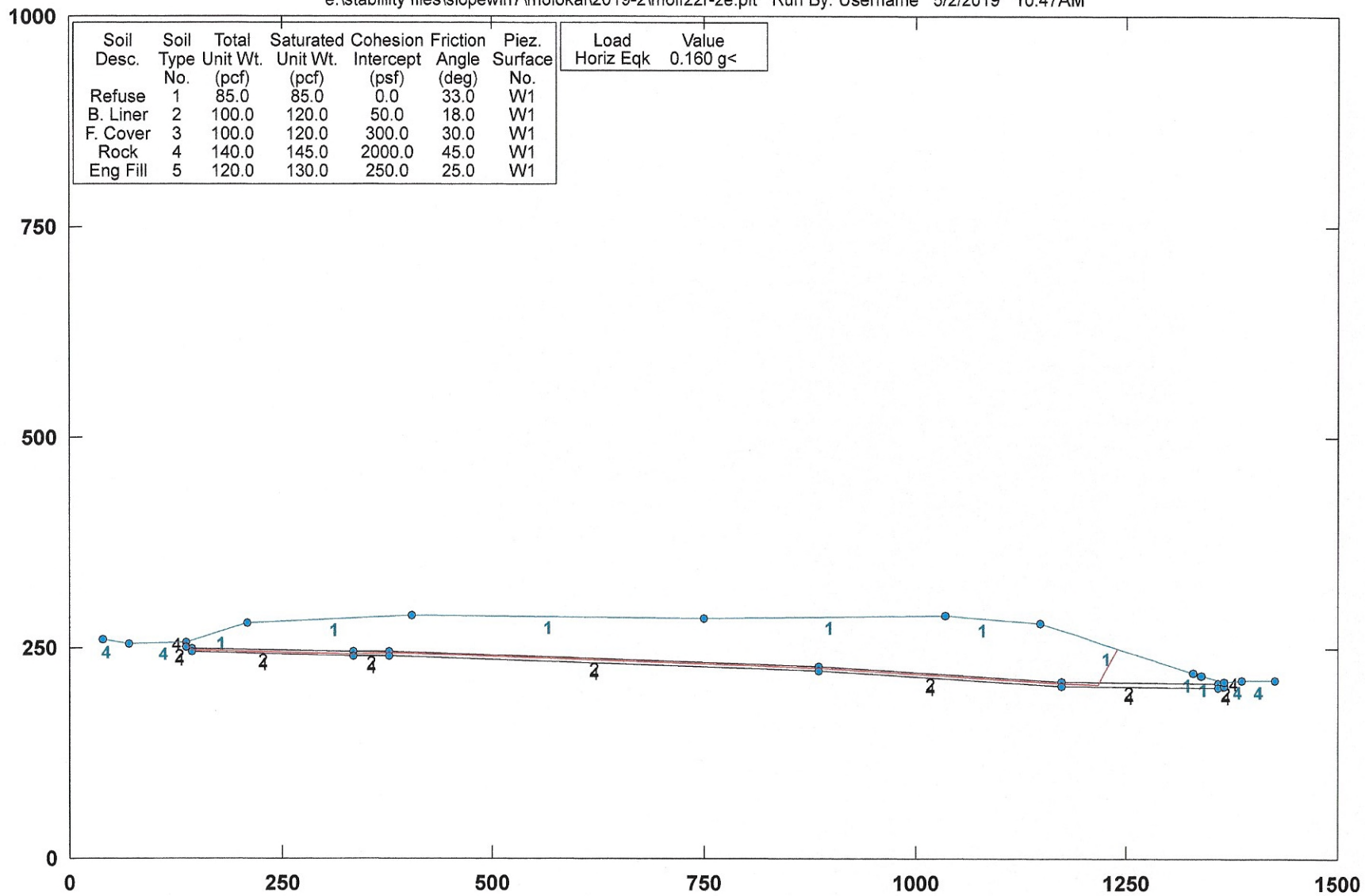
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

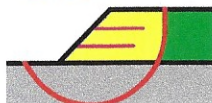
e:\stability files\slopewin7\molokai\2019-2\molf22r-2e.plt Run By: Username 5/2/2019 10:47AM



PCSTABL5M/si FSmin=2.61

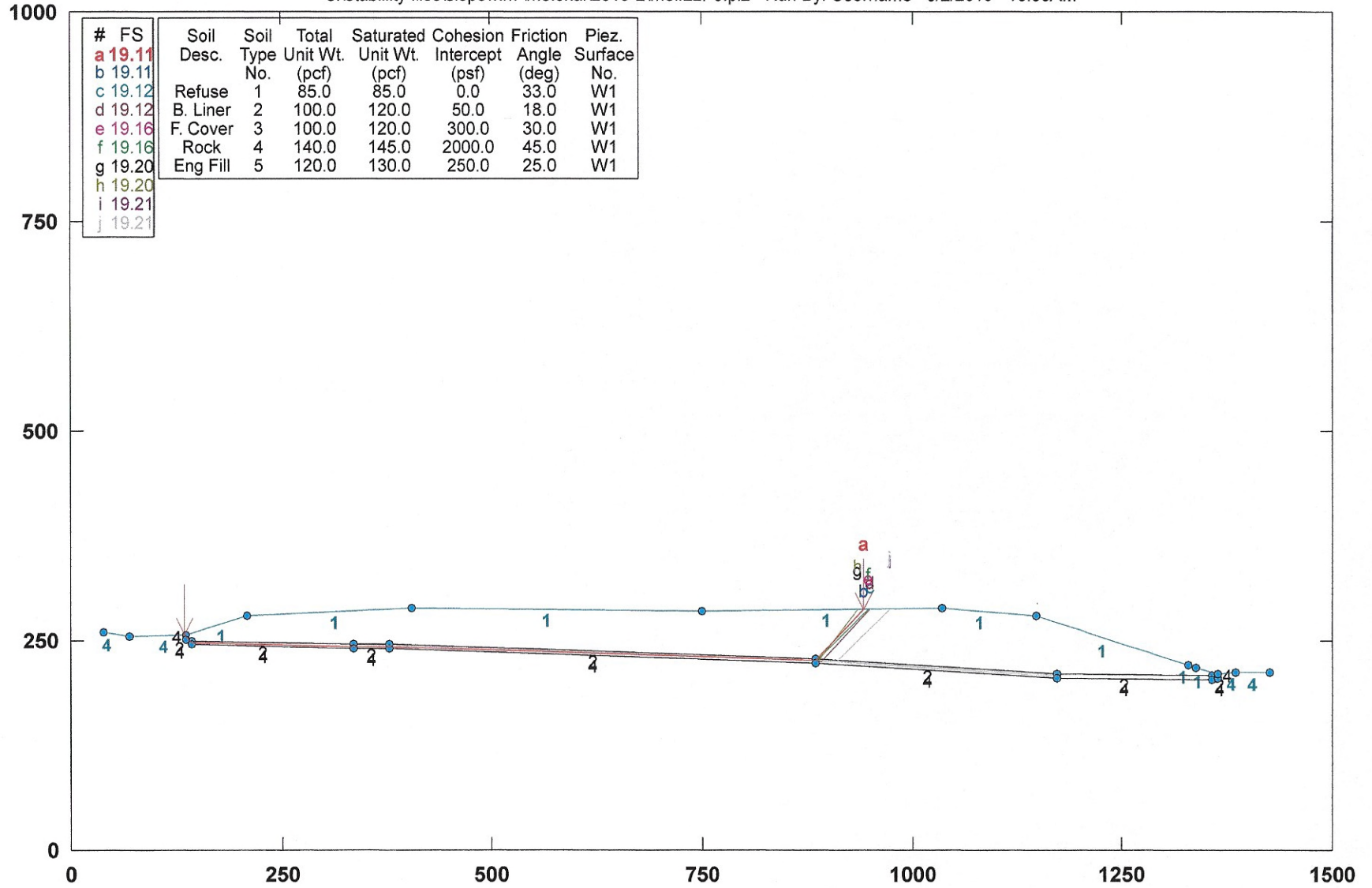
Factors of Safety Calculated by Janbu Method

STED



MOLF - Slope Stability Section 2-2 Static

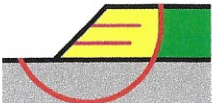
e:\stability files\slopewin7\molokai\2019-2\molf22r-3.pl2 Run By: Username 5/2/2019 10:50AM



PCSTABL5M/si FSmin=19.11

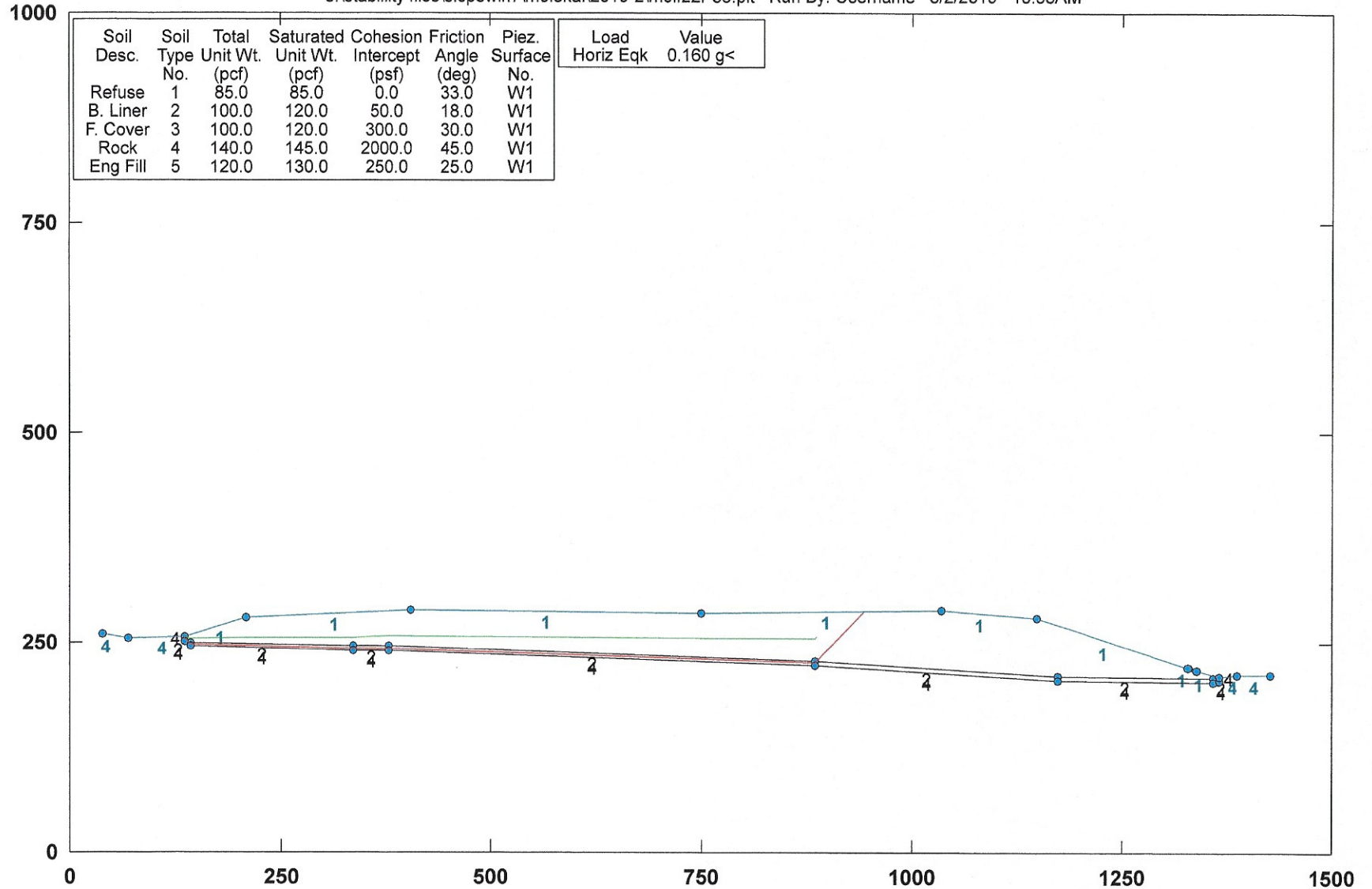
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

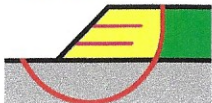
e:\stability files\slopewin7\moloka\2019-2\molof22r-3e.plt Run By: Username 5/2/2019 10:53AM



PCSTABL5M/si FSmin=2.11

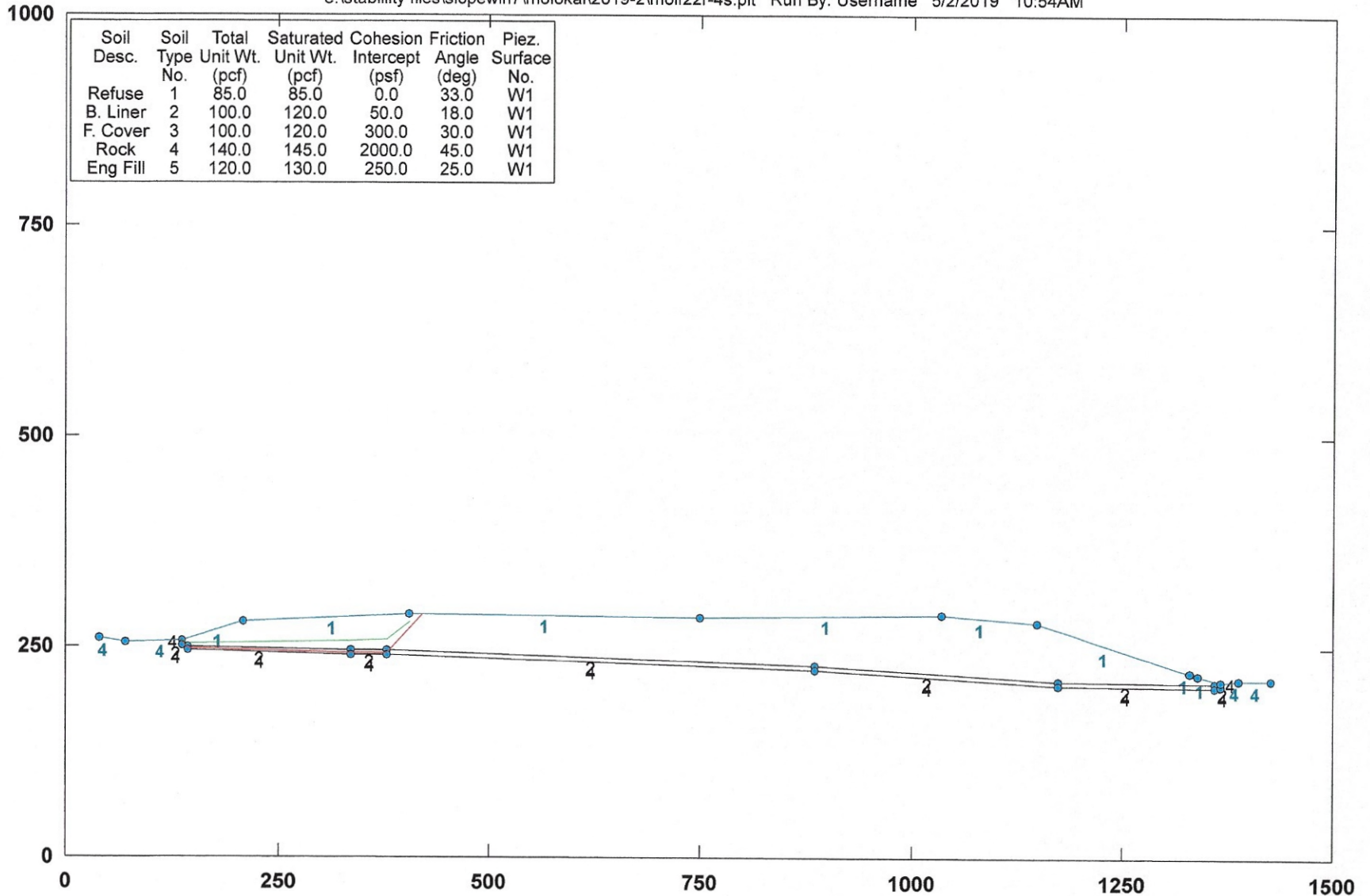
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

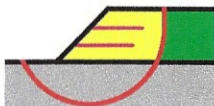
e:\stability files\slopewin7\molokai\2019-2\molf22r-4s.plt Run By: Username 5/2/2019 10:54AM



PCSTABL5M/si FSmin=5.86

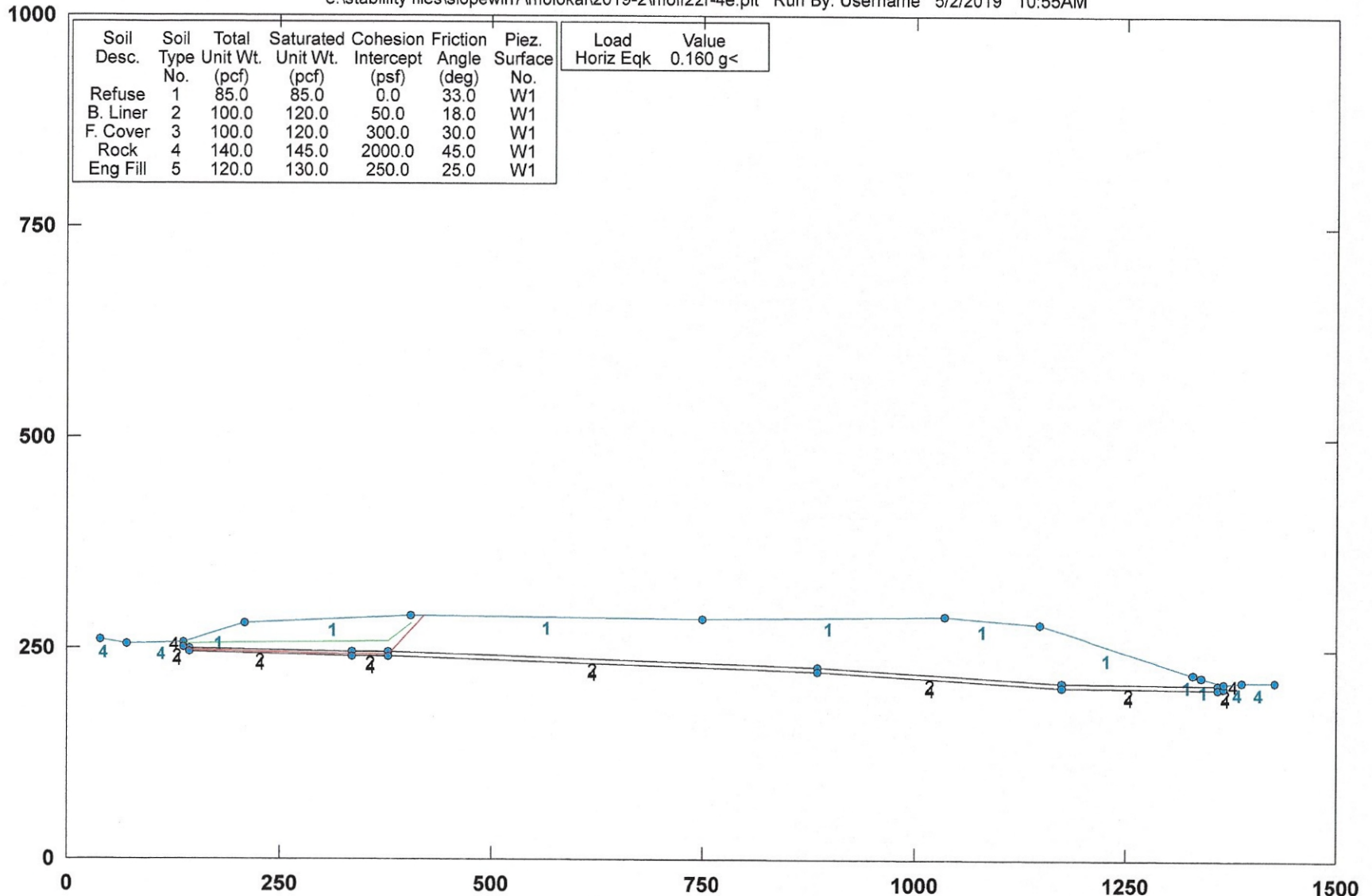
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

e:\stability files\slopewin7\molokai\2019-2\molf22r-4e.plt Run By: Username 5/2/2019 10:55AM

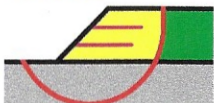


Soil Desc.	Soil No.	Soil Type	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.	Load Horiz Eqk	Value
Refuse	1		85.0	85.0	0.0	33.0	W1		
B. Liner	2		100.0	120.0	50.0	18.0	W1		
F. Cover	3		100.0	120.0	300.0	30.0	W1		
Rock	4		140.0	145.0	2000.0	45.0	W1		
Eng Fill	5		120.0	130.0	250.0	25.0	W1		

PCSTABL5M/si FSmin=1.83

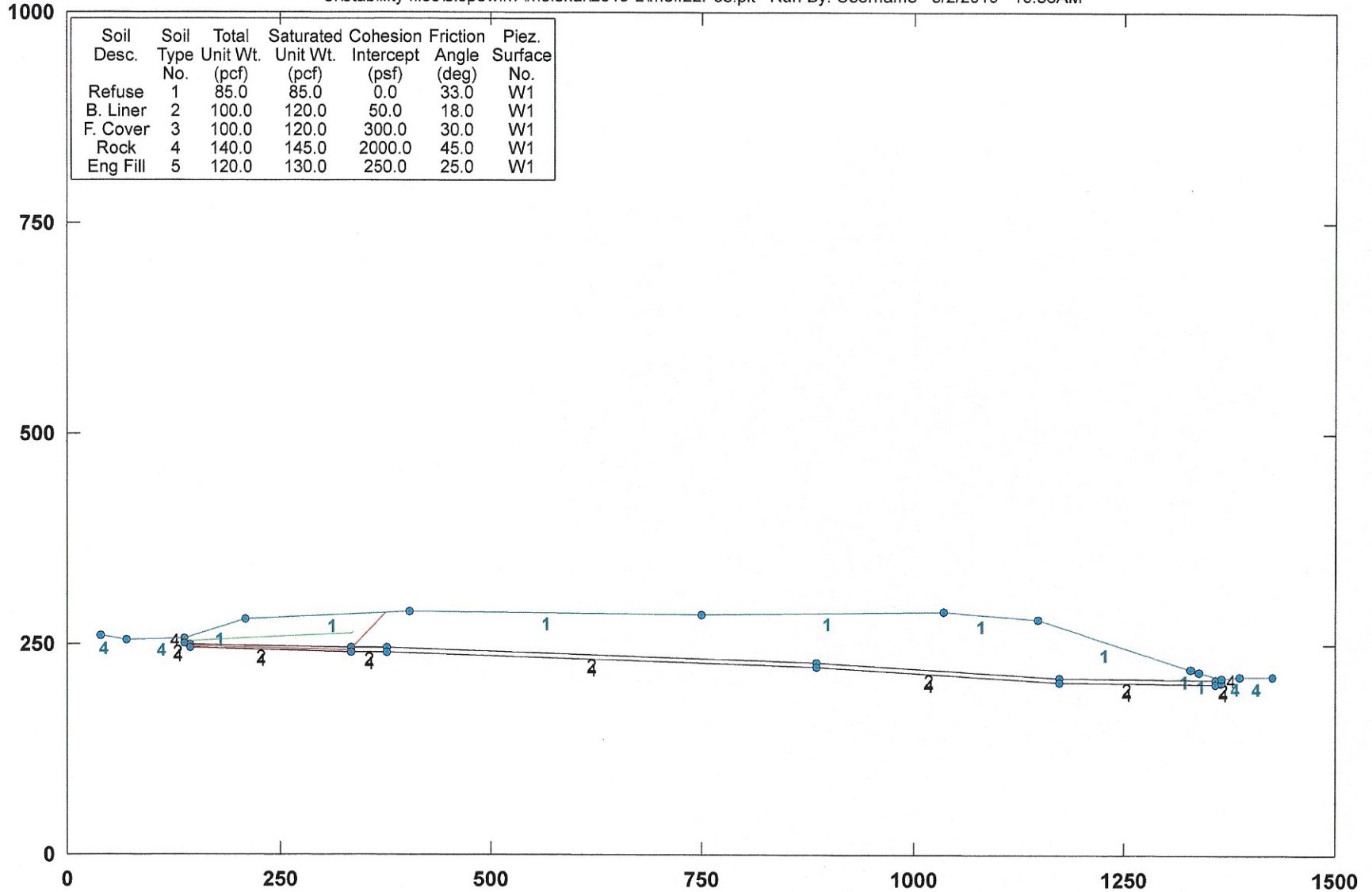
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

