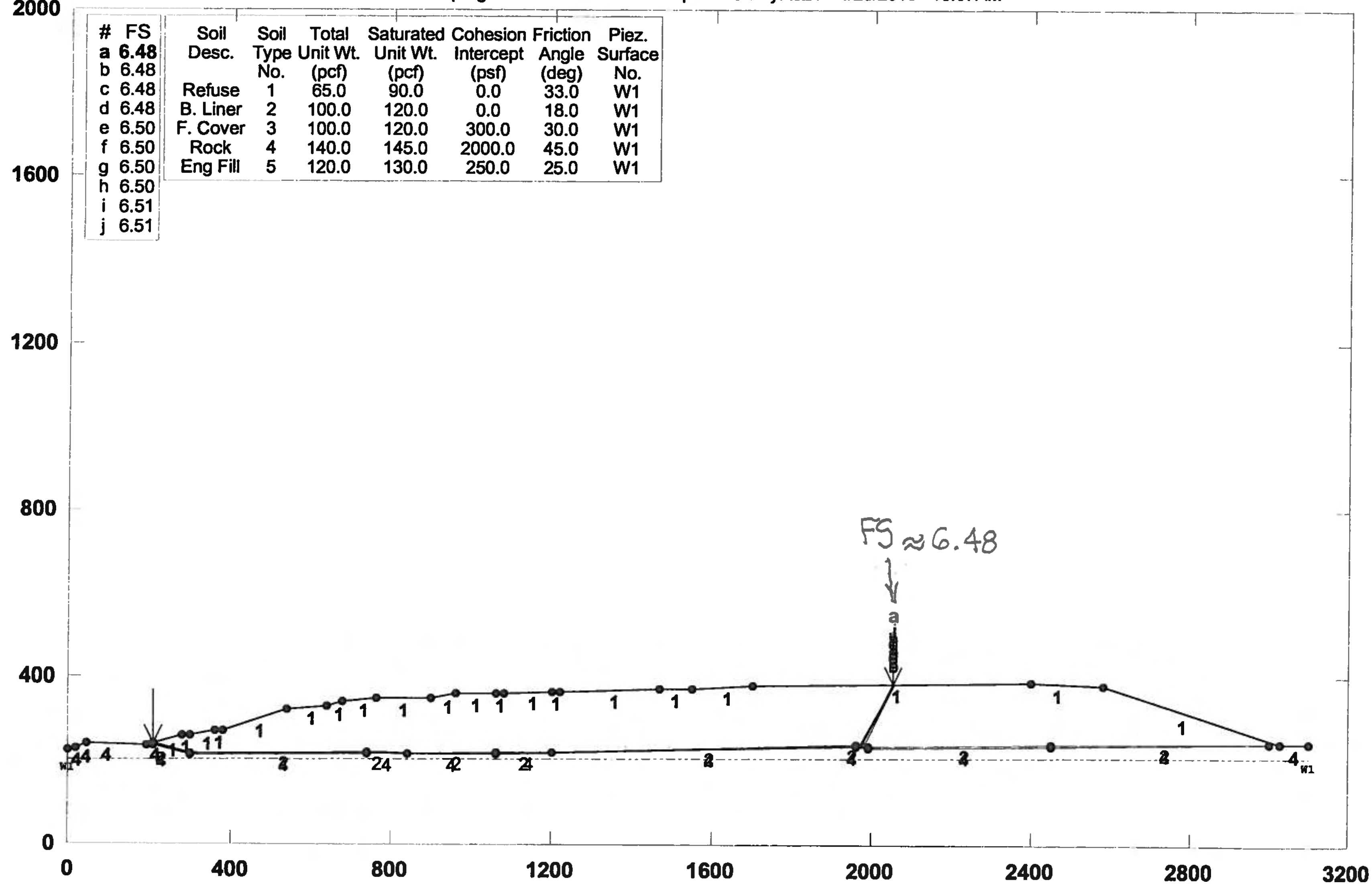
CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb.pl2 Run By: EEV 4/26/2016 10:07AM

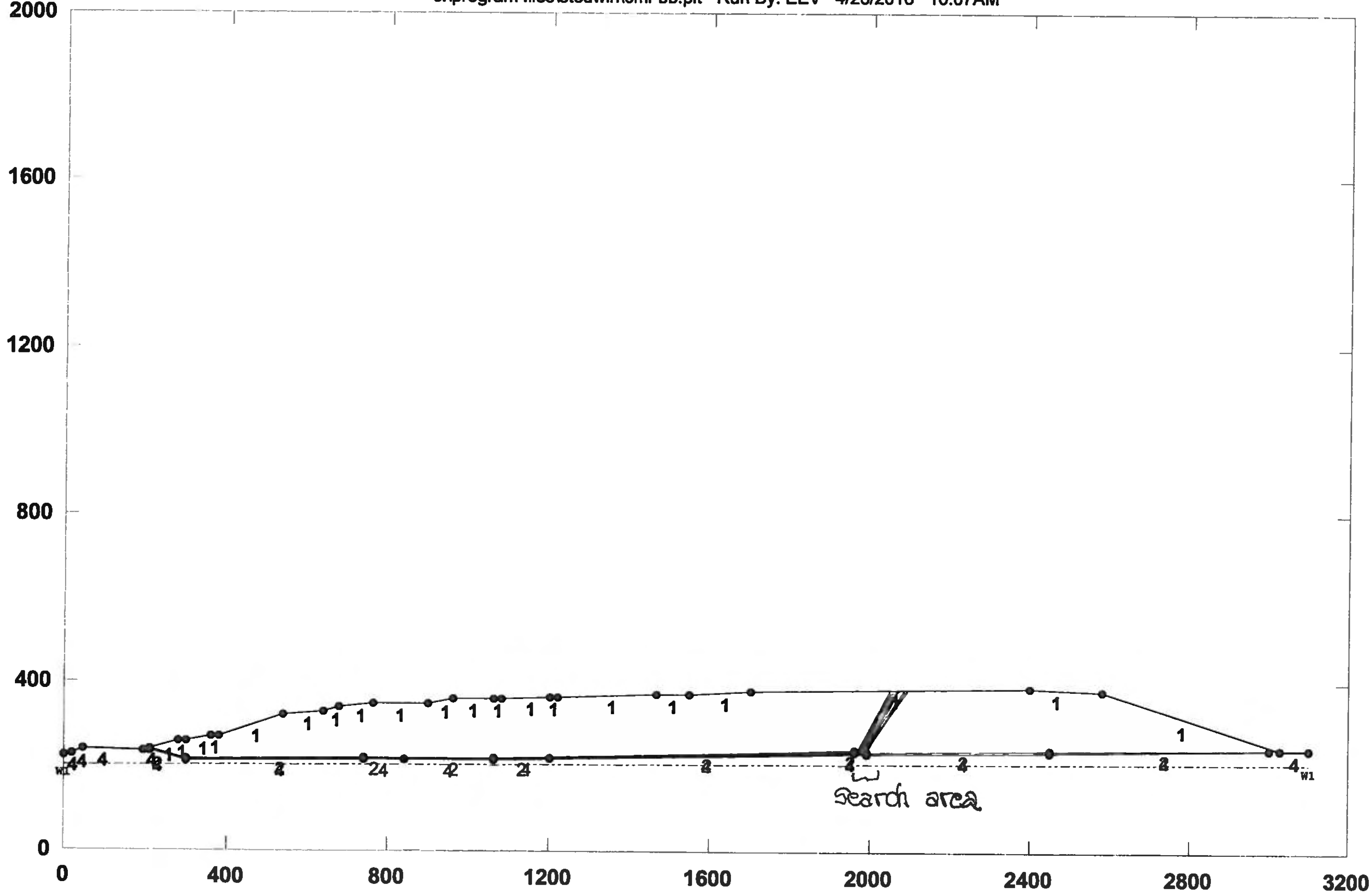


PCSTABL5M/si FSmin=6.48

Safety Factors Are Calculated By The Modified Janbu Method

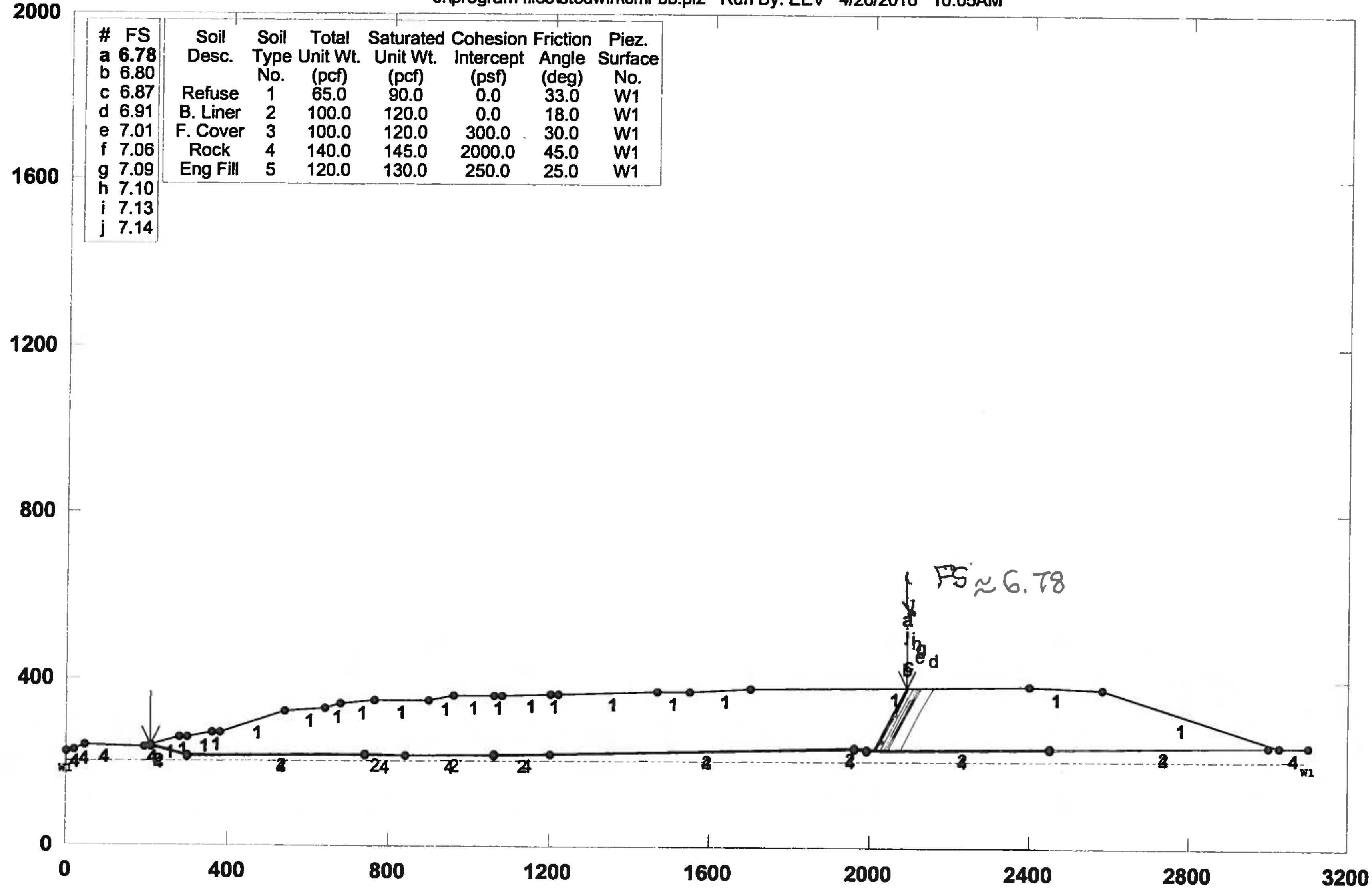
CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb.plt Run By: EEV 4/26/2016 10:07AM



CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb.pl2 Run By: EEV 4/26/2016 10:05AM



#	FS
a	**6.78**
b	6.80
c	6.87
d	6.91
e	7.01
f	7.06
g	7.09
h	7.10
i	7.13
j	7.14

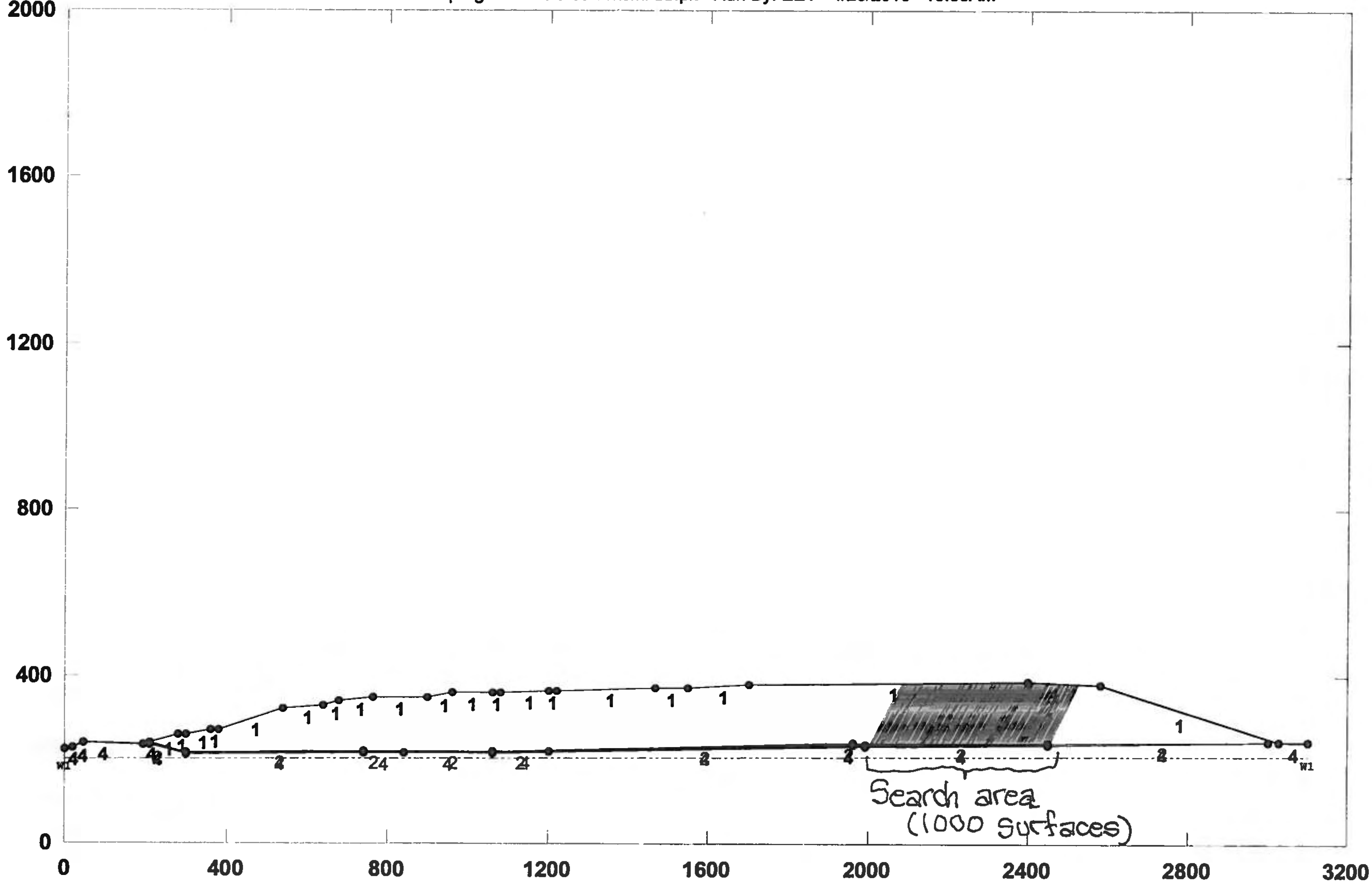
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

PCSTABL5M/si FSmin=6.78

Safety Factors Are Calculated By The Modified Janbu Method

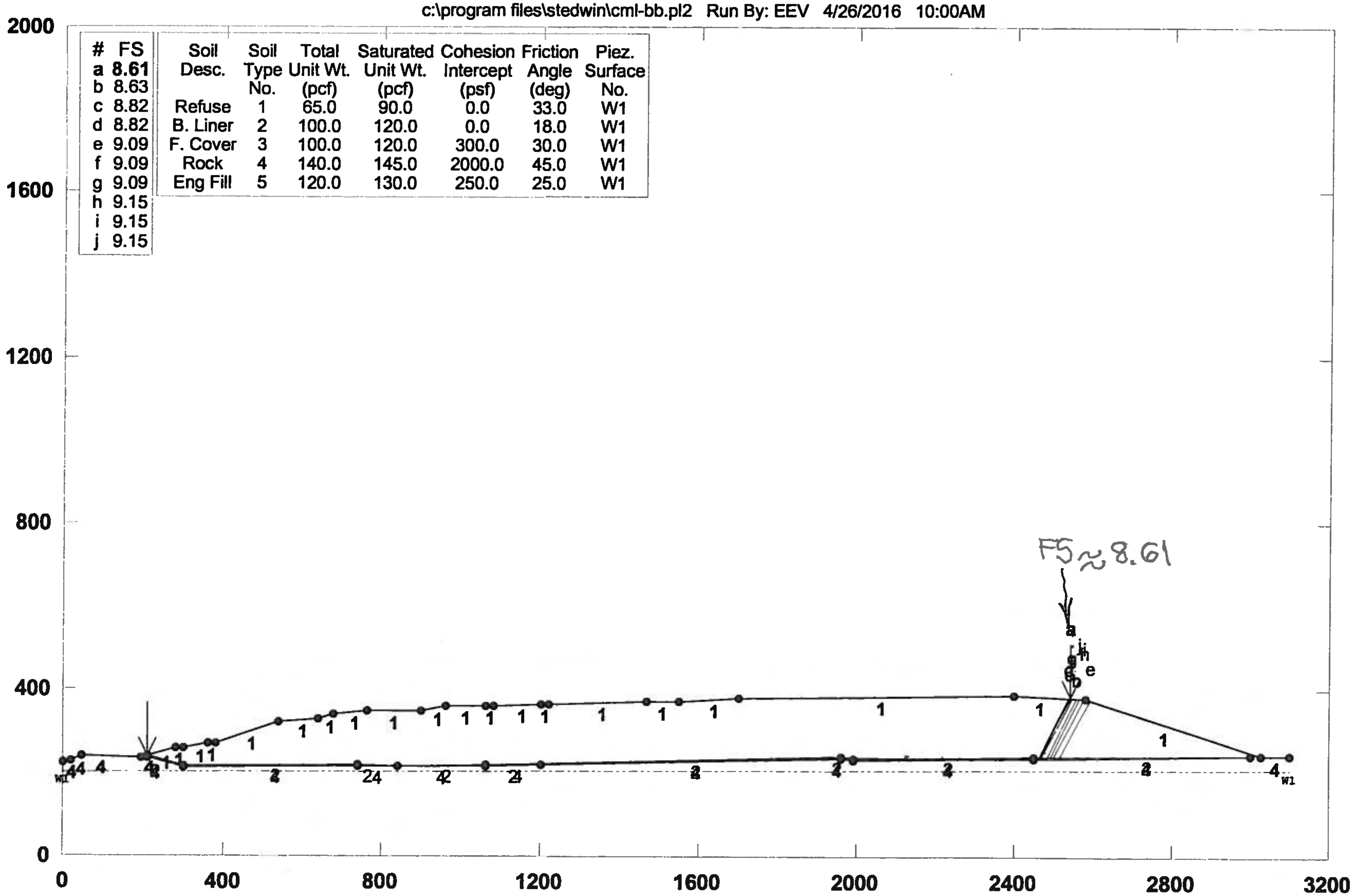
CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb.plt Run By: EEV 4/26/2016 10:05AM



CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb.pl2 Run By: EEV 4/26/2016 10:00AM



#	FS
a	**8.61**
b	8.63
c	8.82
d	8.82
e	9.09
f	9.09
g	9.09
h	9.15
i	9.15
j	9.15

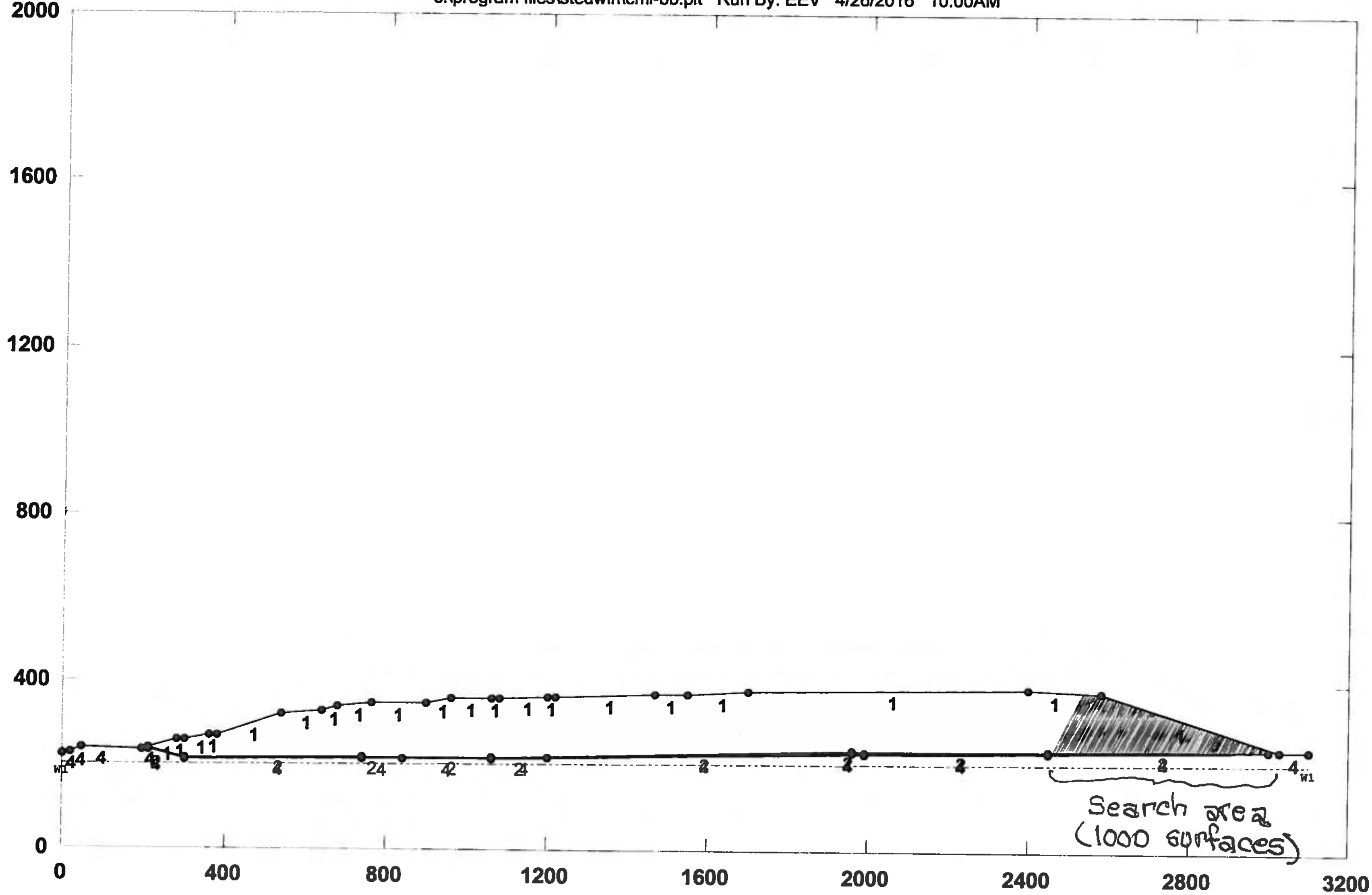
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

PCSTABL5M/si FSmin=8.61

Safety Factors Are Calculated By The Modified Janbu Method

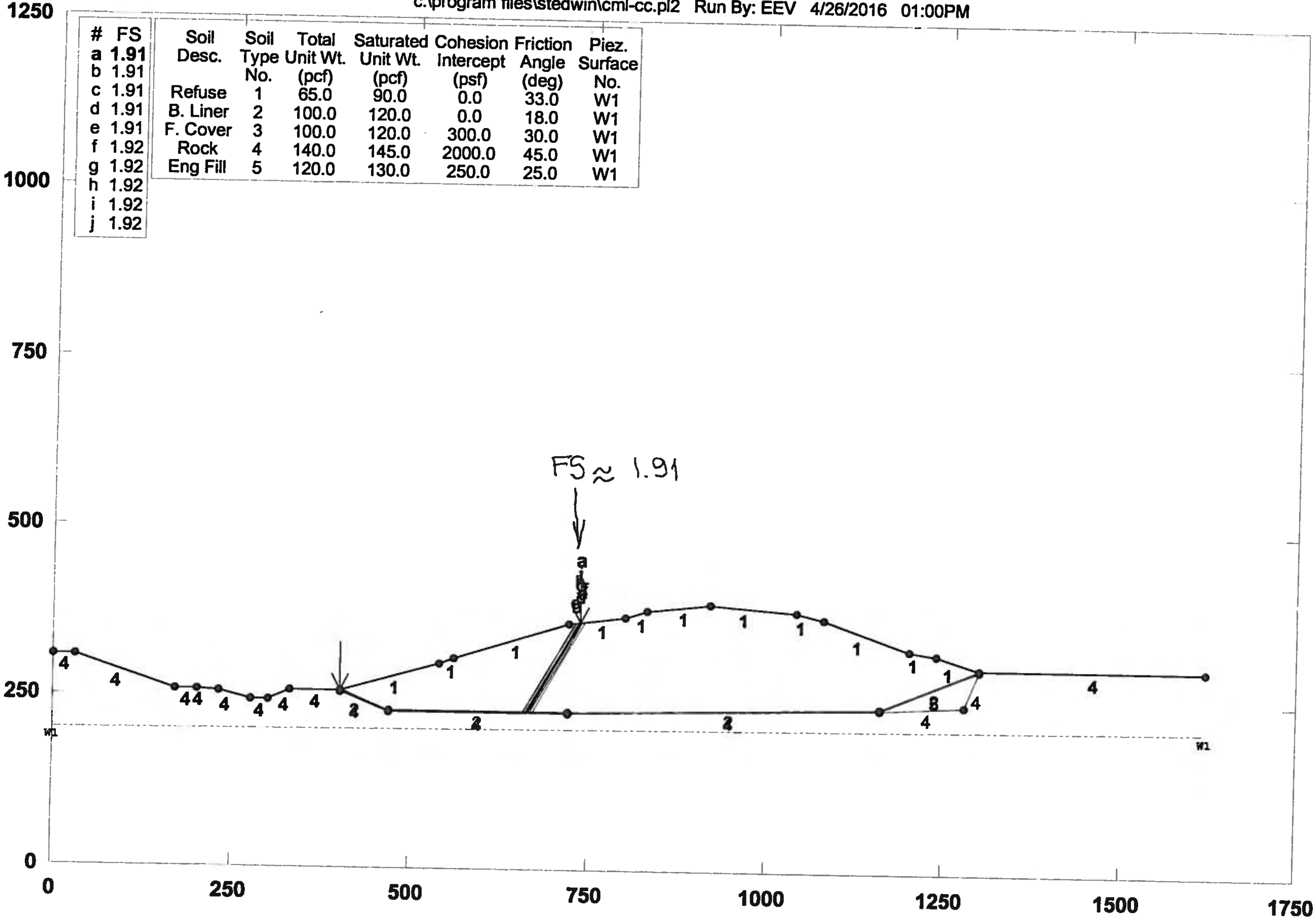
CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb.plt Run By: EEV 4/26/2016 10:00AM



CML - Phase VI - Section CC Static, Liner

c:\program files\stedwin\cml-cc.pl2   Run By: EEV   4/26/2016   01:00PM



#	FS
a	**1.91**
b	1.91
c	1.91
d	1.91
e	1.91
f	1.92
g	1.92
h	1.92
i	1.92
j	1.92

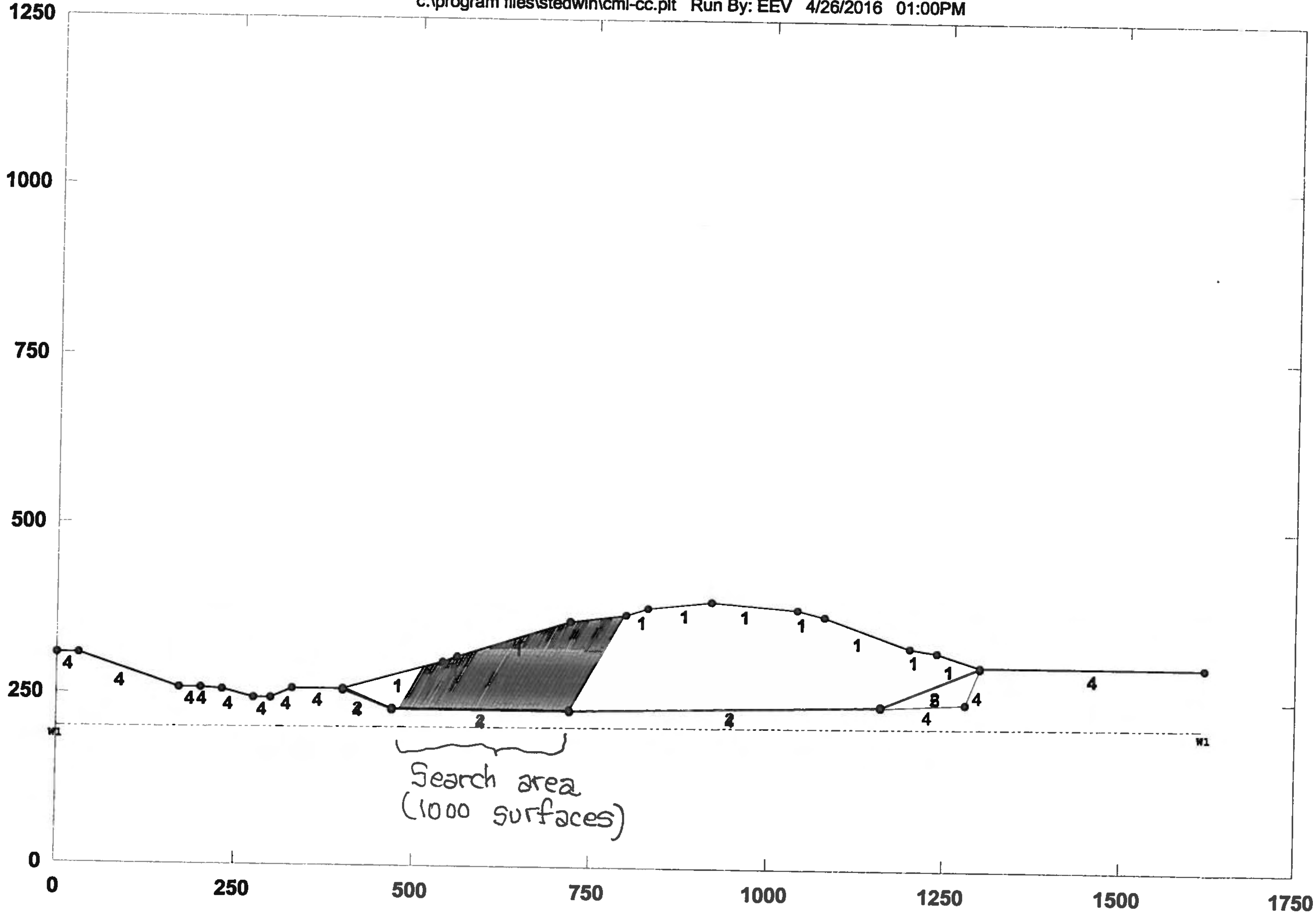
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