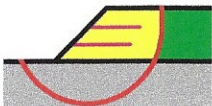
e:\stability files\slopewin7\molokai\2019-2\molof22r-5s.plt Run By: Username 5/2/2019 10:56AM



PCSTABL5M/si FSmin=5.64

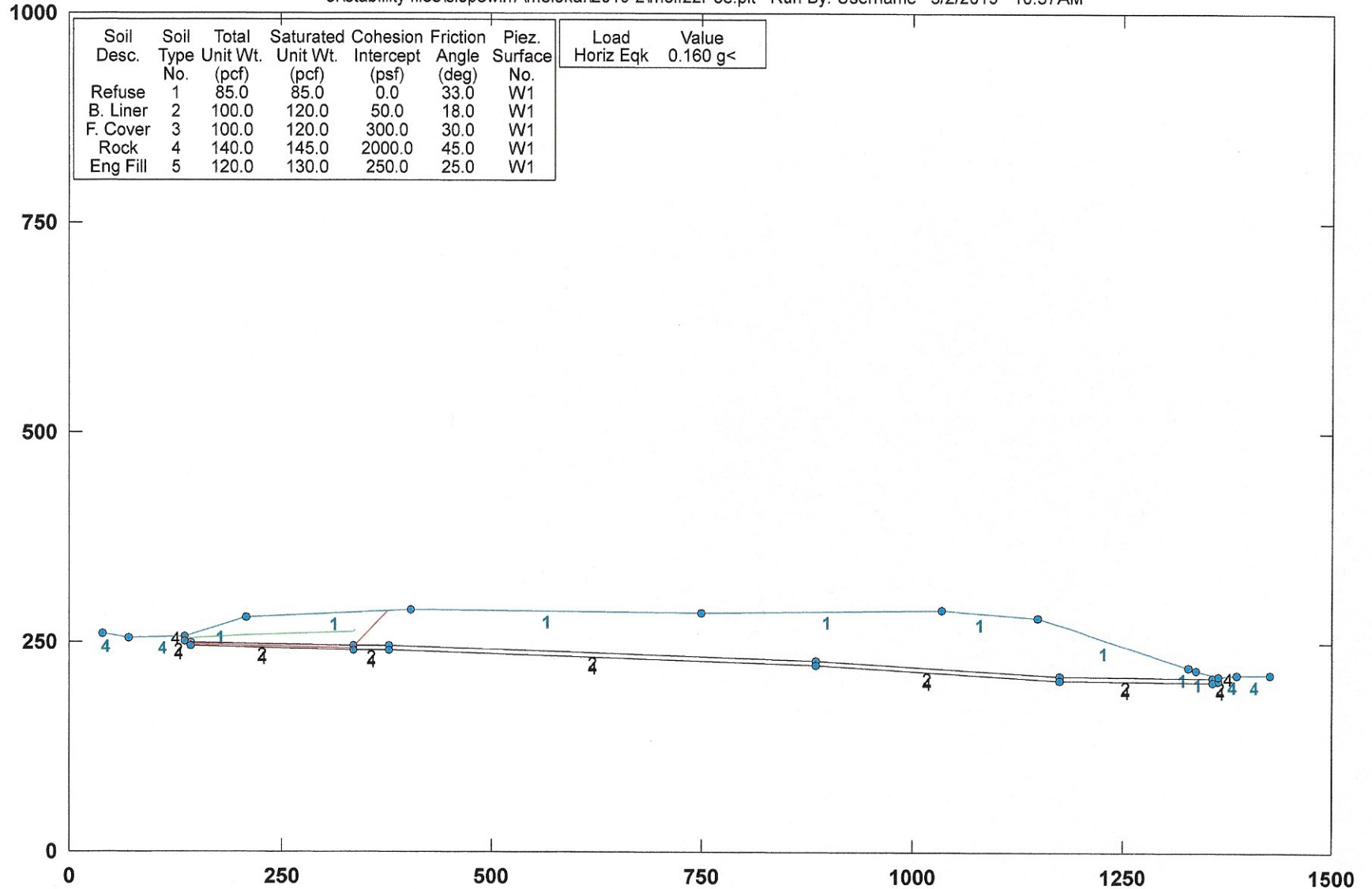
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

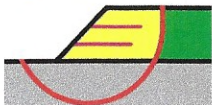
e:\stability files\slopewin7\molokai\2019-2\molf22r-5e.plt Run By: Username 5/2/2019 10:57AM



PCSTABL5M/si FSmin=1.79

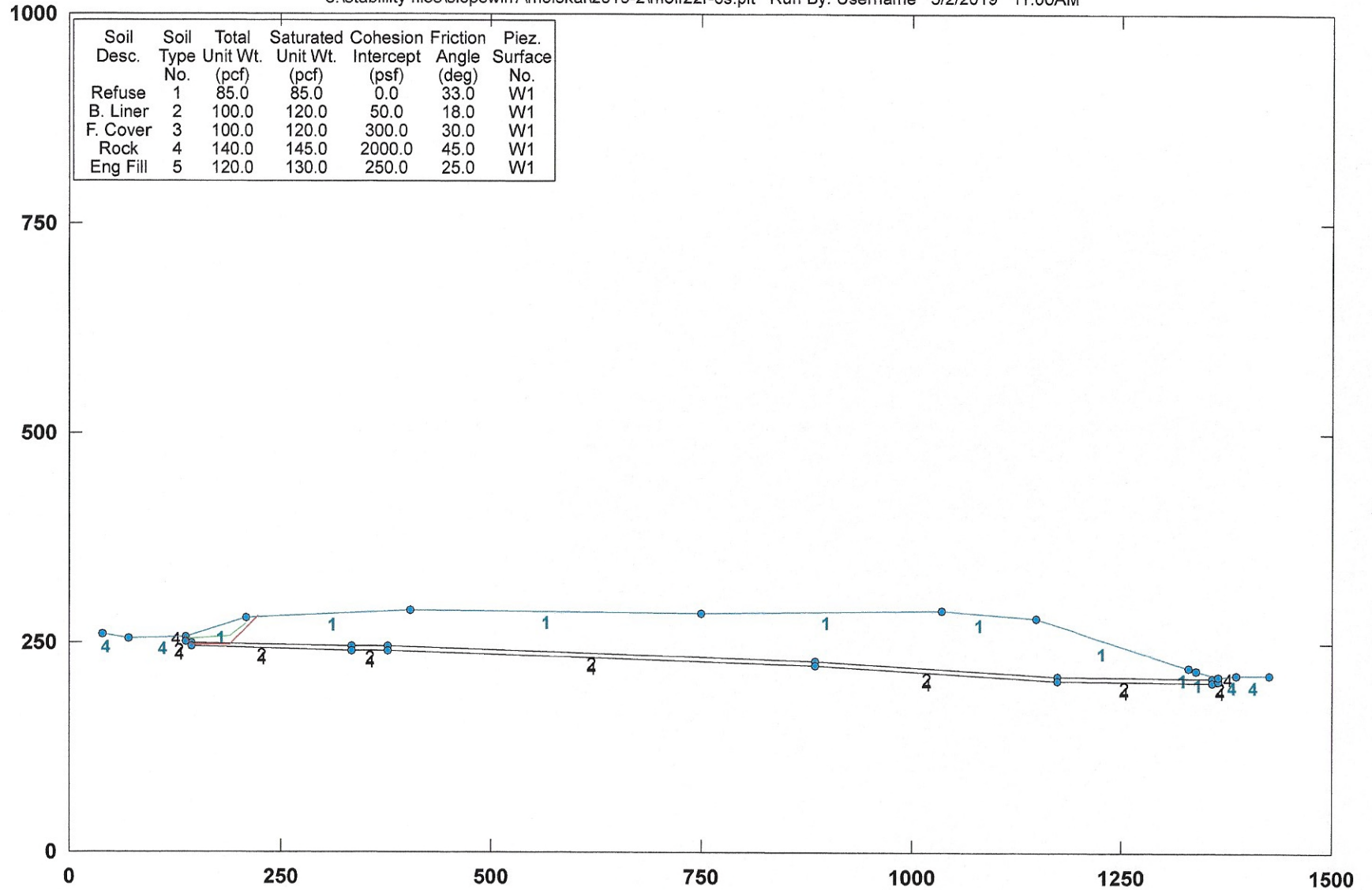
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

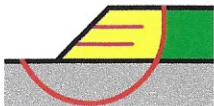
e:\stability files\slopewin7\molokai\2019-2\mol22r-6s.plt Run By: Username 5/2/2019 11:00AM



PCSTABL5M/si FSmin=2.83

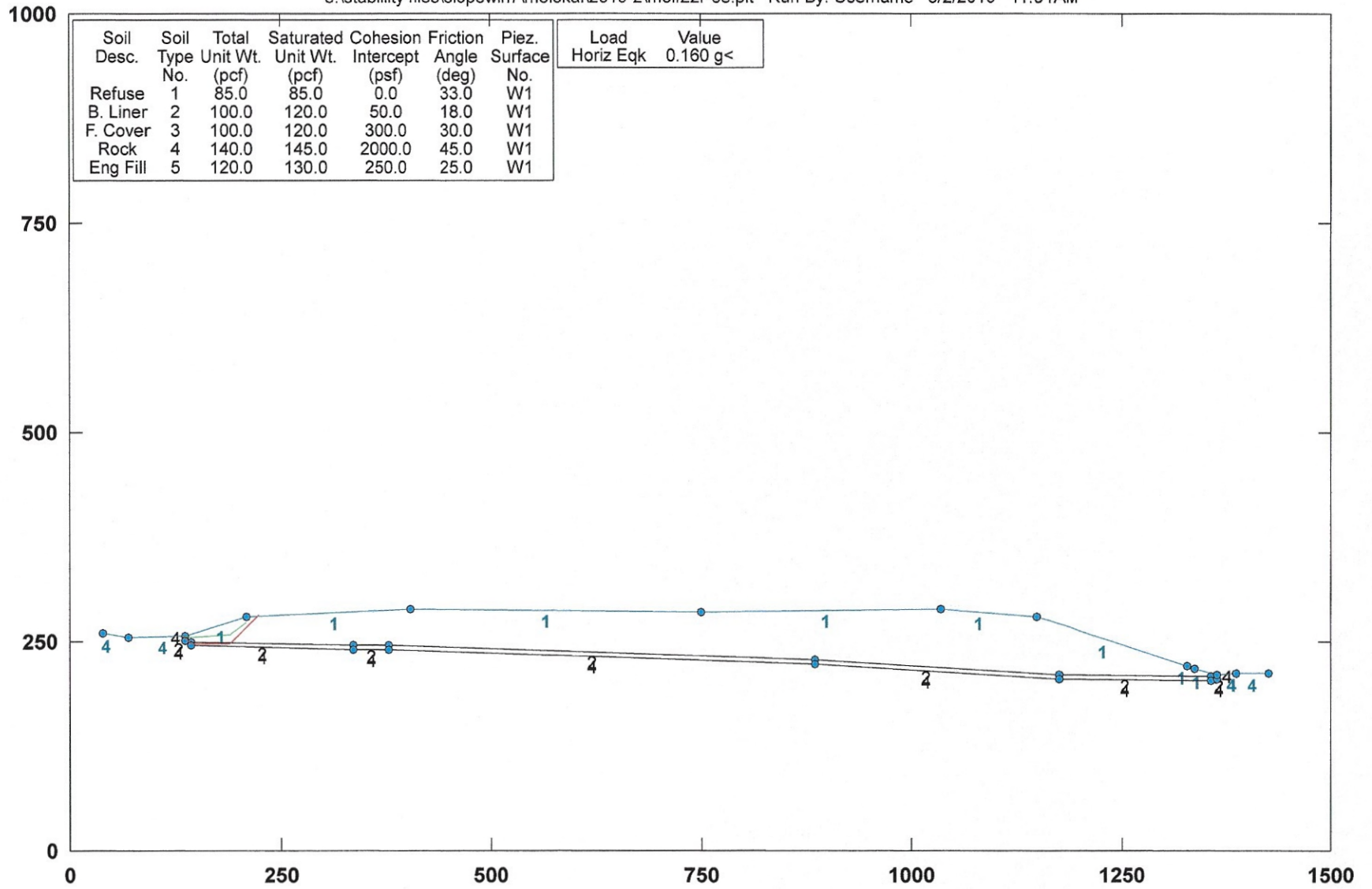
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

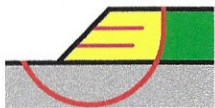
e:\stability files\slopewin7\molokai\2019-2\molf22r-6e.plt Run By: Username 5/2/2019 11:01AM



PCSTABL5M/si FSmin=1.66

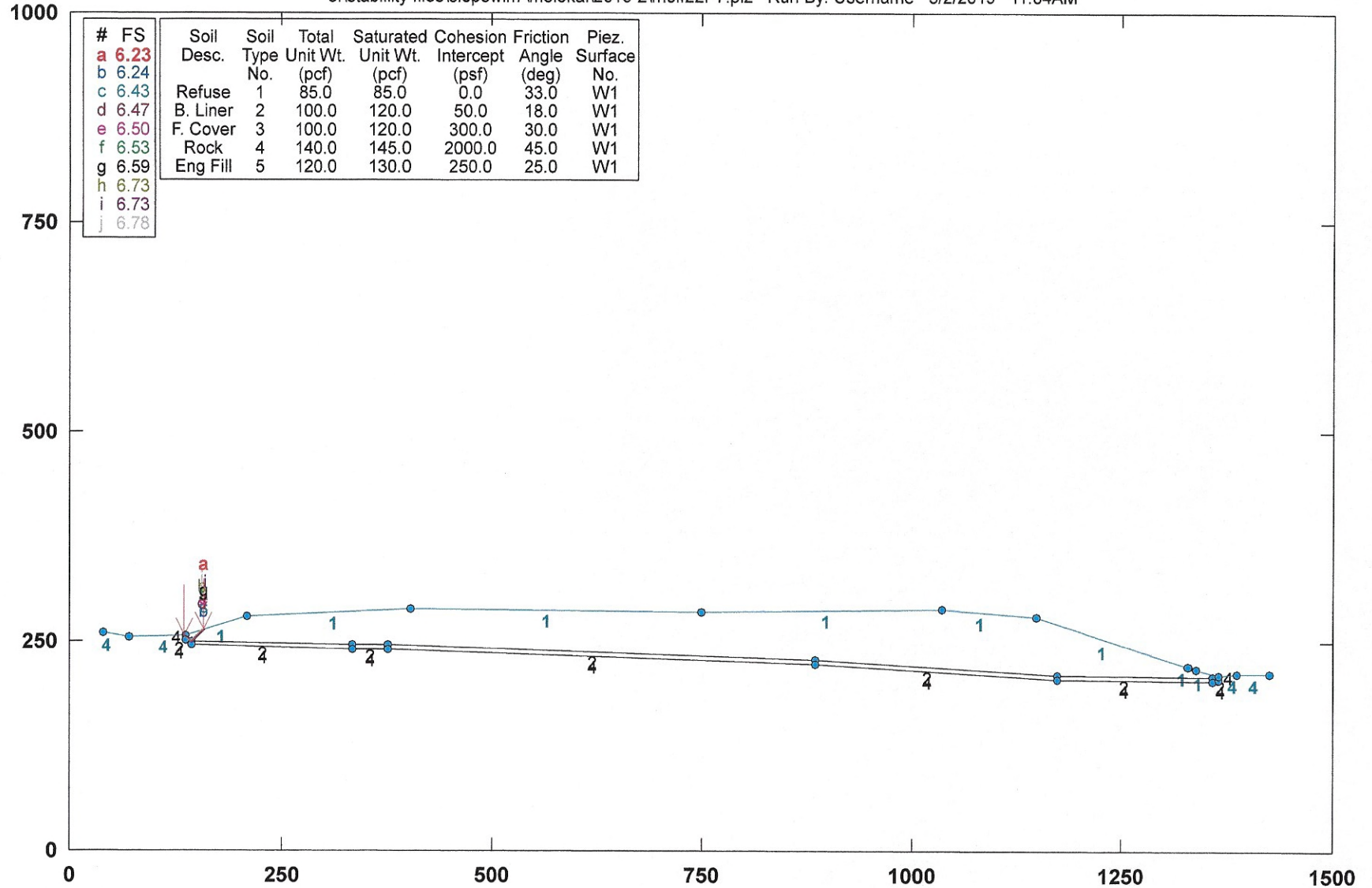
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 2-2 Static

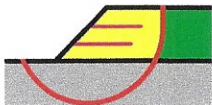
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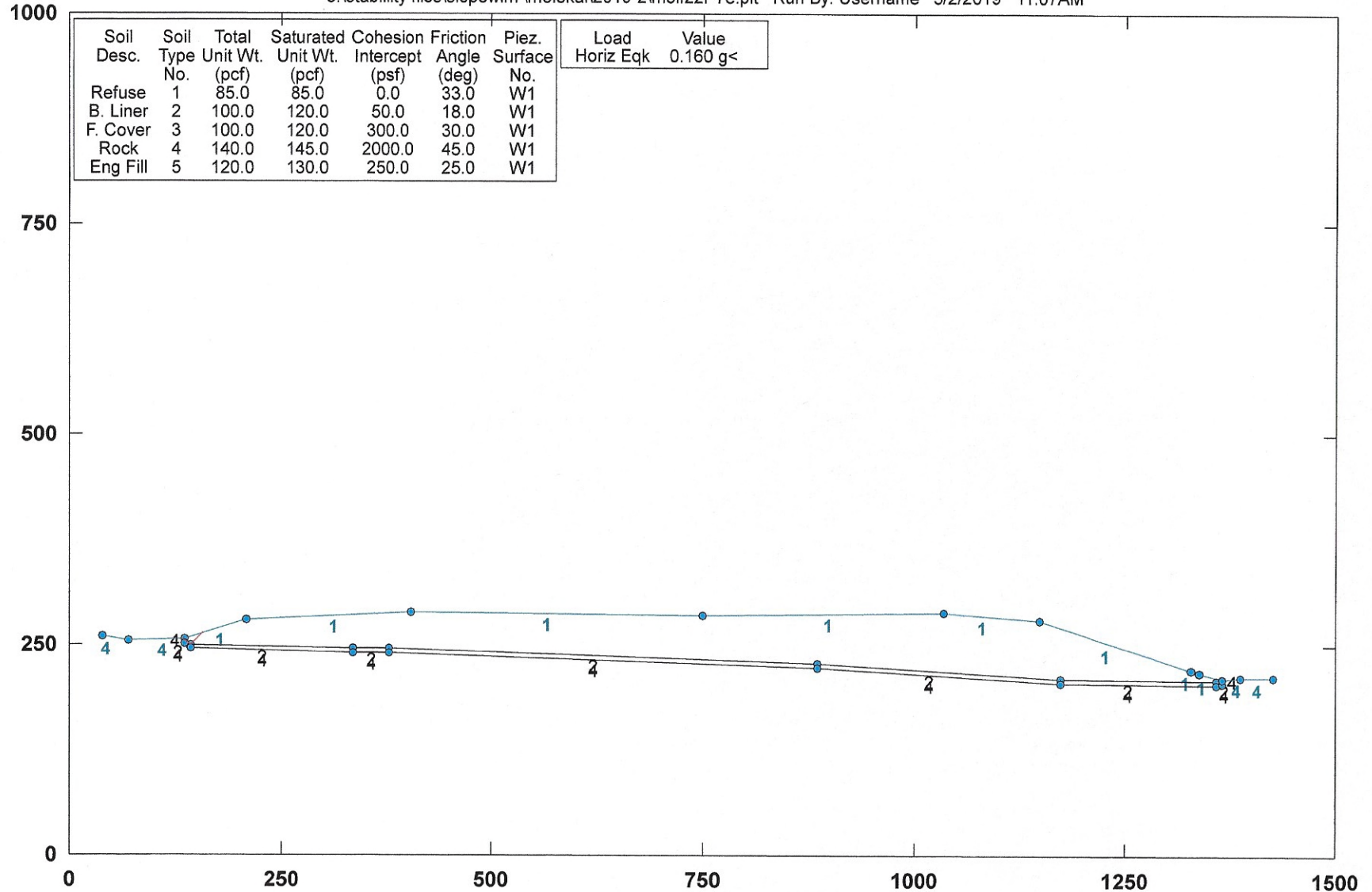
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 2-2 Pseudo-Static

e:\stability files\slopewin7\molokai\2019-2\molf22r-7e.plt Run By: Username 5/2/2019 11:07AM



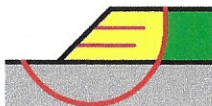
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

Load Horiz Eqk	Value
	0.160 g<

PCSTABL5M/si FSmin=4.12

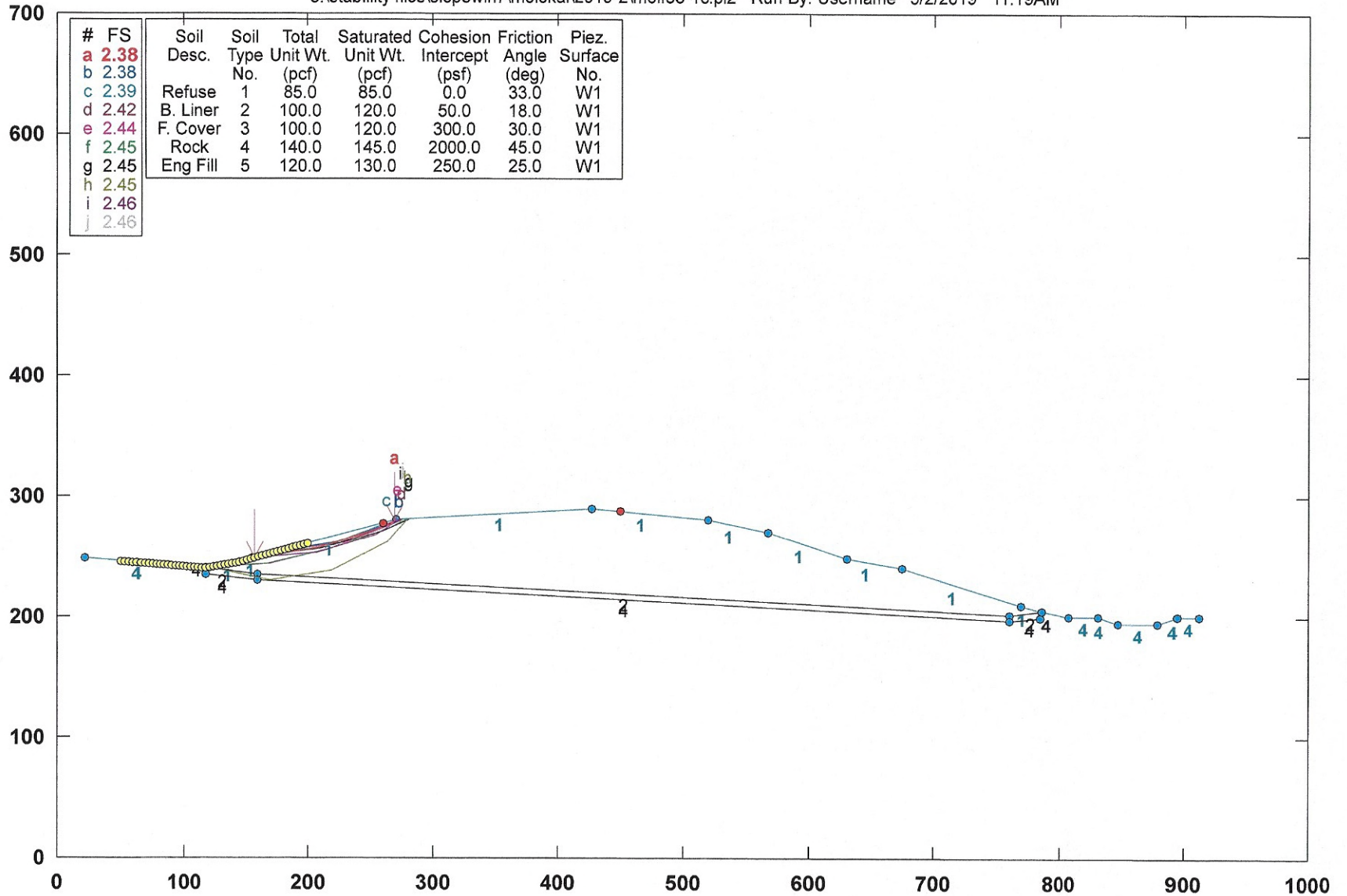
Factors of Safety Calculated by Janbu Method

STED

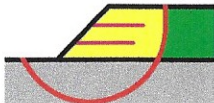


MOLF - Slope Stability Section 3-3 Static

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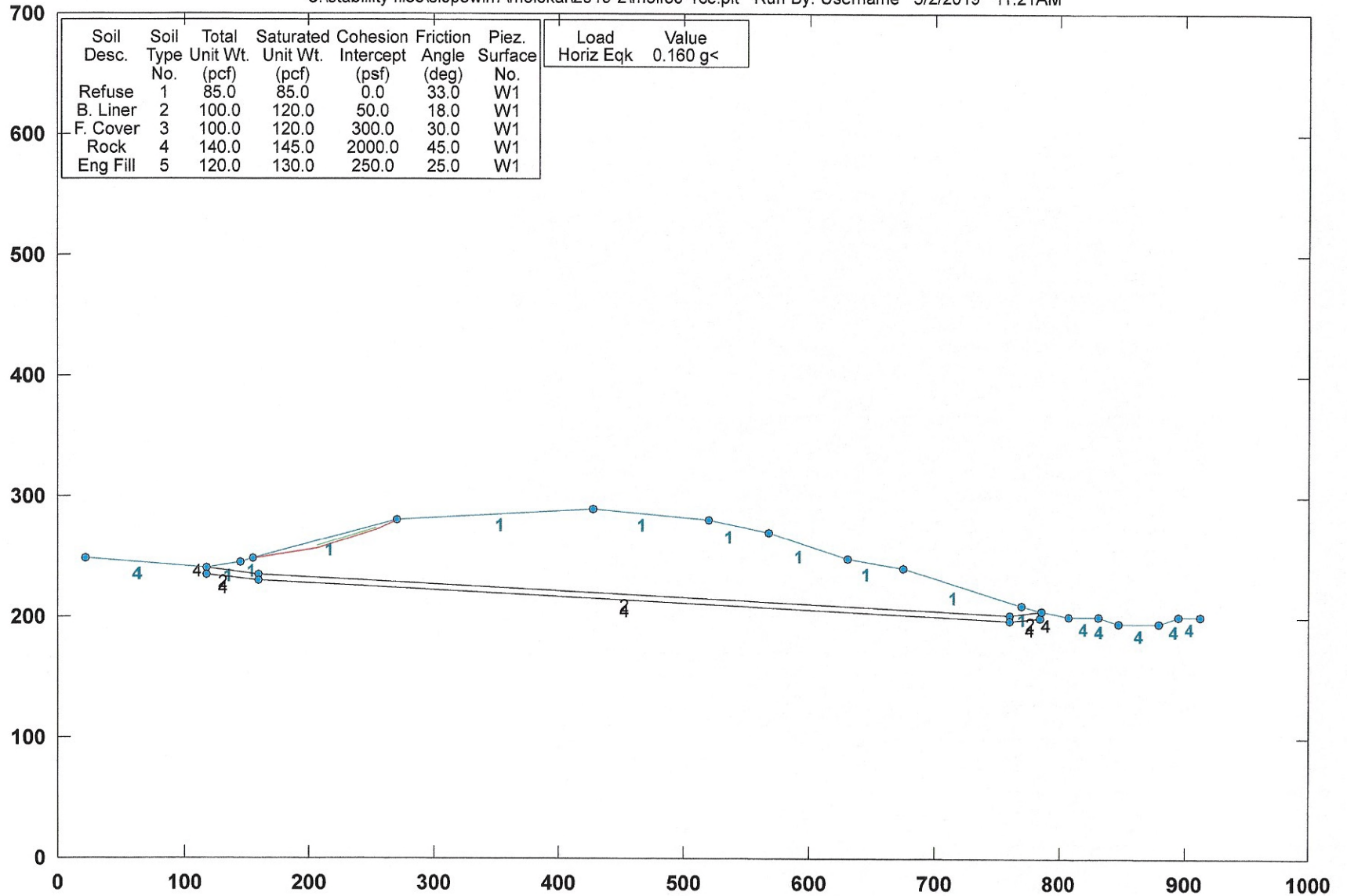
STED



PCSTABL5M/si FSmin=2.38
 Safety Factors Are Calculated By The Modified Bishop Method

MOLF - Slope Stability Section 3-3 Pseudo-Static

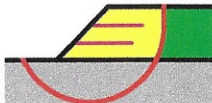
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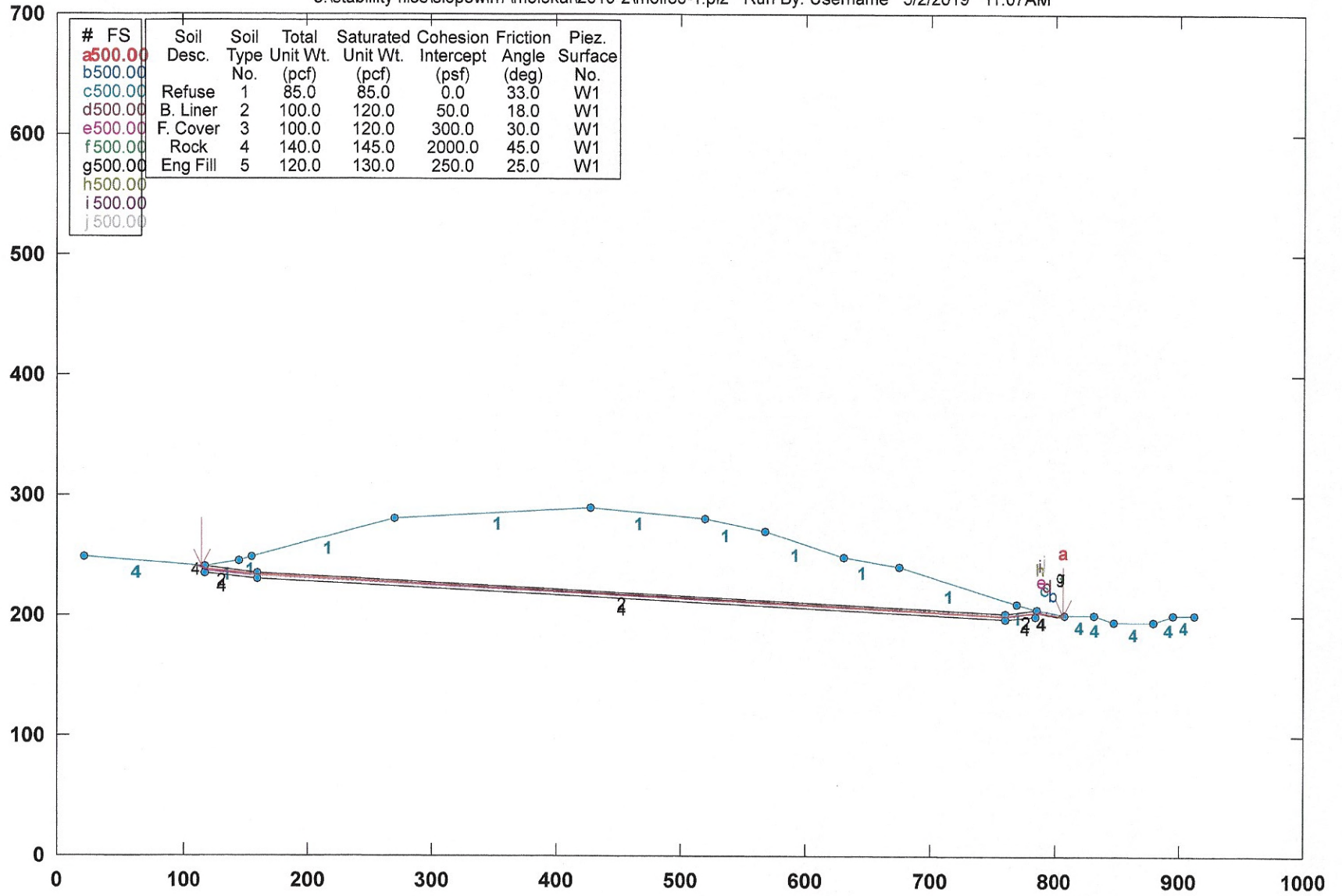
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Static

e:\stability files\slopewin7\molokai\2019-2\molf33-1.pl2 Run By: Username 5/2/2019 11:07AM



PCSTABL5M/si FSmin=500.00

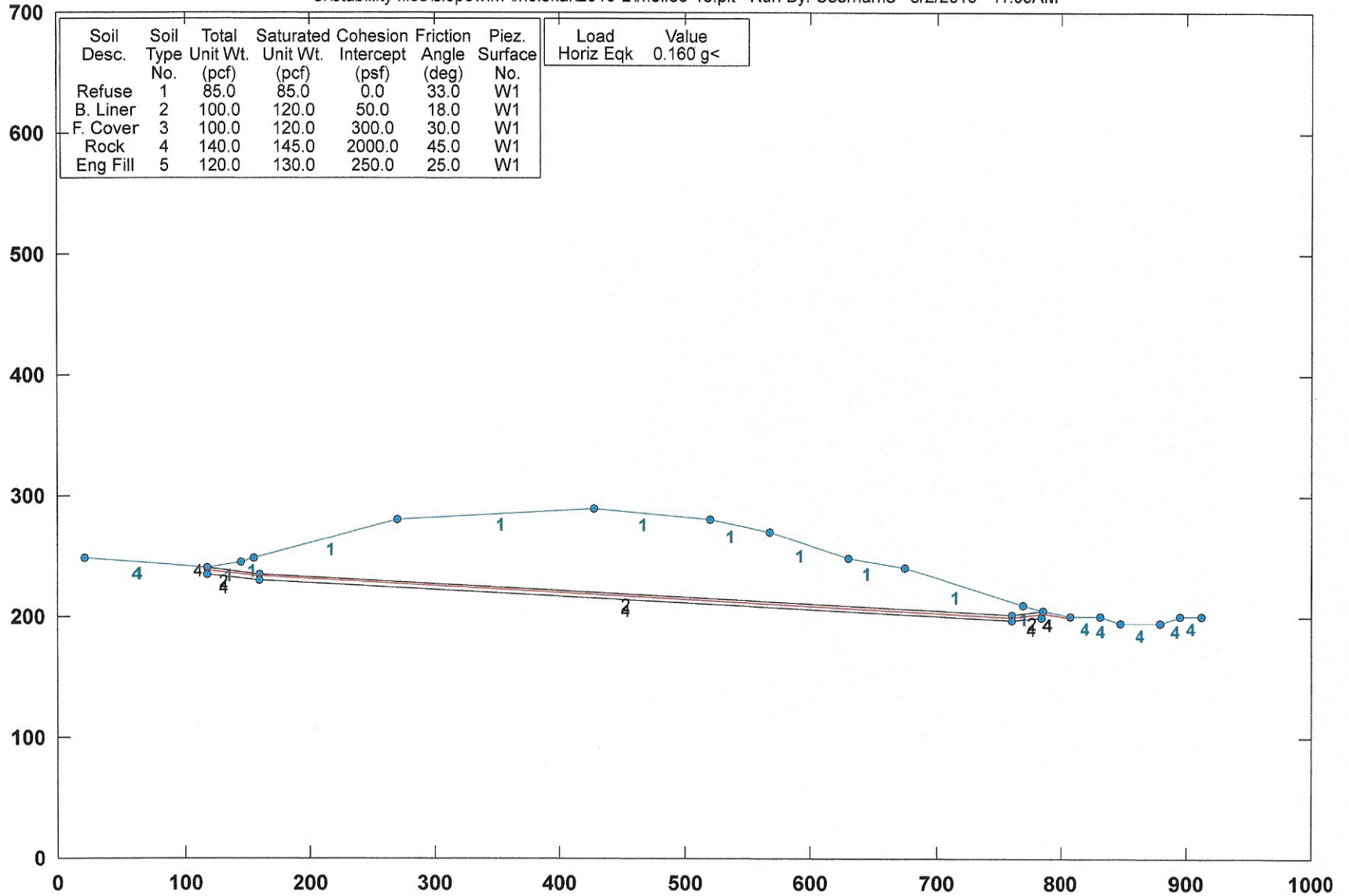
Safety Factors Are Calculated By The Modified Janbu Method

STED



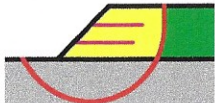
MOLF - Slope Stability Section 3-3 Pseudo-Static

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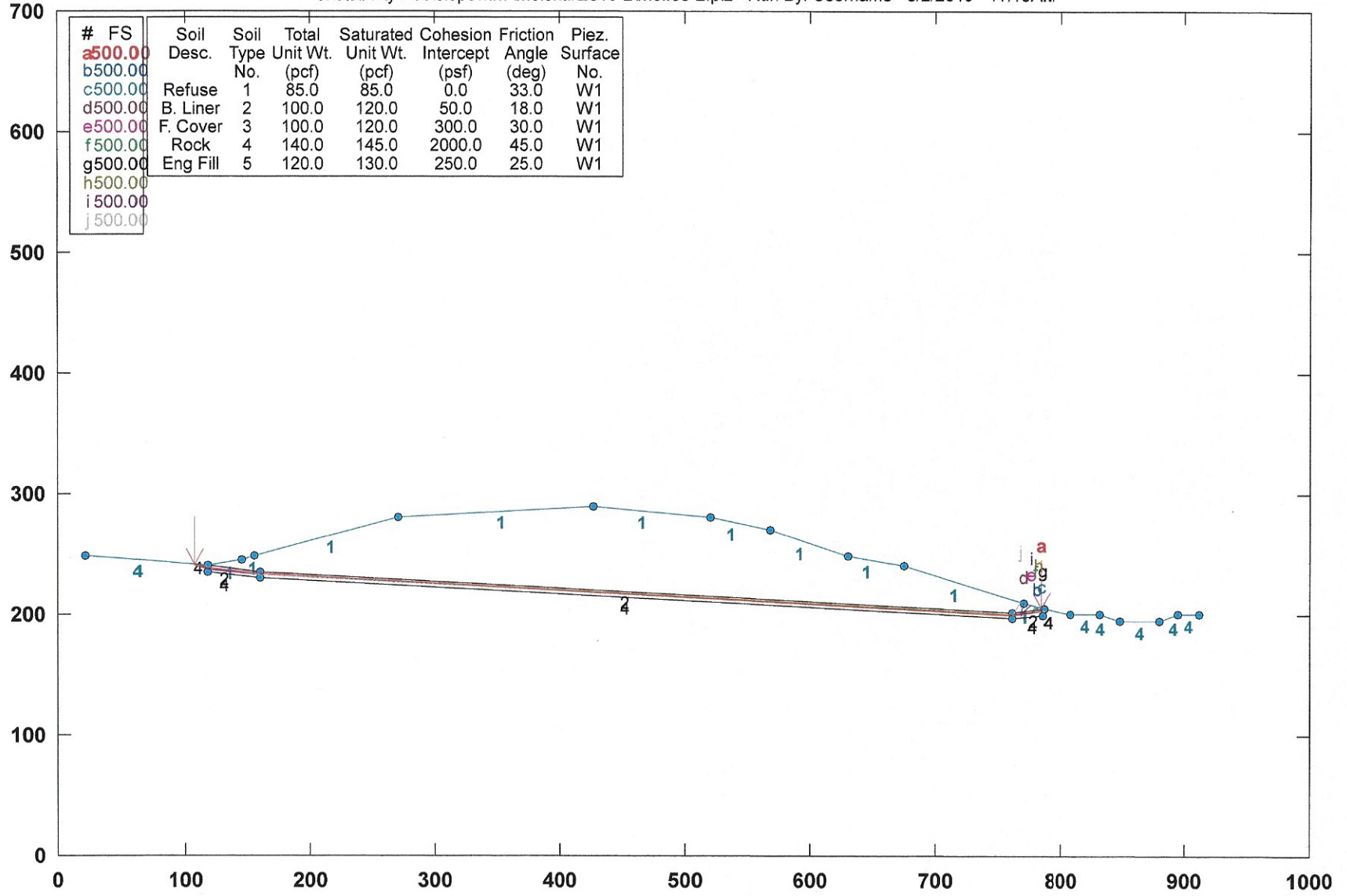
PCSTABL5M/si FSmin=3.53
 Factors of Safety Calculated by Janbu Method

STED



MOLF - Slope Stability Section 3-3 Static

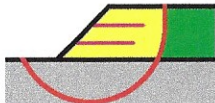
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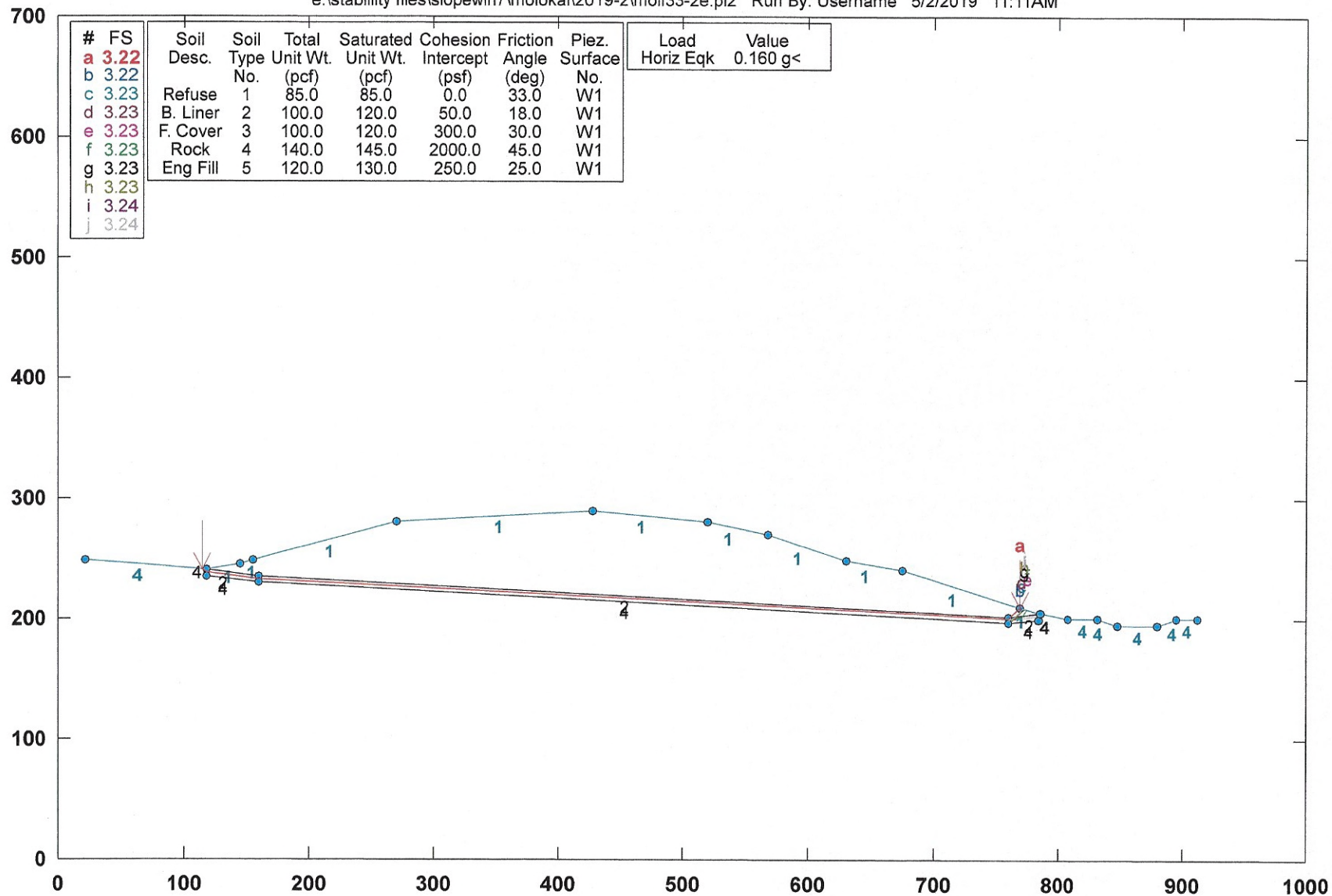
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 3-3 Pseudo-Static