PCSTABL5M/si FSmin=1.91

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section CC Static, Liner

c:\program files\stedwin\cml-cc.plt Run By: EEV 4/26/2016 01:00PM

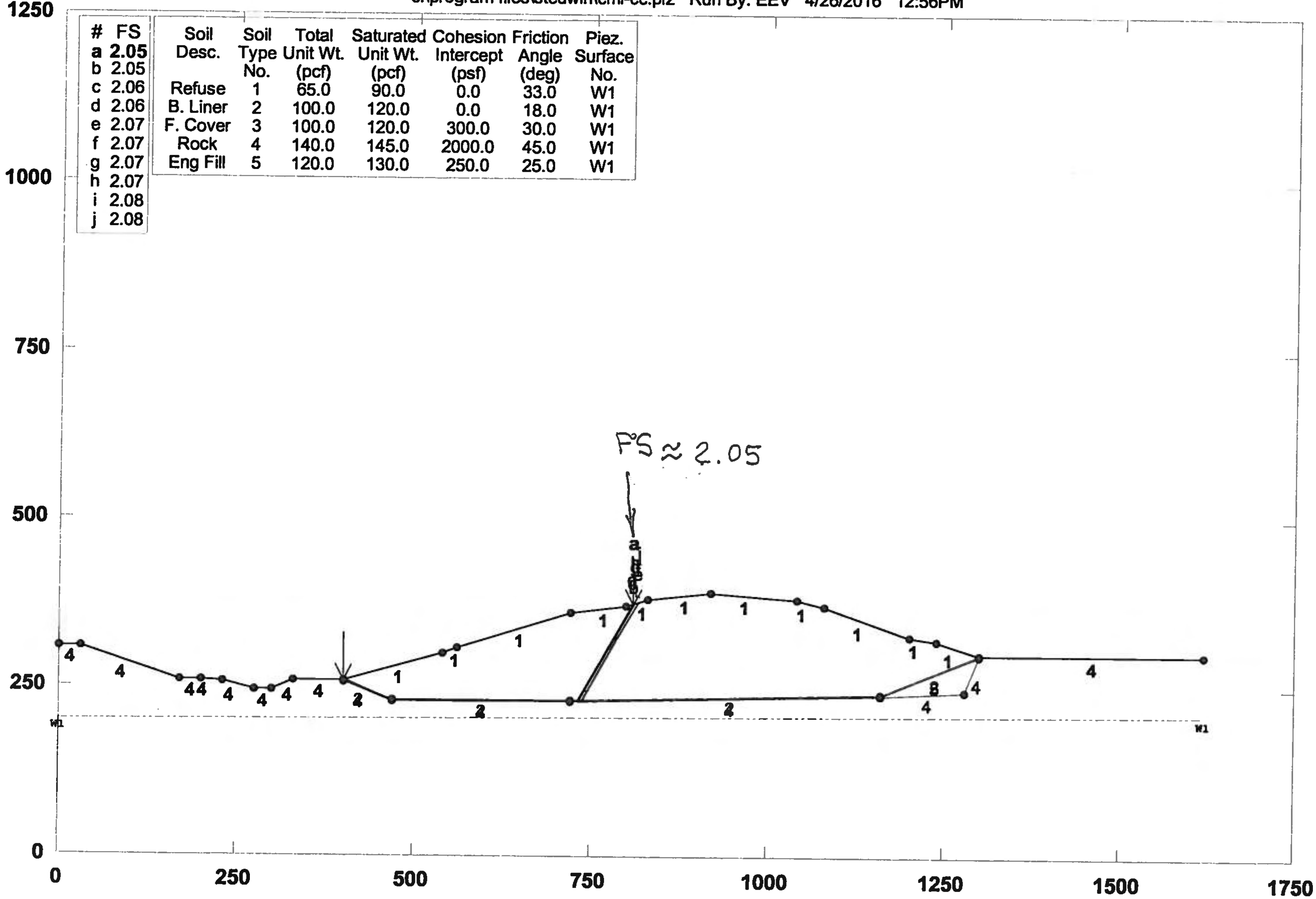


CML - Phase VI - Section CC Static, Liner

c:\program files\stedwin\cml-cc.pl2 Run By: EEV 4/26/2016 12:56PM

#	FS
a	**2.05**
b	2.05
c	2.06
d	2.06
e	2.07
f	2.07
g	2.07
h	2.07
i	2.08
j	2.08

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

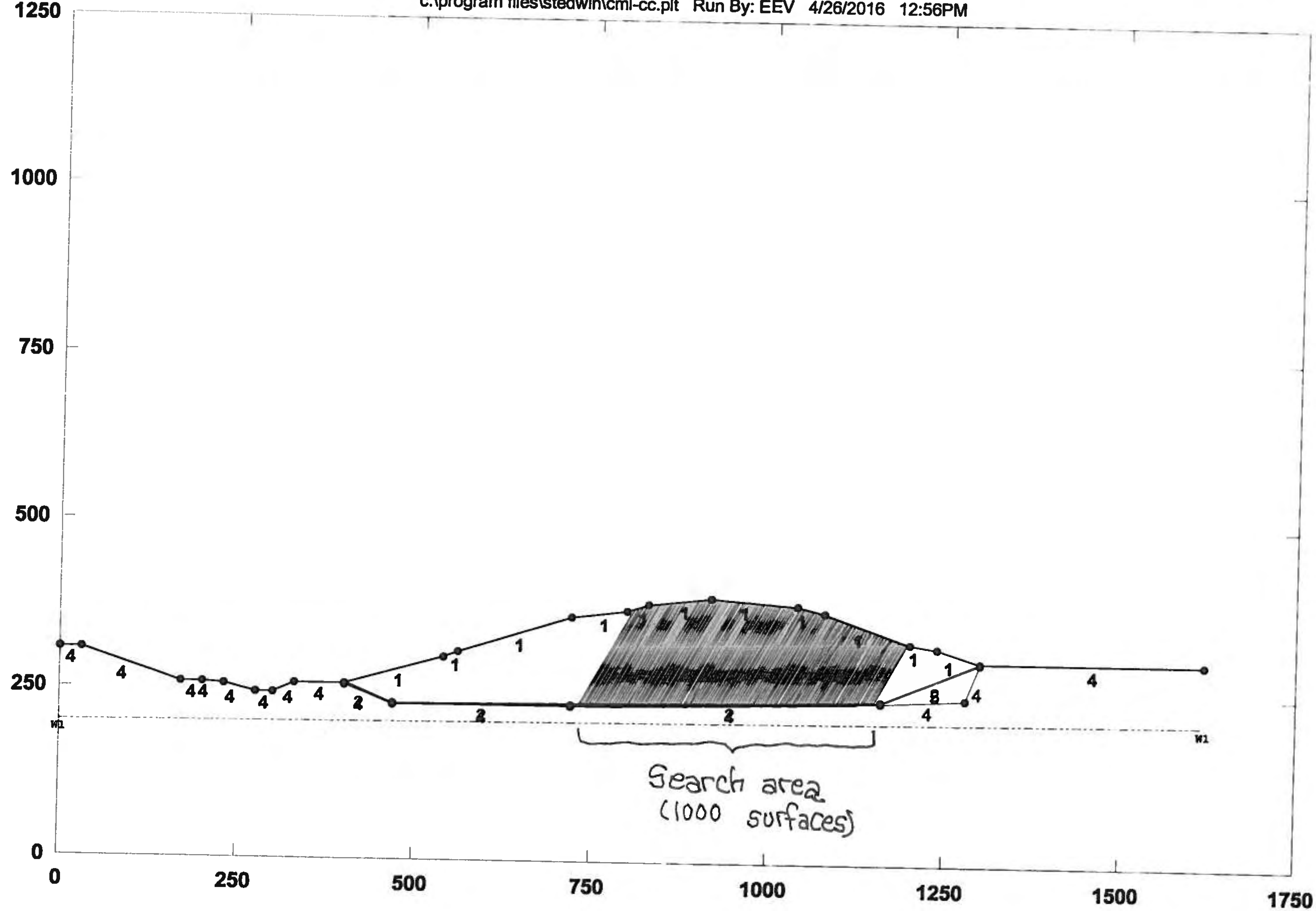


PCSTABL5M/si FSmin=2.05

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section CC Static, Liner

c:\program files\stedwin\cml-cc.plt Run By: EEV 4/26/2016 12:56PM

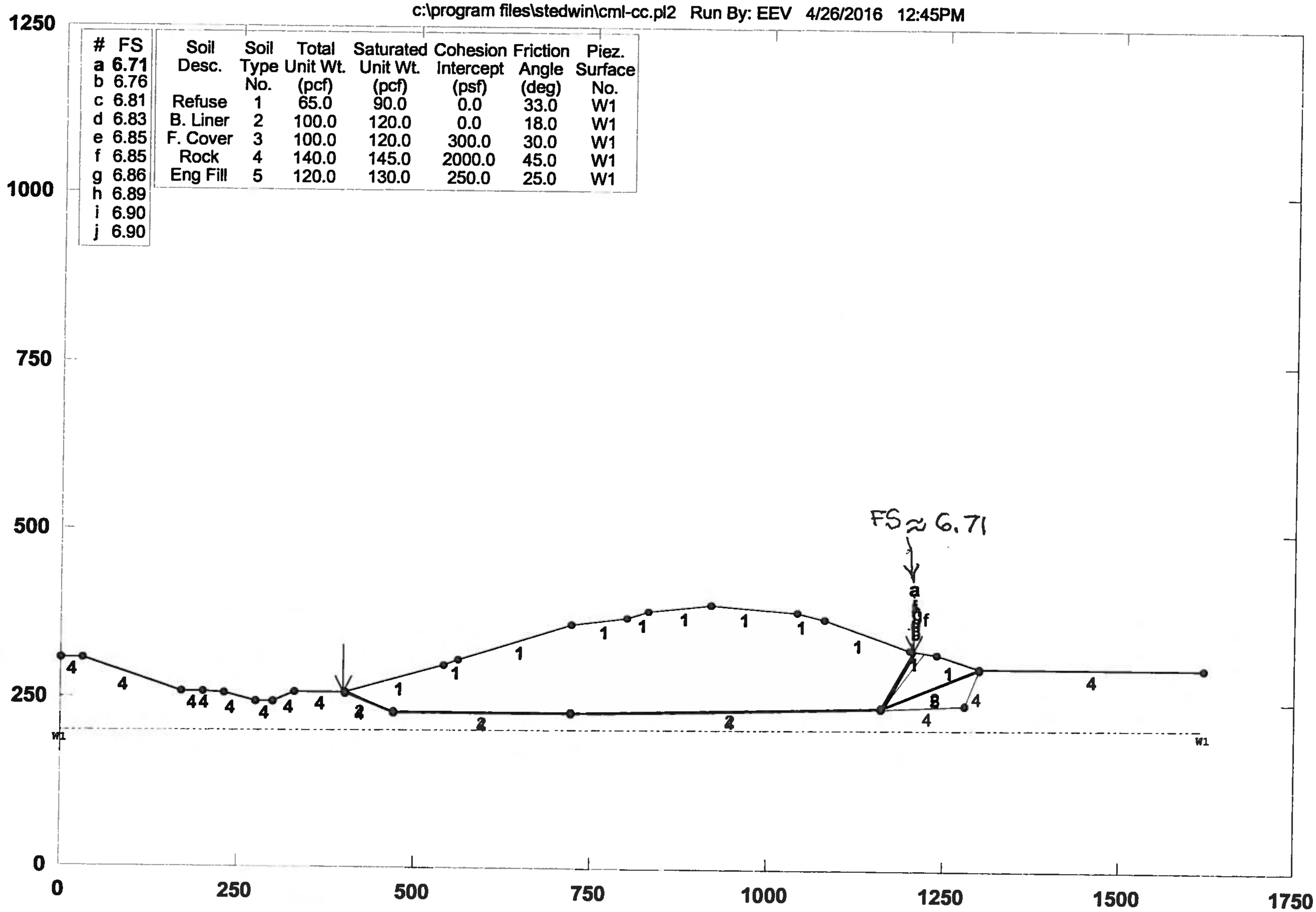


CML - Phase VI - Section CC Static, Liner

c:\program files\stedwin\cml-cc.pl2 Run By: EEV 4/26/2016 12:45PM

#	FS
a	**6.71**
b	6.76
c	6.81
d	6.83
e	6.85
f	6.85
g	6.86
h	6.89
i	6.90
j	6.90

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

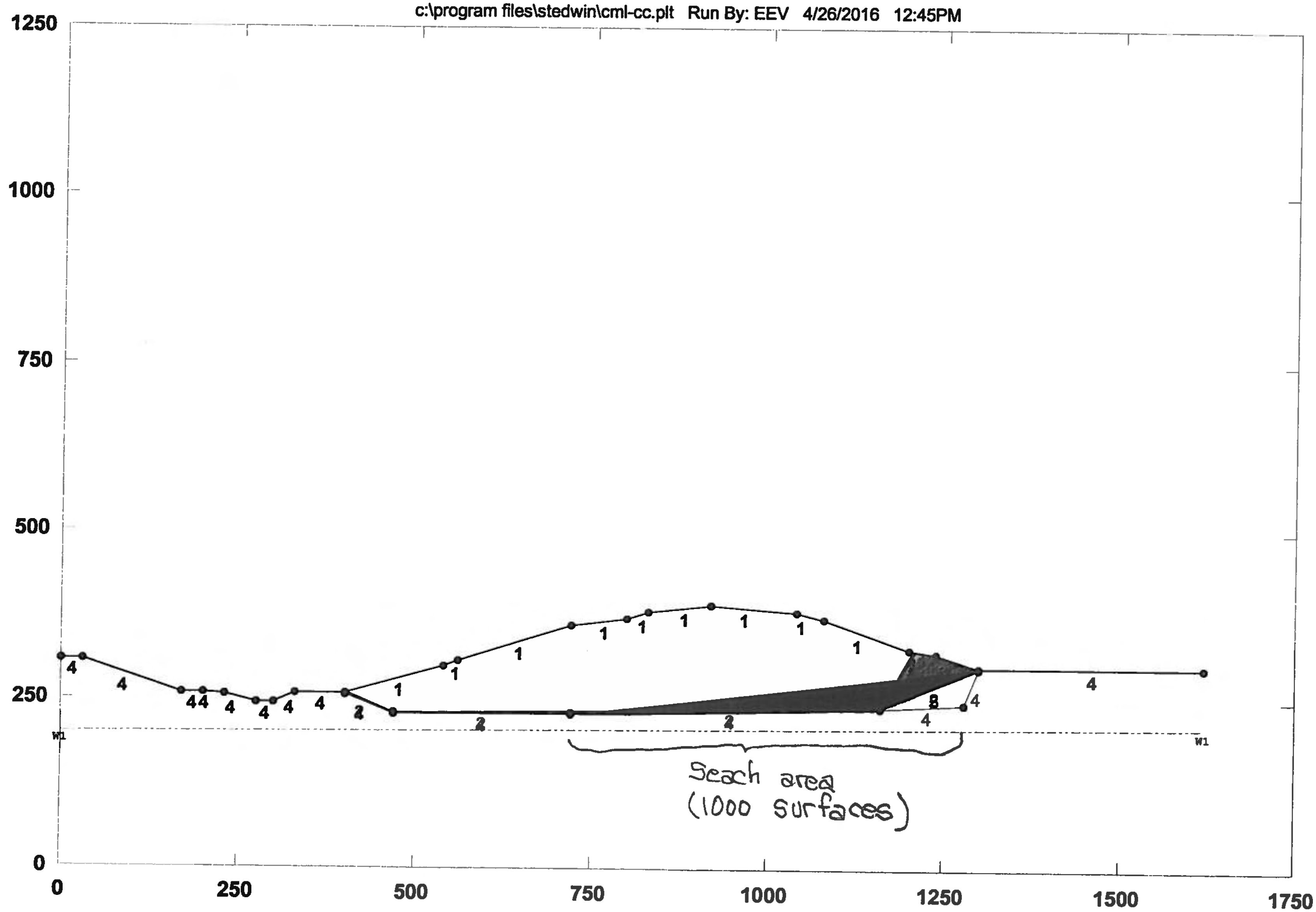


PCSTABL5M/si FSmin=6.71

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section CC Static, Liner

c:\program files\stedwin\cml-cc.plt Run By: EEV 4/26/2016 12:45PM

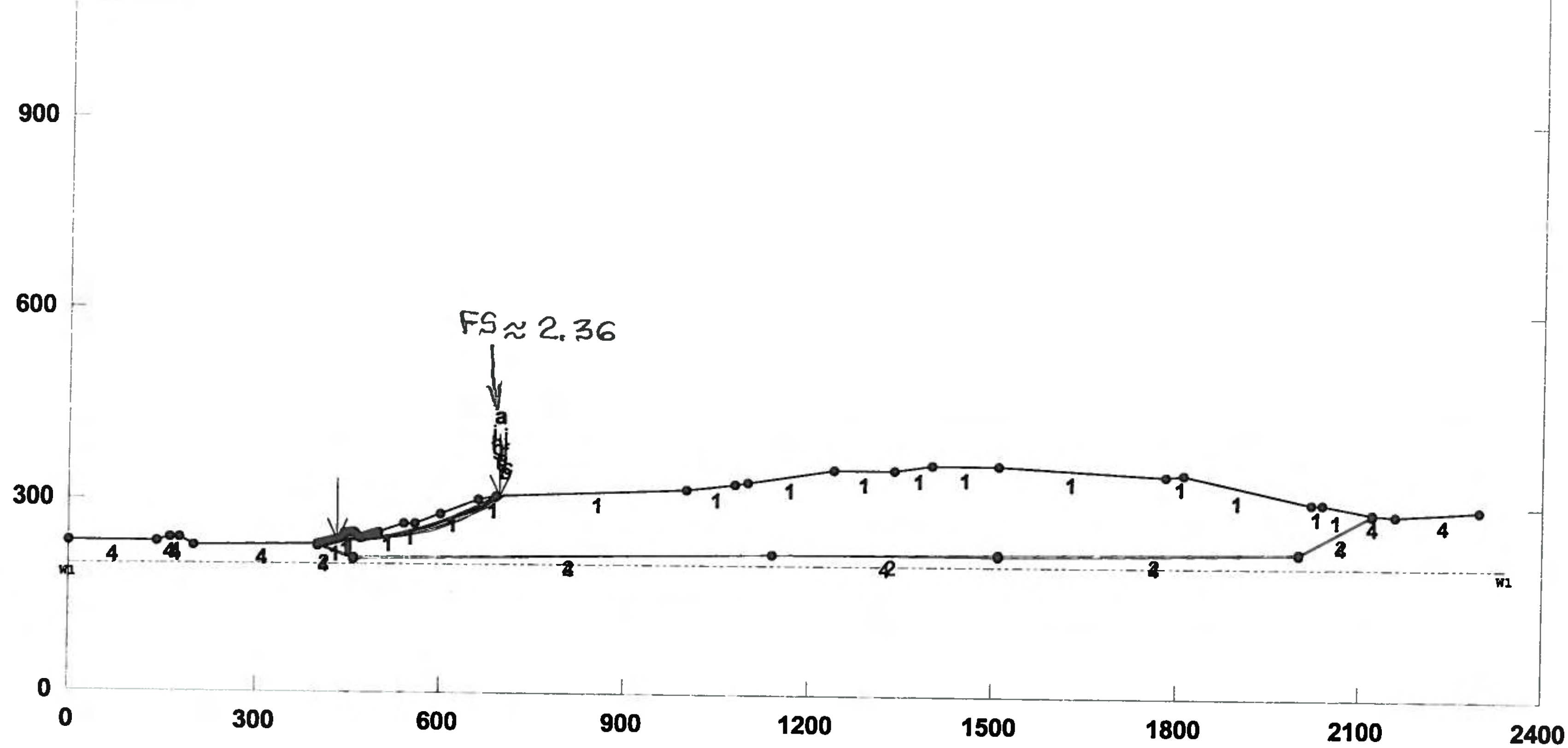


CML - Phase VI - Section AA Static, Liner

c:\program files\stedwin\cml-aa-c.pl2 Run By: EEV 4/26/2016 01:57PM

#	FS
a	**2.36**
b	2.39
c	2.39
d	2.39
e	2.40
f	2.40
g	2.41
h	2.42
i	2.42
j	2.42

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

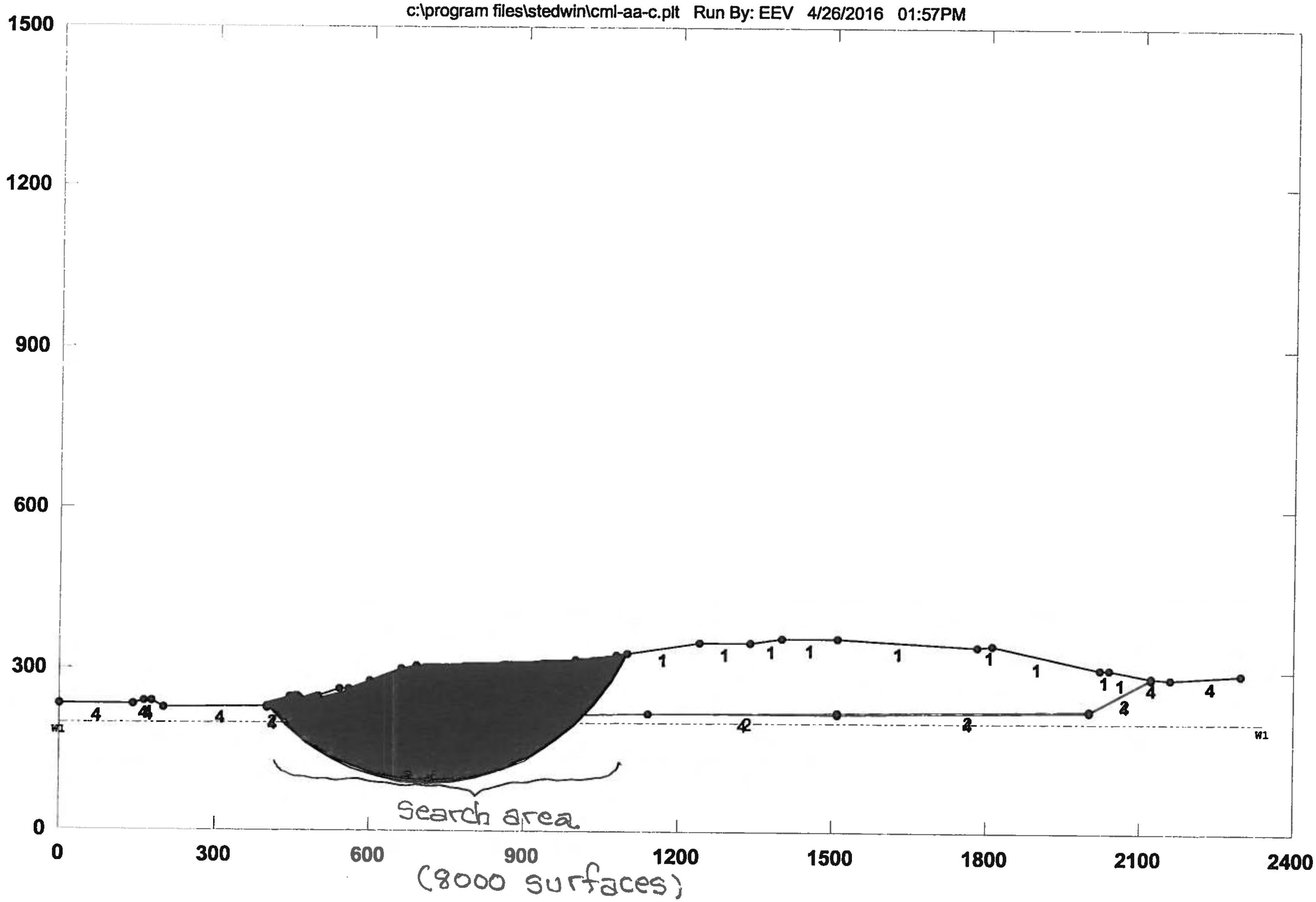


PCSTABL5M/si FSmin=2.36

Safety Factors Are Calculated By The Modified Bishop Method

CML - Phase VI - Section AA Static, Liner

c:\program files\stedwin\cml-aa-c.plt Run By: EEV 4/26/2016 01:57PM

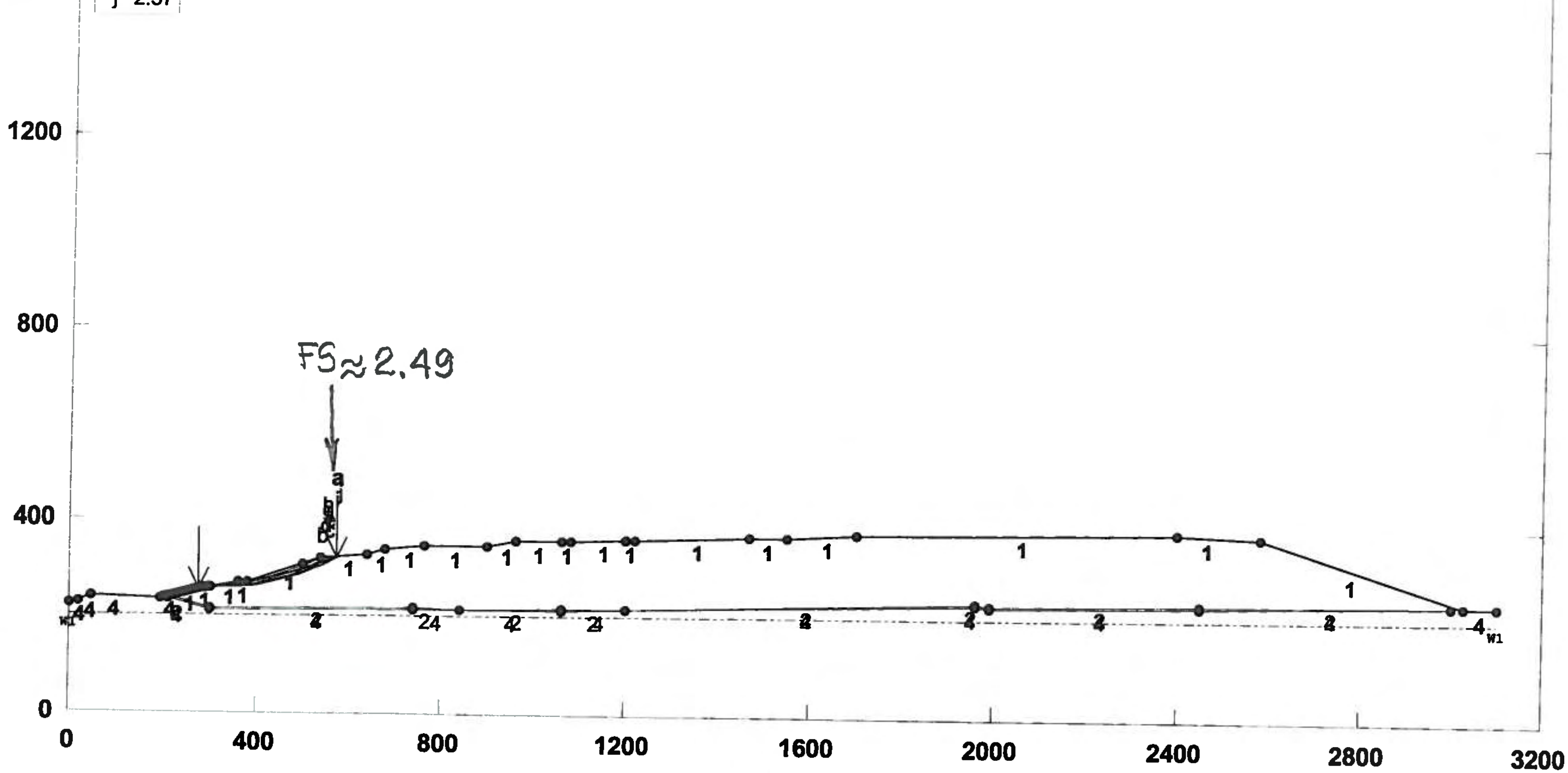


CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb-c.pl2 Run By: EEV 4/26/2016 02:01PM