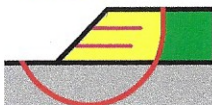
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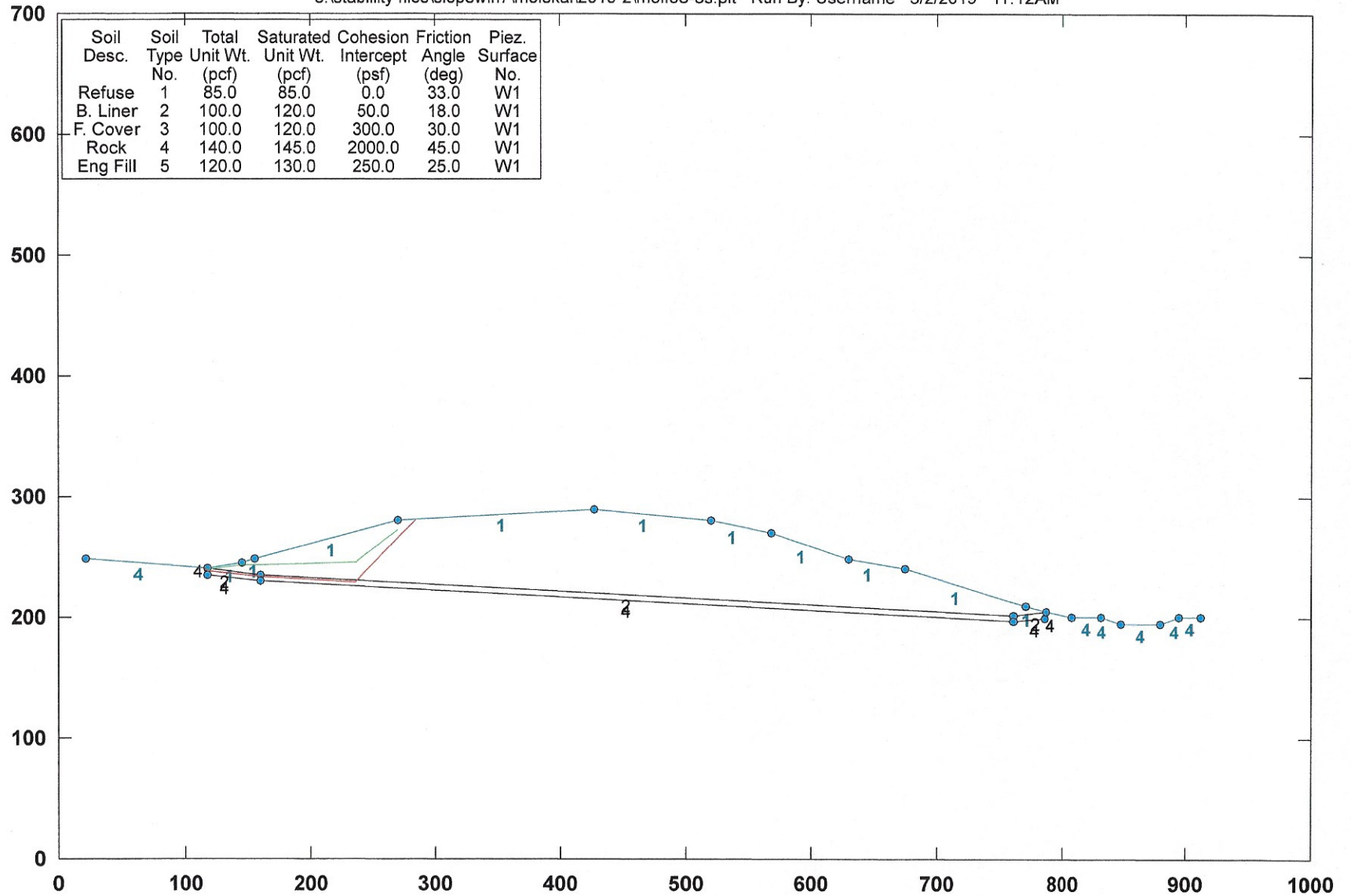
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 3-3 Static

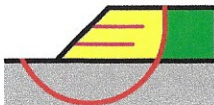
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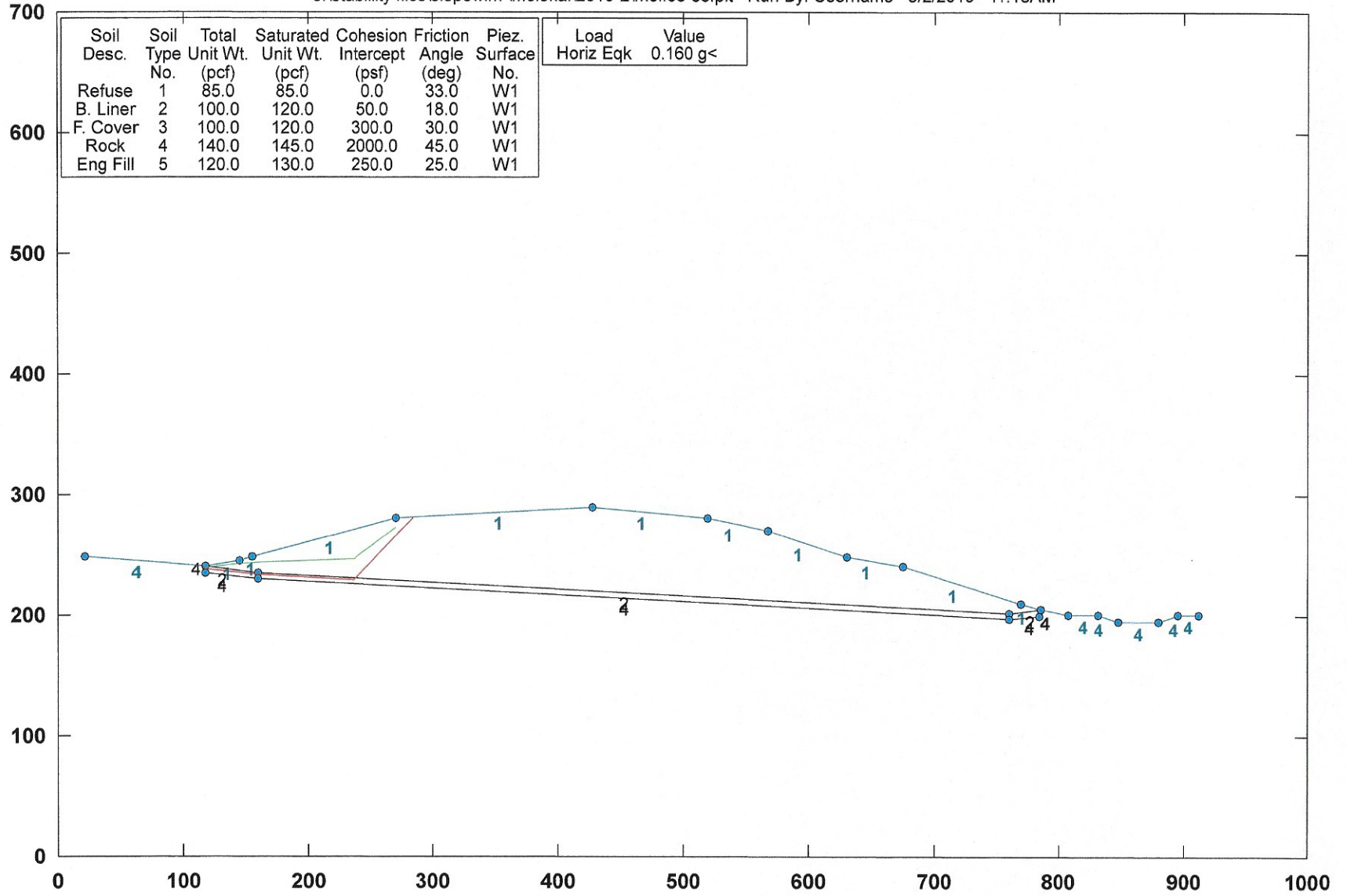
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Pseudo-Static

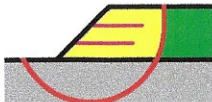
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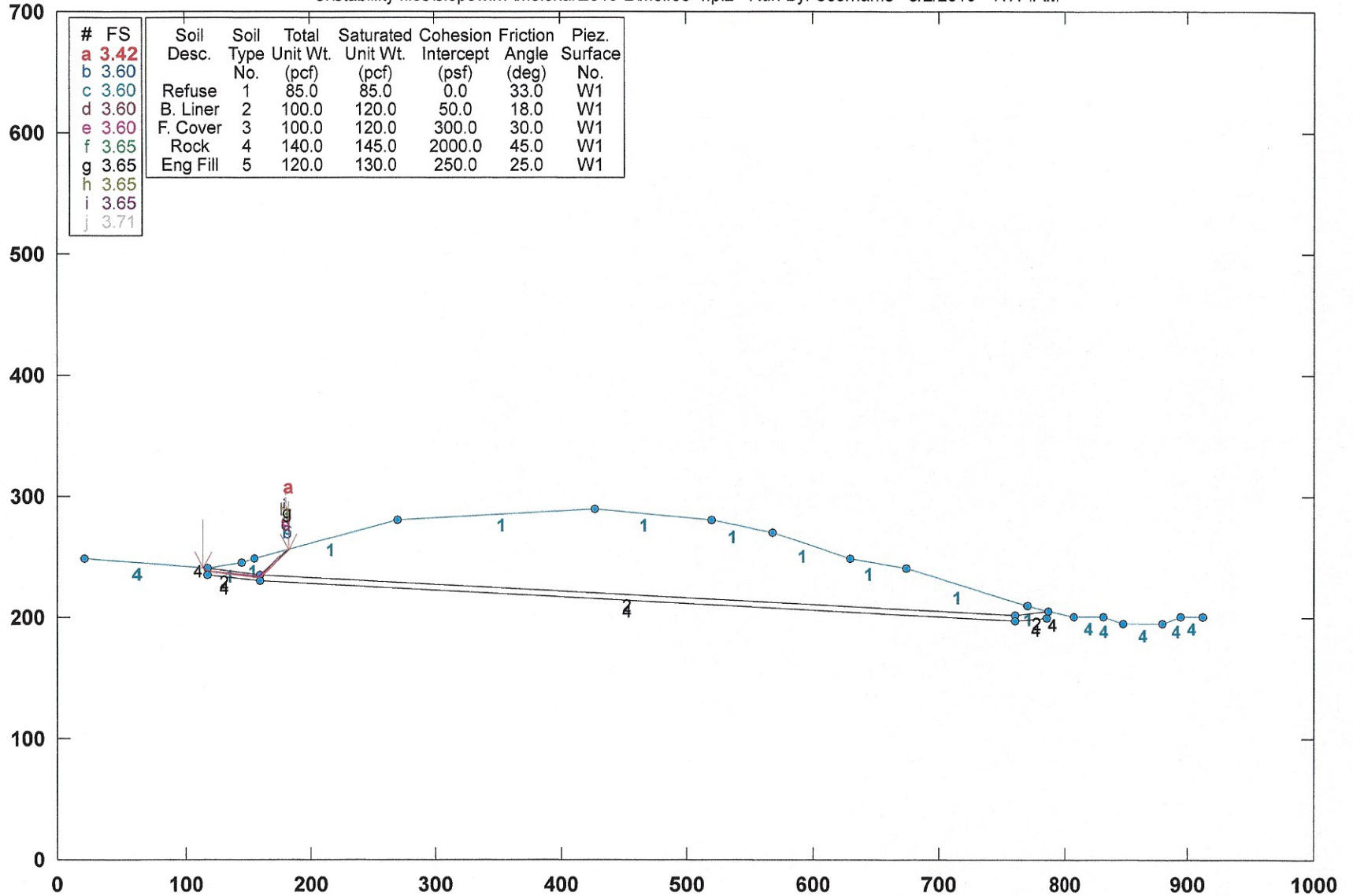
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED

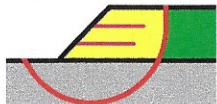


MOLF - Slope Stability Section 3-3 Static

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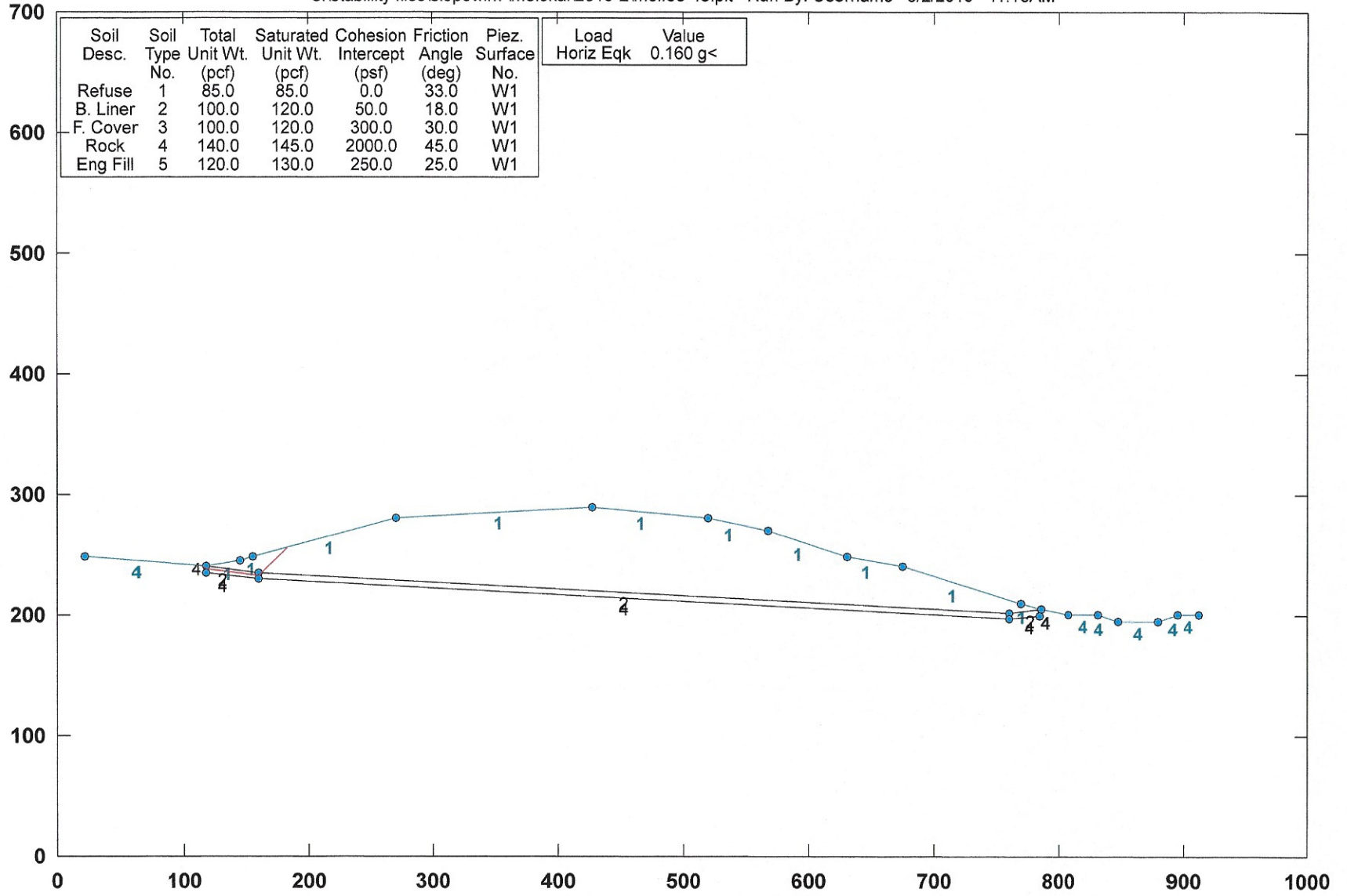
STED



PCSTABL5M/si FSmin=3.42
Safety Factors Are Calculated By The Modified Janbu Method

MOLF - Slope Stability Section 3-3 Pseudo-Static

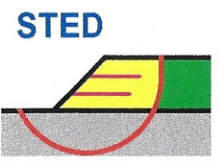
e:\stability files\slopewin7\molokai\2019-2\molf33-4e.plt Run By: Username 5/2/2019 11:16AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

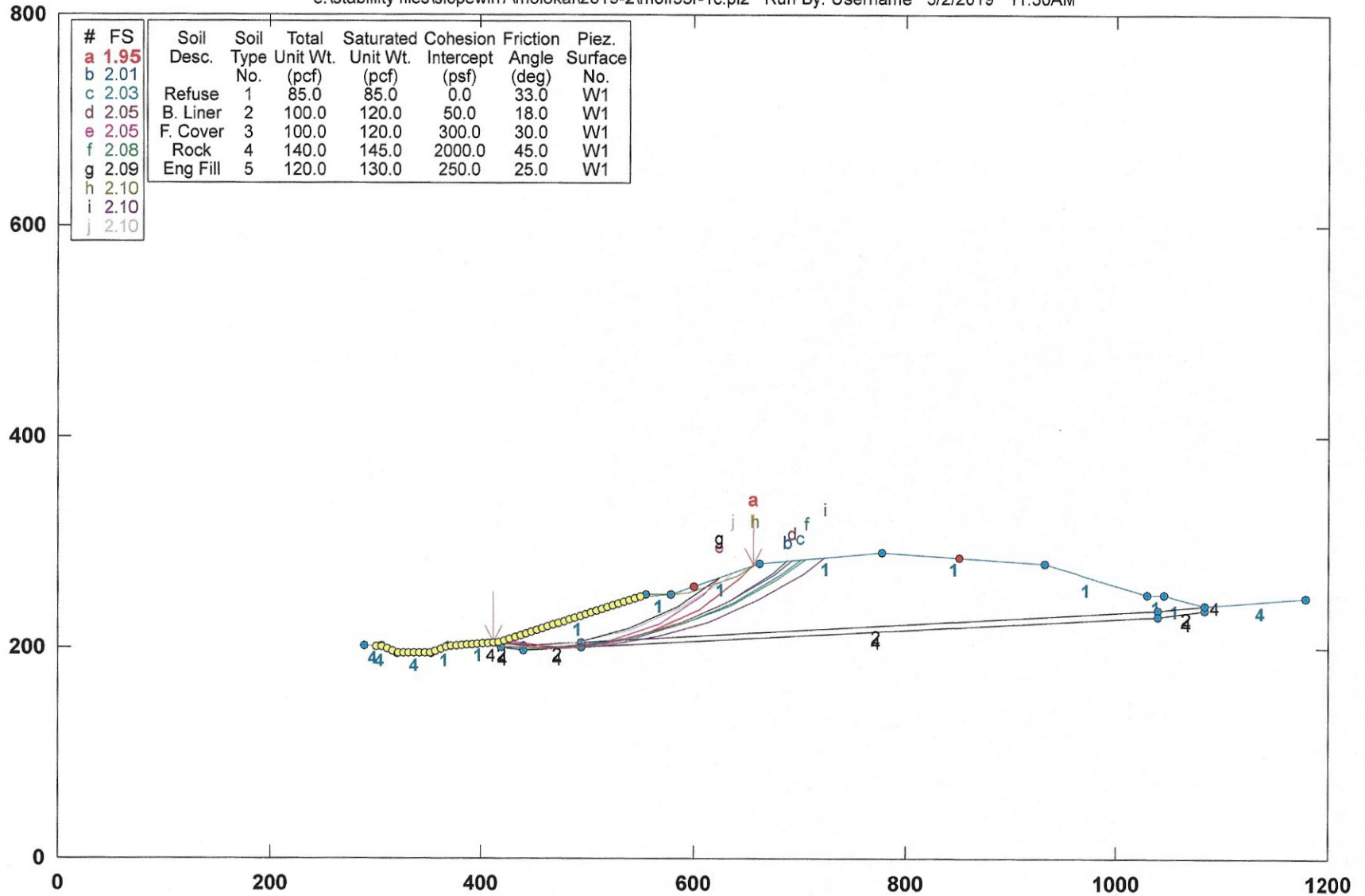
Load Horiz Eqk	Value
	0.160 g<

PCSTABL5M/si FSmin=2.08
 Factors of Safety Calculated by Janbu Method



MOLF - Slope Stability Section 3-3 Static

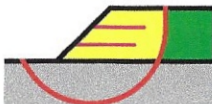
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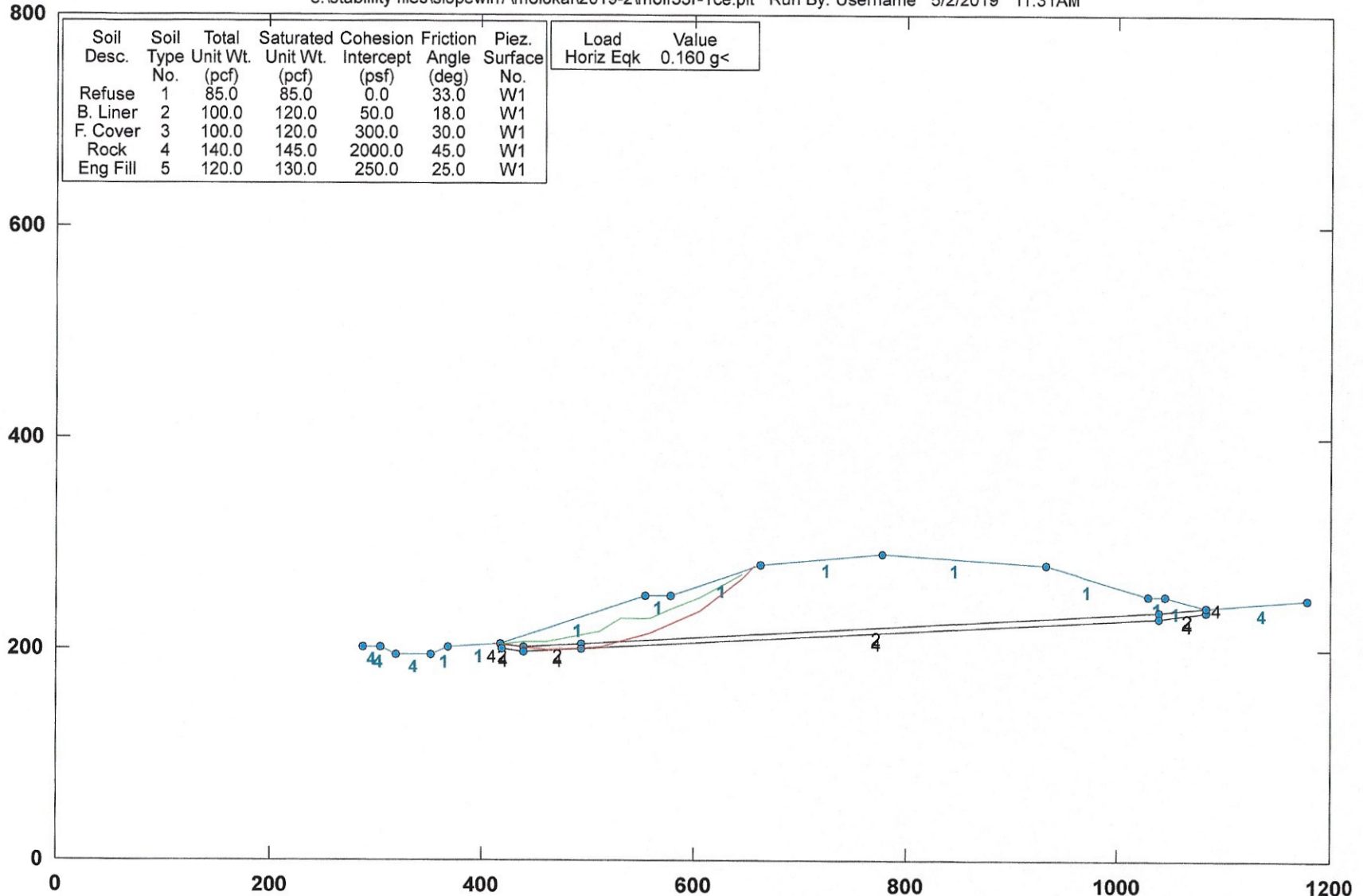
Safety Factors Are Calculated By The Modified Bishop Method

STED



MOLF - Slope Stability Section 3-3 Pseudo-Static

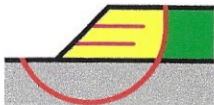
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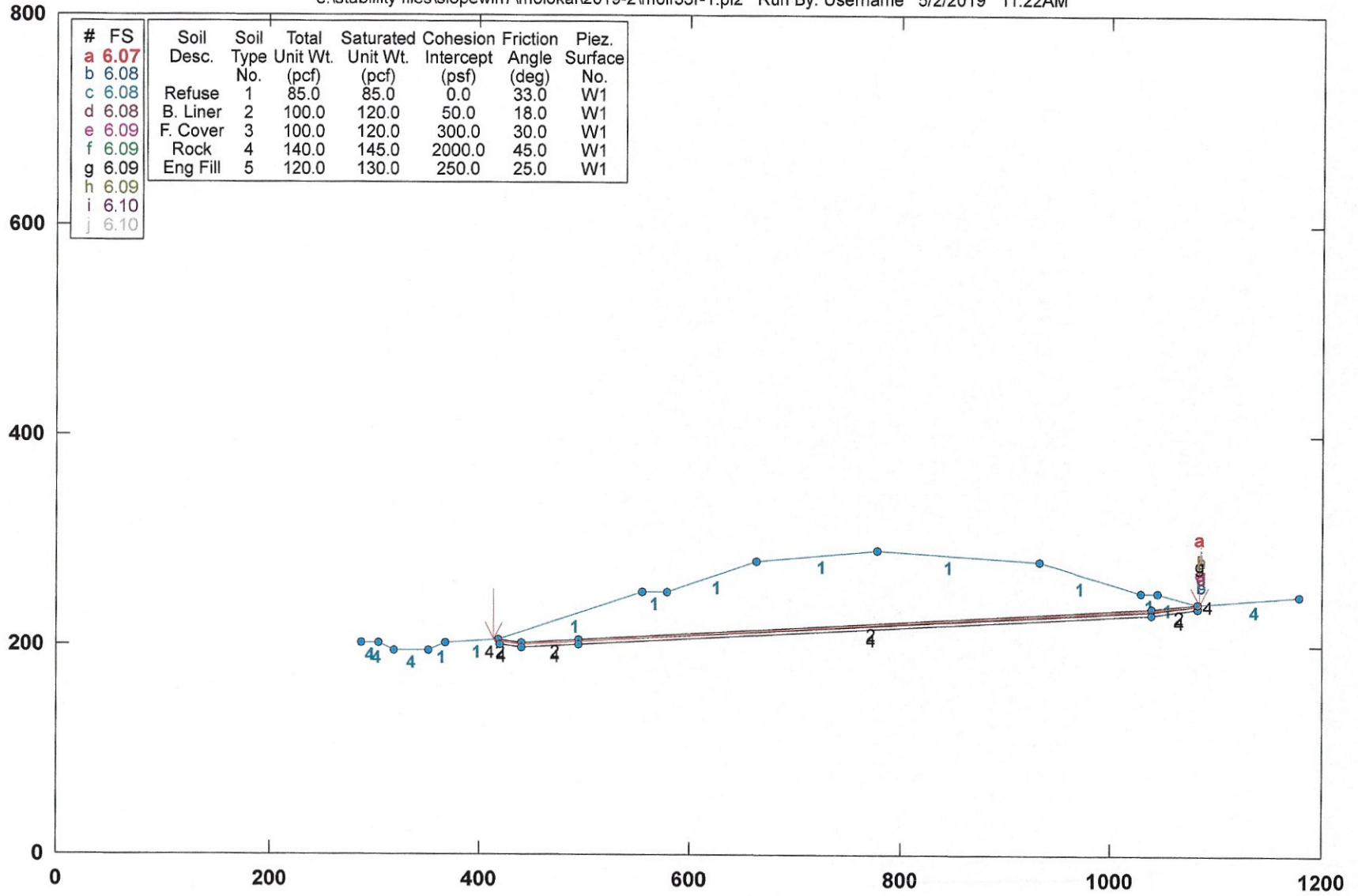
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Static

e:\stability files\slopewin7\molokai\2019-2\mol33r-1.pl2 Run By: Username 5/2/2019 11:22AM

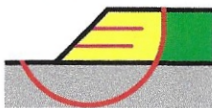


#	FS	Soil Desc.	Soil Type	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface
a	6.07							
b	6.08							
c	6.08	Refuse	1	85.0	85.0	0.0	33.0	W1
d	6.08	B. Liner	2	100.0	120.0	50.0	18.0	W1
e	6.09	F. Cover	3	100.0	120.0	300.0	30.0	W1
f	6.09	Rock	4	140.0	145.0	2000.0	45.0	W1
g	6.09	Eng Fill	5	120.0	130.0	250.0	25.0	W1
h	6.09							
i	6.10							
j	6.10							

PCSTABL5M/si FSmin=6.07

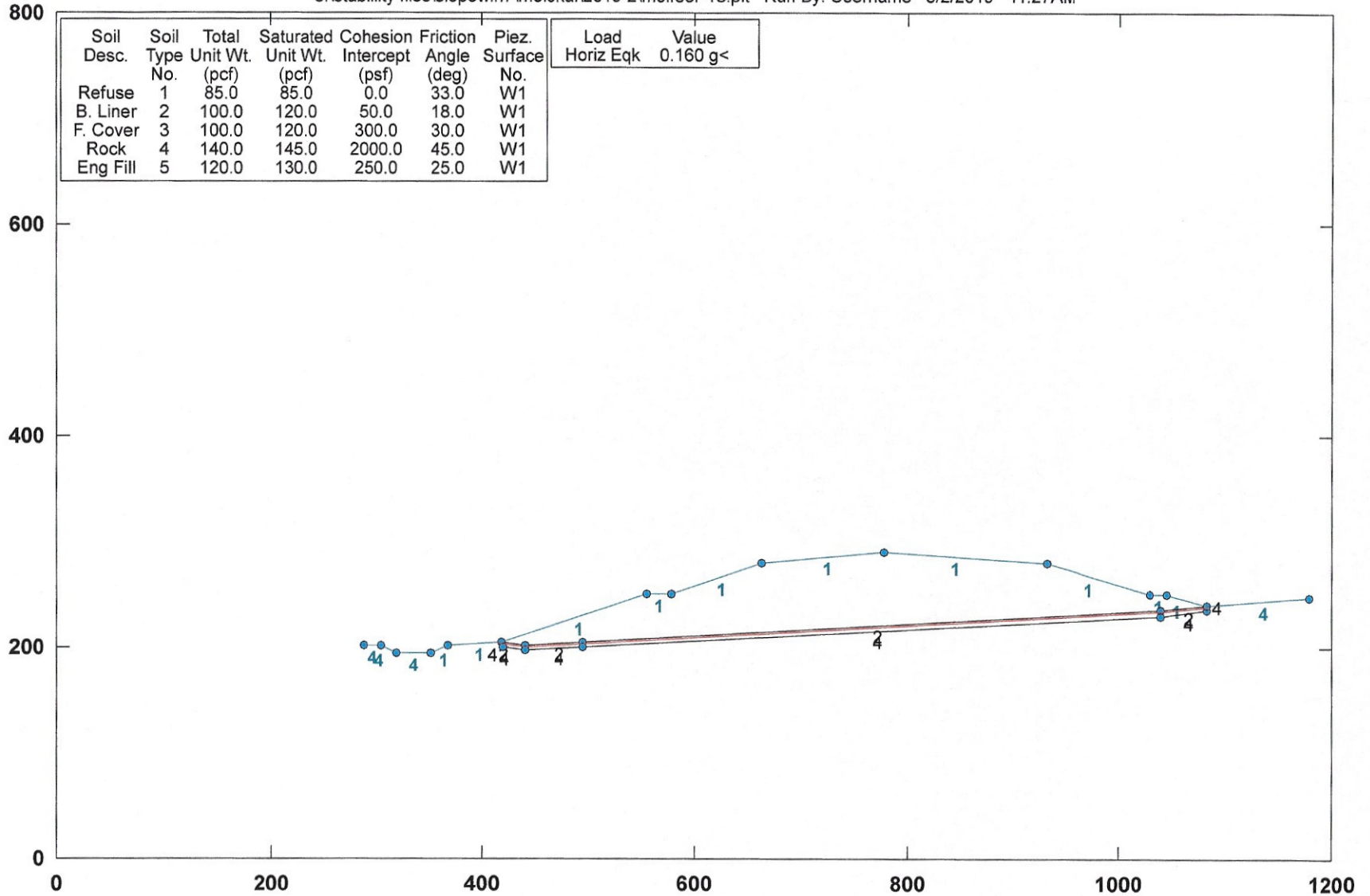
Safety Factors Are Calculated By The Modified Janbu Method

STED



MOLF - Slope Stability Section 3-3 Pseudo-Static

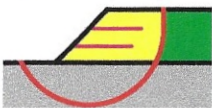
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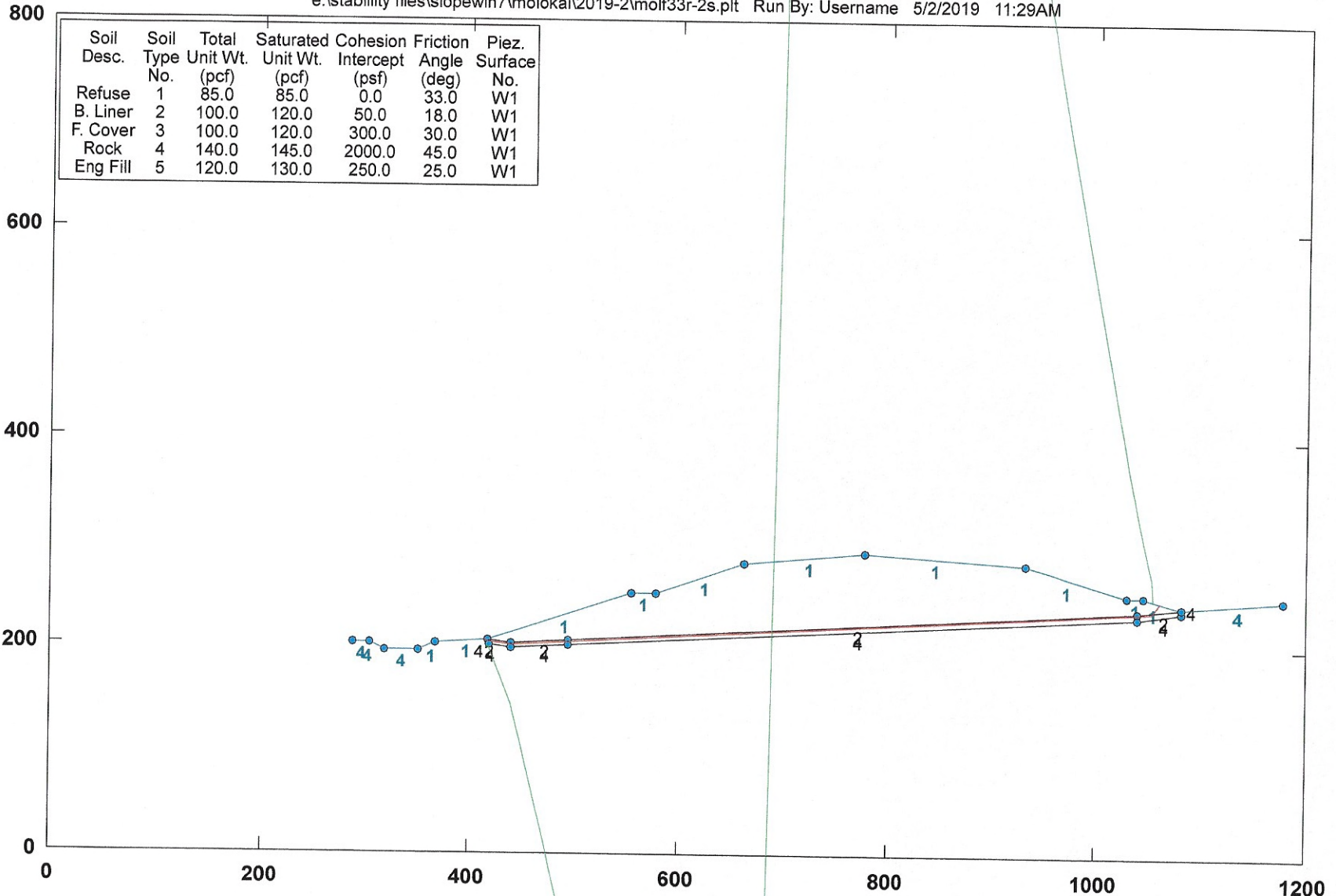
Factors of Safety Calculated by Janbu Method

STED



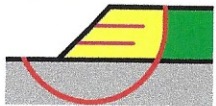
MOLF - Slope Stability Section 3-3 Static

e:\stability files\slopewin7\molokai\2019-2\molf33r-2s.plt Run By: Username 5/2/2019 11:29AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

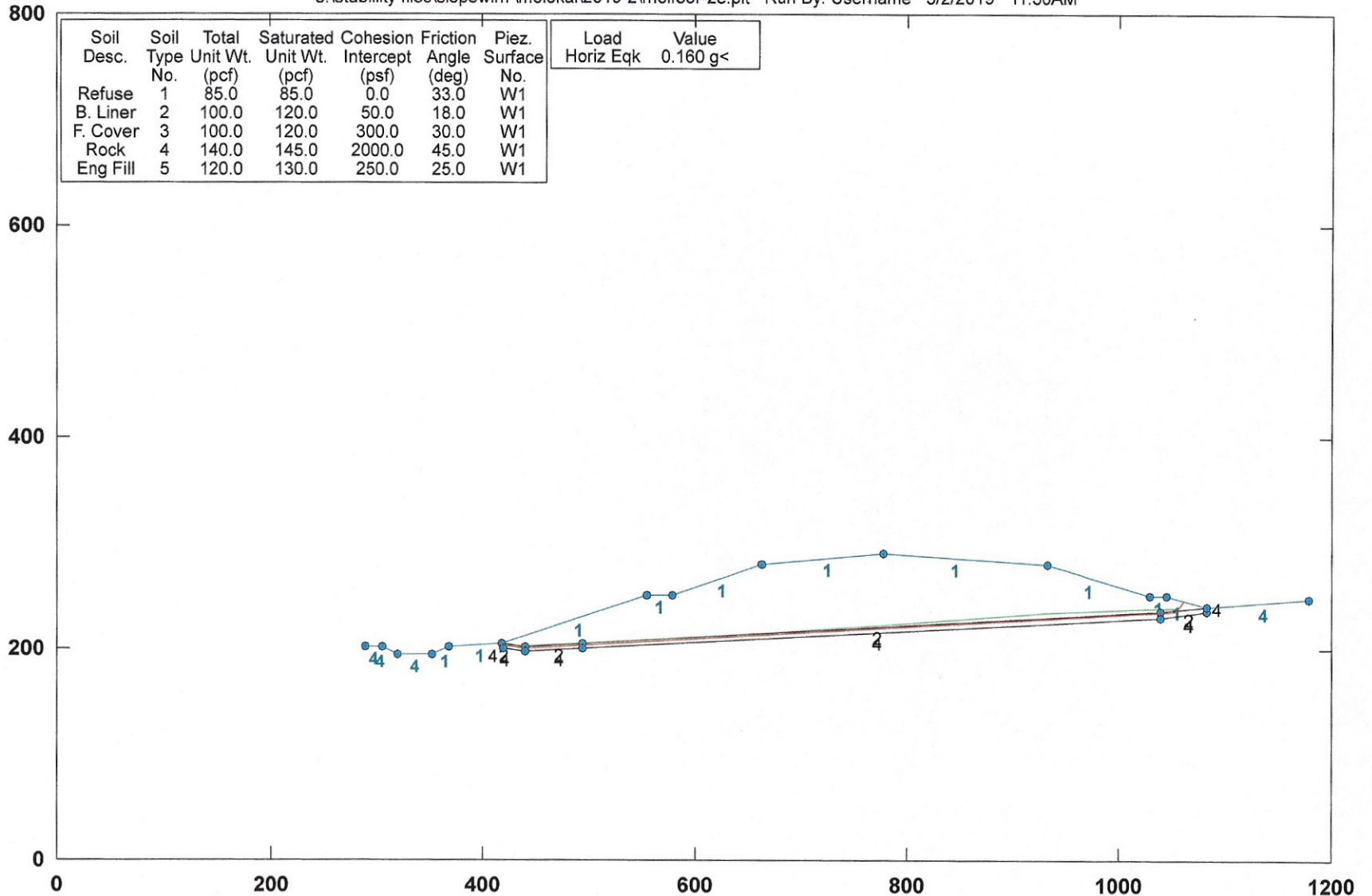
STED



PCSTABL5M/si FSmin=5.95
Factor Of Safety Is Calculated By Spencer's Method of Slices

MOLF - Slope Stability Section 3-3 Pseudo-Static

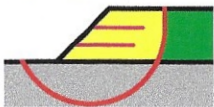
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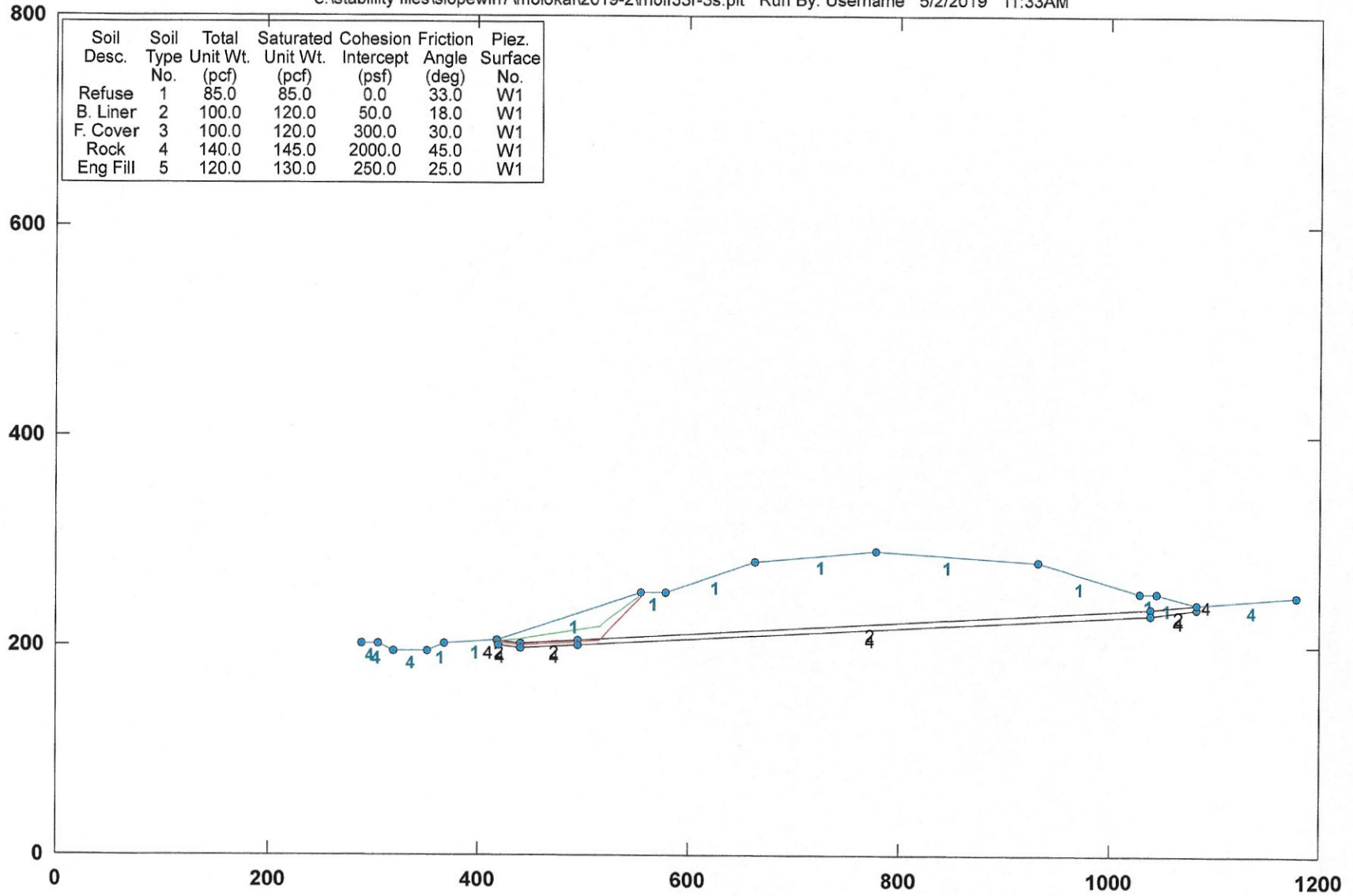
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Static

e:\stability files\slopewin7\molokai\2019-2\molf33r-3s.plt Run By: Username 5/2/2019 11:33AM