#	FS
a	**2.49**
b	2.51
c	2.53
d	2.53
e	2.54
f	2.54
g	2.55
h	2.56
i	2.57
j	2.57

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

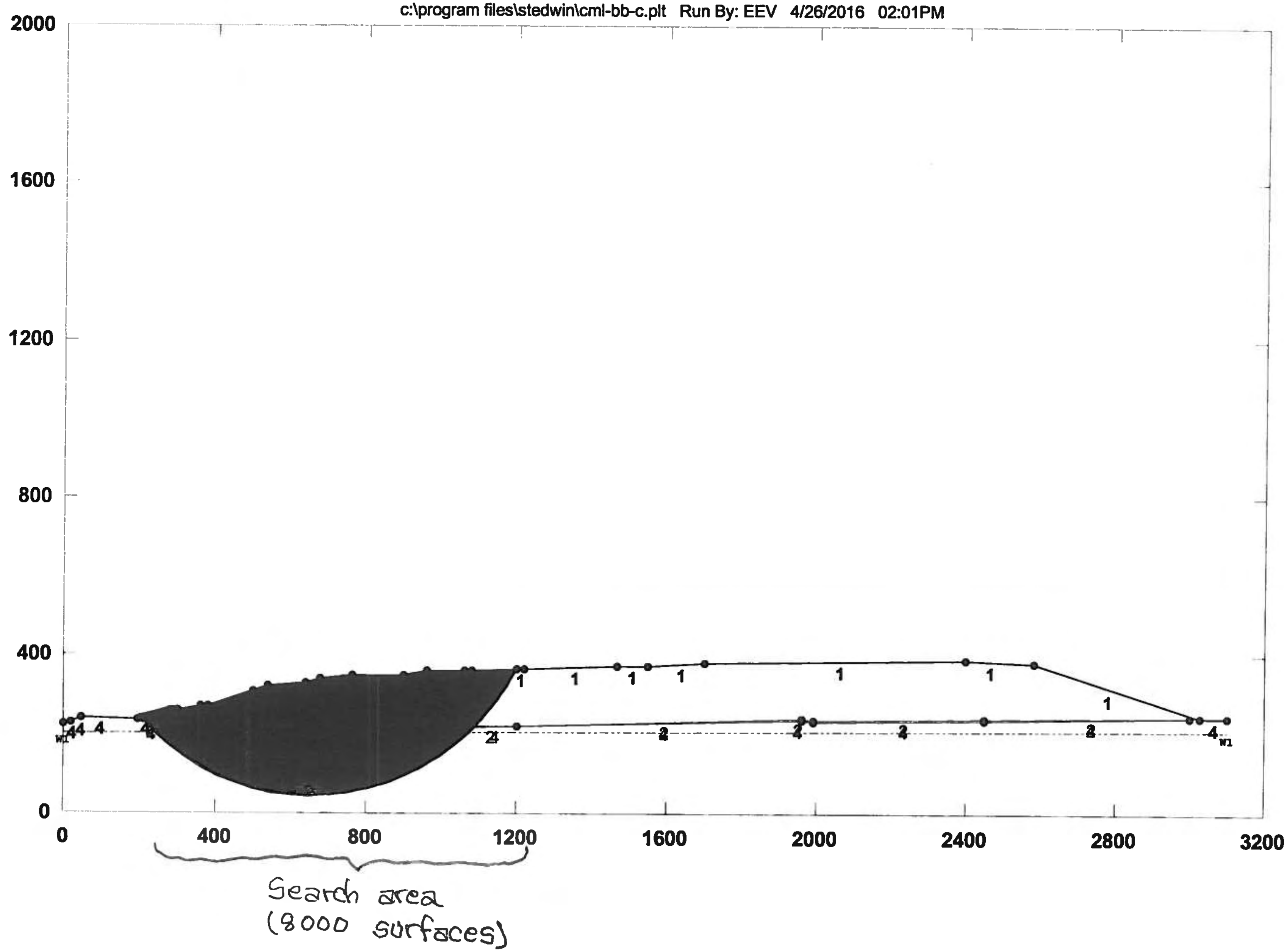


PCSTABL5M/si FSmin=2.49

Safety Factors Are Calculated By The Modified Bishop Method

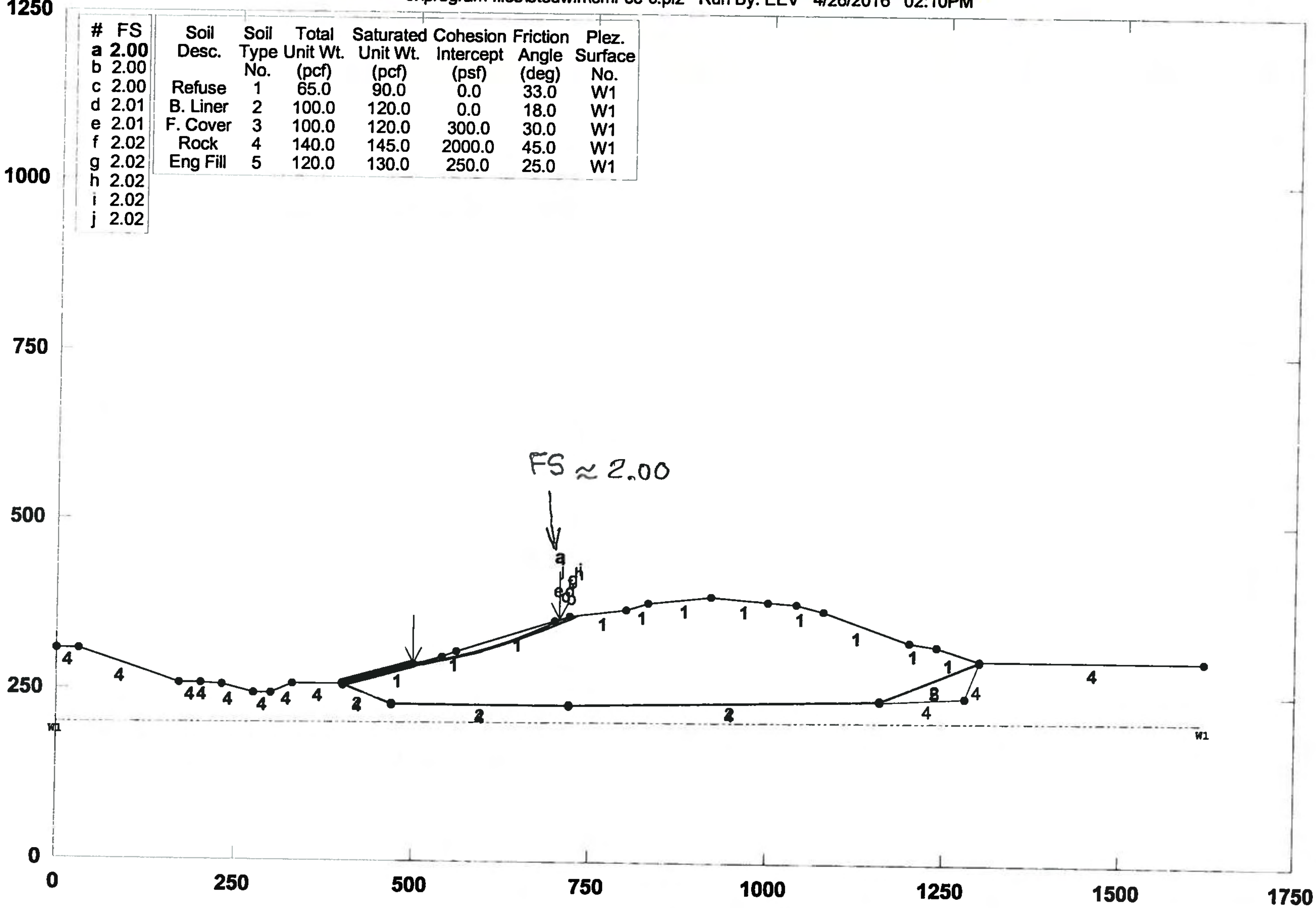
CML - Phase VI - Section BB Static, Liner

c:\program files\stedwin\cml-bb-c.plt Run By: EEV 4/26/2016 02:01PM



CML - Phase VI - Section CC Static, Liner

c:\program files\stedwin\cml-cc-c.pl2   Run By: EEV   4/26/2016   02:10PM



#	FS
a	**2.00**
b	2.00
c	2.00
d	2.01
e	2.01
f	2.02
g	2.02
h	2.02
i	2.02
j	2.02

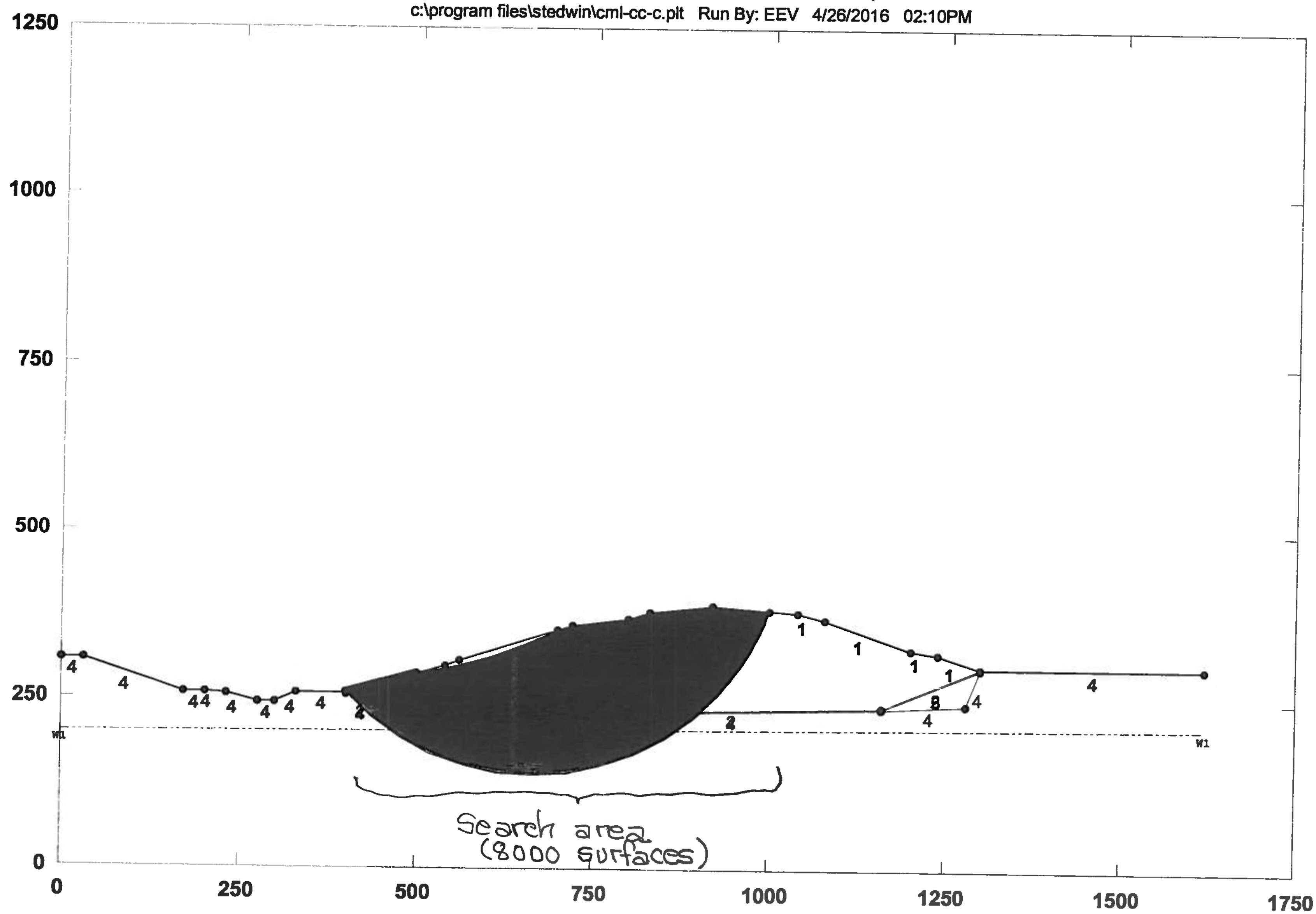
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	18.0	W1
F. Cover	3	100.0	120.0	300.0	30.0	W1
Rock	4	140.0	145.0	2000.0	45.0	W1
Eng Fill	5	120.0	130.0	250.0	25.0	W1

PCSTABL5M/si FSmin=2.00

Safety Factors Are Calculated By The Modified Bishop Method

CML - Phase VI - Section CC Static, Liner

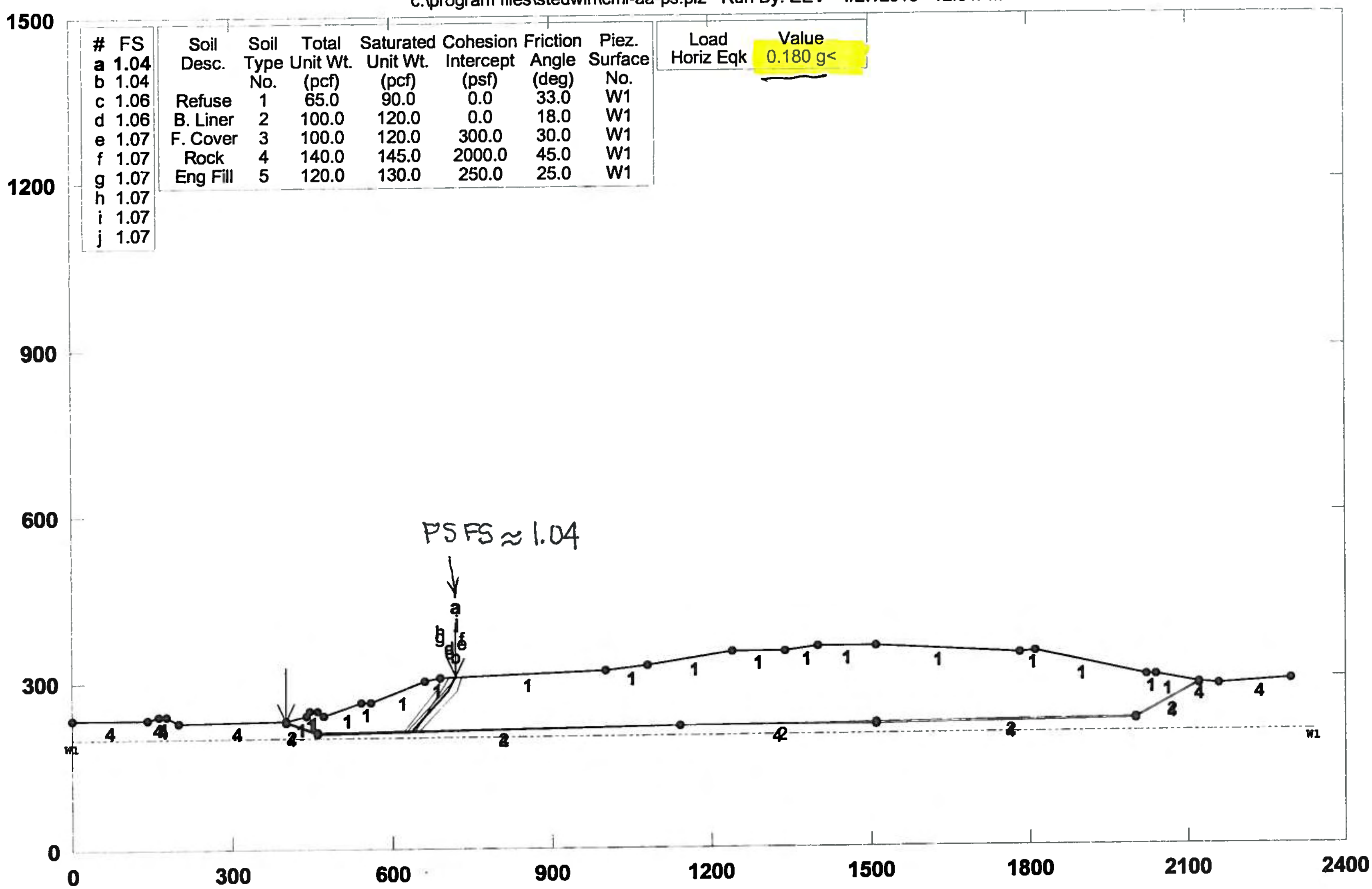
c:\program files\stedwin\cml-cc-c.plt Run By: EEV 4/26/2016 02:10PM



Pseudo-Static Stability

CML - Phase VI - Section AA Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-ps.pl2 Run By: EEV 4/27/2016 12:54PM



#	FS
a	**1.04**
b	1.04
c	1.06
d	1.06
e	1.07
f	1.07
g	1.07
h	1.07
i	1.07
j	1.07

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

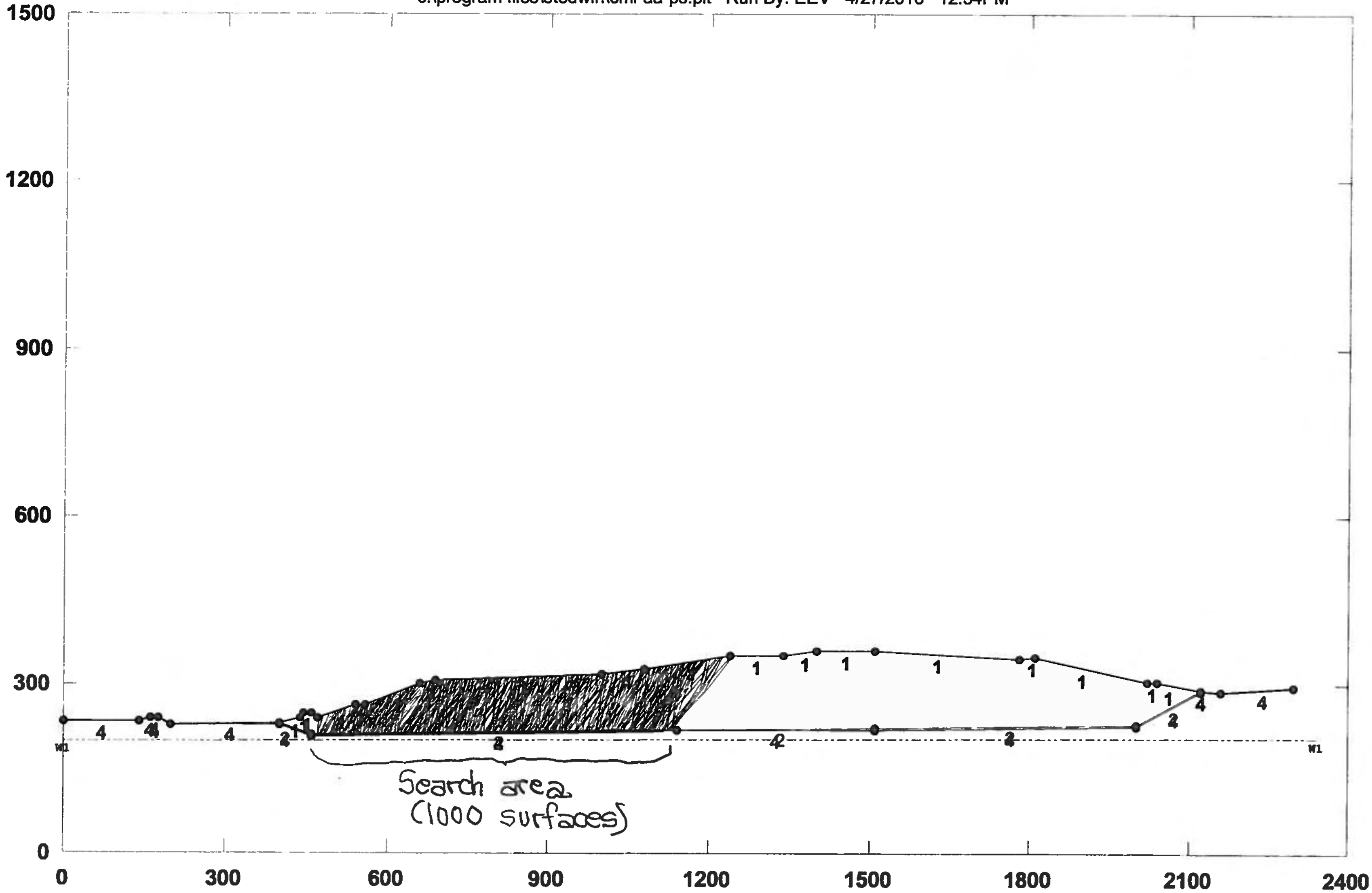
Load	Value
Horiz Eqk	0.180 g<

PCSTABL5M/si FSmin=1.04

Safety Factors Are Calculated By The Modified Janbu Method

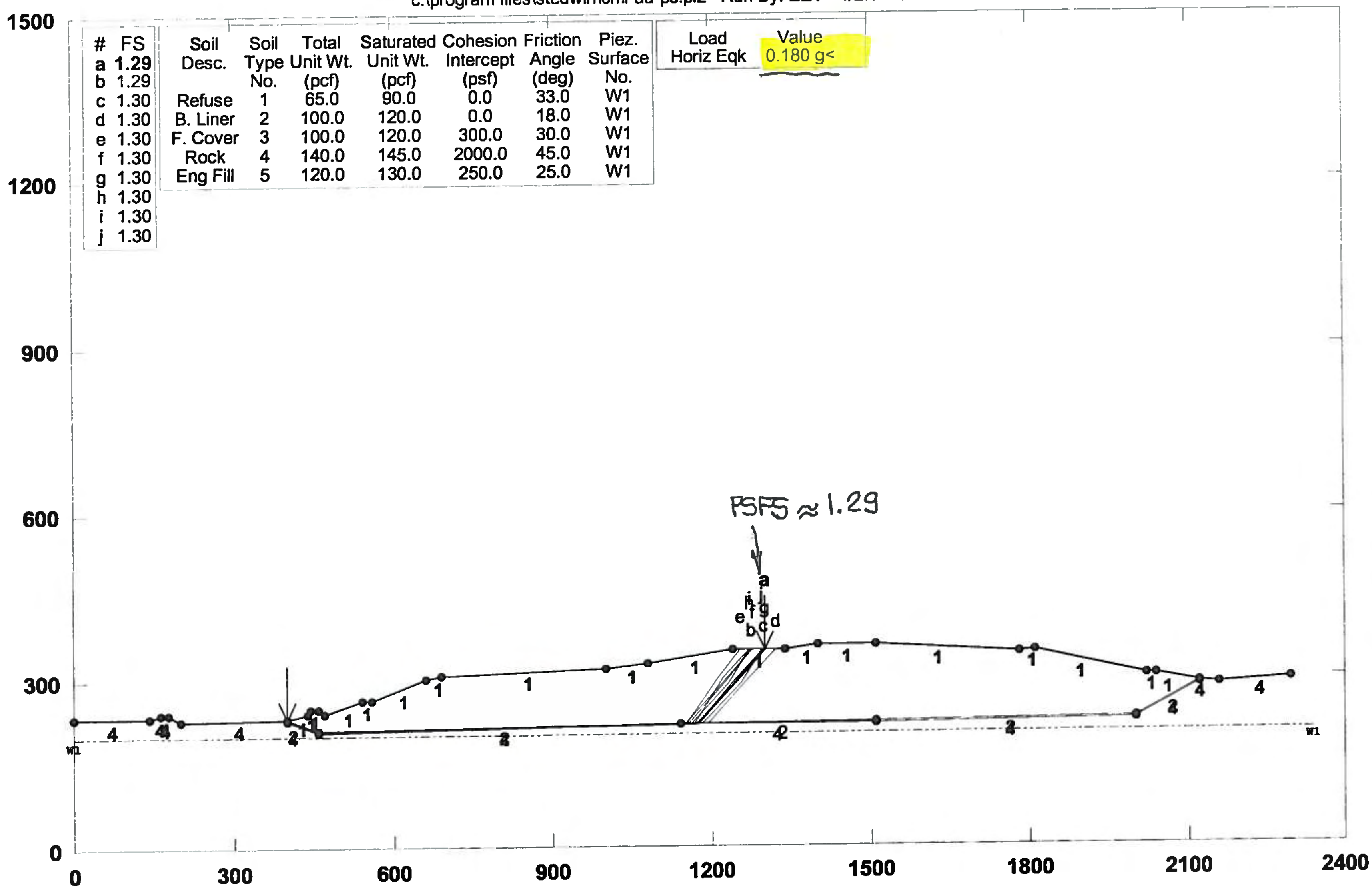
CML - Phase VI - Section AA Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-ps.plt Run By: EEV 4/27/2016 12:54PM



CML - Phase VI - Section AA Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-ps.pl2 Run By: EEV 4/27/2016 12:53PM



#	FS
a	**1.29**
b	1.29
c	1.30
d	1.30
e	1.30
f	1.30
g	1.30
h	1.30
i	1.30
j	1.30

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

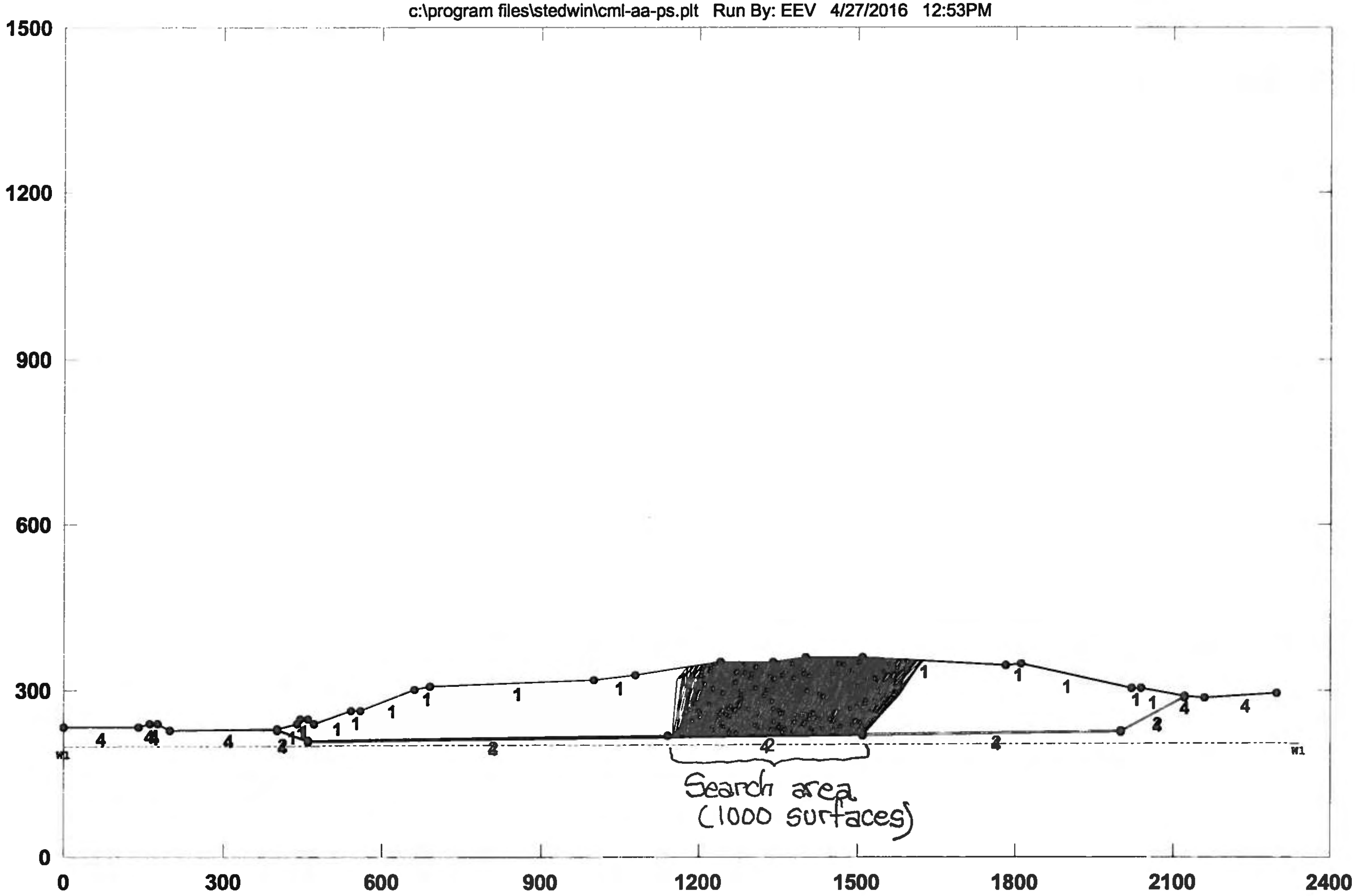
Load	Value
Horiz Eqk	0.180 g<

PCSTABL5M/si FSmin=1.29

Safety Factors Are Calculated By The Modified Janbu Method

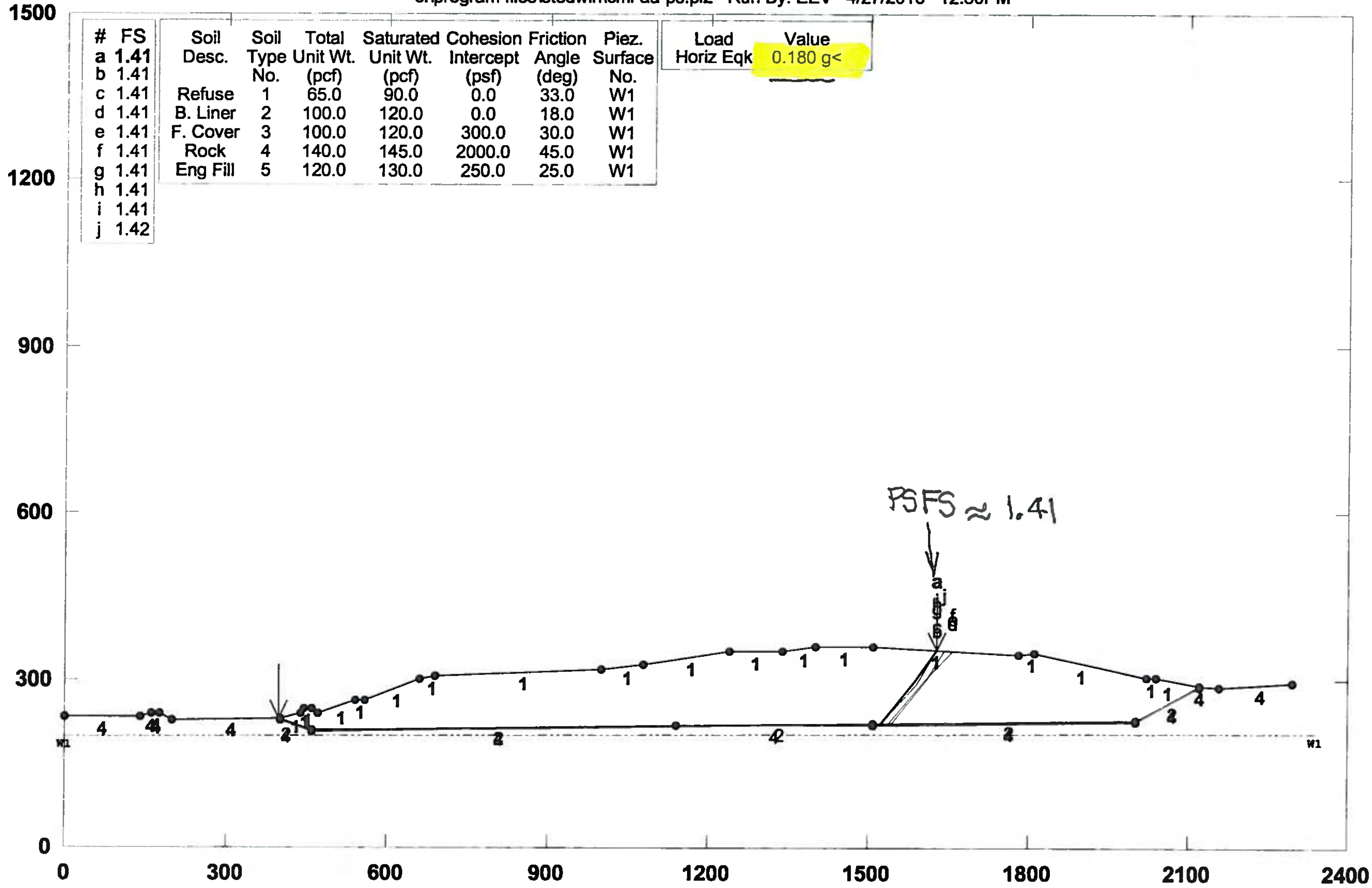
CML - Phase VI - Section AA Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-ps.plt Run By: EEV 4/27/2016 12:53PM



CML - Phase VI - Section AA Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-ps.pl2 Run By: EEV 4/27/2016 12:50PM



#	FS
a	**1.41**
b	1.41
c	1.41
d	1.41
e	1.41
f	1.41
g	1.41
h	1.41
i	1.41
j	1.42

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

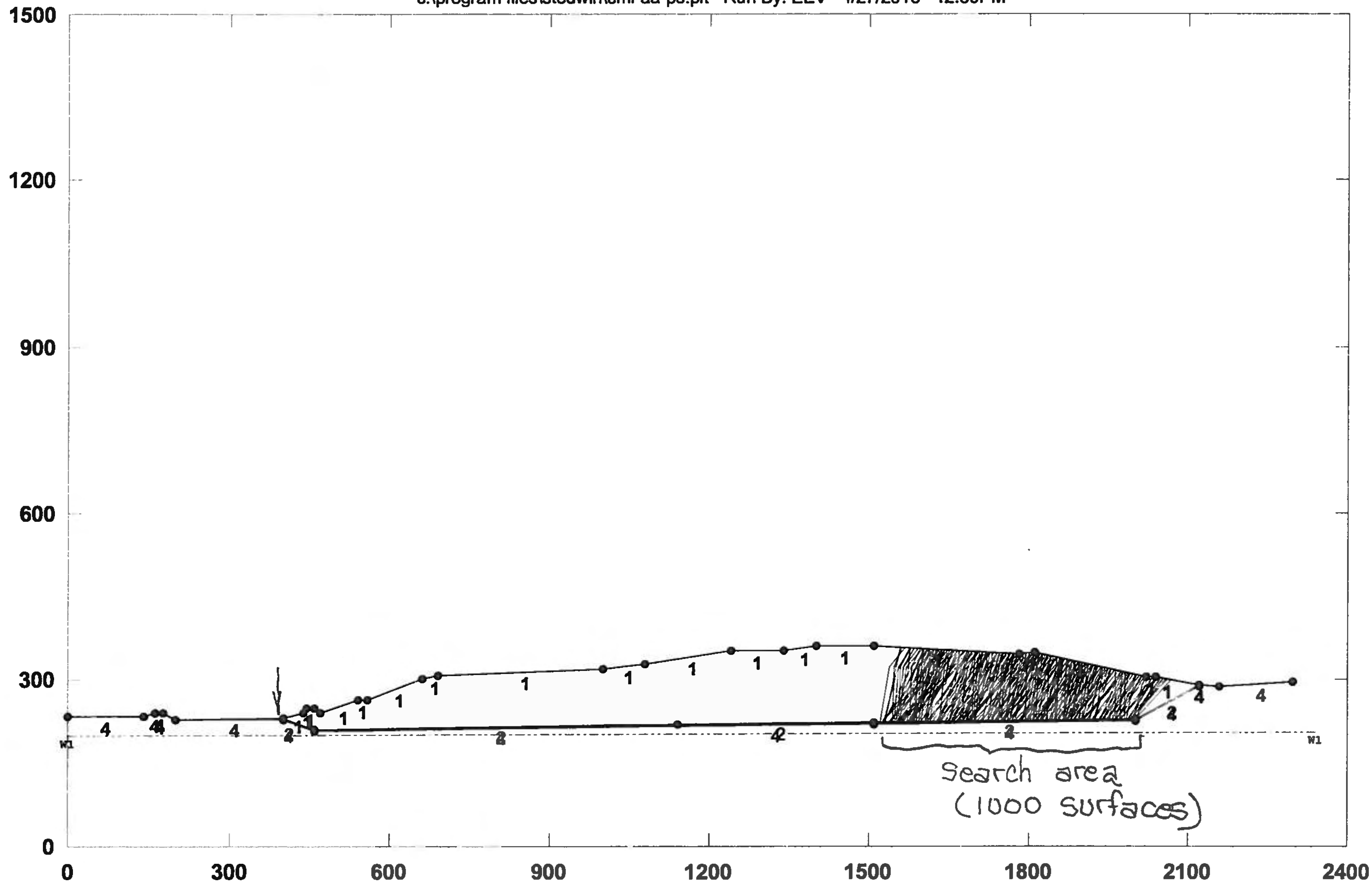
Load	Value
Horiz Eqk	0.180 g<

PCSTABL5M/si FSmin=1.41

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section AA Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-ps.plt Run By: EEV 4/27/2016 12:50PM



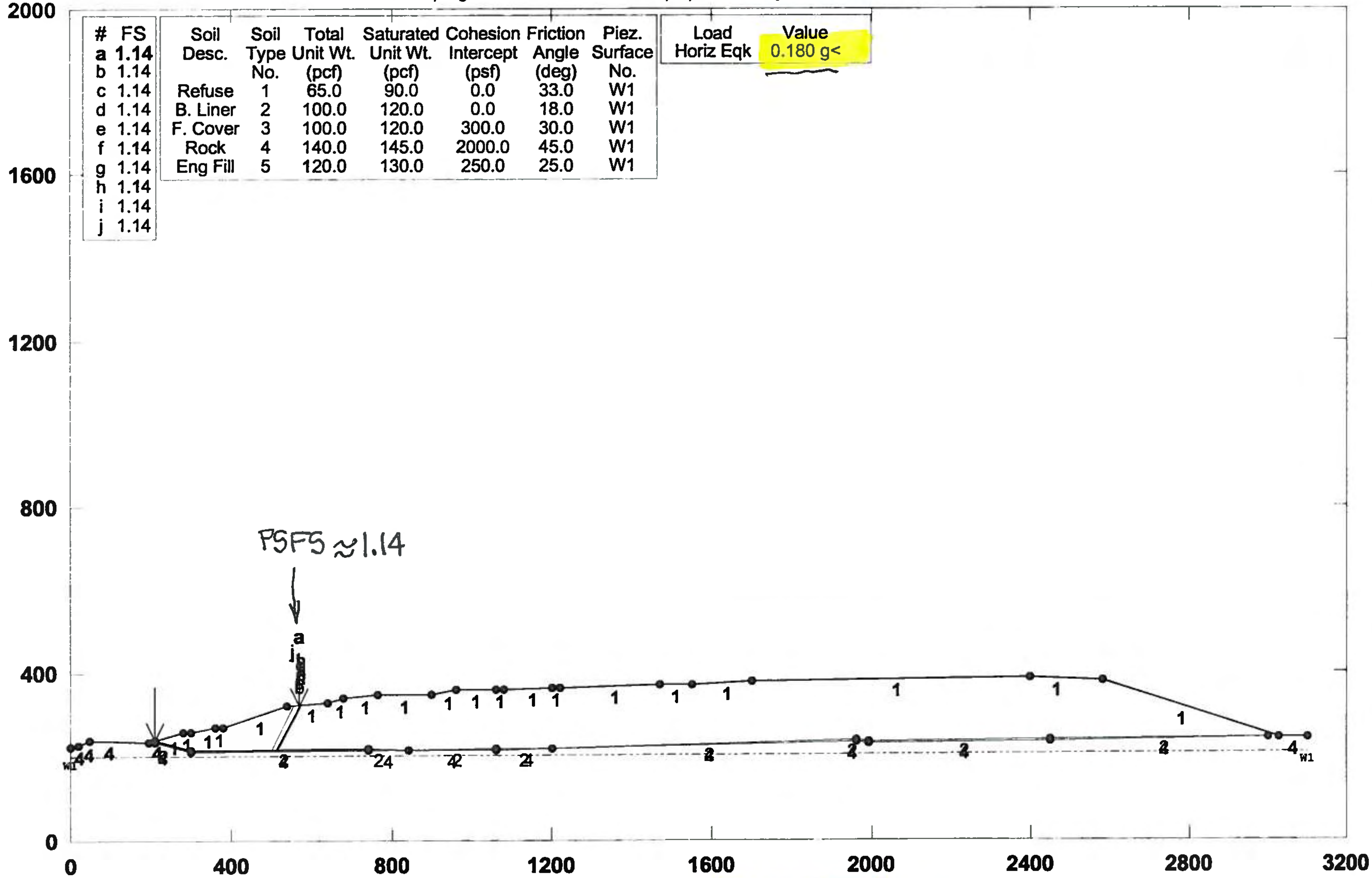
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:47PM

#	FS
a	**1.14**
b	1.14
c	1.14
d	1.14
e	1.14
f	1.14
g	1.14
h	1.14
i	1.14
j	1.14

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.180 g<

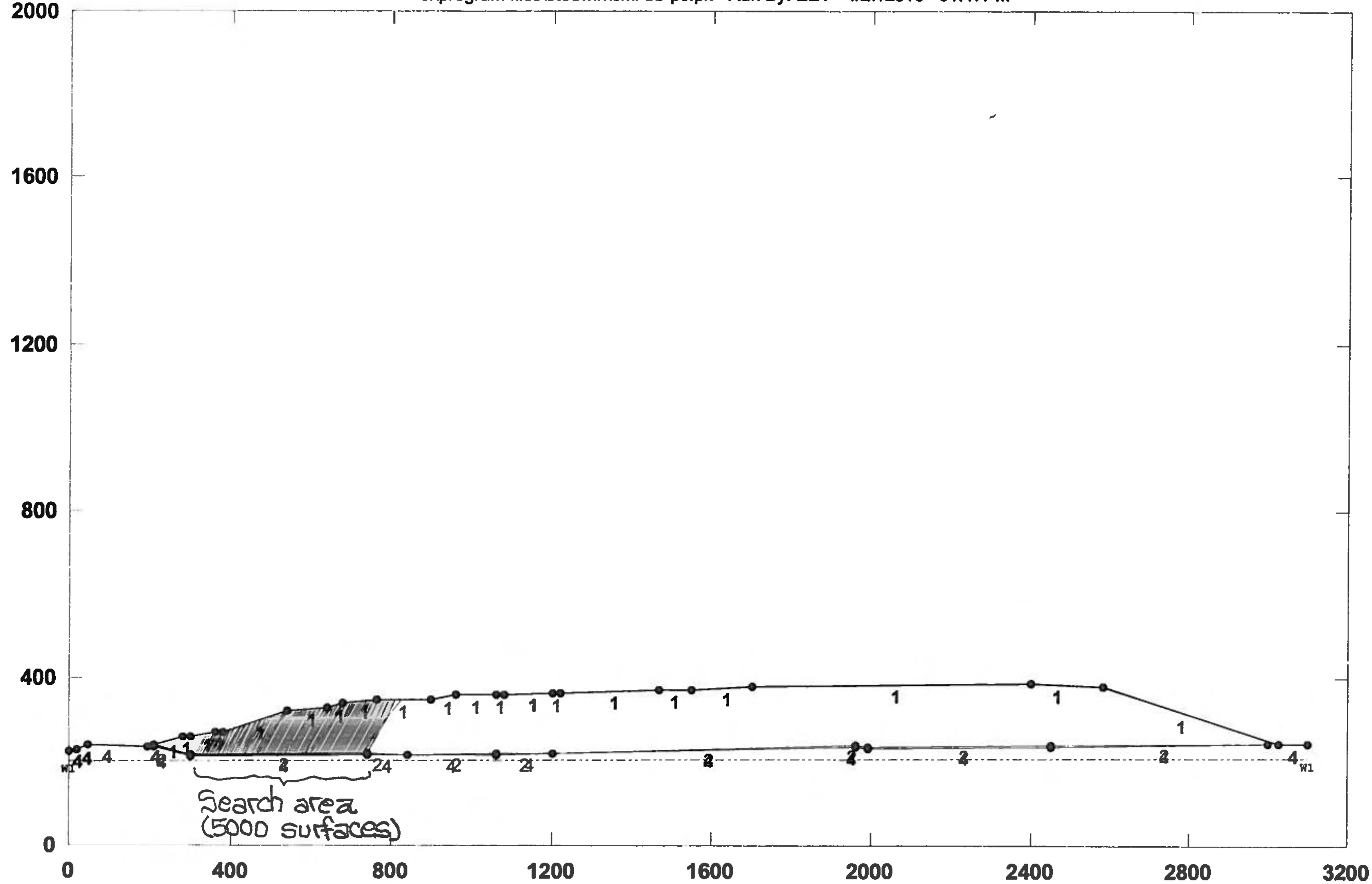


PCSTABL5M/si FSmin=1.14

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:47PM



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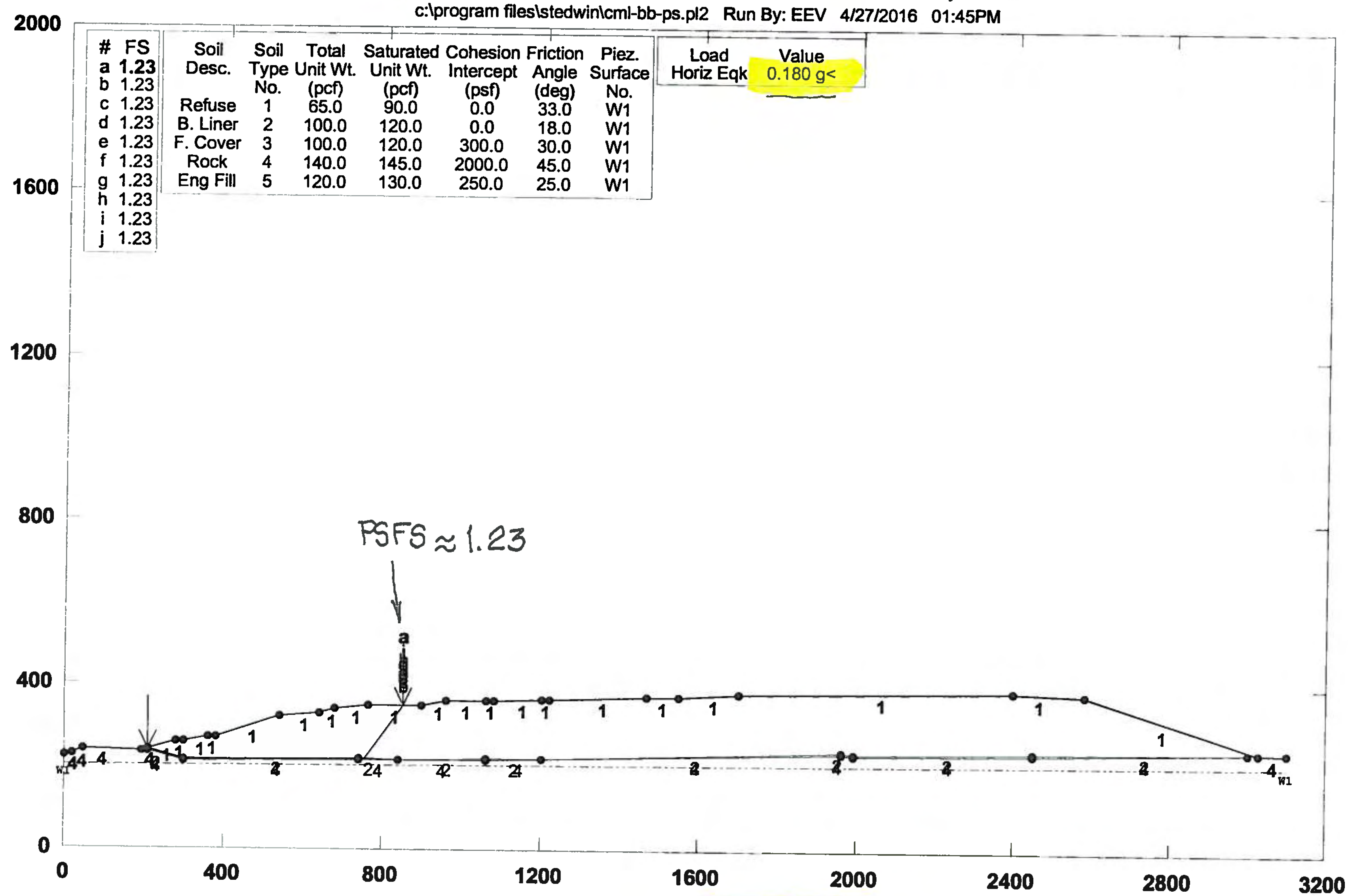
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:45PM



#	FS
a	1.23
b	1.23
c	1.23
d	1.23
e	1.23
f	1.23
g	1.23
h	1.23
i	1.23
j	1.23

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

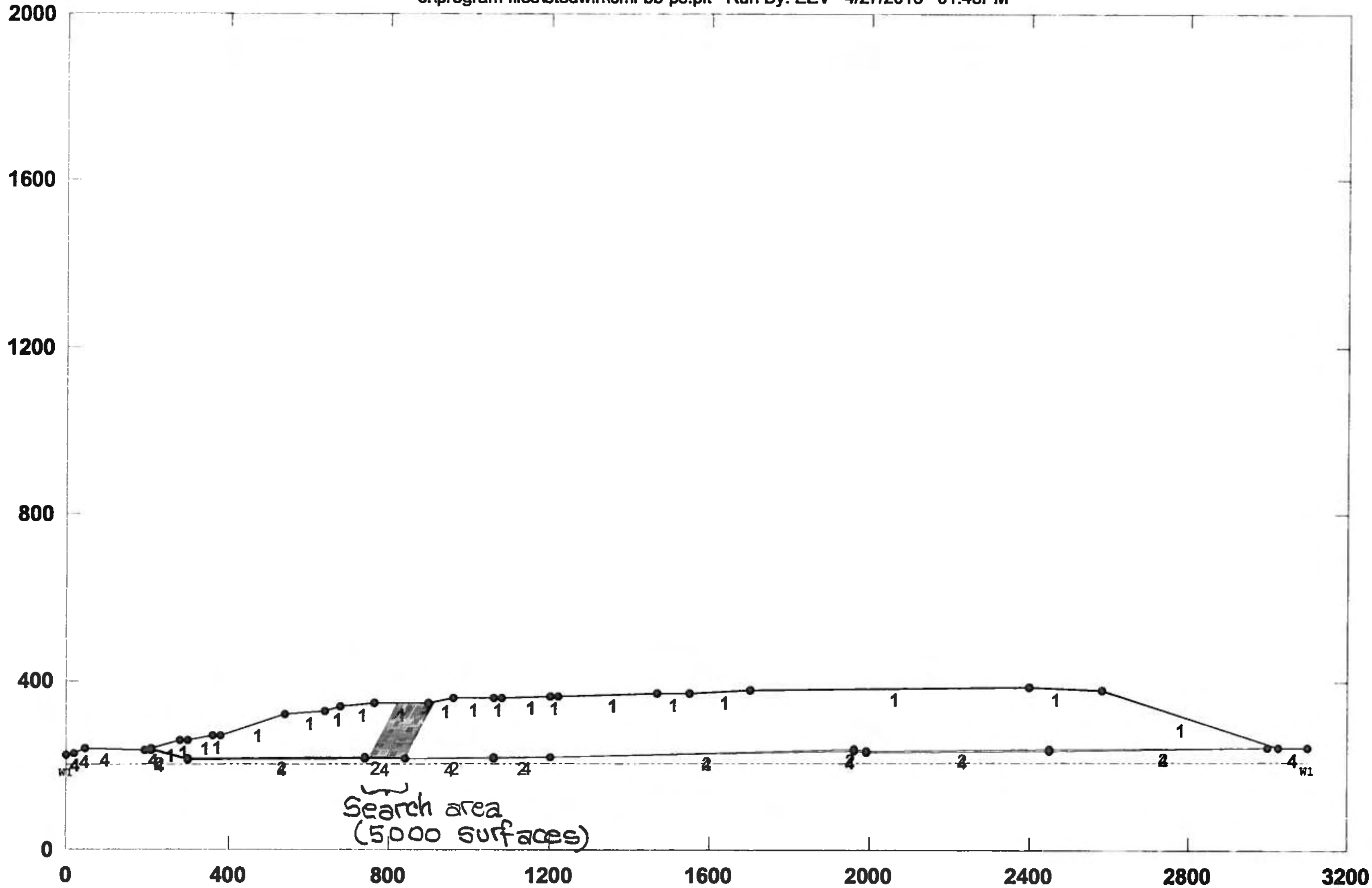
Load	Value
Horiz Eqk	0.180 g<

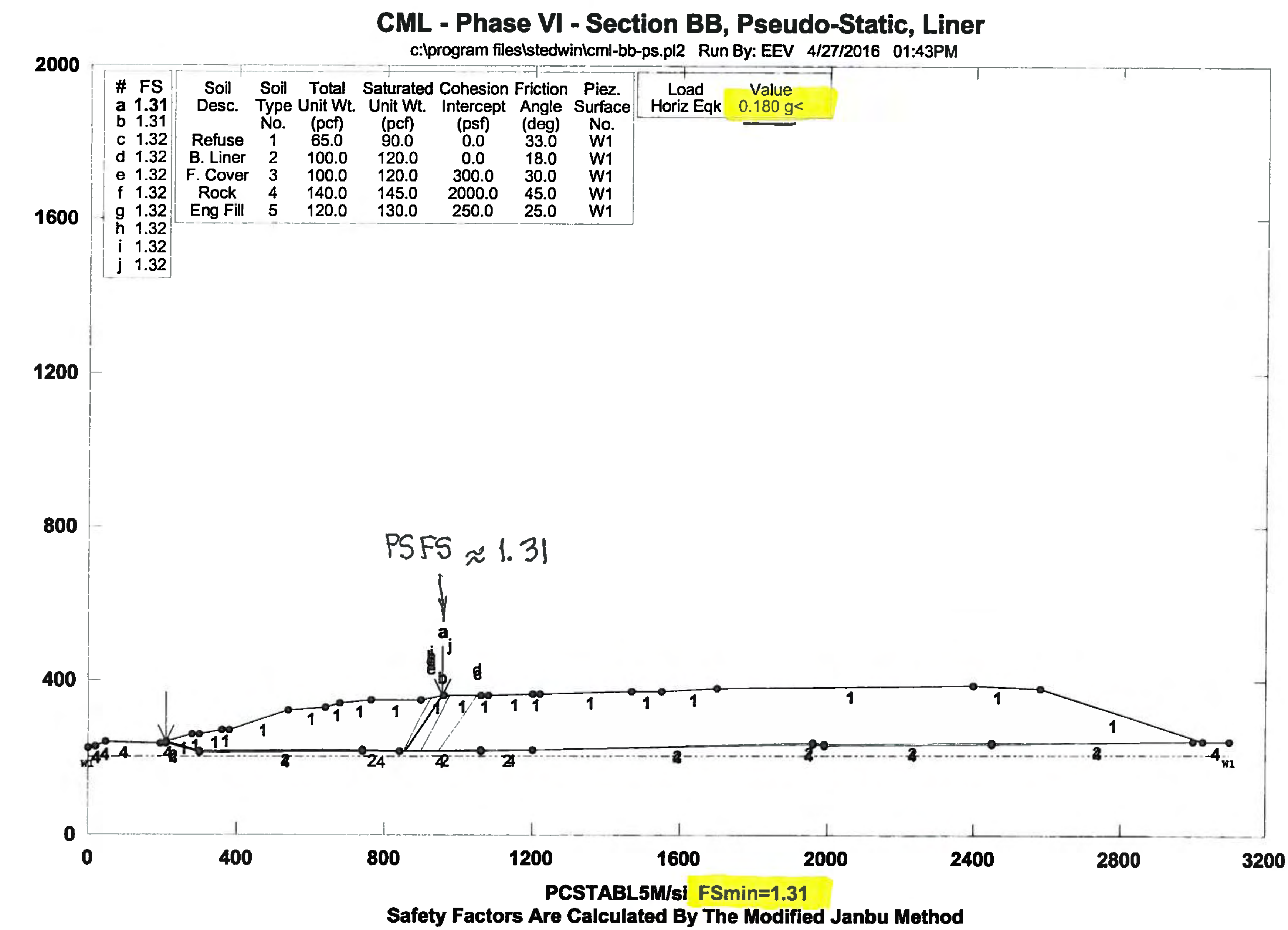
PCSTABL5M/si FSmin=1.23

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section BB, Pseudo-Static, Liner

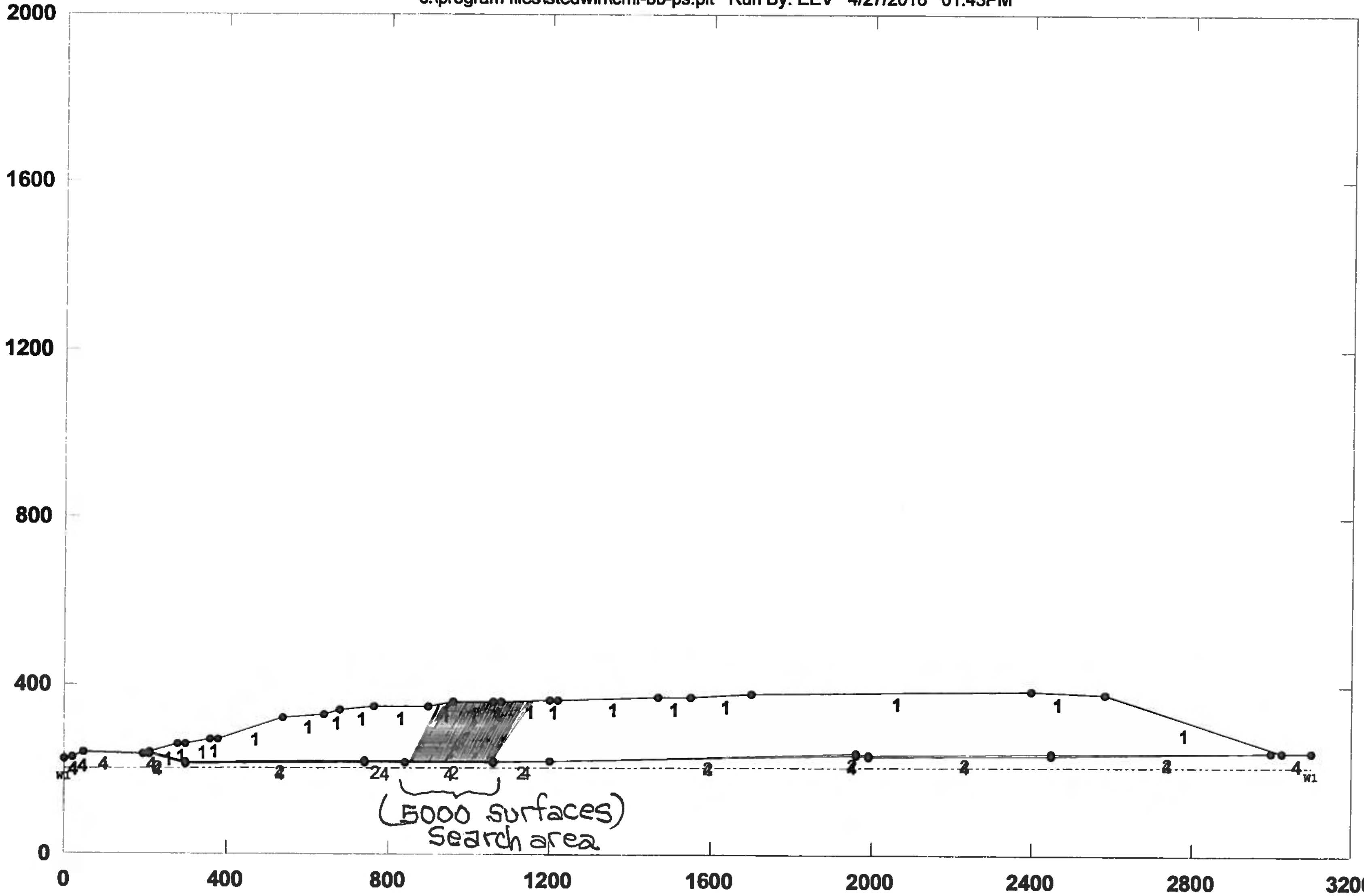
c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:45PM




CML - Phase VI - Section BB, Pseudo-Static, Liner
c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:43PM
FS
a 1.31
b 1.31
c 1.32
d 1.32
e 1.32
f 1.32
g 1.32
h 1.32
i 1.32
j 1.32
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No.
Refuse 1 65.0 90.0 0.0 33.0 W1
B. Liner 2 100.0 120.0 0.0 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 0.180 g<
PSFS ≈ 1.31
2000
1600
1200
800
400
0
0
400
800
1200
1600
2000
2400
2800
3200
PCSTABL5M/si FSmin=1.31
Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:43PM



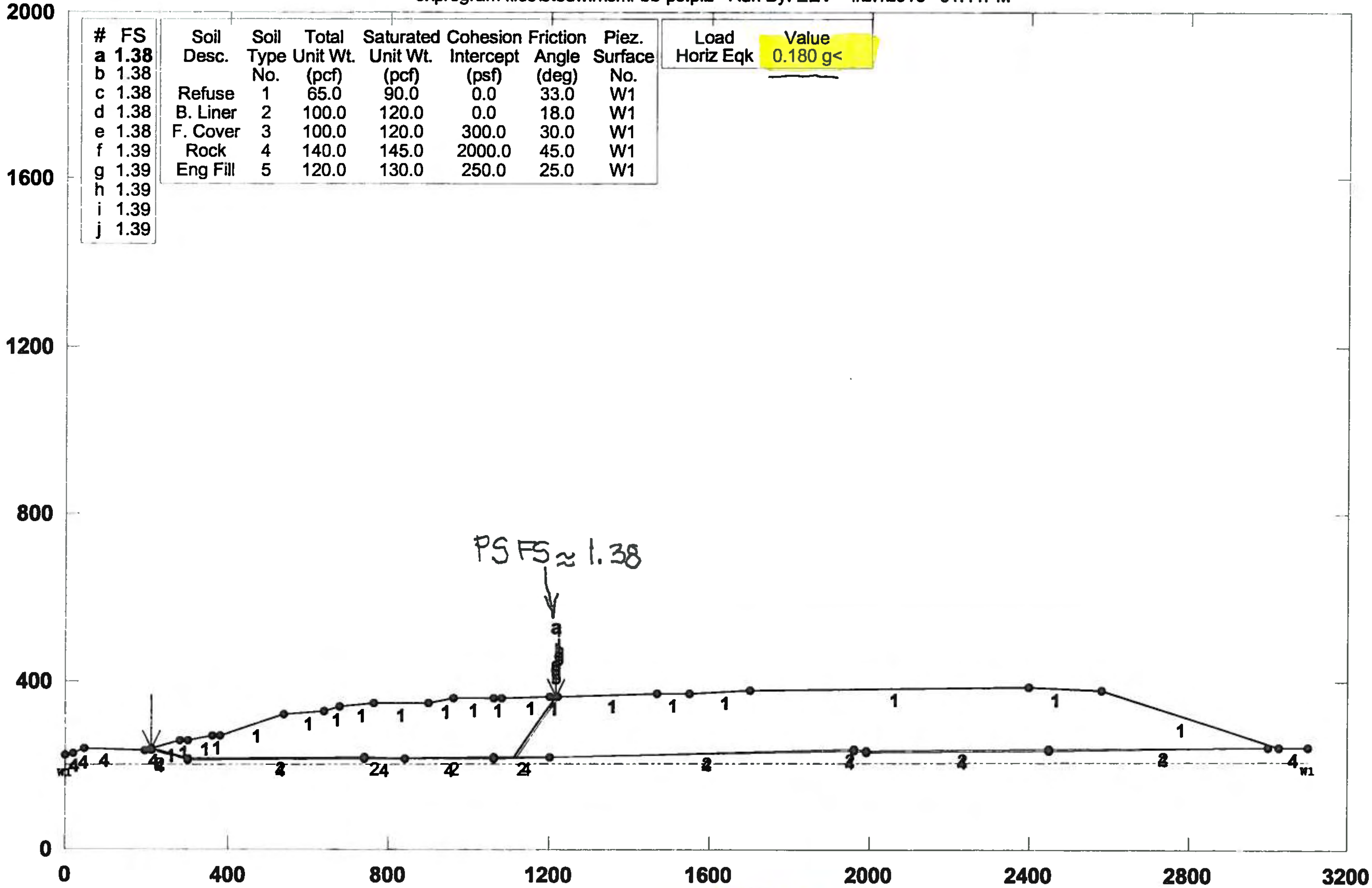
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:41PM

#	FS
a	**1.38**
b	1.38
c	1.38
d	1.38
e	1.38
f	1.39
g	1.39
h	1.39
i	1.39
j	1.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.180 g<