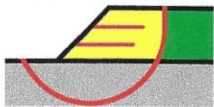


Soil Desc.	Soil No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

PCSTABL5M/si FSmin=1.80

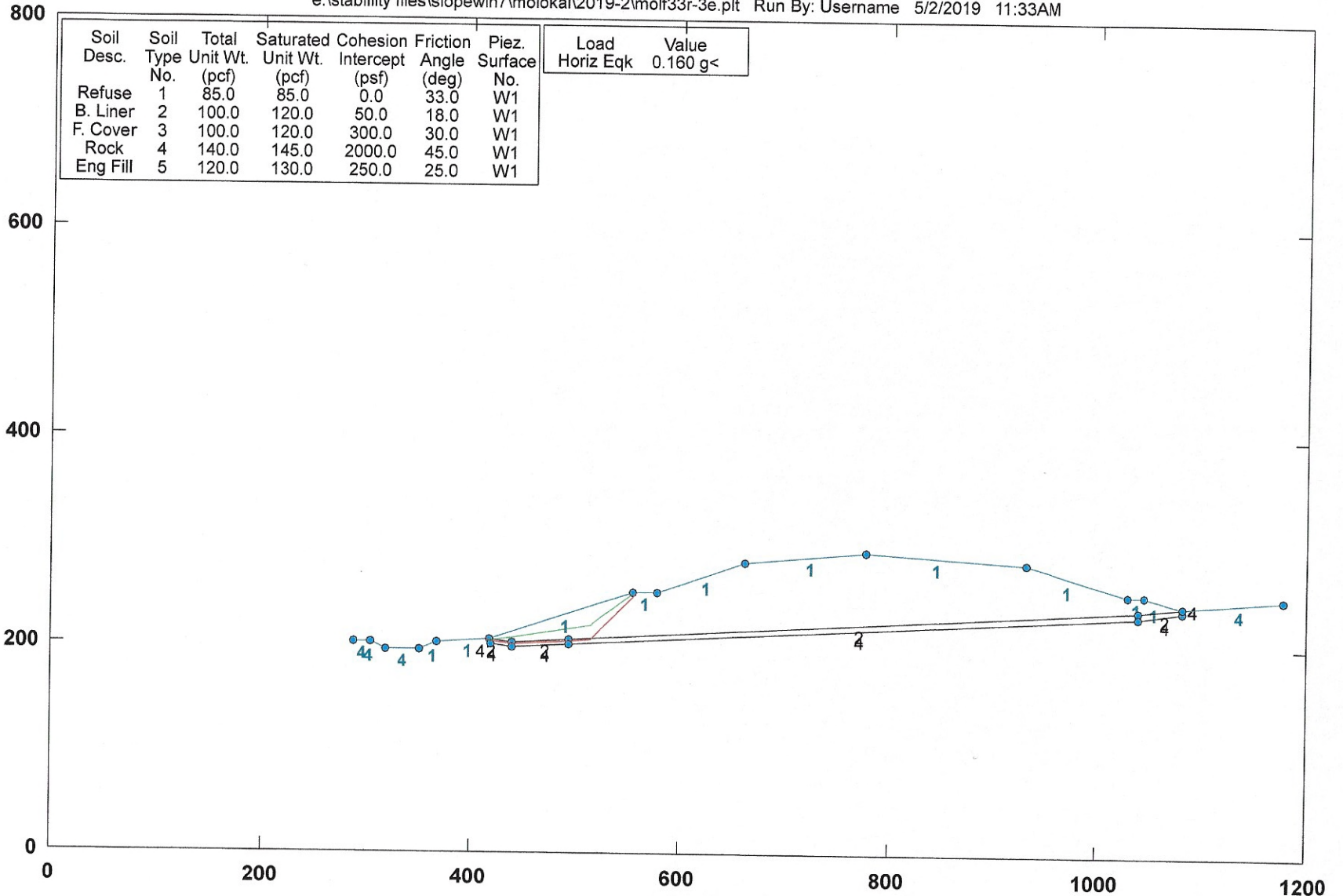
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Pseudo-Static

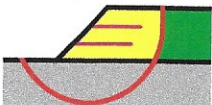
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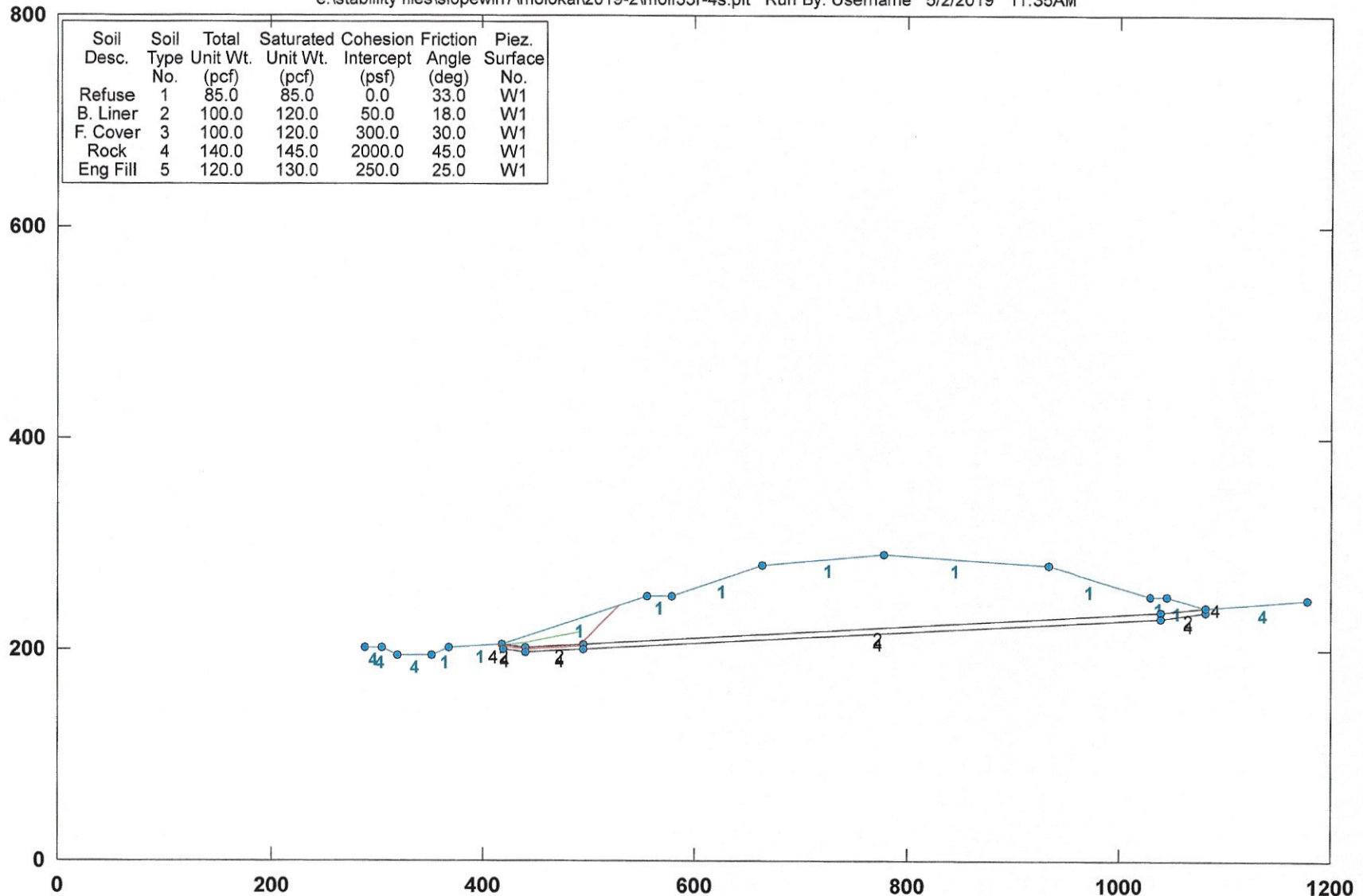
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Static

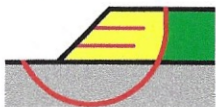
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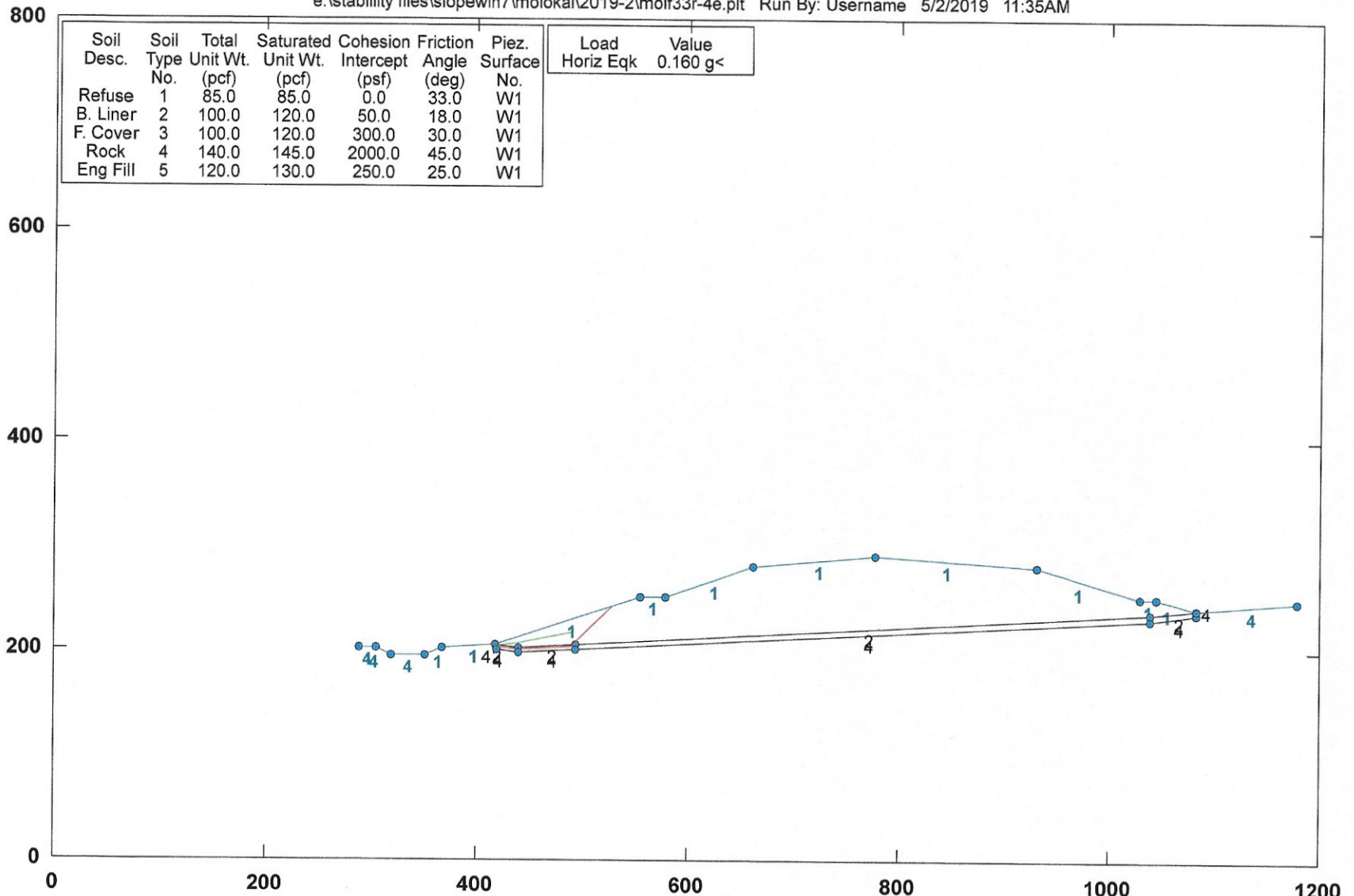
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Pseudo-Static

e:\stability files\slopewin7\molokai\2019-2\molf33r-4e.plt Run By: Username 5/2/2019 11:35AM

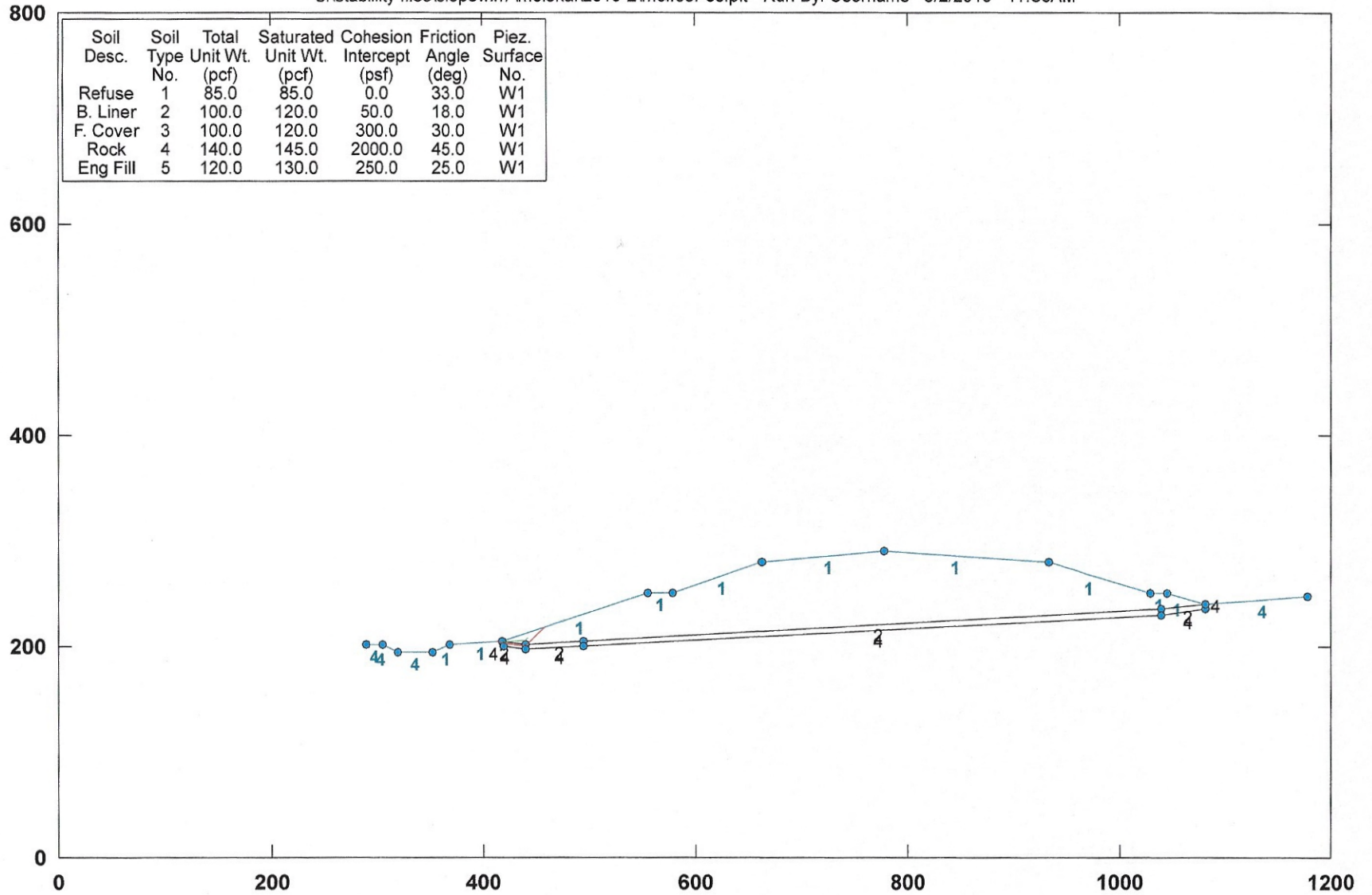


PCSTABL5M/si FSmin=1.10
Factor Of Safety Is Calculated By Spencer's Method of Slices



MOLF - Slope Stability Section 3-3 Static

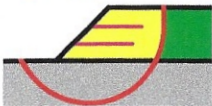
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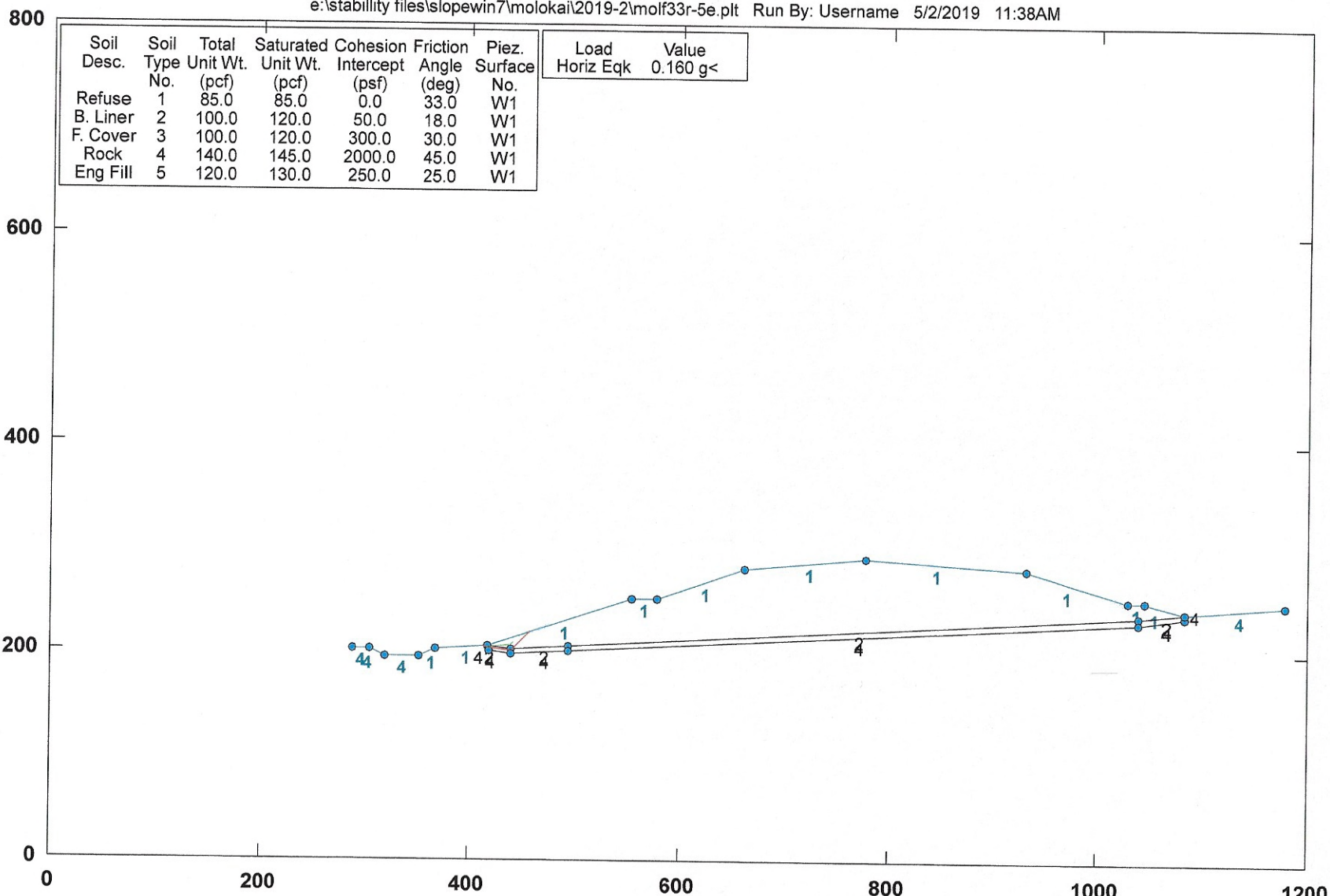
Factor Of Safety Is Calculated By Spencer's Method of Slices

STED



MOLF - Slope Stability Section 3-3 Pseudo-Static

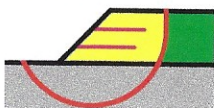
e:\stability files\slopewin7\molokai\2019-2\molf33r-5e.plt Run By: Username 5/2/2019 11:38AM



Soil Desc.	Soil No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	85.0	85.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	50.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

Load	Value
Horiz Eqk	0.160 g<

STED



PCSTABL5M/si FSmin=1.57
Factor Of Safety Is Calculated By Spencer's Method of Slices

APPENDIX D

HYDROLOGY REPORT

**HYDROLOGY STUDY
MOLOKAI INTEGRATED WASTE MANAGEMENT FACILITY
August 2017**

INTRODUCTION

This report has been prepared as an appendix to the Phases 5 and 6 Design Plan (A-Mehr, Inc., 2017) for the Molokai Integrated Waste Management Facility. It provides a conceptual design for future improvements to manage surface water as the facility proceeds toward final buildout. Proposed new and improved drainage structures are designed based on hydrologic analysis using the analytical model TR-55 developed by the Natural Resources Conservation Service (NRCS), a branch of the U.S. Department of Agriculture. TR-55 is recognized as a suitable computer model for hydrologic analysis of small watersheds.

MODEL DESCRIPTION

TR-55 is a single-event rainfall-runoff small watershed hydrologic model. The model generates hydrographs from multiple user-defined watershed subareas and at selected points along the user-defined stream system. Hydrographs are routed downstream through channels and/or reservoirs. Each watershed subarea has a hydrograph generated from the land area based on land and climate characteristics supplied by the user. Reaches (stream segments) can be designated as either channel reaches where hydrographs are routed based on physical characteristics, or as storage reaches where hydrographs are routed through a reservoir based on temporary storage and outlet characteristics. Hydrographs are combined as needed to accumulate flow as water moves from upland areas to the watershed outlet.

MODEL INPUTS

The primary data required for the TR-55 hydrologic model include the following:

- Watershed subarea descriptions including area, land use, slope, runoff curve number (CN) and identification of the reach into which it drains;
- Reach descriptions including length, cross-section, Manning “n” friction coefficient, slope and reach or structure into which the reach drains;
- For reservoirs, stage-storage data and description of the outfall structure; and
- Storm data including rainfall distribution type and 24-hour rainfall amounts for return periods ranging from 2 to 100 years.

Figure 1 shows existing conditions at the Molokai facility. Runoff from existing landfill Phases 1, 2, 3, and 4 is collected in perimeter drainage channels and routed to the primary sedimentation basin located in the southwest corner of the site. Drainage from the entrance area tends to collect in a shallow basin area located north of the Phase 3 disposal area, from which it flows overland off the site to the east

Figure 2 shows the proposed drainage master plan, to be implemented as the facility develops in the future. The primary changes and improvements to be made include the following:

- Collection of all runoff from the entrance area where recycling and other potential future activities may occur, and routing it to the existing channel bordering the Phase 3 disposal area;

Proposed future channels will have a 12 ft wide asphalt paved bottom and 1 ft high concrete sidewalls.

Figure 3 shows the subareas and reaches defined to model site hydrology using TR-55. The drawing lists acreage of each subarea and length and slope of each reach. Details of each subarea and reach are contained in Attachment 1, the TR-55 output files.

All subareas for the site were evaluated using runoff curve number 89, corresponding to poorly vegetated open space or pasture in clay soils (Hydrologic Soil Group "D").

Storm data is taken from the publication "Rainfall-Frequency Atlas of the Hawaiian Islands" (Technical Paper No. 43, U.S. Department of Commerce Weather Bureau, 1962). Twenty-four hour rainfall amounts for the site are as follows for the selected return periods:

2 Years	4 inches
5 years	5 inches
10 years	6 inches
25 years	7 inches
50 years	8 inches
100 years	10 inches

Rainfall distribution is assumed to be the Type I storm as designated by NRCS for the West Pacific area including Hawaii (TR-55 Users Guide, Appendix B).