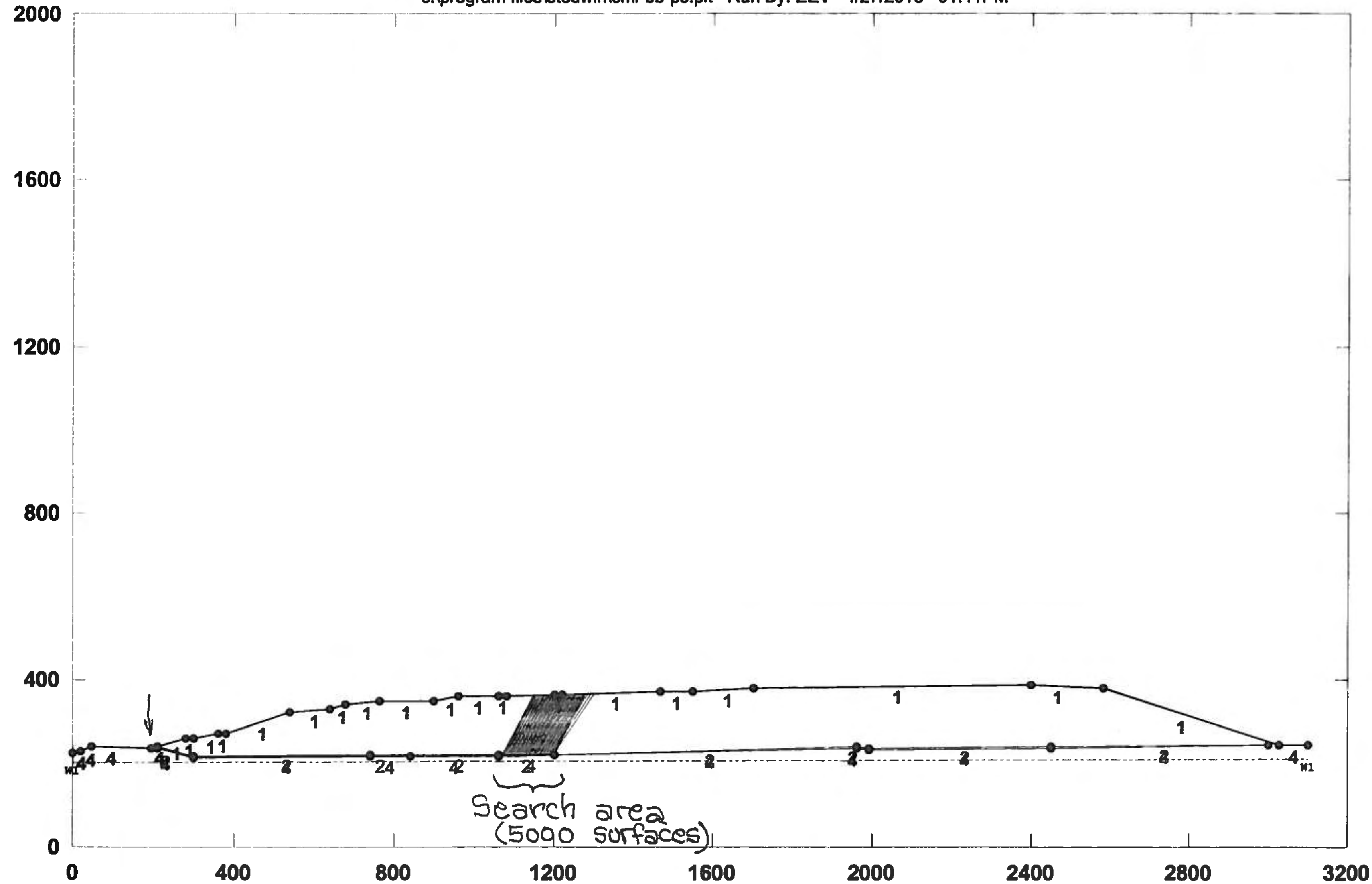


PCSTABL5M/si FSmin=1.38

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:41PM



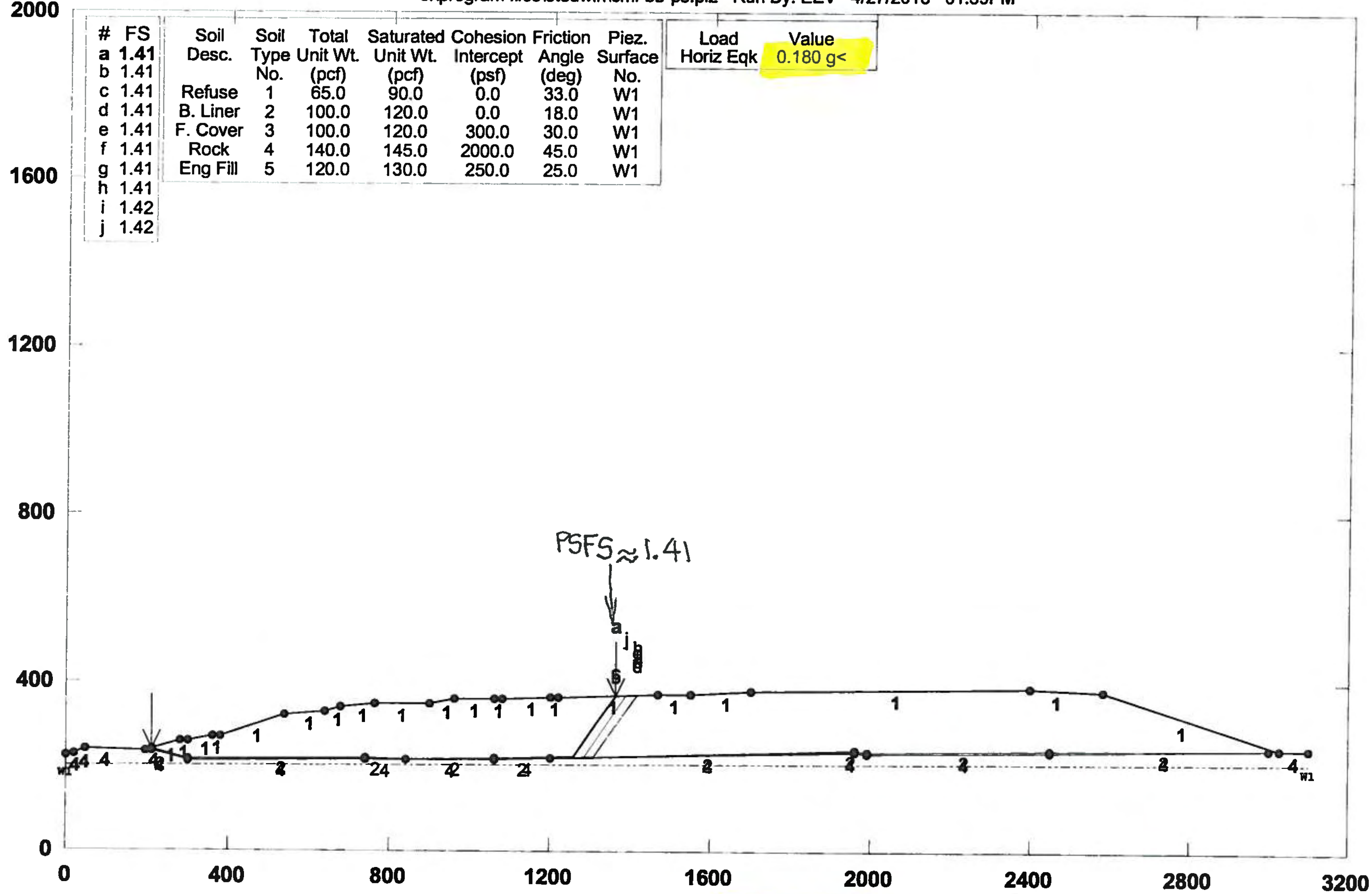
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:39PM

#	FS
a	**1.41**
b	1.41
c	1.41
d	1.41
e	1.41
f	1.41
g	1.41
h	1.41
i	1.42
j	1.42

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.180 g<

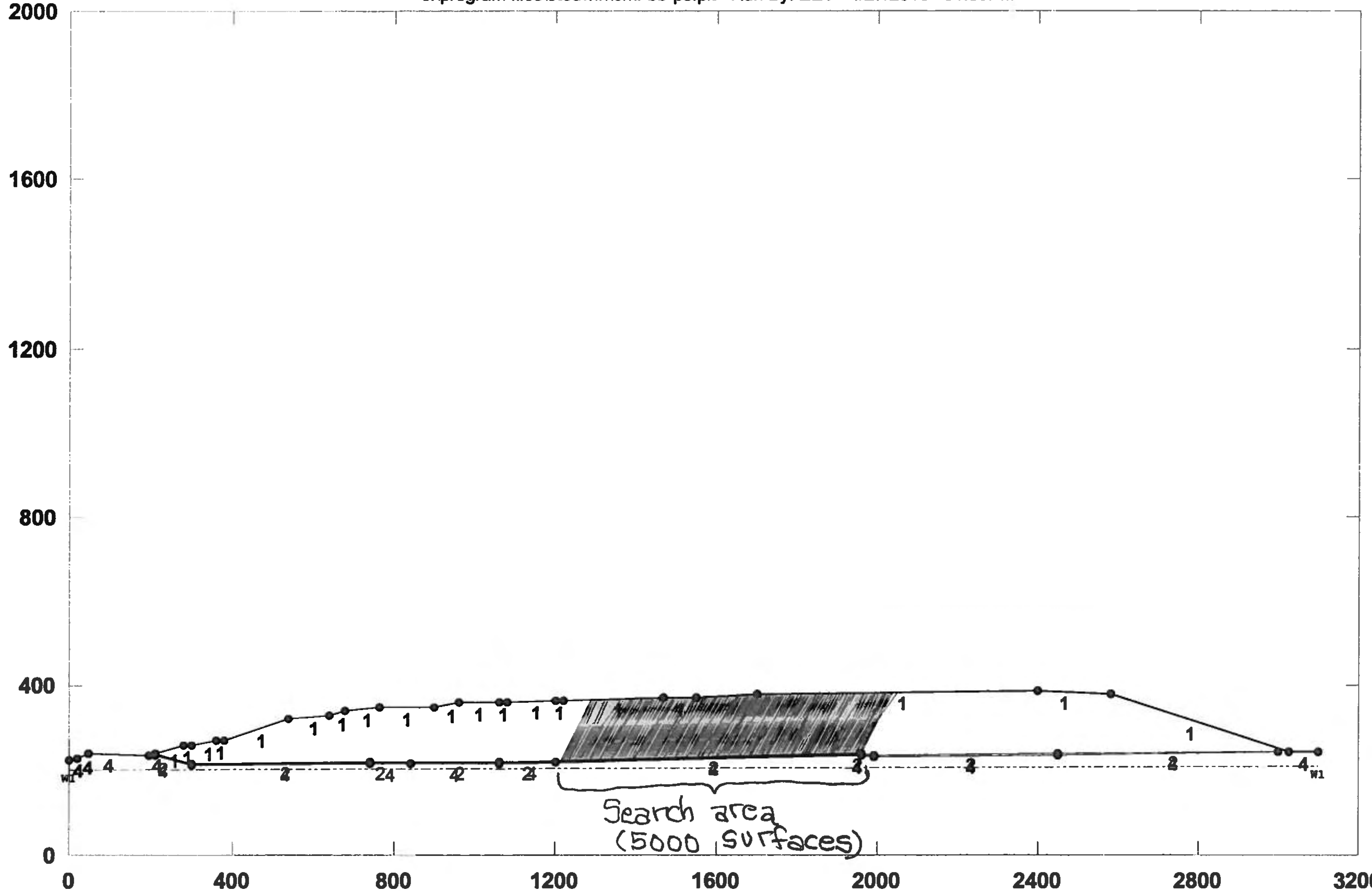


PCSTABL5M/si FSmin=1.41

Safety Factors Are Calculated By The Modified Janbu Method

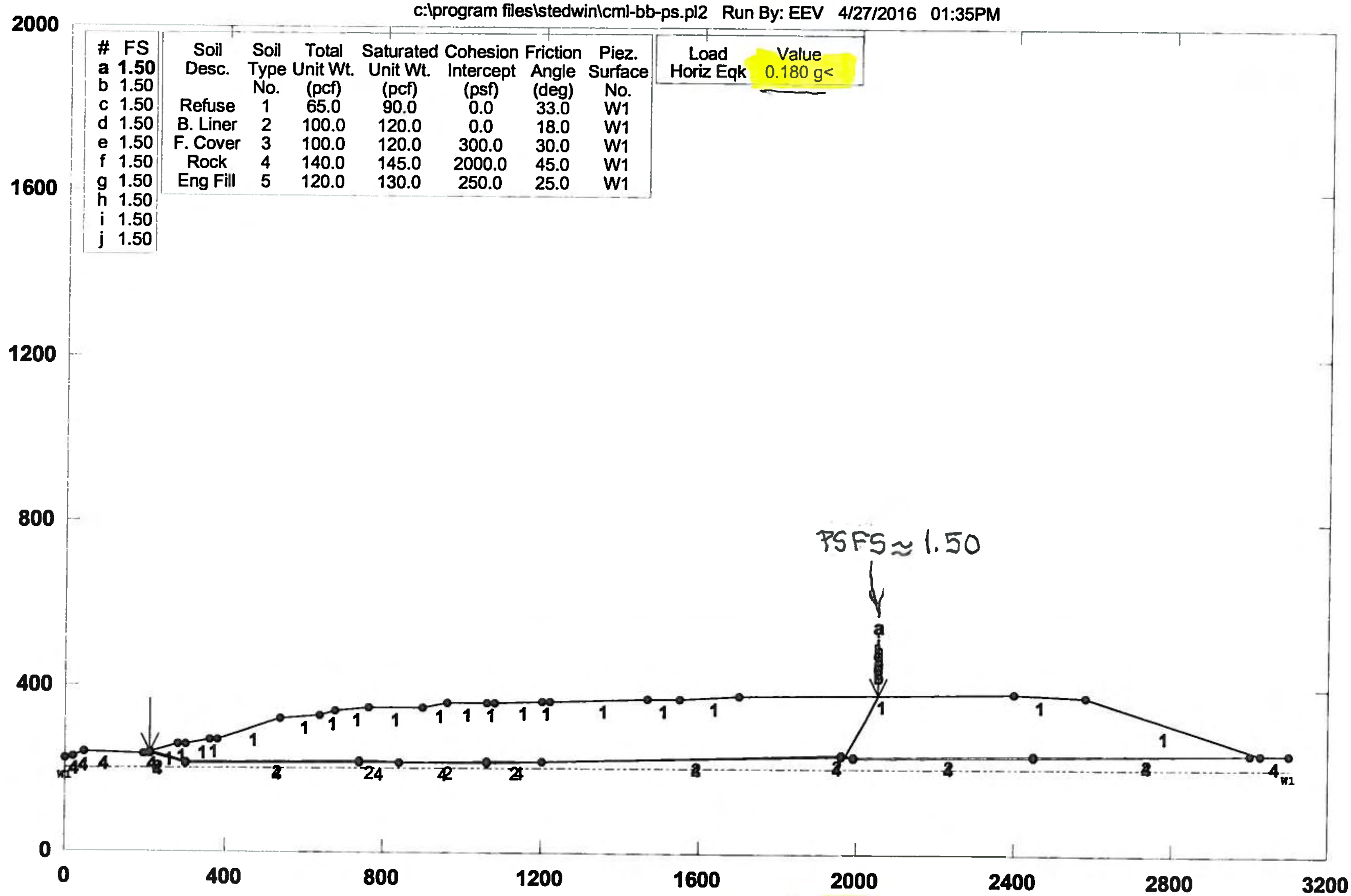
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:39PM



CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:35PM



#	FS
a	**1.50**
b	1.50
c	1.50
d	1.50
e	1.50
f	1.50
g	1.50
h	1.50
i	1.50
j	1.50

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

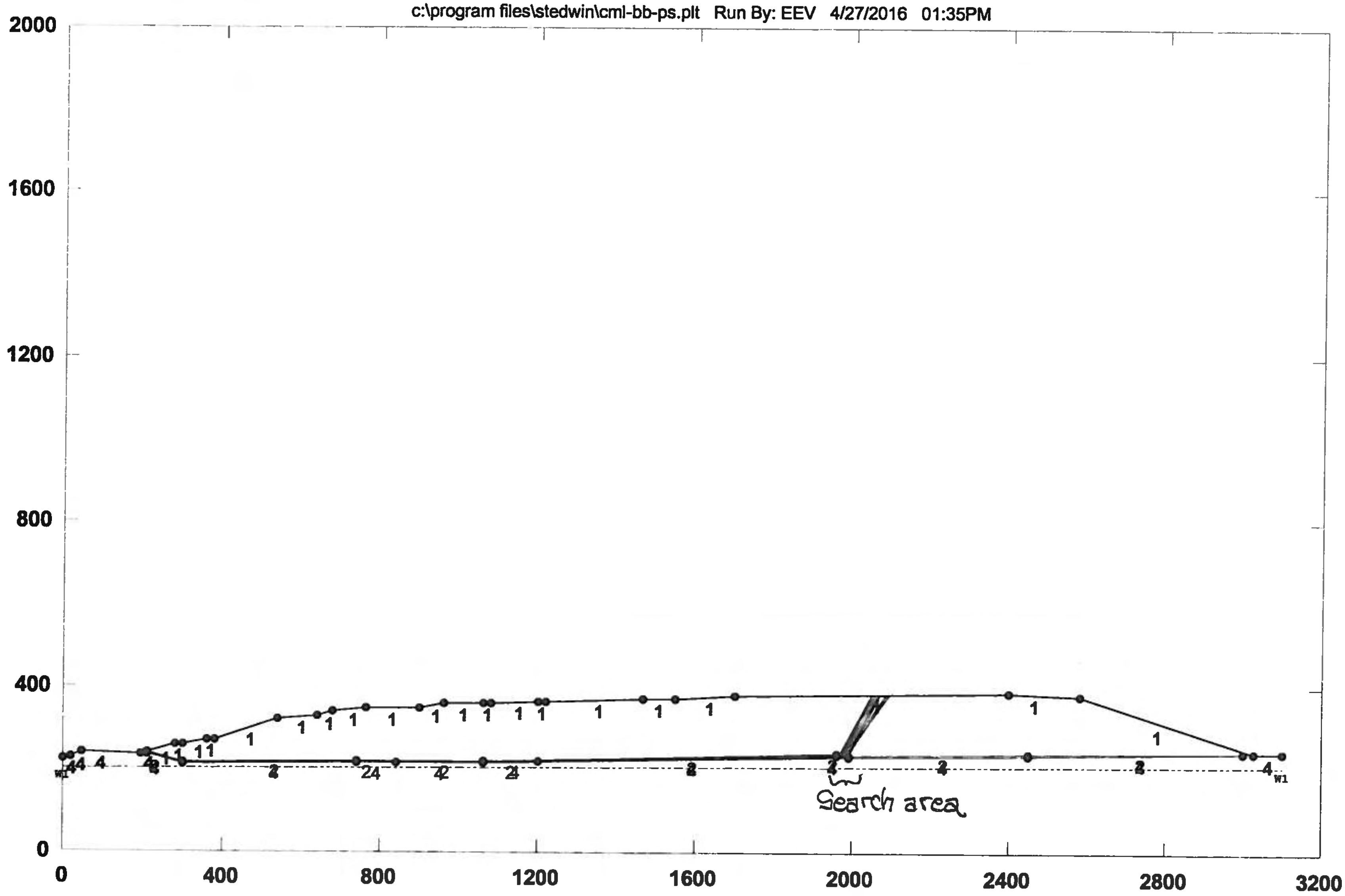
Load	Value
Horiz Eqk	0.180 g<

PCSTABL5M/si FSmin=1.50

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:35PM



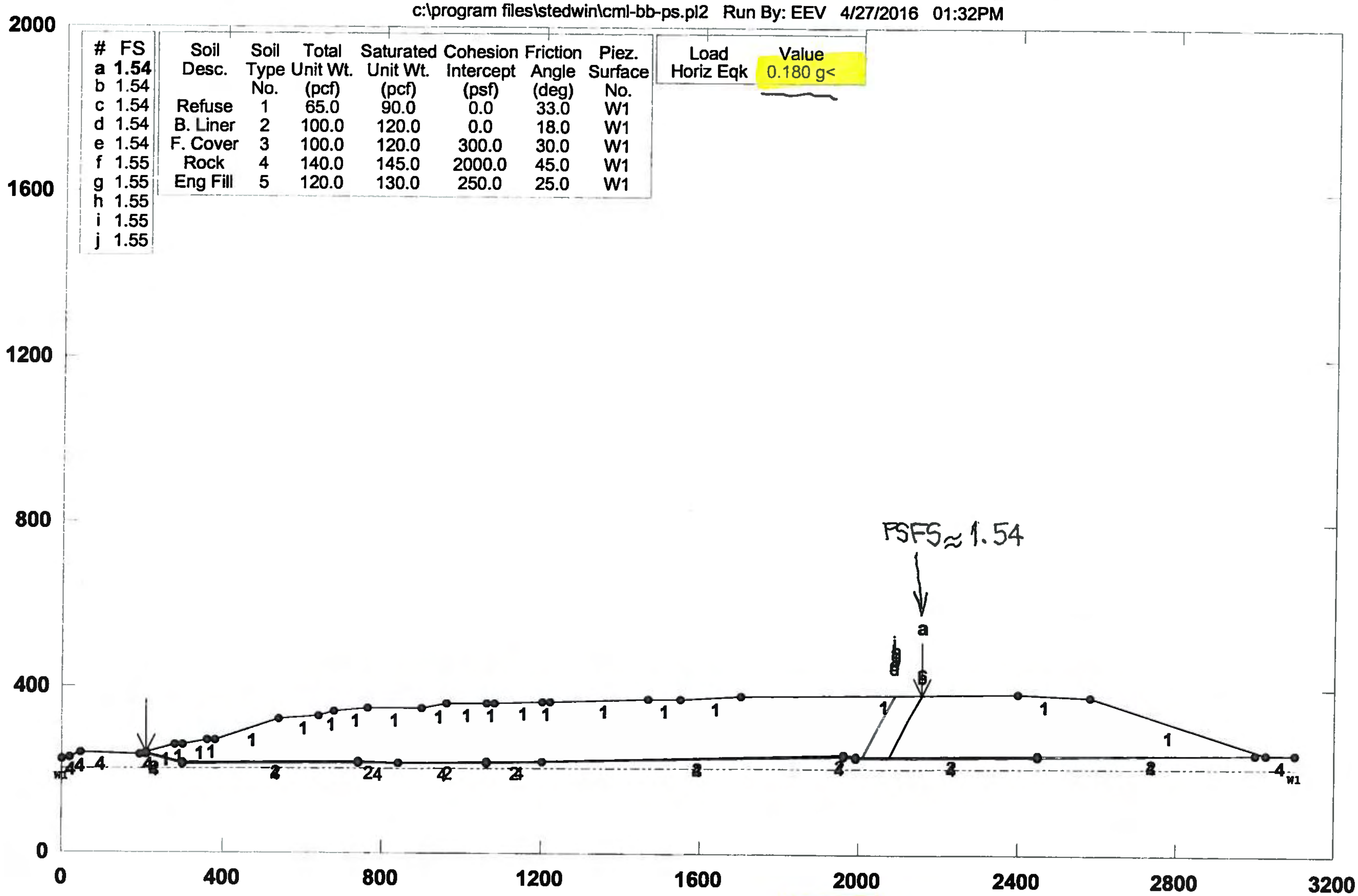
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:32PM

#	FS
a	**1.54**
b	1.54
c	1.54
d	1.54
e	1.54
f	1.55
g	1.55
h	1.55
i	1.55
j	1.55

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.180 g<

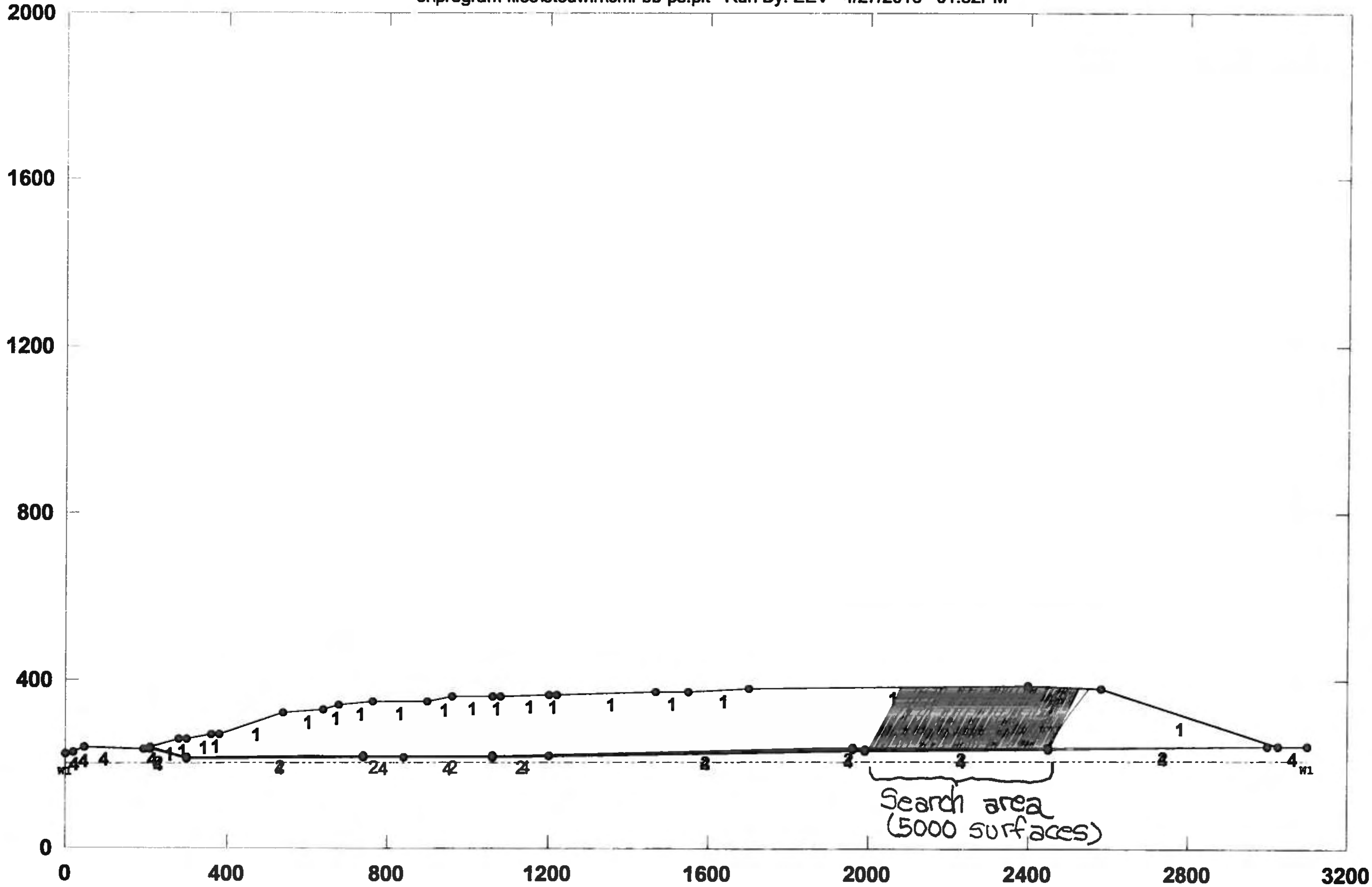


PCSTABL5M/si FSmin=1.54

Safety Factors Are Calculated By The Modified Janbu Method

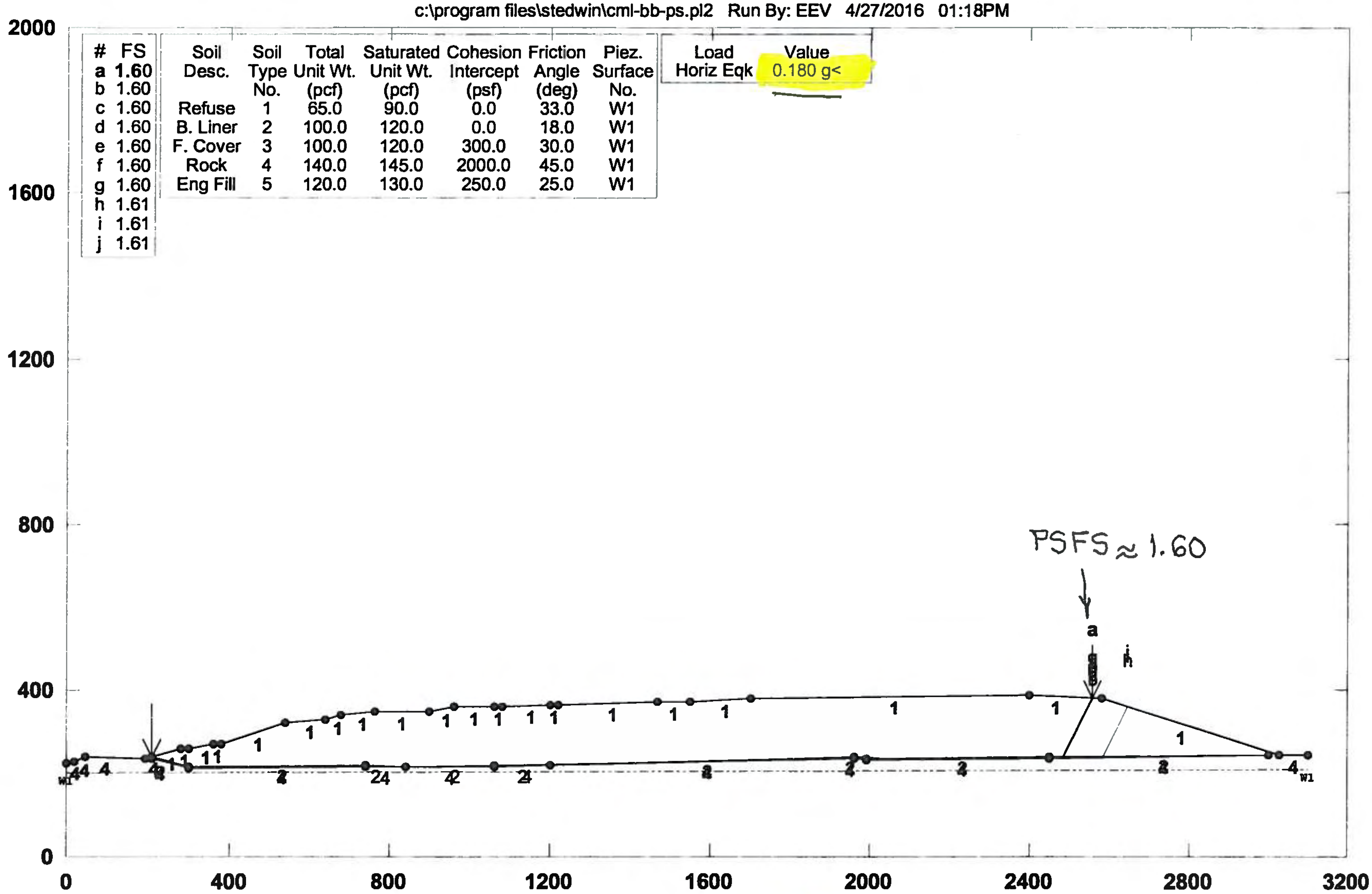
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:32PM



CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.pl2 Run By: EEV 4/27/2016 01:18PM



#	FS
a	1.60
b	1.60
c	1.60
d	1.60
e	1.60
f	1.60
g	1.60
h	1.61
i	1.61
j	1.61

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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

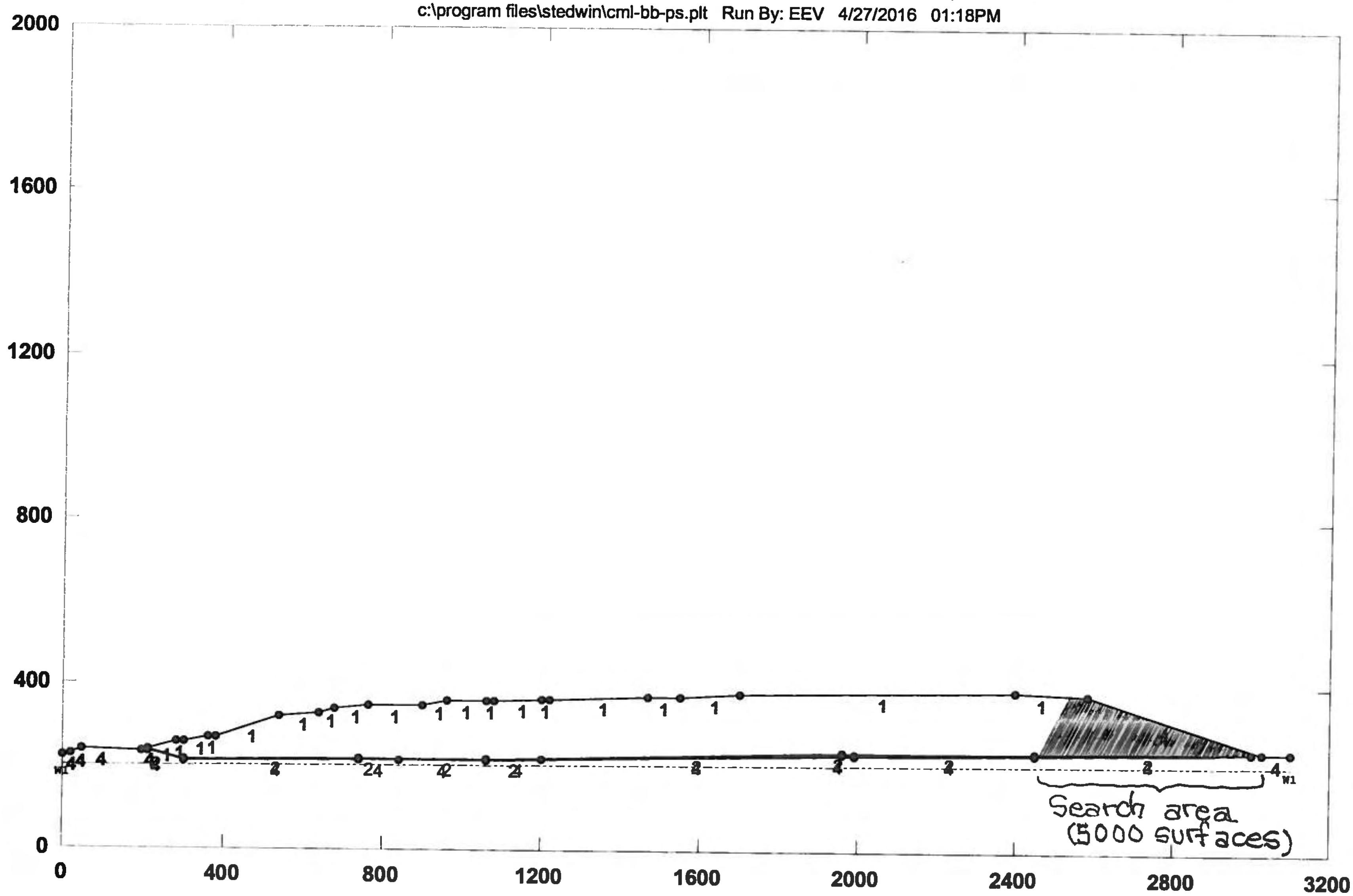
Load	Value
Horiz Eqk	0.180 g<

PCSTABL5M/si FSmin=1.60

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-ps.plt Run By: EEV 4/27/2016 01:18PM



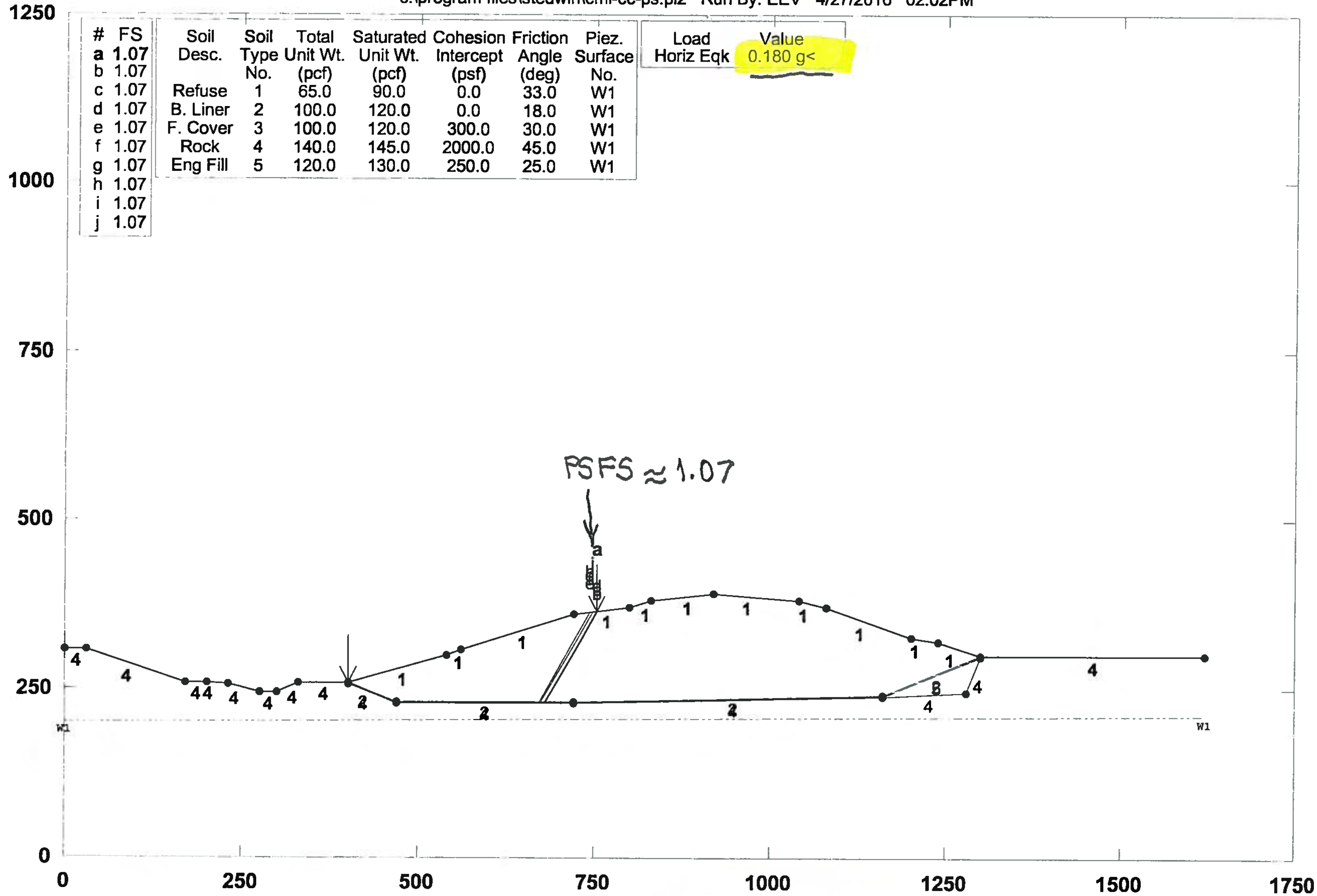
CML - Phase VI - Section CC, Pseudo-Static, Liner

c:\program files\stedwin\cml-cc-ps.pl2 Run By: EEV 4/27/2016 02:02PM

#	FS
a	1.07
b	1.07
c	1.07
d	1.07
e	1.07
f	1.07
g	1.07
h	1.07
i	1.07
j	1.07

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.180 g<

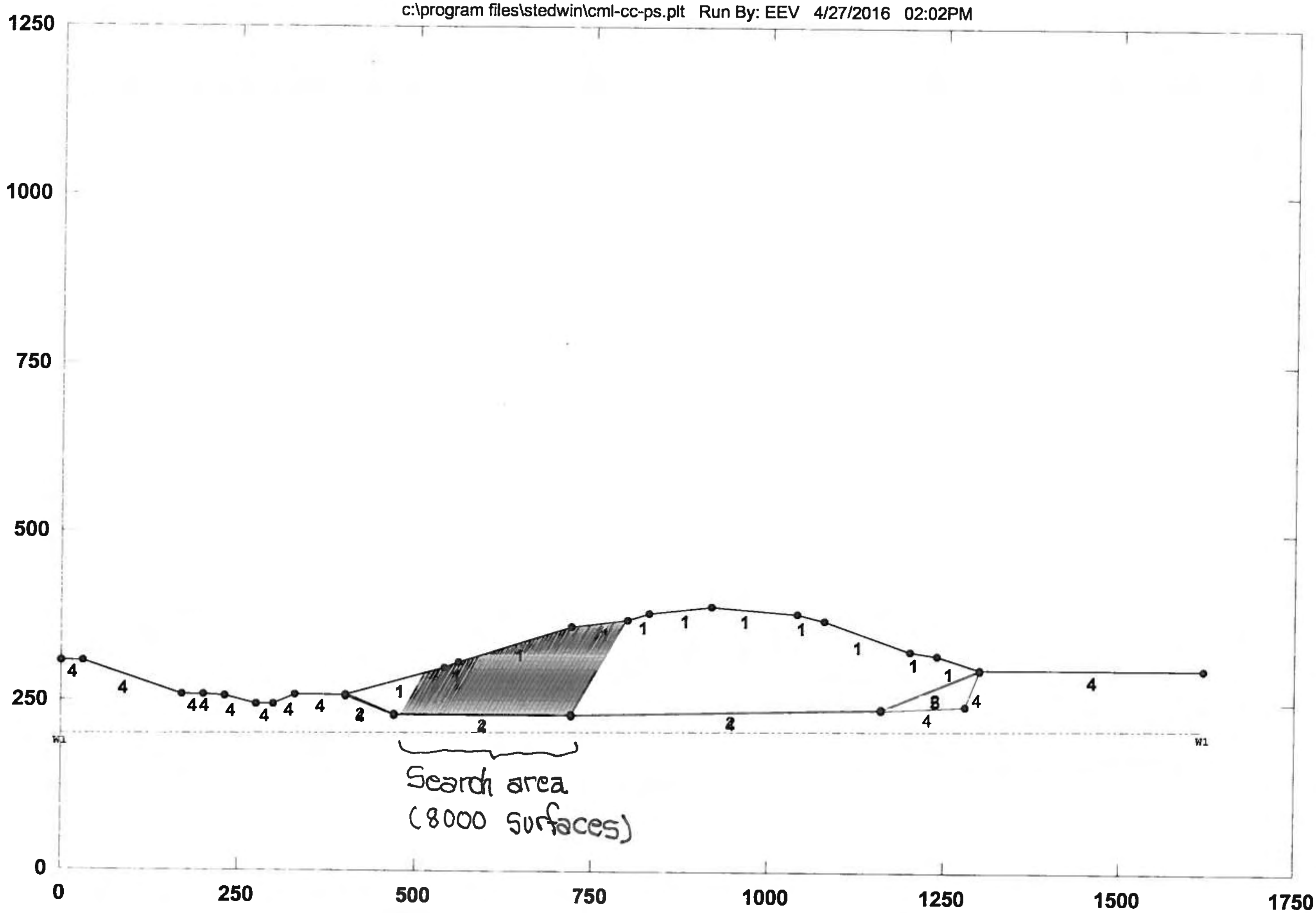


PCSTABL5M/si FSmin=1.07

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section CC, Pseudo-Static, Liner

c:\program files\stedwin\cml-cc-ps.plt Run By: EEV 4/27/2016 02:02PM



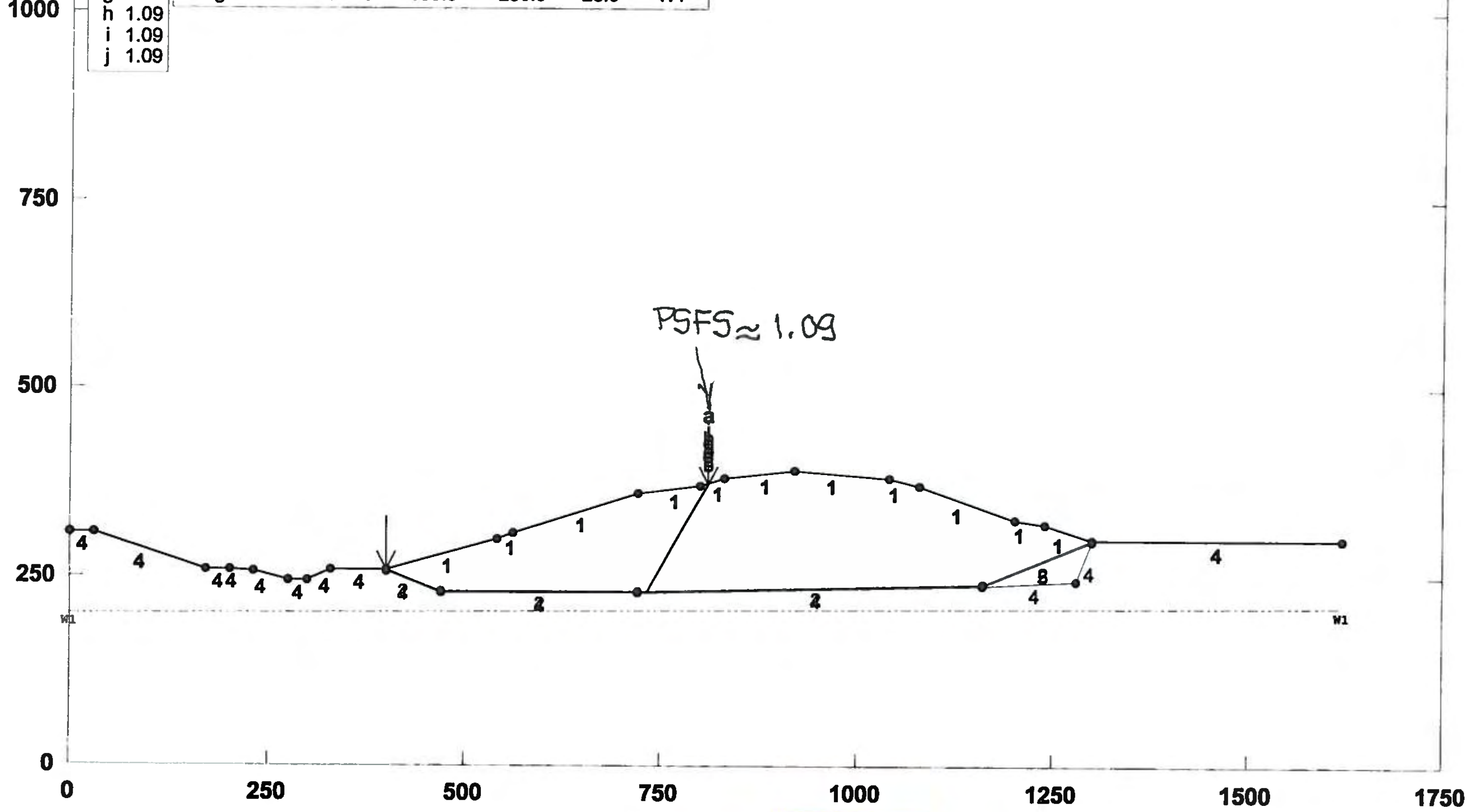
CML - Phase VI - Section CC, Pseudo-Static, Liner

c:\program files\stedwin\cml-cc-ps.pl2 Run By: EEV 4/27/2016 01:59PM

#	FS
a	1.09
b	1.09
c	1.09
d	1.09
e	1.09
f	1.09
g	1.09
h	1.09
i	1.09
j	1.09

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.180 g<

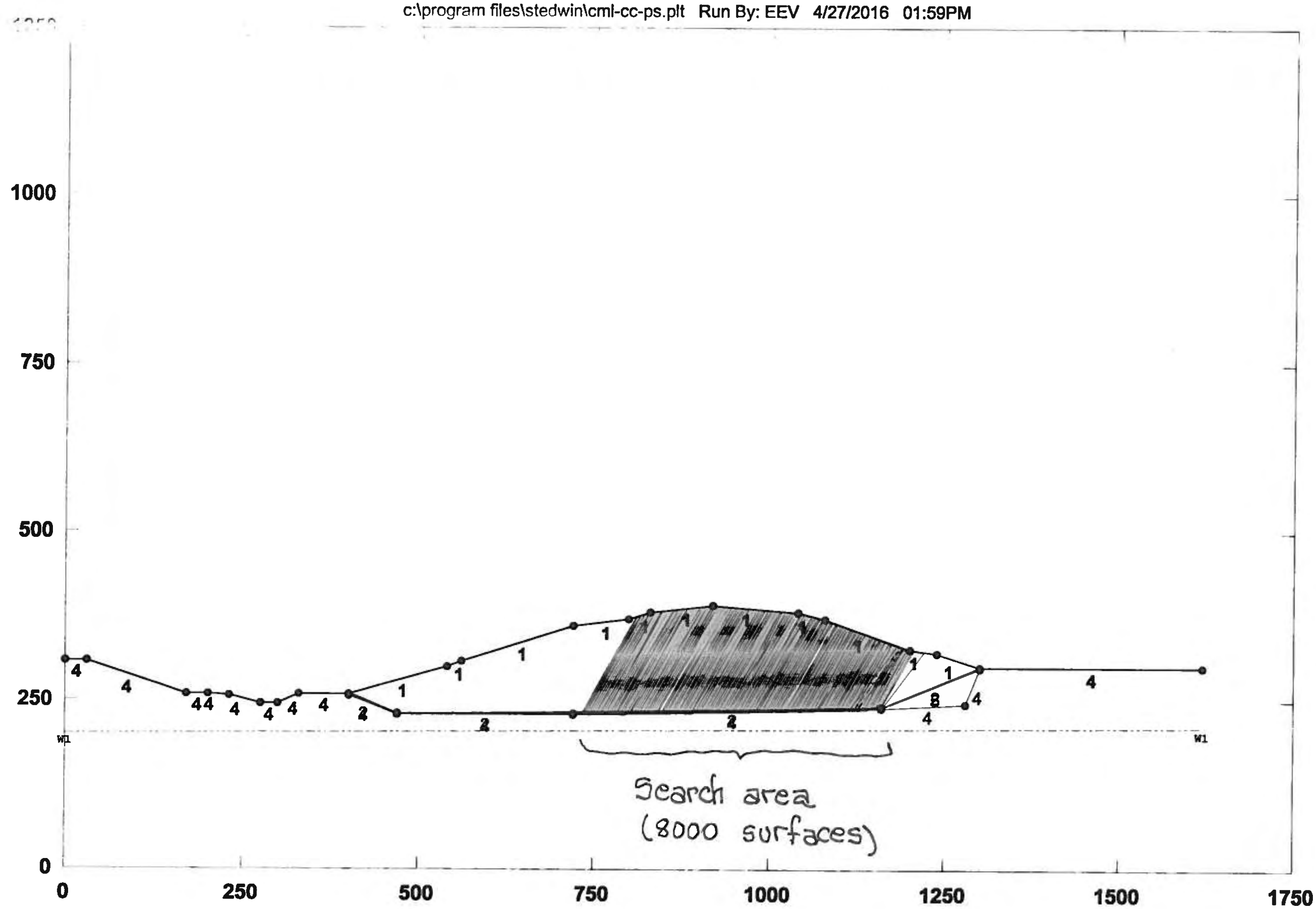


PCSTABL5M/si FSmin=1.09

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section CC, Pseudo-Static, Liner

c:\program files\stedwin\cml-cc-ps.plt Run By: EEV 4/27/2016 01:59PM



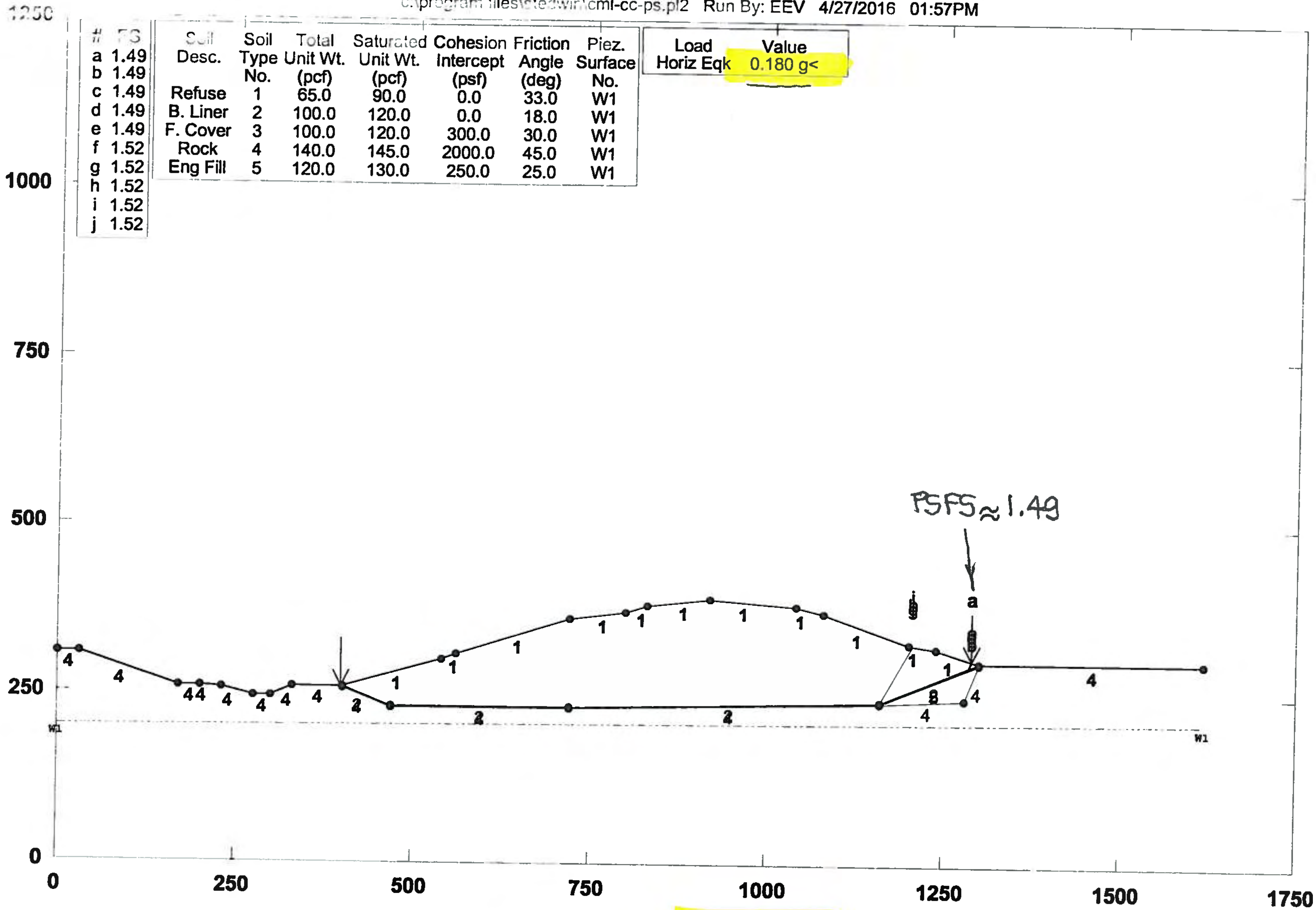
CML - Phase VI - Section CC, Pseudo-Static, Liner

c:\program files\stedwin\cml-cc-ps.pl2 Run By: EEV 4/27/2016 01:57PM

#	FS
a	1.49
b	1.49
c	1.49
d	1.49
e	1.49
f	1.52
g	1.52
h	1.52
i	1.52
j	1.52

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.180 g<

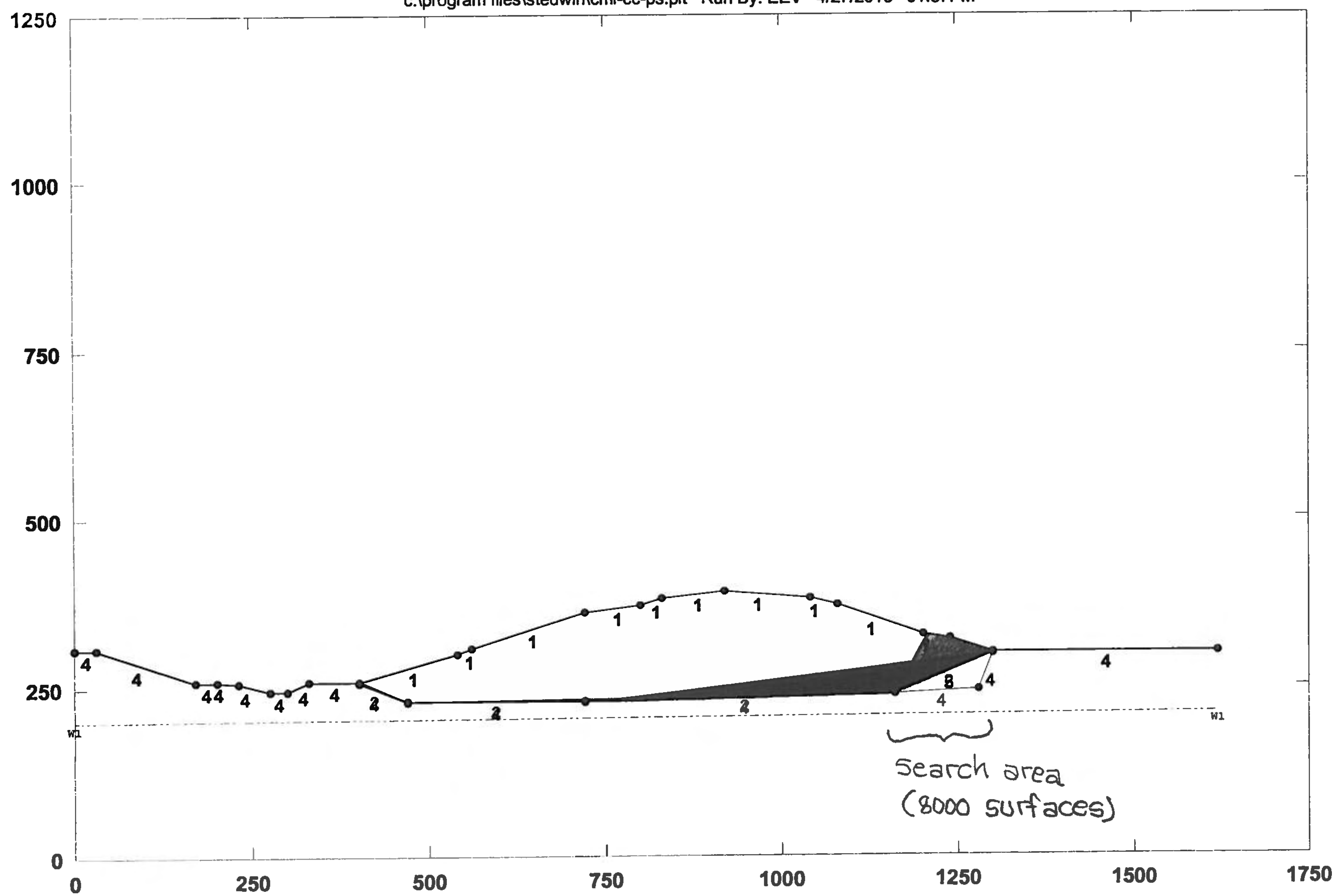


PCSTABL5M/si FSmin=1.49

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section CC, Pseudo-Static, Liner

c:\program files\stedwin\cml-cc-ps.plt Run By: EEV 4/27/2016 01:57PM



Yield Acceleration

CML - Phase VI - Section AA, Pseudo-Static, Liner

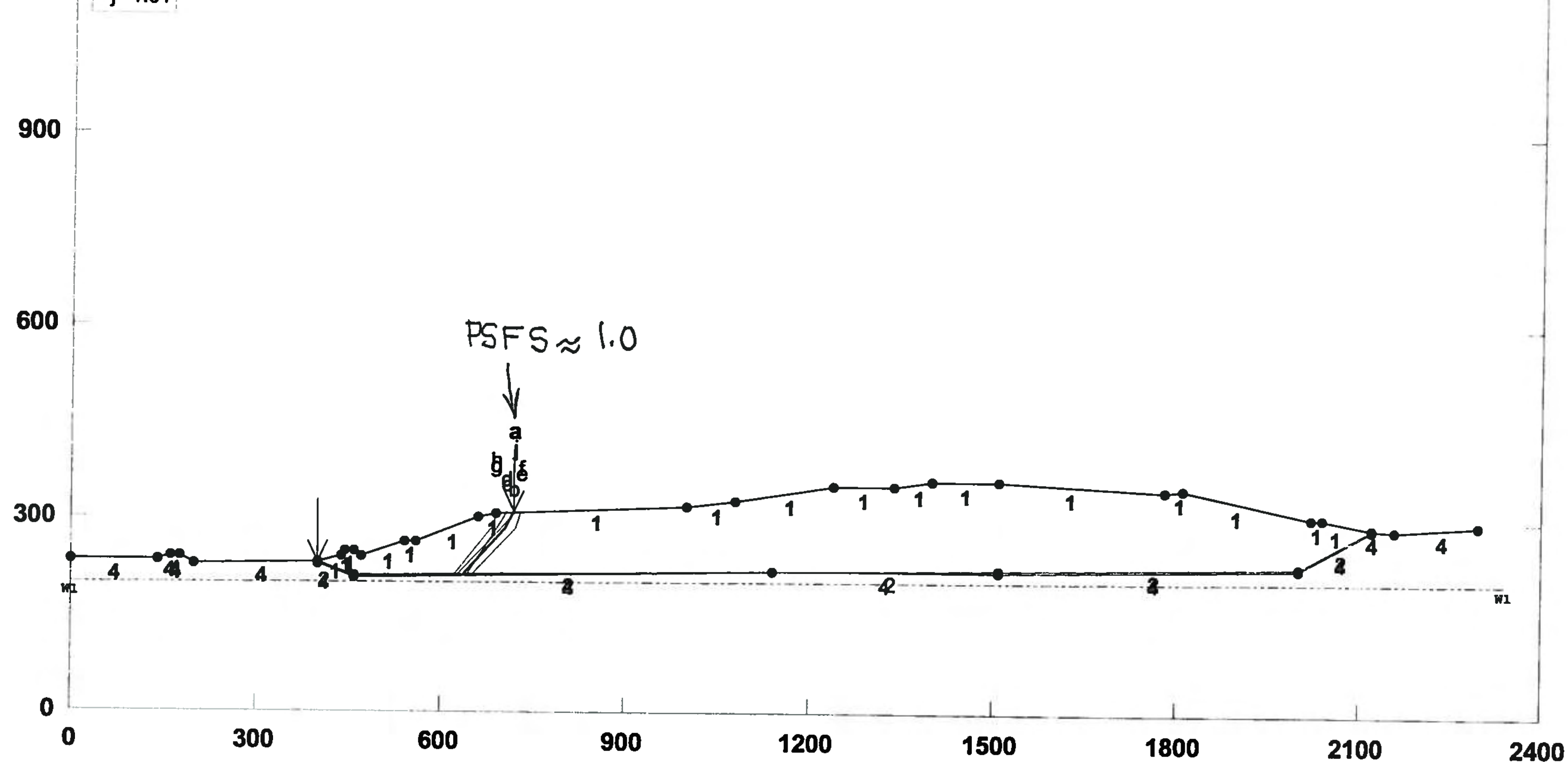
c:\program files\stedwin\cml-aa-s2.pl2 Run By: EEV 4/26/2016 03:09PM

#	FS
a	**0.99**
b	0.99
c	1.00
d	1.00
e	1.01
f	1.01
g	1.01
h	1.01
i	1.01
j	1.01

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.200 g<

Ky ≈ 0.20g

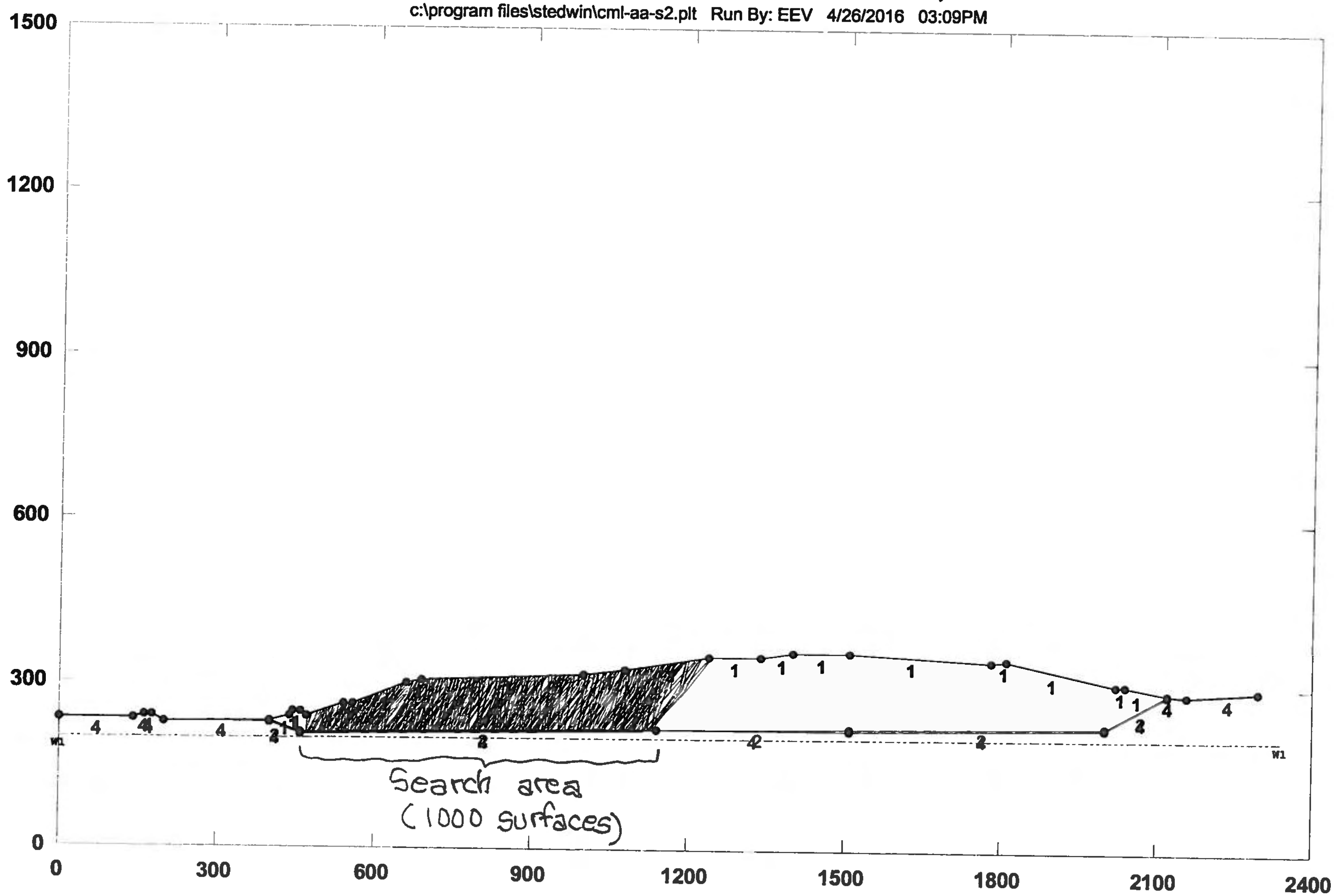


PCSTABL5M/si FSmin=0.99

Safety Factors Are Calculated By The Modified Janbu Method

CML - Phase VI - Section AA, Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-s2.plt Run By: EEV 4/26/2016 03:09PM