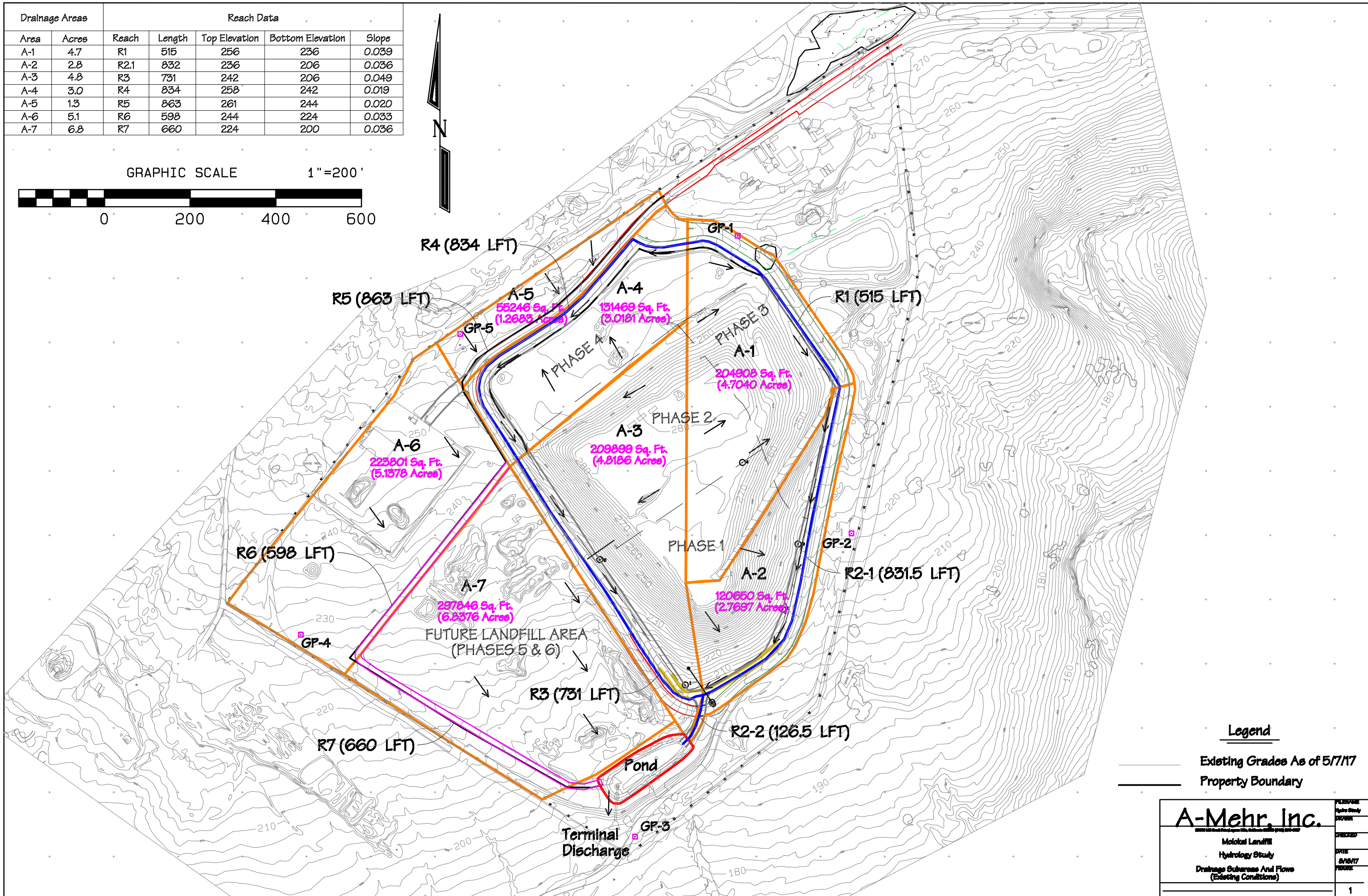
TR-55 RESULTS

The peak flows and depths in each channel segment during the 25-year return storm are presented in Table 1 below. It indicates that all channels have capacity to manage the design storm prescribed by Hawaii solid waste regulations.

TABLE 1
PEAK FLOWS AND DEPTHS
25-YEAR STORM

REACH	FLOW (CFS)	DEPTH (FT)
R1	24.9	0.15
R2.1	11.1	0.08
R2.2	70.4	0.49
R3.1	21.8	0.20
R3.2	59.9	0.48
R3.3	69.9	0.49
R4	26.0	0.19
POND (Inlet)	157.1	--

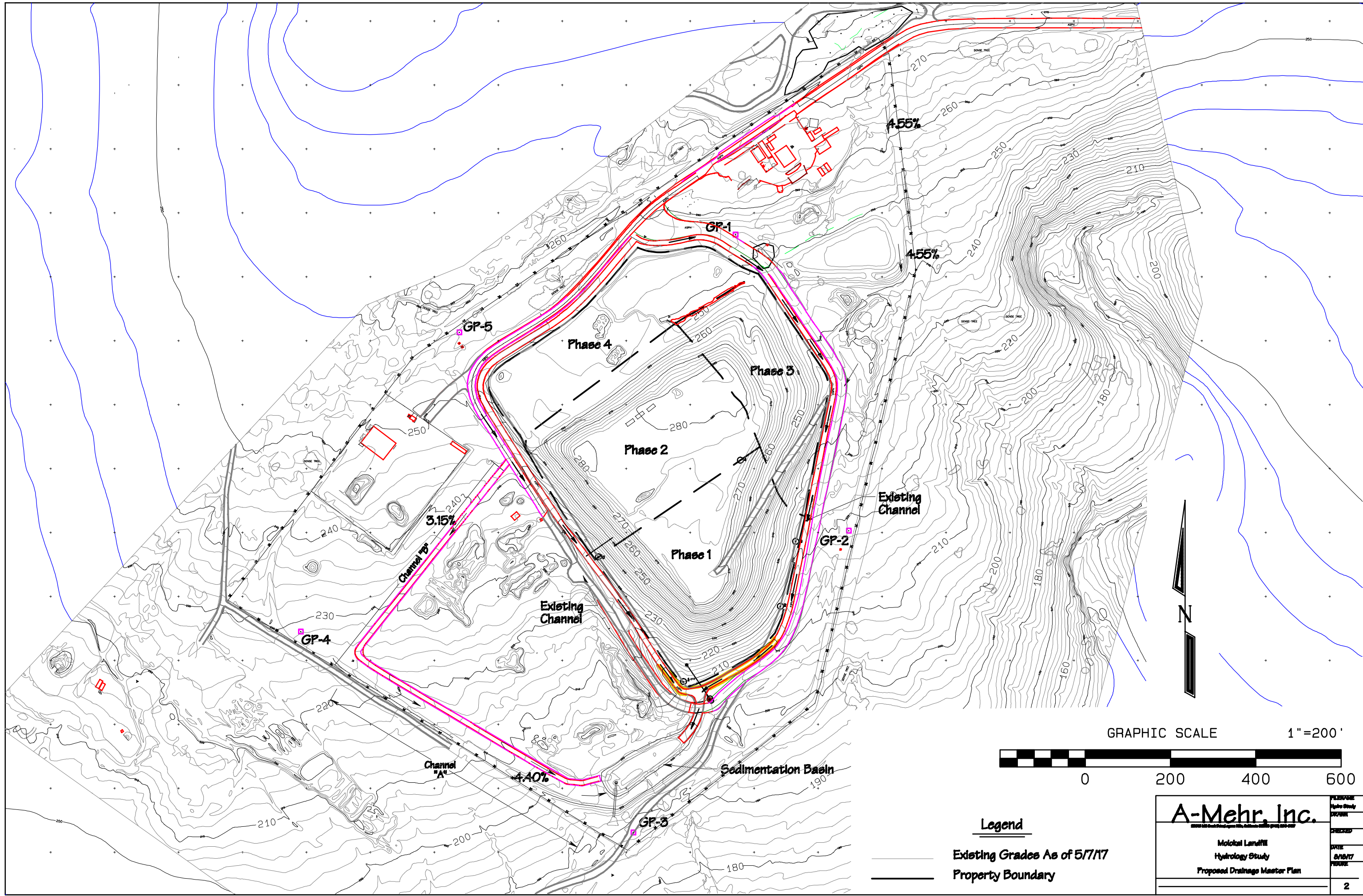
Drainage Areas		Reach Data				
Area	Acres	Reach	Length	Top Elevation	Bottom Elevation	Slope
A-1	4.7	R1	515	256	236	0.039
A-2	2.8	R2.1	832	236	206	0.036
A-3	4.8	R3	731	242	206	0.049
A-4	3.0	R4	834	258	242	0.019
A-5	1.3	R5	863	261	244	0.020
A-6	5.1	R6	598	244	224	0.033
A-7	6.8	R7	660	224	200	0.036



Legend

- Existing Grades As of 5/7/17
- Property Boundary

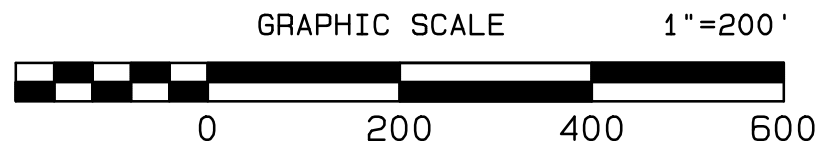
A-Mehr, Inc.		PREPARED BY
Molokai Landfill		Hydro Study
Hydrology Study		CHECKED
Drainage Subareas And Flows		DATE
(Existing Conditions)		8/18/17
		FIGURE
		1



Legend

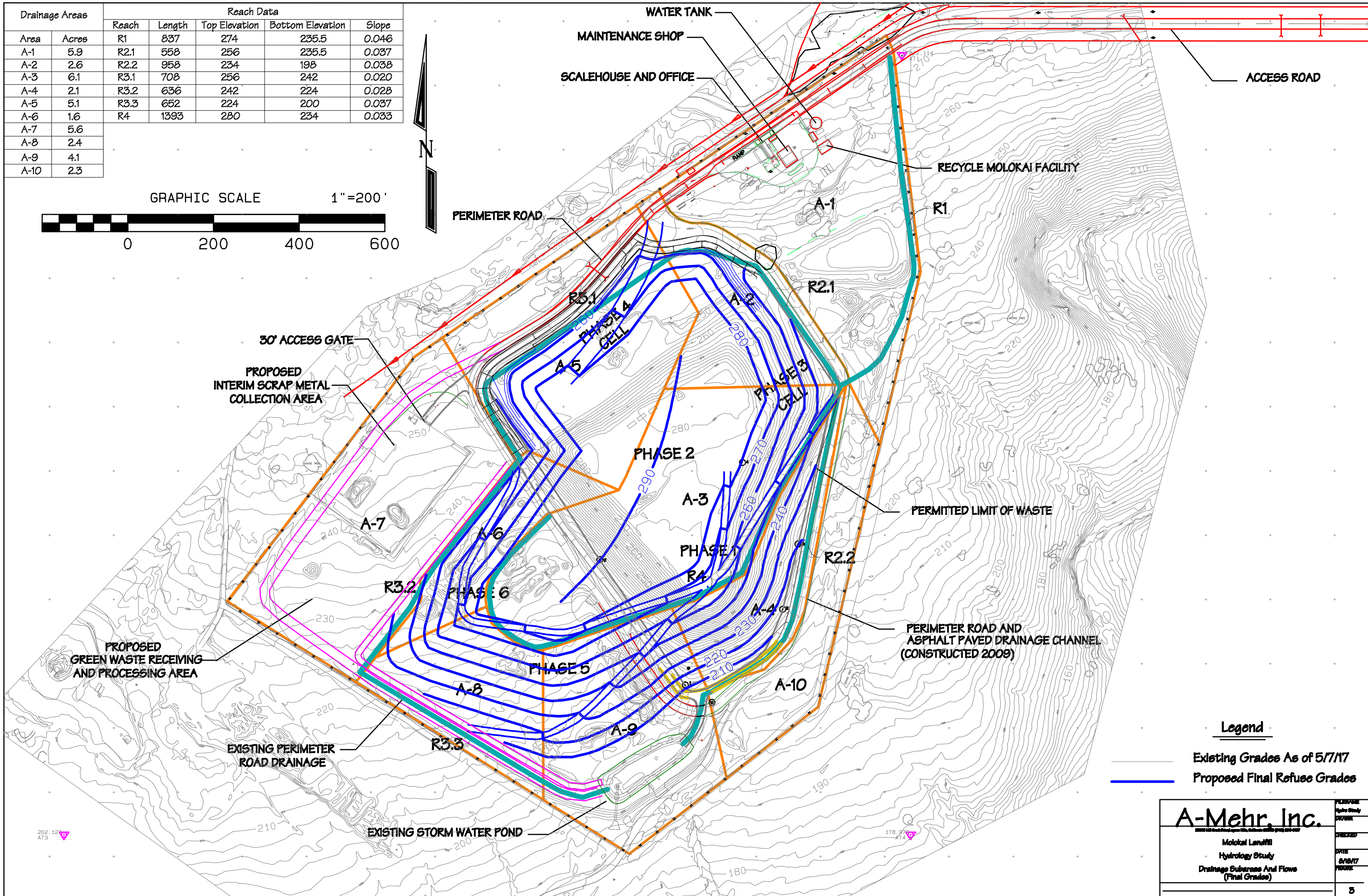
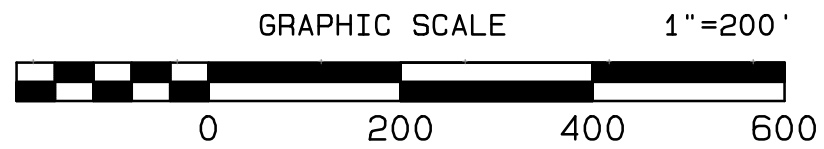
— Existing Grades As of 5/7/17

— Property Boundary



A-Mehr, Inc.		FILED
		DATE
Molokai Landfill Hydrology Study Proposed Drainage Master Plan		8/16/17
		FIGURE
		2

Drainage Areas		Reach Data				
Area	Acres	Reach	Length	Top Elevation	Bottom Elevation	Slope
A-1	5.9	R1	837	274	235.5	0.046
A-2	2.6	R2.1	558	256	235.5	0.037
A-3	2.6	R2.2	958	234	198	0.038
A-4	6.1	R3.1	708	256	242	0.020
A-5	2.1	R3.2	636	242	224	0.028
A-6	5.1	R3.3	652	224	200	0.037
A-7	1.6	R4	1393	280	234	0.033
A-8	5.6					
A-9	2.4					
A-10	4.1					
	2.3					



Legend

Existing Grades As of 5/7/17

Proposed Final Refuse Grades

A-Mehr, Inc.		PREPARED BY	Hydro Study
Molokai Landfill		CHECKED BY	
Hydrology Study		DATE	8/16/17
Drainage Subareas And Flows (Final Grades)		FIGURE	5

202.12
AT3

WinTR-55 Current Data Description

--- Identification Data ---

User: A-Mehr Date: 7/11/2016
 Project: Molokai Landfill Units: English
 SubTitle: Master Drainage Plan Areal Units: Acres
 State: Hawaii
 County: Maui
 Filename: E:\Bin\molokai\Hydrology\TR-55 Molokai FNL.w55

--- Sub-Area Data ---

Name	Description	Reach	Area (ac)	RCN	Tc
A1	Entrance Area	R1	5.9	91	.154
A2	Phase 3 NW	R2.1	2.6	89	.129
A3	Central Landfill	R4	6.1	89	.129
A4	Phase 2-3 SW	R2.2	2.1	89	0.1
A5	Phase 1 & 4 NE	R3.1	5.1	89	.127
A6	Phase 6 NE	R3.2	1.6	89	0.1
A7	Scrap Metal & GW	R3.2	5.6	94	0.154
A8	Phase 5 & 6	R3.3	2.4	89	0.1
A9	Phase 5 S	Pond	4.1	89	0.1
A10	Phase 5SE	R2.2	2.3	91	0.129

Total area: 37.80 (ac)

--- Storm Data ---

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
4.0	5.0	6.0	7.0	8.0	10.0	.0

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type I
 Dimensionless Unit Hydrograph: <standard>

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Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
4.0	5.0	6.0	7.0	8.0	10.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

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Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Watershed Peak Table (Trial #1)

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	2-Yr (cfs)	25-Yr (cfs)

SUBAREAS		
A1	12.87	24.90
A2	5.52	11.06
A3	12.95	25.95
A4	4.68	9.37
A5	10.87	21.78
A6	3.57	7.14
A7	13.29	24.52
A8	5.35	10.71
A9	9.15	18.31
A10	5.21	10.08
REACHES		
R1	12.87	24.90
Down	12.86	24.90
R2.1	5.52	11.06
Down	5.52	11.05
R2.2	40.71	80.26
Down	40.70	80.26
R4	12.95	25.95
Down	12.95	25.93
R3.1	10.87	21.78
Down	10.87	21.75
R3.2	27.54	53.00
Down	27.52	53.00
R3.3	32.48	62.95
Down	32.48	62.93
Pond	81.59	160.00
Down	70.42	88.97
OUTLET	70.42	88.97

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Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Watershed Peak Table (Trial #2)

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	2-Yr (cfs)	25-Yr (cfs)

SUBAREAS		
A1	12.87	24.90
A2	5.52	11.06
A3	12.95	25.95
A4	4.68	9.37
A5	10.87	21.78
A6	3.57	7.14
A7	13.29	24.52
A8	5.35	10.71
A9	9.15	18.31
A10	5.21	10.08
REACHES		
R1	12.87	24.90
Down	12.86	24.90
R2.1	5.52	11.06
Down	5.52	11.05
R2.2	40.71	80.26
Down	40.70	80.26
R4	12.95	25.95
Down	12.95	25.93
R3.1	10.87	21.78
Down	10.87	21.75
R3.2	27.54	53.00
Down	27.52	53.00
R3.3	32.48	62.95
Down	32.48	62.93
Pond	81.59	160.00
Down	75.67	132.69
OUTLET	75.67	132.69

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Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Watershed Peak Table (Trial #3)

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	2-Yr (cfs)	25-Yr (cfs)

SUBAREAS		
A1	12.87	24.90
A2	5.52	11.06
A3	12.95	25.95
A4	4.68	9.37
A5	10.87	21.78
A6	3.57	7.14
A7	13.29	24.52
A8	5.35	10.71
A9	9.15	18.31
A10	5.21	10.08
REACHES		
R1	12.87	24.90
Down	12.86	24.90
R2.1	5.52	11.06
Down	5.52	11.05
R2.2	40.71	80.26
Down	40.70	80.26
R4	12.95	25.95
Down	12.95	25.93
R3.1	10.87	21.78
Down	10.87	21.75
R3.2	27.54	53.00
Down	27.52	53.00
R3.3	32.48	62.95
Down	32.48	62.93
Pond	81.59	160.00
Down	78.16	153.18
OUTLET	78.16	153.18

Hydrograph Peak/Peak Time Table (Trial #1)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)

SUBAREAS		
A1	12.87 9.96	24.90 9.96
A2	5.52 9.94	11.06 9.95
A3	12.95 9.94	25.95 9.95
A4	4.68 9.93	9.37 9.93
A5	10.87 9.95	21.78 9.94
A6	3.57 9.93	7.14 9.93
A7	13.29 9.96	24.52 9.96
A8	5.35 9.93	10.71 9.93
A9	9.15 9.93	18.31 9.93
A10	5.21 9.94	10.08 9.94
REACHES		
R1	12.87 9.96	24.90 9.96
Down	12.86 9.97	24.90 9.97
R2.1	5.52 9.94	11.06 9.95
Down	5.52 9.95	11.05 9.95
R2.2	40.71 9.96	80.26 9.96
Down	40.70 9.97	80.26 9.96
R4	12.95 9.94	25.95 9.95
Down	12.95 9.97	25.93 9.97
R3.1	10.87 9.95	21.78 9.94
Down	10.87 9.96	21.75 9.96
R3.6	27.54 9.96	53.00 9.95
Down	27.52 9.97	53.00 9.96

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Hydrograph Peak/Peak Time Table (Trial #1) (continued)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)
R3.3	32.48	62.95
	9.96	9.96
Down	32.48	62.93
	9.97	9.97
Pond	81.59	160.00
	9.96	9.96
Down	70.42	88.97
	10.04	10.11
OUTLET	70.42	88.97

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Hydrograph Peak/Peak Time Table (Trial #2) (continued)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)
R3.3	32.48	62.95
	9.96	9.96
Down	32.48	62.93
	9.97	9.97
Pond	81.59	160.00
	9.96	9.96
Down	75.67	132.69
	10.02	10.05
OUTLET	75.67	132.69

Hydrograph Peak/Peak Time Table (Trial #3)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)

SUBAREAS		
A1	12.87 9.96	24.90 9.96
A2	5.52 9.94	11.06 9.95
A3	12.95 9.94	25.95 9.95
A4	4.68 9.93	9.37 9.93
A5	10.87 9.95	21.78 9.94
A6	3.57 9.93	7.14 9.93
A7	13.29 9.96	24.52 9.96
A8	5.35 9.93	10.71 9.93
A9	9.15 9.93	18.31 9.93
A10	5.21 9.94	10.08 9.94
REACHES		
R1	12.87 9.96	24.90 9.96
Down	12.86 9.97	24.90 9.97
R2.1	5.52 9.94	11.06 9.95
Down	5.52 9.95	11.05 9.95
R2.2	40.71 9.96	80.26 9.96
Down	40.70 9.97	80.26 9.96
R4	12.95 9.94	25.95 9.95
Down	12.95 9.97	25.93 9.97
R3.1	10.87 9.95	21.78 9.94
Down	10.87 9.96	21.75 9.96
R3.2	27.52 9.96	53.00 9.95
Down	27.52 9.97	53.00 9.96

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Hydrograph Peak/Peak Time Table (Trial #3) (continued)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)
R3.3	32.48	62.95
	9.96	9.96
Down	32.48	62.93
	9.97	9.97
Pond	81.59	160.00
	9.96	9.96
Down	78.16	153.18
	10.00	10.00
OUTLET	78.16	153.18

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Structure Output Table

Reach Identifier Peak Flow (PF), Storage Volume (SV), Stage (STG)
by Rainfall Return Period

Structure Identifier 2-Yr 25-Yr

Reach: Pond

Pipe : Pond

36(in)

PF (cfs) 70.42 88.97

SV (ac ft) .51 1.60

STG (ft) 1.39 3.41

48(in)

PF (cfs) 75.67 132.69

SV (ac ft) .33 .73

STG (ft) .89 1.86

60(in)

PF (cfs) 78.16 153.18

SV (ac ft) .23 .45

STG (ft) .62 1.22

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
A1	5.90	0.154	91	R1	Entrance Area
A2	2.60	0.129	89	R2.1	Phase 3 NW
A3	6.10	0.129	89	R4	Central Landfill
A4	2.10	0.100	89	R2.2	Phase 2-3 SW
A5	5.10	0.127	89	R3.1	Phase 1 & 4 NE
A6	1.60	0.100	89	R3.2	Phase 6 NE
A7	5.60	0.154	94	R3.2	Scrap Metal & GW
A8	2.40	0.100	89	R3.3	Phase 5 & 6
A9	4.10	0.100	89	Pond	Phase 5 S
A10	2.30	0.129	91	R2.2	Phase 5SE

Total Area: 37.80 (ac)

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Reach Summary Table

Reach Identifier	Receiving Reach Identifier	Reach Length (ft)	Routing Method
R1	R2.2	837	CHANNEL
R2.1	R2.2	558	CHANNEL
R2.2	Pond	234	CHANNEL
R4	R2.2	1393	CHANNEL
R3.1	R3.2	708	CHANNEL
R3.2	R3.3	636	CHANNEL
R3.3	Pond	652	CHANNEL
Pond	Outlet		STRUCTURE (Pond)

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)