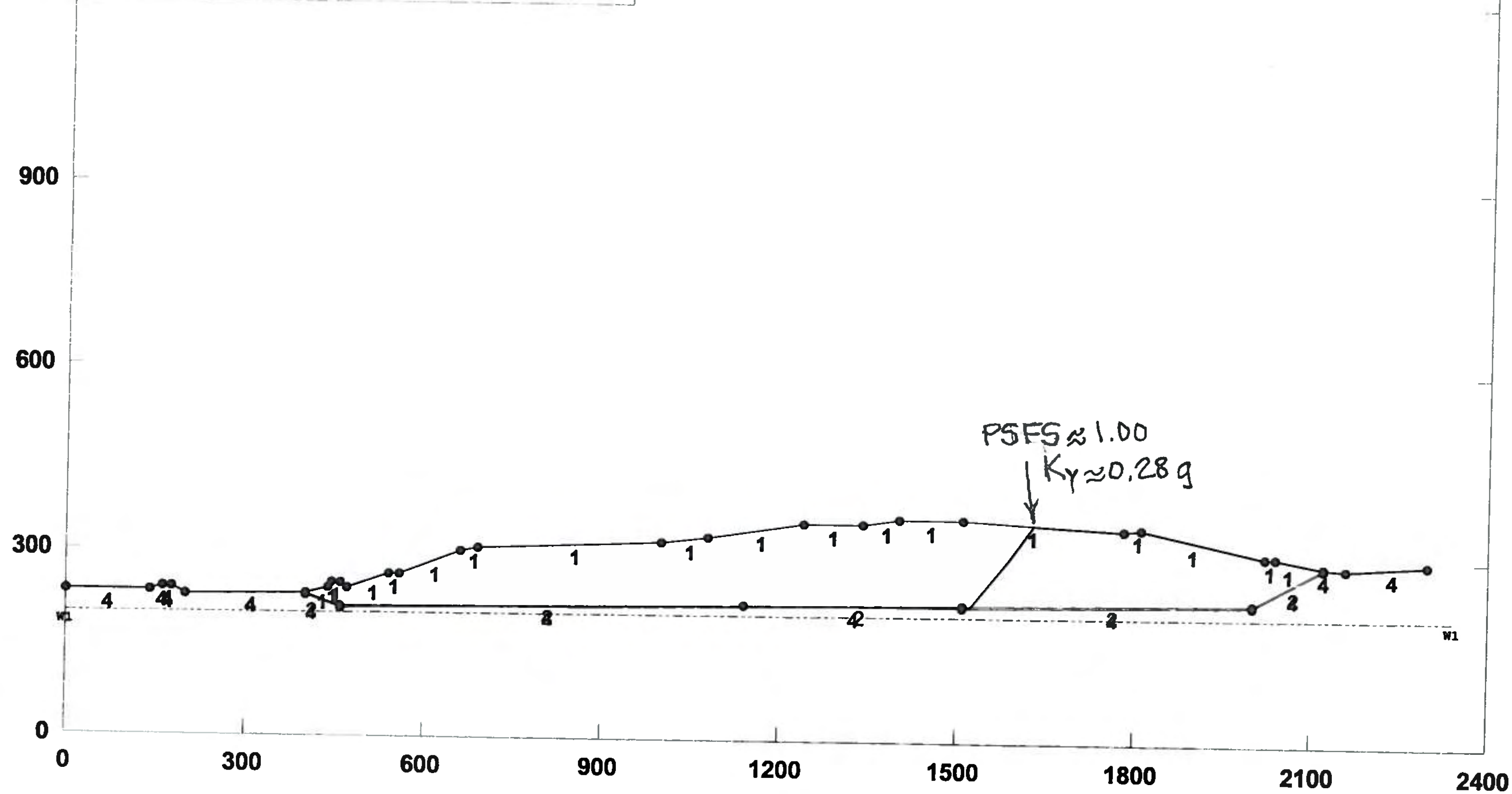


CML - Phase VI - Section AA, Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-s.plt Run By: EEV 4/26/2016 02:49PM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.280 g<



PCSTABL5M/si FSmin=1.00

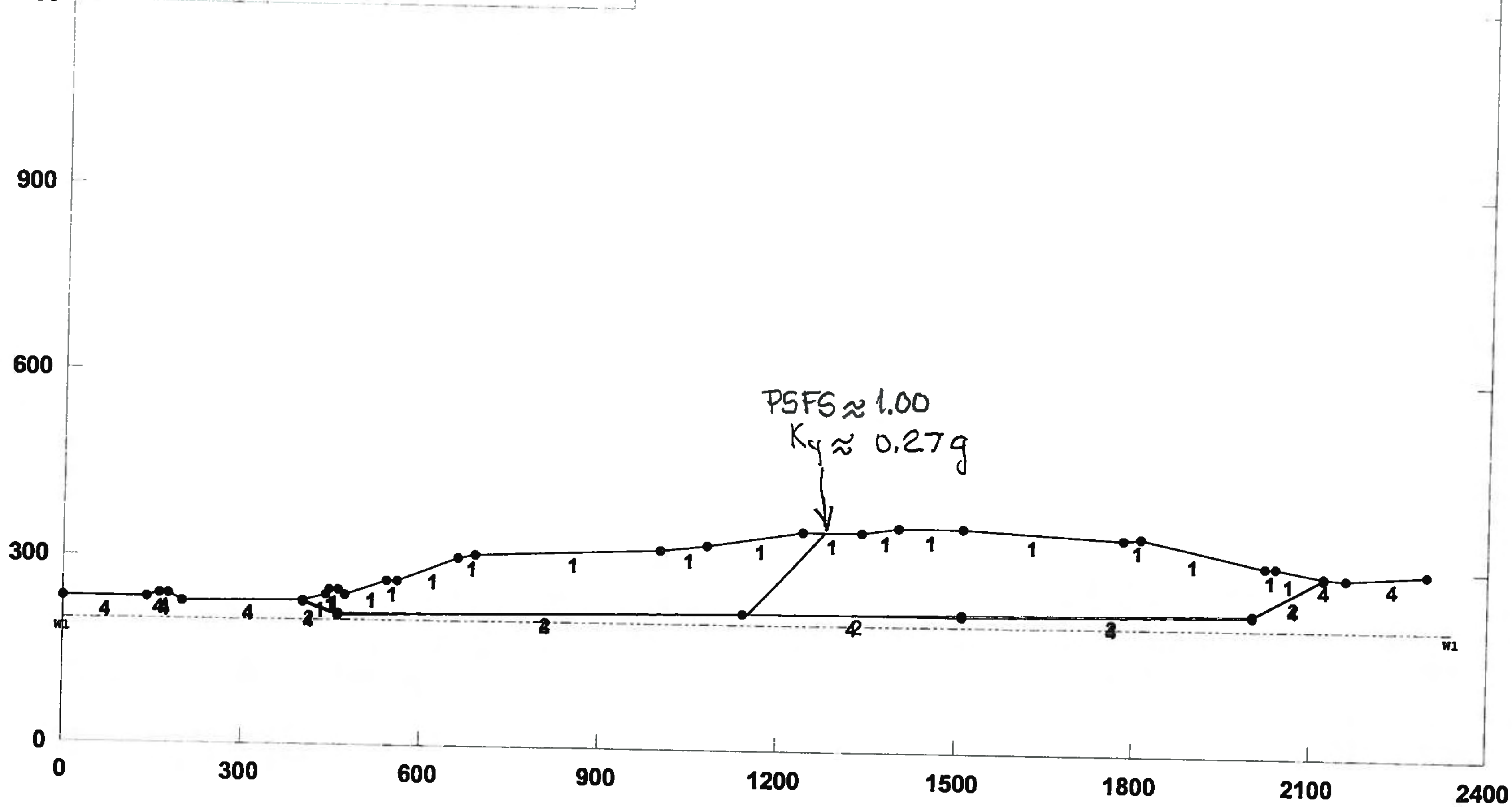
Factors of Safety Calculated by Janbu Method

CML - Phase VI - Section AA, Pseudo-Static, Liner

c:\program files\stedwin\cml-aa-s1.plt Run By: EEV 4/26/2016 03:05PM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.270 g<



PCSTABL5M/si FSmin=1.00

Factors of Safety Calculated by Janbu Method

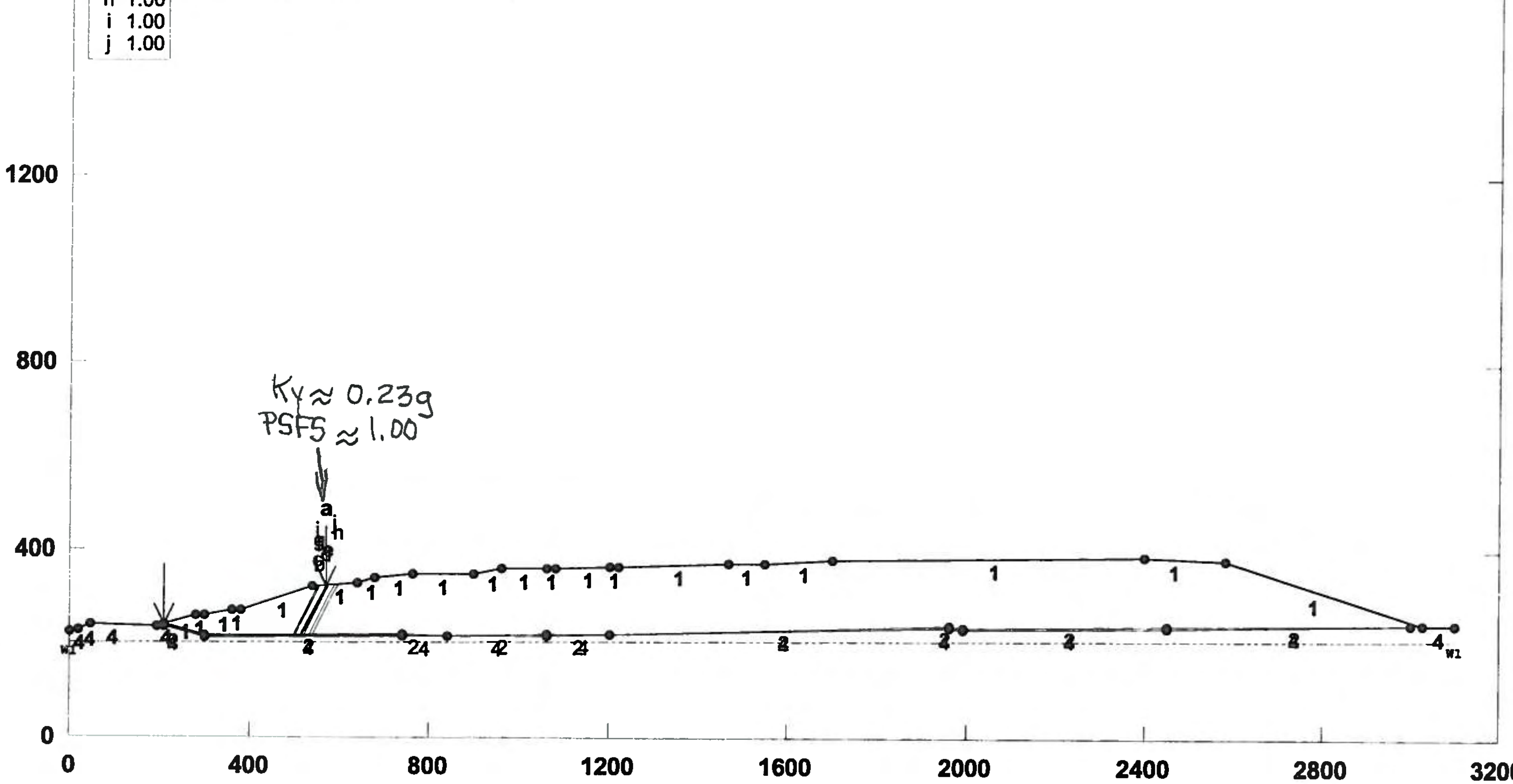
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-s.pl2 Run By: EEV 4/26/2016 03:15PM

#	FS
a	**0.99**
b	0.99
c	0.99
d	0.99
e	1.00
f	1.00
g	1.00
h	1.00
i	1.00
j	1.00

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.230 g<

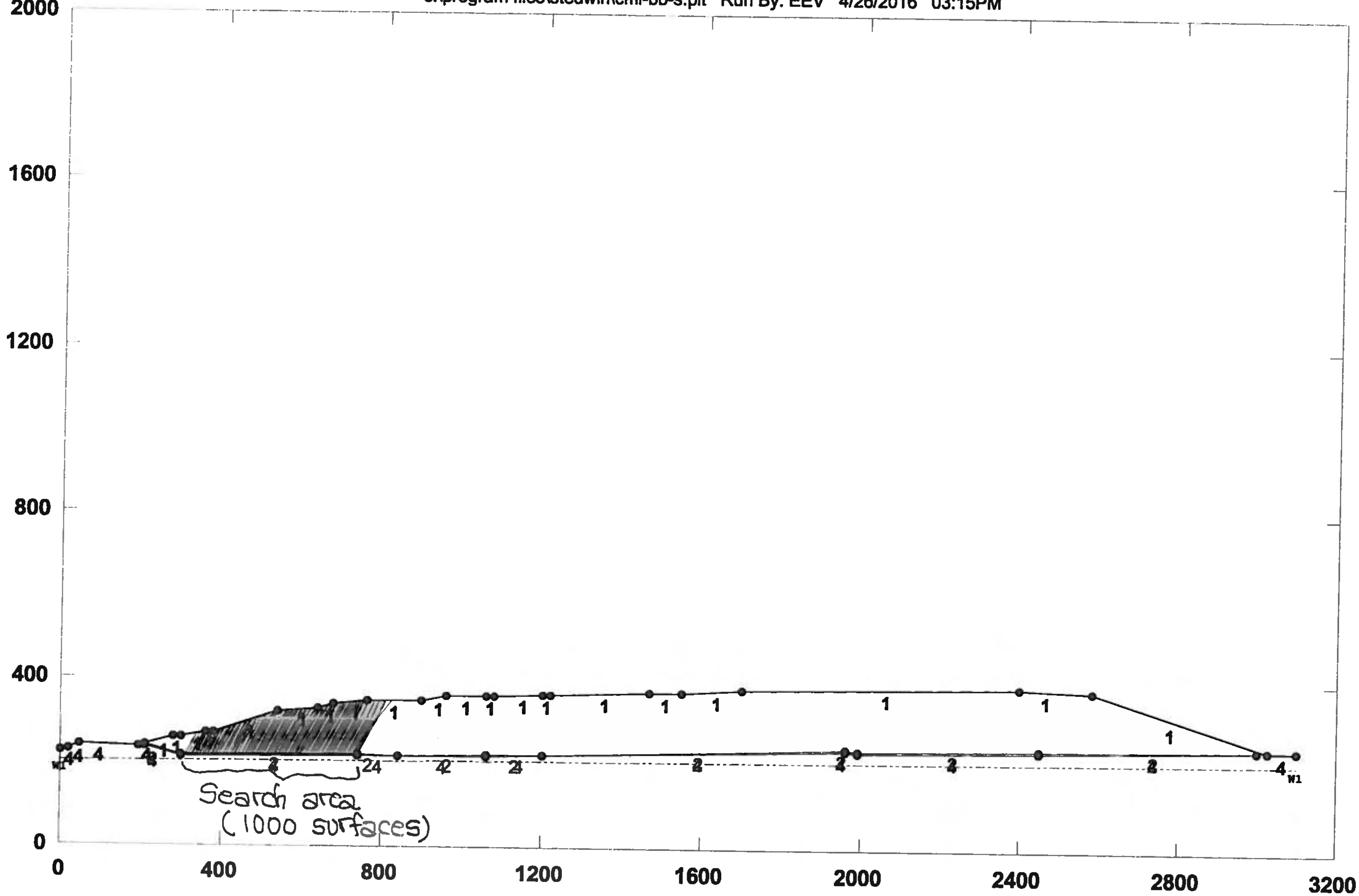


PCSTABL5M/si FSmin=0.99

Safety Factors Are Calculated By The Modified Janbu Method

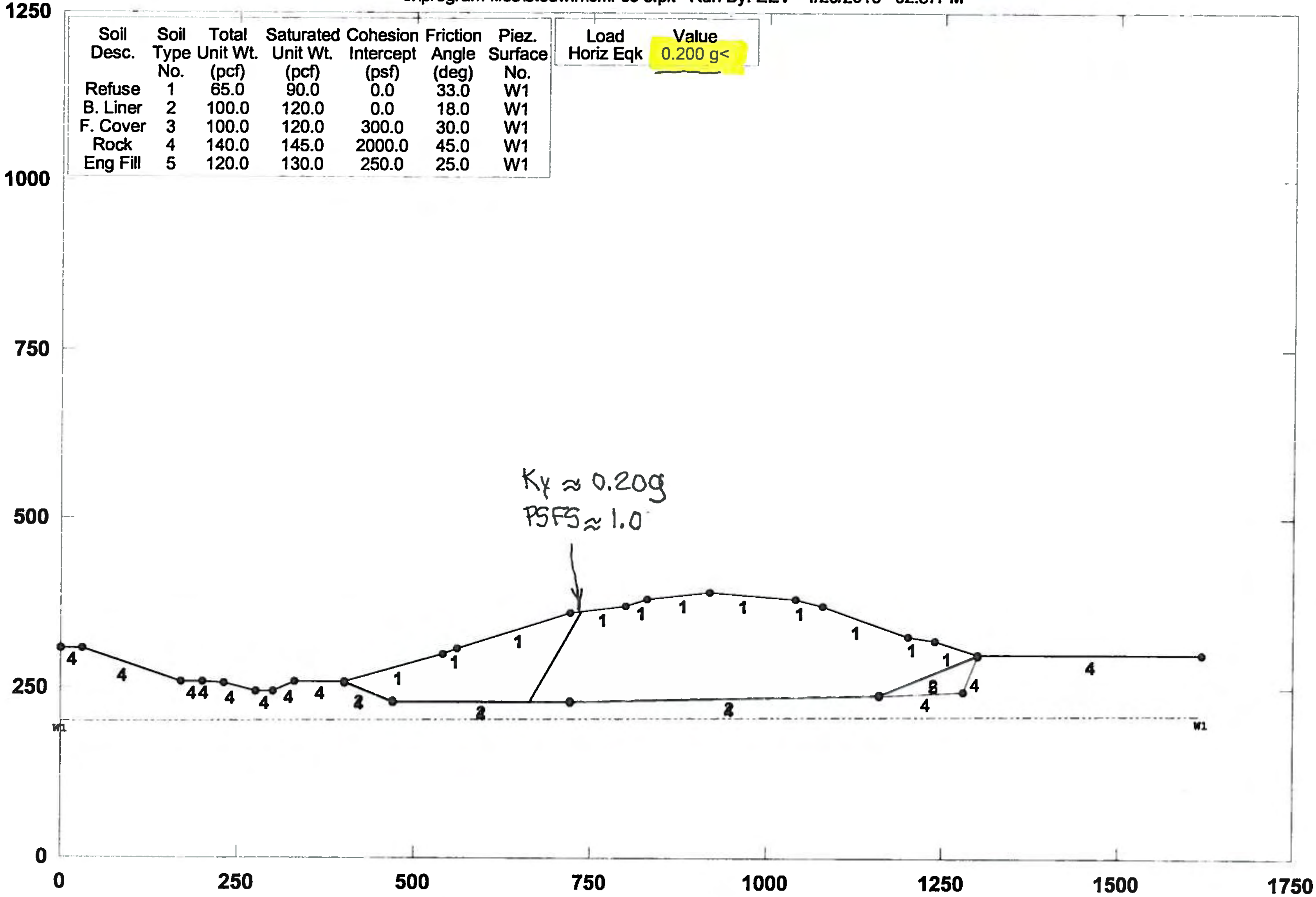
CML - Phase VI - Section BB, Pseudo-Static, Liner

c:\program files\stedwin\cml-bb-s.plt Run By: EEV 4/26/2016 03:15PM



CML - Phase VI - Section CC, Pseudo-Static, Liner

c:\program files\stedwin\cml-cc-s.plt   Run By: EEV   4/26/2016   02:57PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Refuse	1	65.0	90.0	0.0	33.0	W1
B. Liner	2	100.0	120.0	0.0	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	0.200 g<

PCSTABL5M/si FSmin=1.01
Factors of Safety Calculated by Janbu Method

CML - Phase VI - Section CC Static, Liner

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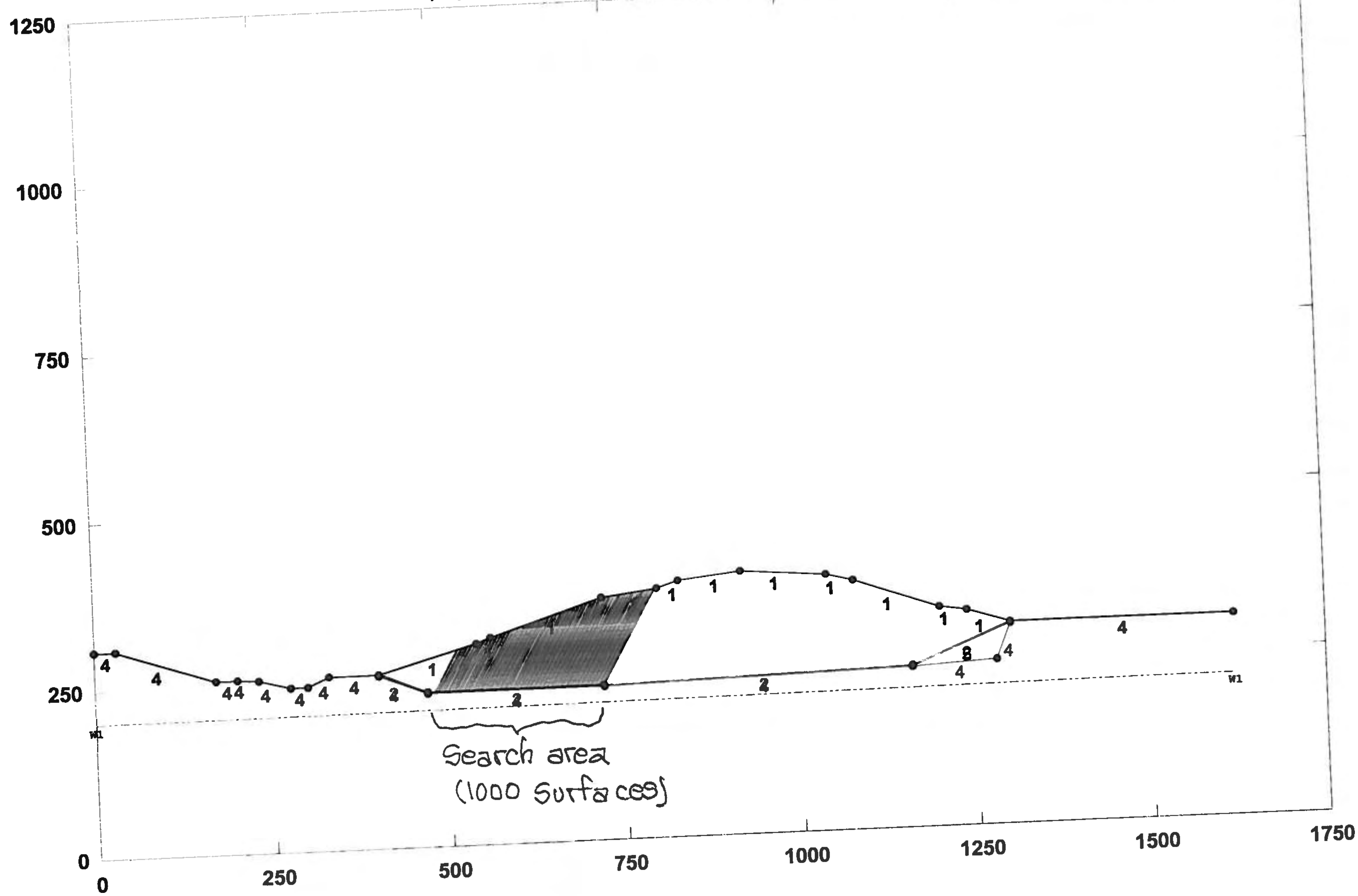

Appendix D

Point of Compliance Analysis

POINT OF COMPLIANCE DEMONSTRATION

COUNTY OF MAUI

CENTRAL MAUI SANITARY LANDFILL, PHASE IV-A

August 25, 2004

Prepared for:

A-Mehr, Inc.

Prepared by:

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August 25, 2004

A-Mehr Inc.
23016 Mill Creek Drive
Laguna Hills, California 92653

Attention: Mr. Glen Odell

Subject: **Point of Compliance Demonstration**
County of Maui
Central Maui Sanitary Landfill, Phase IV-A

Dear Mr. Odell:

Mountain Edge Environmental, Inc. is pleased to submit the attached Point of Compliance Demonstration for the County of Maui's Central Maui Sanitary Landfill, Phase IV-A.

It has been a pleasure conducting this work for you. Please contact me at (808) 237-1503, if you have any questions.

Yours very truly,

Mountain Edge Environmental, Inc.

Jennifer K. Hernando

Jennifer Kleveno Hernando
Senior Hydrogeologist / Vice President

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ATTACHMENTS

EXECUTIVE SUMMARY

This point of compliance demonstration was prepared for the County of Maui's Central Maui Sanitary Landfill Phase IV-A located in Puunene, Maui, Hawaii. A point of compliance demonstration is a requirement of the design criteria for municipal solid waste landfills as stipulated by Federal and State regulations. The regulations state that design of the landfill shall ensure that the maximum contaminant levels (MCLs) for drinking water will not be exceeded in the uppermost aquifer at a relevant point of compliance which is no more than 150 meters from the waste management unit boundary.

The point of compliance for Phase IV-A of the Central Maui Sanitary Landfill is the closest downgradient monitoring well to Phase IV-A, monitoring well MW-5, which is located approximately 40 meters from the edge of the lined waste management unit. The U.S. Environmental Protection Agency's (U. S. EPA's) Multimedia Exposure Assessment Model (MULTIMED) was utilized to model leachate leaking from a hypothetical hole in the landfill liner, traveling through the vadose (unsaturated) zone beneath the landfill to the groundwater table, and traveling in groundwater to monitoring well MW-5. Predicted concentrations in groundwater at monitoring well MW-5 were then compared to the MCLs.

The MUTLIMED model was utilized following the Subtitle D landfill application procedures, which employ very conservative assumptions, including steady-state conditions, no chemical decay, no volatilization of the chemical to air, no sorption of the chemical to the soil, no biodegradation, no dilution due to rainfall recharge, and no other attenuation of the contaminant. Additionally, the various model input parameters were conservatively estimated.

MULTIMED predicted that the contaminant concentrations in groundwater in monitoring well MW-5 would not exceed the MCLs for drinking water.

In accordance with U.S. EPA procedures for application of MULTIMED to Subtitle D landfill facilities, the dilution attenuation factor of 953 calculated by MULTIMED is greater than 100, indicating that the design of Phase IV-A of the Central Maui Sanitary Landfill is acceptable.

POINT OF COMPLIANCE DEMONSTRATION
COUNTY OF MAUI
CENTRAL MAUI SANITARY LANDFILL, PHASE IV-A

1.0 INTRODUCTION

This point of compliance demonstration was prepared by Jennifer Kleveno Hernando of Mountain Edge Environmental, Inc. for A-Mehr Inc. for the County of Maui's Central Maui Sanitary Landfill Phase IV-A located in Puunene, Maui, Hawaii. A point of compliance demonstration is a requirement of the design criteria for municipal solid waste landfills as stipulated in Title 11 Chapter 58.1, Subchapter 2 [§11-58.1-14(b) and (e)] of the Hawaii Administrative Rules (HAR). Paragraphs (b) and (e) of HAR §11-58.1-14 state that design of the landfill shall ensure that the maximum contaminant levels (MCLs) for drinking water listed in Table 1 of 40 CFR 258 or HAR §11-20, whichever is more stringent, will not be exceeded in the uppermost aquifer at a relevant point of compliance which is no more than 150 meters from the waste management unit boundary, and is located on land owned by the landfill owner.

The point of compliance for Phase IV-A of the Central Maui Sanitary Landfill is the closest downgradient monitoring well to Phase IV-A, monitoring well MW-5, which is located approximately 40 meters from the edge of lined waste management unit (URS, 2004a). MULTIMED, the Multimedia Exposure Assessment Model, was utilized to model leachate leaking from a hypothetical hole in the landfill liner, traveling through the vadose (unsaturated) zone beneath the landfill to the groundwater table, and traveling in groundwater to monitoring well MW-5. Predicted concentrations in groundwater at monitoring well MW-5 were then compared to the MCLs.

2.0 SITE CONCEPTUAL MODEL

Prior to utilizing MULTIMED to model conditions at Phase IV-A of the Central Maui Sanitary Landfill a conceptual model of the site was developed. The site conceptual model incorporated data on the landfill liner design and on the site geology and hydrogeology.

Information on the landfill liner design was obtained from the output of the Hydrologic Evaluation of Landfill Performance (HELP) Model prepared for the site (Joseph, 2003). The landfill liner system at the Central Maui Sanitary Landfill Phase IV-A consists of, from bottom to top, a prepared subgrade, a geosynthetic clay liner with a saturated hydraulic conductivity of approximately 3.0×10^{-9} cm/sec, a 60-mil high density polyethylene (HPDE) geomembrane, a drainage net, and a three-foot layer of loamy sand. The municipal waste will be placed on top of the loamy sand.

Hydrogeological conditions at the Central Maui Sanitary Landfill were characterized in previous studies prepared for the landfill (MFA, 1997a and URS, 2004b) and are briefly summarized below.

Subsurface conditions beneath the landfill consist of residual soils overlying volcanic rock (basalt). Wells drilled at the site encountered silty clays, weathered basalt (saprolite) and fragmented basalt (clinker), and competent basalt rock (MFA, 1997a). Although silty clays are present in the subsurface, for the conceptual site model a conservative approach was utilized which assumed the subsurface consisted of only basalt rock.