A1							
SHEET	100	0.0300	0.150				0.124
SHALLOW	300	0.0300	0.050				0.030
					Time of Concentration		.154
							=====
A2							
SHEET	100	0.0300	0.150				0.124
SHALLOW	150	0.3000	0.050				0.005
					Time of Concentration		.129
							=====
A3							
SHEET	100	0.0300	0.150				0.124
SHALLOW	150	0.3000	0.050				0.005
					Time of Concentration		.129
							=====
A4							
SHEET	100	0.3000	0.150				0.049
SHALLOW	50	0.3000	0.050				0.002
					Time of Concentration		0.1
							=====
A5							
SHEET	100	0.0300	0.150				0.124
SHALLOW	100	0.3000	0.050				0.003
					Time of Concentration		.127
							=====
A6							
SHEET	100	0.3000	0.150				0.049
					Time of Concentration		0.1
							=====
A7							
SHEET	100	0.0300	0.150				0.124
SHALLOW	300	0.0300	0.050				0.030
					Time of Concentration		0.154
							=====
A8							
SHEET	100	0.3000	0.150				0.049
SHALLOW	150	0.3000	0.050				0.005
					Time of Concentration		0.1
							=====
A9							
SHEET	100	0.3000	0.150				0.049
SHALLOW	100	0.3000	0.050				0.003
SHALLOW	100	0.0300	0.050				0.019
					Time of Concentration		0.1
							=====

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Sub-Area Time of Concentration Details (continued)

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)

A10							
SHEET	100	0.0300	0.150				0.124
SHALLOW	50	0.0300	0.050				0.005
						Time of Concentration	0.129
							=====

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
A1	Open space; grass cover < 50%	(poor) D	4.4	89
	Paved parking lots, roofs, driveways	D	1.5	98
	Total Area / Weighted Curve Number			5.9
			===	==
A2	CN directly entered by user	-	2.6	89
	Total Area / Weighted Curve Number		2.6	89
			===	==
A3	CN directly entered by user	-	6.1	89
	Total Area / Weighted Curve Number		6.1	89
			===	==
A4	CN directly entered by user	-	2.1	89
	Total Area / Weighted Curve Number		2.1	89
			===	==
A5	CN directly entered by user	-	5.1	89
	Total Area / Weighted Curve Number		5.1	89
			===	==
A6	CN directly entered by user	-	1.6	89
	Total Area / Weighted Curve Number		1.6	89
			===	==
A7	Open space; grass cover < 50%	(poor) D	2.6	89
	Paved parking lots, roofs, driveways	D	3	98
	Total Area / Weighted Curve Number			5.6
			===	==
A8	CN directly entered by user	-	2.4	89
	Total Area / Weighted Curve Number		2.4	89
			===	==
A9	CN directly entered by user	-	4.1	89
	Total Area / Weighted Curve Number		4.1	89
			===	==
A10	CN directly entered by user	-	2.3	91
	Total Area / Weighted Curve Number		2.3	91
			===	==

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Reach Channel Rating Details

Reach Identifier	Reach Length (ft)	Reach Manning's n	Friction Slope (ft/ft)	Bottom Width (ft)	Side Slope
R1	837	0.015	0.046	12	1 :1
R2.1	558	0.015	0.037	12	1 :1
R2.2	234	0.015	0.038	12	1 :1
R4	1393	0.015	0.033	12	1 :1
R3.1	708	0.015	0.02	12	1 :1
R3.2	636	0.015	0.028	12	1 :1
R3.3	652	0.015	0.037	12	1 :1
Pond	(This reach is a structure: Pond)				

Reach Identifier	Stage (ft)	Flow (cfs)	End Area (sq ft)	Top Width (ft)	Friction Slope (ft/ft)
R1	0.0	0.000	0	12	0.046
	0.5	79.811	6.3	13	
	1.0	253.016	13	14	
	2.0	809.023	28	16	
	5.0	3963.790	85	22	
	10.0	14496.192	220	32	
	20.0	60282.300	640	52	
R2.1	0.0	0.000	0	12	0.037
	0.5	71.579	6.3	13	
	1.0	226.919	13	14	
	2.0	725.576	28	16	
	5.0	3554.942	85	22	
	10.0	13000.973	220	32	
	20.0	54064.446	640	52	
R2.2	0.0	0.000	0	12	0.038
	0.5	72.540	6.3	13	
	1.0	229.965	13	14	
	2.0	735.316	28	16	
	5.0	3602.662	85	22	
	10.0	13175.491	220	32	
	20.0	54790.176	640	52	
R4	0.0	0.000	0	12	0.033
	0.5	67.599	6.3	13	
	1.0	214.302	13	14	
	2.0	685.234	28	16	
	5.0	3357.289	85	22	
	10.0	12278.123	220	32	
	20.0	51058.478	640	52	
R3.1	0.0	0.000	0	12	0.02
	0.5	52.626	6.3	13	
	1.0	166.834	13	14	
	2.0	533.454	28	16	
	5.0	2613.646	85	22	
	10.0	9558.506	220	32	
	20.0	39748.971	640	52	
R3.2	0.0	0.000	0	12	0.028
	0.5	62.268	6.3	13	
	1.0	197.401	13	14	
	2.0	631.191	28	16	
	5.0	3092.507	85	22	
	10.0	11309.777	220	32	
	20.0	47031.617	640	52	
R3.3	0.0	0.000	0	12	0.037

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Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Reach Channel Rating Details (continued)

Reach Identifier	Reach Length (ft)	Reach Manning's n	Friction Slope (ft/ft)	Bottom Width (ft)	Side Slope
	0.5	71.579	6.3	13	
	1.0	226.919	13	14	
	2.0	725.576	28	16	
	5.0	3554.942	85	22	
	10.0	13000.973	220	32	
	20.0	54064.446	640	52	

Pond (This reach is a structure: Pond)

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Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Structure Description - User Entered

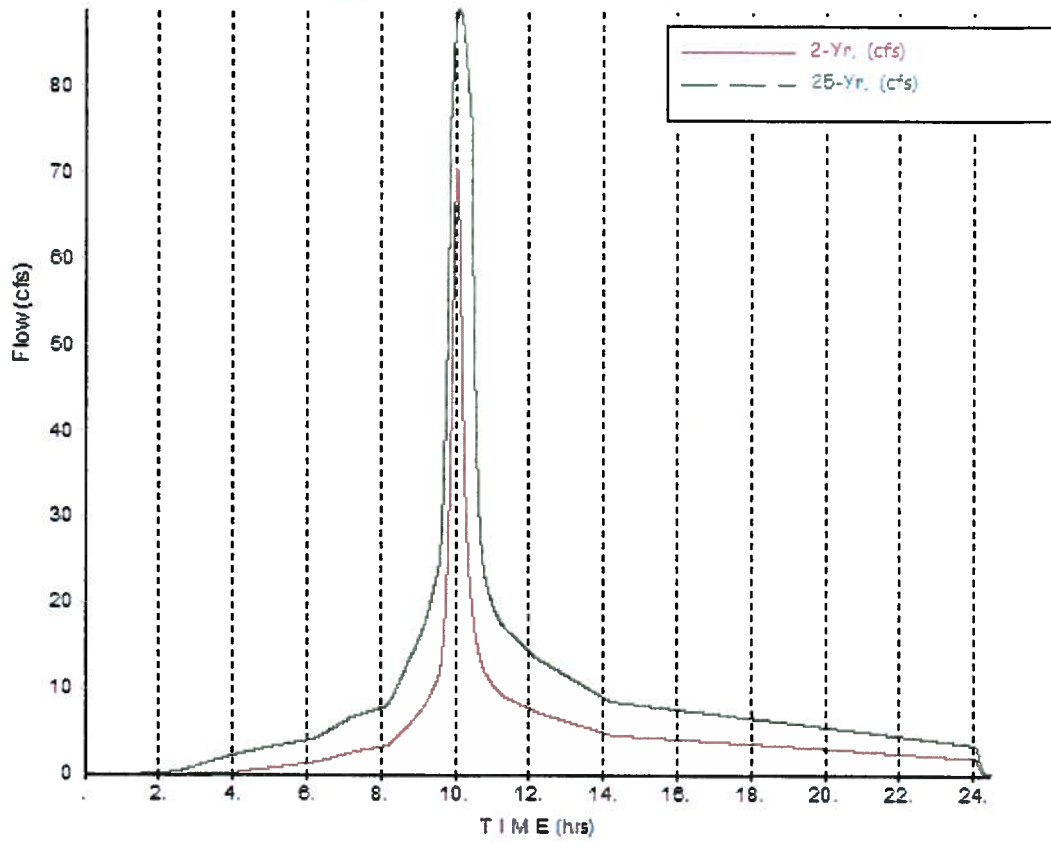
Reach Identifier	Surface Area @ Crest (ac)	Height Above Crest (ft)	Surface Area @ Ht Above (ac)	Pipe Diameter (in)	Head on Pipe (ft)	Weir Length (ft)
Pond	0.300	3	0.574	36 48 60	5	

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Structure Rating Details - Computed

Reach Identifier	Stage (ft)	Pool Storage (ac ft)	Flows (cfs) @ Pipe Diameter		
			Dia #1 36in	Dia #2 48in	Dia #3 60in
Pond	0	0.00	0.000	0.000	0.000
	1.5	0.55	75.868	127.955	188.496
	3	1.31	86.503	147.750	221.031
	6	3.44	104.577	180.956	274.777
	15	14.77	145.935	255.910	394.267



WinTR-55 Current Data Description

--- Identification Data ---

User: A-Mehr Date: 7/11/2016
 Project: Molokai Landfill Units: English
 SubTitle: Master Drainage Plan Areal Units: Acres
 State: Hawaii
 County: Maui
 Filename: E:\Bin\molokai\Hydrology\TR-55 Molokai existing.w55

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
A1	Entrance Area	R1	4.7	91	.154
A2	Phase 3 NW	R2-1	2.8	89	.129
A3	Central Landfill	R3	4.8	89	.129
A4	Phase 2-3 SW	R4	3	89	0.1
A5	Phase 1 & 4 NE	R5	1.3	89	.127
A6	Phase 6 NE	R6	5.1	89	0.1
A7	Scrap Metal & GW	R7	6.8	94	0.154

Total area: 28.50 (ac)

--- Storm Data ---

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
4.0	5.0	6.0	7.0	8.0	10.0	.0

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type I
 Dimensionless Unit Hydrograph: <standard>

A-Mehr

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Maui County, Hawaii

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
4.0	5.0	6.0	7.0	8.0	10.0	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type I
Dimensionless Unit Hydrograph: <standard>

A-Mehr

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Watershed Peak Table (Trial #1)

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	2-Yr (cfs)	25-Yr (cfs)

SUBAREAS		
A1	10.25	19.82
A2	5.95	11.93
A3	10.19	20.42
A4	6.69	13.40
A5	2.77	5.55
A6	11.37	22.77
A7	16.14	29.79
REACHES		
R1	10.25	19.82
Down	10.25	19.82
R2-1	16.11	31.54
Down	16.09	31.52
R3	16.88	33.81
Down	16.87	33.79
R4	6.69	13.40
Down	6.69	13.39
R5	2.77	5.55
Down	2.77	5.54
R6	13.98	28.00
Down	13.98	27.98
R7	30.01	57.54
Down	30.00	57.51
Pond	62.80	122.55
Down	53.80	81.76
R2-2	32.82	65.04
Down	32.82	65.04
OUTLET	53.80	81.76

A-Mehr

Molokai Landfill
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Watershed Peak Table (Trial #2)

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	2-Yr (cfs)	25-Yr (cfs)

SUBAREAS		
A1	10.25	19.82
A2	5.95	11.93
A3	10.19	20.42
A4	6.69	13.40
A5	2.77	5.55
A6	11.37	22.77
A7	16.14	29.79
REACHES		
R1	10.25	19.82
Down	10.25	19.82
R2-1	16.11	31.54
Down	16.09	31.52
R3	16.88	33.81
Down	16.87	33.79
R4	6.69	13.40
Down	6.69	13.39
R5	2.77	5.55
Down	2.77	5.54
R6	13.98	28.00
Down	13.98	27.98
R7	30.01	57.54
Down	30.00	57.51
Pond	62.80	122.55
Down	57.86	112.80
R2-2	32.82	65.04
Down	32.82	65.04
OUTLET	57.86	112.80

A-Mehr

Molokai Landfill
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Maui County, Hawaii

Watershed Peak Table (Trial #3)

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period	
	2-Yr (cfs)	25-Yr (cfs)

SUBAREAS		
A1	10.25	19.82
A2	5.95	11.93
A3	10.19	20.42
A4	6.69	13.40
A5	2.77	5.55
A6	11.37	22.77
A7	16.14	29.79
REACHES		
R1	10.25	19.82
Down	10.25	19.82
R2-1	16.11	31.54
Down	16.09	31.52
R3	16.88	33.81
Down	16.87	33.79
R4	6.69	13.40
Down	6.69	13.39
R5	2.77	5.55
Down	2.77	5.54
R6	13.98	28.00
Down	13.98	27.98
R7	30.01	57.54
Down	30.00	57.51
Pond	62.80	122.55
Down	59.90	116.78
R2-2	32.82	65.04
Down	32.82	65.04
OUTLET	59.90	116.78

A-Mehr

Molokai Landfill
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Hydrograph Peak/Peak Time Table (Trial #1) (continued)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)
R7	30.01	57.54
	9.95	9.95
Down	30.00	57.51
	9.96	9.96
Pond	62.80	122.55
	9.96	9.96
Down	53.80	81.76
	10.04	10.09
R2-2	32.82	65.04
	9.96	9.96
Down	32.82	65.04
	9.97	9.96
OUTLET	53.80	81.76

A-Mehr

Molokai Landfill
 Master Drainage Plan
 Maui County, Hawaii

Hydrograph Peak/Peak Time Table (Trial #2)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)

SUBAREAS

A1	10.25 9.96	19.82 9.96
A2	5.95 9.94	11.93 9.95
A3	10.19 9.94	20.42 9.95
A4	6.69 9.93	13.40 9.93
A5	2.77 9.95	5.55 9.94
A6	11.37 9.93	22.77 9.93
A7	16.14 9.96	29.79 9.96

REACHES

R1	10.25 9.96	19.82 9.96
Down	10.25 9.97	19.82 9.97
R2-1	16.11 9.96	31.54 9.96
Down	16.09 9.98	31.52 9.97
R3	16.88 9.94	33.81 9.94
Down	16.87 9.96	33.79 9.96
R4	6.69 9.93	13.40 9.93
Down	6.69 9.95	13.39 9.94
R5	2.77 9.95	5.55 9.94
Down	2.77 9.96	5.54 9.96
R6	13.98 9.94	28.00 9.93
Down	13.98 9.94	27.98 9.94

A-Mehr

Molokai Landfill
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Hydrograph Peak/Peak Time Table (Trial #2) (continued)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)
R7	30.01	57.54
	9.95	9.95
Down	30.00	57.51
	9.96	9.96
Pond	62.80	122.55
	9.96	9.96
Down	57.86	112.80
	10.02	10.01
R2-2	32.82	65.04
	9.96	9.96
Down	32.82	65.04
	9.97	9.96
OUTLET	57.86	112.80

A-Mehr

Molokai Landfill
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Maui County, Hawaii

Hydrograph Peak/Peak Time Table (Trial #3) (continued)

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	2-Yr (cfs) (hr)	25-Yr (cfs) (hr)
R7	30.01	57.54
	9.95	9.95
Down	30.00	57.51
	9.96	9.96
Pond	62.80	122.55
	9.96	9.96
Down	59.90	116.78
	10.00	9.99
R2-2	32.82	65.04
	9.96	9.96
Down	32.82	65.04
	9.97	9.96
OUTLET	59.90	116.78

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Structure Output Table

Reach Identifier Peak Flow (PF), Storage Volume (SV), Stage (STG)
Structure Identifier by Rainfall Return Period
Identifier 2-Yr 25-Yr

Reach: Pond

Pipe : Pond

36(in)

PF (cfs) 53.80 81.76

SV (ac ft) .39 .97

STG (ft) 1.06 2.33

48(in)

PF (cfs) 57.86 112.80

SV (ac ft) .25 .48

STG (ft) .68 1.32

60(in)

PF (cfs) 59.90 116.78

SV (ac ft) .17 .34

STG (ft) .48 .93

A-Mehr

Molokai Landfill
Master Drainage Plan
Maui County, Hawaii

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
A1	4.70	0.154	91	R1	Entrance Area
A2	2.80	0.129	89	R2-1	Phase 3 NW
A3	4.80	0.129	89	R3	Central Landfill
A4	3.00	0.100	89	R4	Phase 2-3 SW
A5	1.30	0.127	89	R5	Phase 1 & 4 NE
A6	5.10	0.100	89	R6	Phase 6 NE
A7	6.80	0.154	94	R7	Scrap Metal & GW

Total Area: 28.50 (ac)

A-Mehr

Molokai Landfill
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Reach Summary Table

Reach Identifier	Receiving Reach Identifier	Reach Length (ft)	Routing Method
R1	R2-1	515	CHANNEL
R2-1	R2-2	832	CHANNEL
R3	R2-2	731	CHANNEL
R4	R3	834	CHANNEL
R5	R6	863	CHANNEL
R6	R7	598	CHANNEL
R7	Pond	660	CHANNEL
Pond	Outlet		STRUCTURE (Pond)
R2-2	Pond	126	CHANNEL

A-Mehr

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Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)

A1							
SHEET	100	0.0300	0.150				0.124
SHALLOW	300	0.0300	0.050				0.030
						Time of Concentration	.154
							=====
A2							
SHEET	100	0.0300	0.150				0.124
SHALLOW	150	0.3000	0.050				0.005
						Time of Concentration	.129
							=====
A3							
SHEET	100	0.0300	0.150				0.124
SHALLOW	150	0.3000	0.050				0.005
						Time of Concentration	.129
							=====
A4							
SHEET	100	0.3000	0.150				0.049
SHALLOW	50	0.3000	0.050				0.002
						Time of Concentration	0.1
							=====
A5							
SHEET	100	0.0300	0.150				0.124
SHALLOW	100	0.3000	0.050				0.003
						Time of Concentration	.127
							=====
A6							
SHEET	100	0.3000	0.150				0.049
						Time of Concentration	0.1
							=====
A7							
SHEET	100	0.0300	0.150				0.124
SHALLOW	300	0.0300	0.050				0.030
						Time of Concentration	0.154
							=====

A-Mehr

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Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
A1	CN directly entered by user	-	4.7	91
	Total Area / Weighted Curve Number		4.7 ===	91 ==
A2	CN directly entered by user	-	2.8	89
	Total Area / Weighted Curve Number		2.8 ===	89 ==
A3	CN directly entered by user	-	4.8	89
	Total Area / Weighted Curve Number		4.8 ===	89 ==
A4	CN directly entered by user	-	3	89
	Total Area / Weighted Curve Number		3 =	89 ==
A5	CN directly entered by user	-	1.3	89
	Total Area / Weighted Curve Number		1.3 ===	89 ==
A6	CN directly entered by user	-	5.1	89
	Total Area / Weighted Curve Number		5.1 ===	89 ==
A7	CN directly entered by user	-	6.8	94
	Total Area / Weighted Curve Number		6.8 ===	94 ==

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Reach Channel Rating Details

Reach Identifier	Reach Length (ft)	Reach Manning's n	Friction Slope (ft/ft)	Bottom Width (ft)	Side Slope
R1	515	0.015	0.039	12	1 :1
R2-1	832	0.015	0.036	12	1 :1
R3	731	0.015	0.049	12	1 :1
R4	834	0.015	0.019	12	1 :1
R5	863	0.015	0.02	12	1 :1
R6	598	0.015	0.033	12	1 :1
R7	660	0.015	0.036	12	1 :1
Pond	(This reach is a structure: Pond)				
R2-2	126	0.015	0.079	12	1 :1

Reach Identifier	Stage (ft)	Flow (cfs)	End Area (sq ft)	Top Width (ft)	Friction Slope (ft/ft)
R1	0.0	0.000	0	12	0.039
	0.5	73.488	6.3	13	
	1.0	232.971	13	14	
	2.0	744.928	28	16	
	5.0	3649.758	85	22	
	10.0	13347.727	220	32	
	20.0	55506.418	640	52	
R2-1	0.0	0.000	0	12	0.036
	0.5	70.605	6.3	13	
	1.0	223.831	13	14	
	2.0	715.704	28	16	
	5.0	3506.574	85	22	
	10.0	12824.081	220	32	
	20.0	53328.841	640	52	
R3	0.0	0.000	0	12	0.049
	0.5	82.372	6.3	13	
	1.0	261.137	13	14	
	2.0	834.988	28	16	
	5.0	4091.003	85	22	
	10.0	14961.428	220	32	
	20.0	62216.981	640	52	
R4	0.0	0.000	0	12	0.019
	0.5	51.293	6.3	13	
	1.0	162.610	13	14	
	2.0	519.947	28	16	
	5.0	2547.467	85	22	
	10.0	9316.479	220	32	
	20.0	38742.505	640	52	
R5	0.0	0.000	0	12	0.02
	0.5	52.626	6.3	13	
	1.0	166.834	13	14	
	2.0	533.454	28	16	
	5.0	2613.646	85	22	
	10.0	9558.506	220	32	
	20.0	39748.971	640	52	

A-Mehr

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Reach Channel Rating Details (continued)

Reach Identifier	Reach Length (ft)	Reach Manning's n	Friction Slope (ft/ft)	Bottom Width (ft)	Side Slope
R6	0.0	0.000	0	12	0.033
	0.5	67.599	6.3	13	
	1.0	214.302	13	14	
	2.0	685.234	28	16	
	5.0	3357.289	85	22	
	10.0	12278.123	220	32	
	20.0	51058.478	640	52	
R7	0.0	0.000	0	12	0.036
	0.5	70.605	6.3	13	
	1.0	223.831	13	14	
	2.0	715.704	28	16	
	5.0	3506.574	85	22	
	10.0	12824.081	220	32	
	20.0	53328.841	640	52	
Pond	(This reach is a structure: Pond)				
R2-2	0.0	0.000	0	12	0.079
	0.5	104.592	6.3	13	
	1.0	331.576	13	14	
	2.0	1060.219	28	16	
	5.0	5194.518	85	22	
	10.0	18997.155	220	32	
	20.0	78999.518	640	52	

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Structure Description - User Entered

Reach Identifier	Surface Area @ Crest (ac)	Height Above Crest (ft)	Surface Area @ Ht Above (ac)	Pipe Diameter (in)	Head on Pipe (ft)	Weir Length (ft)
Pond	0.300	3	0.574	36 48 60	5	

A-Mehr

Molokai Landfill
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Maui County, Hawaii

Structure Rating Details - Computed

Reach Identifier	Stage (ft)	Pool Storage (ac ft)	Flows (cfs) @ Pipe Diameter		
			Dia #1 36in	Dia #2 48in	Dia #3 60in
Pond	0	0.00	0.000	0.000	0.000
	1.5	0.55	75.868	127.955	188.496
	3	1.31	86.503	147.750	221.031
	6	3.44	104.577	180.956	274.777
	15	14.77	145.935	255.910	394.267