Groundwater at the site occurs in the basalt rock as freshwater floating on seawater. The depth to the groundwater table in monitoring wells MW-1 through MW-6 measured during the December 2003 groundwater monitoring event ranged from 220 to 304 feet below the top of the well casings (URS, 2004b).

Groundwater beneath the site flows to the northwest with a groundwater gradient ranging from 0.000042 to 0.00011 foot/foot based on groundwater data collected on December 18, 2003 (URS, 2004b). Figure 1, attached, shows the approximate groundwater gradient as of December 18, 2003 and the location of the monitoring wells. Previously, groundwater gradients at the site were measured at 0.0001 foot/foot in 1997 (MFA, 1997a) and 0.001 foot/foot in June 2003 (URS, 2004b).

The hydraulic conductivity of the aquifer calculated from slug tests conducted on monitoring wells MW-1, MW-2, and MW-3 ranged from 8.5 feet/day to 19.1 feet/day with an average of 15.4 feet/day for the three wells (MFA, 1997a). The thickness of the aquifer was estimated to be approximately 124 to 135 feet based on the Ghyben-Herzberg relation and the average hydraulic heads observed in monitoring wells MW-1, MW-2, and MW-3 (MFA, 1997a).

3.0 MULTIMED MODEL DESCRIPTION

MULTIMED, the Multimedia Exposure Assessment Model, was developed by the U.S. Environmental Protection Agency to simulate the movement of contaminants leaching from a landfill to the multimedia environment. The model uses analytical, semi-analytical, and numerical solution techniques to solve the mathematical equations describing flow and transport (U.S. EPA, 1995). The model can be used in a deterministic simulation mode, where exactly one model result is determined for a given set of input data, or in a Monte Carlo simulation mode, which allows the user to analyze the impact of uncertainty and variability in the input data. The U.S. EPA has developed several restrictions for using MULTIMED in Subtitle D applications. These restrictions were made in an effort to develop a conservative approach for simulating the migration of leachate from Subtitle D facilities. In conducting the point of compliance demonstration for the Central Maui Sanitary Landfill, the Subtitle D restrictions were utilized in a deterministic simulation mode. Version 2.0 Beta of the model was utilized for this study.

This study used the following restrictions as required for Subtitle D applications of MULTIMED:

- Only the Saturated and Unsaturated Modules were used. The Surface Water, Landfill, and Air Modules were not used.

- Only steady-state transport simulations were used. No decay of the source term was allowed – the concentration of contaminants entering the aquifer system was held constant with time. The contaminant pulse was assumed continuous and constant for the duration of the simulation.

- The receptor was located directly downgradient of the landfill, so that it intercepts the center of the contaminant plume.

- The contaminant concentration was calculated at the top of the aquifer.

- Only the Gaussian source geometry was used.

Other conservative assumptions used in this application of MULTIMED include the following:

- No chemical decay
- No partitioning (sorption) of the chemical to the solid phase
- No biodegradation
- No partitioning (volatilization) of the chemical to the vapor phase
- No dilution of the contaminant concentration due to rainfall recharge
- No other attenuation of the contaminant.

The EPA-recommended criteria for establishing whether or not a particular landfill design is acceptable is based on the dilution attenuation factor (DAF). Since no attenuation of the contaminant occurs in the Subtitle D application of MULTIMED, there is a linear relationship between the input concentration and the concentration that MULTIMED estimates at the point of compliance. The DAF is the factor by which the concentration is expected to decrease between the landfill and the point of compliance and is calculated using the following equation (EPA, 1995):

DAF = leachate concentration / concentration at the point of compliance

If the leachate concentration is assigned a unit value of 1.0 mg/ℓ, then

DAF = 1.0 / concentration at the point of compliance.

If the DAF is equal to or greater than 100, then the landfill design is acceptable. The threshold DAF of 100 is used to define an acceptable design because maximum leachate concentrations are expected to be 100 times the MCL (EPA, 1995).

After using MULTIMED to compute the DAF, the concentrations of various contaminants at the point of compliance are calculated by dividing typical landfill leachate concentrations by the DAF:

concentration at the point of compliance = typical leachate concentration / DAF

To compute the concentration at the point of compliance, typical concentrations of leachate were used from EPA literature (U.S. EPA, 1989 as reported by Gibbons, et al., 1992). These typical leachate concentrations were obtained from data compiled from 83 landfills reported in numerous leachate studies (U.S. EPA, 1989 as reported by Gibbons, et al., 1992). The calculated concentrations at the point of compliance are then compared to the MCLs.

4.0 MODEL INPUT DATA

Data input requirements for MULTIMED are grouped into four categories:

- Chemical-Specific Parameters
- Leachate Source-Specific Parameters
- Unsaturated Zone Flow and Transport Parameters
- Saturated Zone Flow and Transport Parameters.

Model input parameters are shown below in Table 1. Each parameter is listed in Table 1, along with the units, the value used, and an explanation of how the parameter was estimated.

A model sensitivity analysis was performed to evaluate the effects of different values of certain input parameters that varied or are difficult to estimate. These input parameters included hydraulic gradient, infiltration rate, and longitudinal, transverse, and vertical dispersivity. Hydraulic gradients at the site ranged from 0.000042 to 0.00011 foot/foot based on groundwater elevations measured in December 2003 and 0.001 foot/foot measured in June 2003 (URS, 2004b). The MULTIMED model was run using hydraulic gradients of 0.000042, 0.00011, and 0.001.

Typically, output from the HELP model, in the form of infiltration rate, is used as input to MULTIMED; however, the infiltration rate leaving the bottom layer calculated in the HELP model was zero (Joseph, 2003). Therefore, an alternative method was used to calculate the infiltration rate. An infiltration rate of 8.9×10^{-7} m/yr was calculated using the method of Giroud and Bonaparte (1989a and 1989b), based on a hydraulic conductivity of 3.0×10^{-9} cm/sec for the geosynthetic clay liner (Joseph, 2003), an assumed average head of 6 inches above the liner, and a typical defect diameter in the liner of 2 mm. The model was also run with a more conservative infiltration rate of 2.76×10^{-6} m/yr based on the same hydraulic conductivity, but with 12 inches of leachate above the liner, and a defect diameter in the liner of 1 inch (2.54 cm).

Table 1. MULTIMED Input Parameters

Parameter	Unit	Value	Explanation
Chemical-Specific Parameters			
Solid-phase decay coefficient	1/yr	0	Conservative assumption – no decay.
Dissolved-phase decay coefficient	1/yr	0	Conservative assumption – no decay.
Overall chemical decay coefficient	1/yr	0	Conservative assumption – no decay.
Acid-catalyzed hydrolysis rate	ℓ/mol-yr	0	Conservative assumption – no decay.
Neutral hydrolysis rate constant	1/yr	0	Conservative assumption – no decay.
Base-catalyzed hydrolysis rate	ℓ/mol-yr	0	Conservative assumption – no decay.
Reference temperature	ºC	25	Standard reference temperature.
Normalized distribution coefficient	mℓ/g	0	Conservative assumption – no sorption of chemical to solid phase.
Distribution coefficient	mℓ/g	0	Conservative assumption – no sorption of chemical to solid phase.
Biodegradation coefficient	1/yr	0	Conservative assumption – no decay.
Air diffusion coefficient	cm^2/s	0	Conservative assumption – no decay.
Reference temperature for air diffusion	ºC	0	Conservative assumption – no decay.
Molecular weight	g/mol	0	Not required for Subtitle D applications of MULTIMED.
Mole fraction of solute	dimensionless	1	Not required for Subtitle D applications of MULTIMED.
Solute vapor pressure	mm Hg	0	Conservative assumption – no partitioning to the vapor phase.
Henry's law constant	atm-m^3/mol	0	Conservative assumption – no partitioning to the vapor phase.
Source-Specific Parameters			
Infiltration rate	m/yr	2.76×10^{-6}	Calculated using the method of Giroud and Bonaparte (1989a and 1989b) and based on a hydraulic conductivity of 3.0×10^{-9} cm/sec for the geosynthetic clay liner (Joseph, 2003), an assumed average head of 12 inches of leachate above the liner, and a defect diameter in the liner of 1 inch (2.54 cm). Used this value because it was the most conservative. Also ran the model using an infiltration rate of 8.9×10^{-7} m/yr based on the same hydraulic conductivity, but with 6 inches of head above the liner and a typical defect diameter in the liner of 2 mm as recommended by Giroud and Bonaparte (1989a and 1989b). Used the value of 2.76×10^{-6} m/yr because it was the most conservative. See attached Model Sensitivity Analysis.
Area of waste disposal unit	m^2	35,160	Measured area of landfill Phase IV-A.
Duration of pulse	year	not required	Not required for Subtitle D applications of MULTIMED which are steady-state.
Spread of contaminant source	m	calculated	Calculated by MULTIMED.
Source decay constant	1/yr	0	MULTIMED default value for steady-state.

Table 1. MULTIMED Input Parameters

Parameter	Unit	Value	Explanation
Recharge rate	m/yr	0	Conservative assumption – no dilution of contaminant concentration due to rainfall recharge.
Initial concentration at landfill	mg/ℓ	1.0	Set at 1.0 to calculate dilution-attenuation factor (DAF) per Subtitle D applications of MULTIMED.
Length scale of facility	m	293	Measured length of landfill Phase IV-A.
Width scale of facility	m	120	Measured width of landfill Phase IV-A.
Unsaturated Zone Flow and Transport Parameters			
Saturated hydraulic conductivity	cm/hr	19.6	Average measured value from slug tests at site (MFA, 1997a).
Unsaturated zone porosity	dimensionless	0.50	Estimated value for weathered basalt (Miller, 1987, Wentworth, 1951).
Air entry pressure head	m	0	Estimate based on values given in MULTIMED manual (U.S. EPA, 1995).
Depth of unsaturated zone	m	60	Estimated distance from bottom of liner in Phase IV-A to groundwater table (URS, 2004b).
Residual water content	dimensionless	0.4	Estimated value (Miller, 1987 as reported by Kleveno, 1990).
Brooks and Corey exponent	dimensionless	not required	Not required when Van Genuchten exponents are used.
Van Genuchten exponent (alpha)	1/cm	0.145	Estimated values from MULTIMED manual (U.S. EPA, 1995).
Van Genuchten exponent (beta)	dimensionless	2.68	Estimated values from MULTIMED manual (U. S. EPA, 1995).
Layer thickness	m	60	As above (depth of unsaturated zone).
Longitudinal dispersivity of layer	m	1.0	Maximum default in MULTIMED for deep unsaturated zones. Also ran model using a vertical dispersivity of 0.2 estimated for saturated zone (see below) with no change to the predicted concentration or DAF. See attached Model Sensitivity Analysis.
Percent organic matter	dimensionless	0	Conservative assumption – no sorption of chemical to solid-phase.
Bulk density of soil layer	g/cm^3	1.03	Estimate for basalt at depths over 11 m (Miller, 1987 as reported by Kleveno, 1990).
Biological decay coefficient	1/yr	0	Conservative assumption – no decay.
Saturated Zone Flow and Transport Parameters			
Particle diameter	cm	calculated	Calculated by MULTIMED.
Aquifer porosity	dimensionless	0.50	Estimated value for weathered basalt (Miller, 1987, Wentworth, 1951).
Bulk density	g/cm^3	1.03	Estimate for basalt at depths over 11 m (Miller, 1987 as reported by Kleveno, 1990).
Aquifer thickness	m	38	Estimated thickness of basal freshwater based on Ghyben-Herzberg relation (MFA, 1997a).
Mixing zone depth	m	calculated	Calculated by MULTIMED.

Table 1. MULTIMED Input Parameters

Parameter	Unit	Value	Explanation
Hydraulic conductivity	m/yr	1713	Average measured value from slug tests at site (MFA, 1997a).
Hydraulic gradient	m/m	0.000042	Most conservative measured value from wells at the site (URS, 2004b). Also ran model using hydraulic gradients of 0.001 and 0.00011 measured at the site (URS, 2004a). Value of 0.000042 was the most conservative. See attached Model Sensitivity Analysis.
Groundwater seepage velocity	m/yr	calculated	Calculated by MULTIMED.
Retardation coefficient	dimensionless	1.0	Conservative assumption – contaminant does not interact with solid phase.
Saturated Zone Flow and Transport Parameters (continued)			
Longitudinal dispersivity	m	3	Estimated using equations provided in the MULTIMED manual (U.S. EPA, 1995). Also ran model using a longitudinal dispersivity of 30 m and 300 m. The value of 3 m was the most conservative. See attached Model Sensitivity Analysis.
Transverse dispersivity	m	1	Estimated using equations provided in the MULTIMED manual (U.S. EPA, 1995). Also ran model using a transverse dispersivity of 10 m and 100 m. The value of 1 m was the most conservative. See attached Model Sensitivity Analysis.
Vertical dispersivity	m	0.2	Estimated using equations provided in the MULTIMED manual (U.S. EPA, 1995). Also ran model using a vertical dispersivity of 2 m and 20 m. The value of 0.2 m was the most conservative. See attached Model Sensitivity Analysis.
Temperature of aquifer	ºC	25.2	Mean value for 3 wells over 8 measurements (MFA, 1997b).
pH	pH units	7.35	Mean value for 3 wells over 8 measurements (MFA, 1997b).
Organic carbon content	fraction	0	Conservative assumption – no sorption of chemical to solid phase.
Well distance from site	m	40	Measured distance to Well MW-5 from edge of liner at Phase IV-A (URS, 2004a).
Well location (angle off center)	degrees	0	Subtitle D MULTIMED conservative approach – the well is assumed to be located on the contaminant plume centerline.
Well vertical distance from water table	fraction	0	Subtitle D MULTIMED conservative approach – the contaminant concentration is predicted at the water table.

A sensitivity analysis was also conducted on the longitudinal, transverse, and vertical dispersivities, since these values are difficult to estimate. Dispsersivities were initially estimated using equations provided in the MULTIMED user's manual (U.S. EPA, 1995), then the model was run using dispersivities one and two orders of magnitude greater than the initial estimates. The values used are shown in Table 1.

5.0 MODEL RESULTS

The results of the MULTIMED simulation are summarized below, and the model input and output files are attached to this report. Also attached to this report is a summary of the model sensitivity analysis. The model sensitivity analysis evaluated the effects of different values of certain input parameters that varied or are difficult to estimate, and determined which values were the most conservative. The most conservative input parameters were then utilized in the final simulation discussed below.

Using a unit concentration of 1.0 mg/l in the leachate, MULTIMED predicted a concentration of 1.049×10^{-3} mg/l at the point of compliance, monitoring well MW-5 located 40 meters downgradient of Phase IV-A of the Central Maui Sanitary Landfill. The corresponding dilution attenuation factor (DAF) was 953. In other words, the concentration of a particular contaminant in the leachate will be 953 times smaller at the point of compliance, monitoring well MW-5. The predicted concentration at the point of compliance of each contaminant of concern listed in Table 1 of 40 CFR 258 is presented below in Table 2. The predicted concentrations at the point of compliance are compared to the MCLs from Table 1 of 40 CFR 258 and the MCLs in §HAR 11-20.

The MULTIMED calculated DAF of 953 exceeds the EPA threshold DAF of 100, meaning that the design of the Central Maui Sanitary Landfill is acceptable. Additionally, the predicted concentrations of all contaminants of concern listed in Table 2 are well below the MCLs at the point of compliance.

6.0 SUMMARY AND CONCLUSIONS

A point of compliance demonstration for the Phase IV-A of the Central Maui Sanitary Landfill was completed using U.S. EPA's MULTIMED model. The MUTLIMED model was utilized following the Subtitle D landfill application procedures, which employ very conservative assumptions, including steady-state conditions, no chemical decay, no volatilization of the chemical to air, no sorption of the chemical to the soil, no biodegradation, no dilution due to rainfall recharge, and no other attenuation of the contaminant. Additionally, the various model input parameters were conservatively estimated.

Table 2. MULTIMED Results at the Point of Compliance

Contaminant of Concern	40 CFR 258 MCL (mg/ℓ)	HAR §11-20 MCL (mg/ℓ)	Typical Leachate Concentration (mg/ℓ) (a)	Predicted Concentration at the Point of Compliance (mg/ℓ) (b)
Arsenic	0.05	0.05	0.042	4.41×10^{-5}
Barium	1.0	2	0.085	8.92×10^{-5}
Benzene	0.005	0.005	0.221	2.32×10^{-4}
Cadmium	0.01	0.005	0.022	2.31×10^{-5}
Carbon Tetrachloride	0.005	0.005	0.202	2.12×10^{-4}
Chromium (hexavalent)	0.05	0.1	0.018	1.89×10^{-5}
2,4-Dichlorophenoxy Acetic Acid	0.1	not listed	0.129	1.35×10^{-4}
1,4-Dichlorobenzene	0.075	0.075	0.0132	1.38×10^{-5}
1,2-Dichloroethane	0.005	0.005	1.841	1.93×10^{-3}
1,1-Dichloroethylene	0.007	0.007	not reported	not calculated
Endrin	0.0002	0.002	0.00025	2.62×10^{-7}
Fluoride	4	1.4	not reported	not calculated
Lindane	0.004	0.0002	0.00002	2.10×10^{-8}
Lead	0.05	not listed	0.162	1.70×10^{-4}
Mercury	0.002	0.002	0.002	2.10×10^{-6}
Methoxychlor	0.1	0.04	not reported	not calculated
Nitrate as Nitrogen	10	10	not reported	not calculated
Selenium	0.01	0.05	0.012	1.26×10^{-5}
Silver	0.05	not listed	0.021	2.20×10^{-5}
Toxaphene	0.005	0.003	0.001	1.05×10^{-6}
1,1,1-Trichloromethane	0.2	not listed	not reported	not calculated
Trichloroethylene	0.005	0.005	0.187	1.96×10^{-4}
2,4,5-Trichlorophenoxy Acetic Acid	0.01	not listed	not reported	not calculated
Vinyl Chloride	0.002	0.002	0.036	3.78×10^{-5}
MULTIMED Unit Concentration at Point of Compliance = 1.049×10^{-3} Dilution Attenuation Factor (DAF) = 953				

Notes:
(a) U.S. EPA Average Leachate Concentration (U.S. EPA, 1989 as reported by Gibbons et al., 1992)
(b) Equals Leachate Concentration / DAF

The point of compliance for Phase IV-A of the Central Maui Sanitary Landfill is the closest downgradient monitoring well to Phase IV-A, monitoring well MW-5, which is located approximately 40 meters from the edge of the lined waste management unit. MULTIMED modeled leachate leaking through a one-inch diameter hole in the landfill liner, traveling to the groundwater table, and traveling to the point of compliance, monitoring well MW-5.

MULTIMED predicted that the contaminant concentrations in groundwater in monitoring well MW-5 would not exceed the MCLs for drinking water.

In accordance with U.S. EPA procedures for application of MULTIMED to Subtitle D landfill facilities, the dilution attenuation factor of 953 calculated by MULTIMED is greater than 100 indicating that the design of Phase IV-A of the Central Maui Sanitary Landfill is acceptable.

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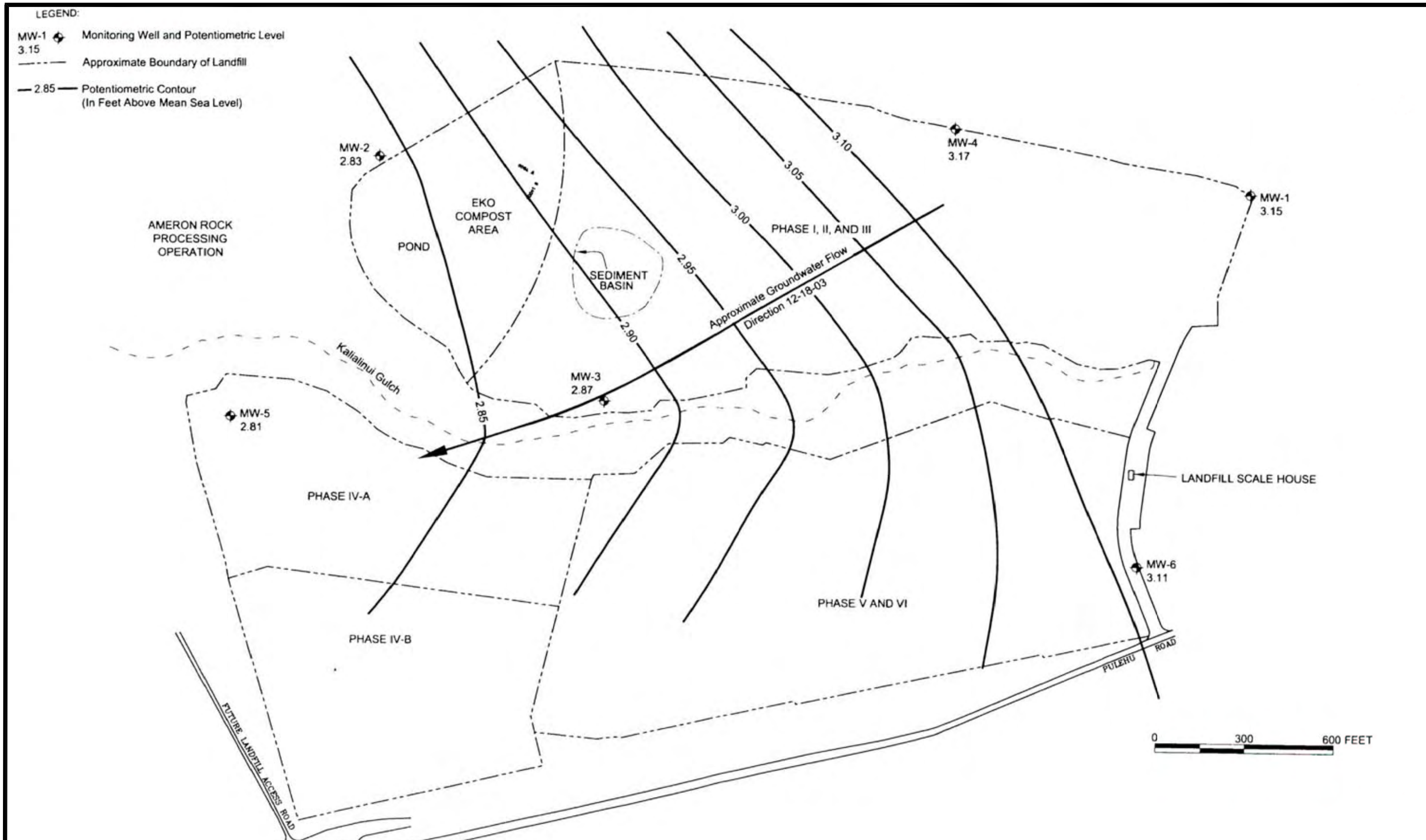

Source Map: URS, Groundwater Potentiometric Surface Map, 2003.

Project:	04068-001
Approved by:	JKH
Drawn by:	LMS
Date:	August 2004
Scale: As Shown	

Figure 1: Well Locations & Groundwater Flow Direction

Central Maui Sanitary Landfill

Puunene, Maui, Hawaii

Mountain Edge Environmental, Inc.

Hydrogeological & Environmental Consulting

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COUNTY OF MAUI, CENTRAL MAUI LANDFILL
Subtitle D Landfill Application of MULTIMED


GENERAL DATA

***  CHEMICAL NAME FORMAT(80A1)
ANY CHEMICAL

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     10.       20.       30.       40.       50.       60.       70.       80.       90.      100.
    110.      120.      130.      140.      150.      160.

***   XST
END GENERAL

CHEMICAL SPECIFIC VARIABLE DATA
ARRAY VALUES
***      CHEMICAL SPECIFIC VARIABLES

***            VARIABLE NAME               UNITS               DISTRIBUTION   PARAMETERS           LIMITS
***                                                                          MEAN      STD DEV    MIN       MAX
 ***********************************************************************************************************************
 1 Solid phase decay coeff (1/yr)                                    0        0.0     -999.     0.000E+00 0.100E+11
 2 Diss phase decay coeff (1/yr)                                     0        0.0     -999.     0.000E+00 0.100E+11
 3 Overall chem dcy coeff (1/yr)                                     0        0.0     -999.     0.000E+00 0.100E+11
 4 Acid cataly hydrol rte(l/M-yr)                                    0    0.000E+00 -999.     0.000E+00 -999.
 5 Neutral hydrol rate cons(1/yr)                                    0    0.000E+00 -999.     0.000E+00 -999.
 6 Base cataly hydrol rte(l/M-yr)                                    0    0.000E+00 -999.     0.000E+00 -999.
 7 Reference temperature (C)                                         0       25.0     -999.     0.000E+00  100.
 8 Normalized distrib coeff(ml/g)                                    0        0.0     -999.     0.000E+00 -999.
 9 Distribution coefficient                                          0        0.0     -999.     0.000E+00 0.100E+11
10 Biodegrad coef(sat zone)(1/yr)                                    0    0.000E+00 -999.     0.000E+00 -999.
11 Air diffusion coeff (cm2/s)                                       0    0.000E+00 -999.     0.000E+00  10.0
12 Ref temp for air diffusion (C)                                    0    0.000E+00 -999.     0.000E+00  100.
13 Molecular weight (g/mole)                                         0         0.     -999.     0.000E+00 -999.
14 Mole fraction of solute                                           0         1.     -999.     0.100E-08  1.00
15 Solute vapor pressure (mm Hg)                                     0         0.     -999.     0.000E+00  100.
16 Henry`s law cons (atm-m^3/M)                                      0         0.     -999.     0.100E-09  1.00
END ARRAY

END CHEMICAL SPECIFIC VARIABLE DATA
```

```
SOURCE SPECIFIC VARIABLE DATA
ARRAY VALUES
***       SOURCE SPECIFIC VARIABLES

***            VARIABLE NAME                UNITS                DISTRIBUTION   PARAMETERS            LIMITS
***                                                                           MEAN      STD DEV    MIN       MAX
************************************************************************************************************************
 1 Infiltration rate (m/yr)                                          0      2.760E-06 -999.     0.100E-09 0.100E+11
 2 Area of waste disp unit (m^2)                                     0      3.516E+04 -999.     0.100E+01 0.100E+11
 3 Duration of pulse (yr)                                            0      0.000E+00 -999.     0.100E-08 -999.
 4 Spread of contaminant srce (m)                                   -1      -999.     -999.     0.100E-08 0.100E+11
 5 Recharge rate (m/yr)                                              0      0.000E+00 -999.     0.100E-09 0.100E+11
 6 Source decay constant (1/yr)                                      0      0.000E+00 -999.     0.000E+00 -999.
 7 Init conc at landfill (mg/l)                                      0       1.00     -999.     0.000E+00 -999.
 8 Length scale of facility (m)                                      0       293.     -999.     0.100E-08 0.100E+11
 9 Width scale of facility (m)                                       0       120.     -999.     0.100E-08 0.100E+11
END ARRAY


END SOURCE SPECIFIC VARIABLE DATA



VFL   UNSATURATED FLOW MODEL PARAMETERS


CONTROL PARAMETERS
***    DUMMY     NMAT      KPROP     DUMMY    NVFLAY
         7         1         1         1         1


END CONTROL PARAMETERS
MATERIAL NUMBER FOR EACH LAYER
 60.              1
END MATERIAL PARAMETERS
SATURATED MATERIAL PROPERTY PARAMETERS
ARRAY VALUES
***   SATURATED MATERIAL   VARIABLES

***            VARIABLE NAME                UNITS                DISTRIBUTION   PARAMETERS            LIMITS
***                                                                           MEAN      STD DEV    MIN       MAX
************************************************************************************************************************
 1 Sat hydraulic conduct (cm/hr)                                     0      0.196E+02 -999.     0.100E-10  350.
 2 Unsaturated zone porosity                                         0      0.500     -999.     0.100E-08 0.990
 3 Air entry pressure head (m)                                       0      0.000E+00 -999.     0.000E+00 -999.
 4 Depth of the unsat zone (m)                                       0       60.      -999.     0.100E-08 -999.
```

```
END ARRAY

END MATERIAL  1
END
SOIL MOISTURE PARAMETERS
***   FUNCTIONAL COEFFICIENTS
ARRAY VALUES
***   FUNCTIONAL COEFFICIE VARIABLES

***            VARIABLE NAME                UNITS                DISTRIBUTION   PARAMETERS             LIMITS
***                                                                              MEAN      STD DEV    MIN       MAX
 ************************************************************************************************************
 1 Residual water content                                              0      0.400E+00 -999.     0.100E-08  1.00
 2 Brooks and Corey exponent, EN                                       0      -999.     -999.     0.000E+00  10.0
 3 ALFA van Genuchten coefficient                                      0      0.145E+00 -999.     0.000E+00 0.150
 4 BETA Van Genuchten coefficient                                      0       2.68     -999.      1.00      1.50
END ARRAY

END MATERIAL  1
END
END UNSATURATED FLOW



VTN    UNSATURATED TRANSPORT MODEL
CONTROL PARAMETERS
***   NMAT    NTSTPS    IBOUND    ITSGEN       NTS      ITSGN     IKALL    IFREUN    IRESOL    NITMAX     IMBAL
         1        40         1         1       100          1         0         0         0        20         0
***  WTFUN      TIMA       TIN      TFAC     TSMAX        UWF
     1.200 0.000E+00    1.00        1.00     1.00       1.0


END CONTROL PARAMETERS
TRANSPORT PARAMETER
ARRAY VALUES
***   UNSATURATED TRANSPOR VARIABLES

***            VARIABLE NAME                UNITS                DISTRIBUTION   PARAMETERS             LIMITS
***                                                                              MEAN      STD DEV    MIN       MAX
 ************************************************************************************************************
 1 Longit disper of layer (m)                                          0      1.000     -999.     0.000E+00 0.100E+05
 2 Percent organic matter                                              0      0.000E+00 -999.     0.000E+00  11.0
 3 Bulk dens of soil layer (g/cc)                                      0       1.03     -999.     0.100E-01  5.00
 4 Biological decay coeff (1/yr)                                       0      0.000E+00 -999.     0.000E+00 -999.
 5 Freundlich coefficient cc/gm                                        0      0.000E+00 -999.     0.000E+00 -999.
 6 Freundlich isotherm exponent  --                                    0      0.000E+00 -999.     0.000E+00 -999.
```

```
END ARRAY

END LAYER  1
END UNSATURATED TRANSPORT PARAMETERS
END TRANSPORT MODEL
AQUIFER SPECIFIC VARIABLE DATA
ARRAY VALUES
***       AQUIFER SPECIFIC VARIABLES

***            VARIABLE NAME                UNITS              DISTRIBUTION   PARAMETERS             LIMITS
***                                                                            MEAN      STD DEV    MIN       MAX
 ***********************************************************************************************************************
 1 Particle diameter (cm)                                           -1      -999.     -999.     0.400E-03 0.100
 2 Aquifer porosity                                                  0        .50     -999.     0.100E-08 0.990
 3 Bulk density (g/cc)                                               0        1.03    -999.     0.100E-01  5.00
 4 Aquifer thickness (m)                                             0       38.0     -999.      3.00      560.
 5 Mixing zone depth (m)                                            -1      -999.     -999.     0.100E-08 0.100E+06
 6 Hydraulic conductivity (m/yr)                                     0      1713.     -999.     0.100E-06 0.100E+09
 7 Hydraulic Gradient                                                0      0.420E-04 -999.     0.100E-04 0.100
 8 Grndwater seep velocity (m/yr)                                   -1      -999.     -999.     0.100E-09 0.100E+09
 9 Retardation coefficient                                           0         1.     -999.      1.00     0.100E+09
10 Longitudinal dispersivity (m)                                     0         3.     -999.     -999.     -999.
11 Transverse dispersivity (m)                                       0         1.     -999.     -999.     -999.
12 Vertical dispersivity (m)                                         0        0.2     -999.     -999.     -999.
13 Temperature of aquifer (C)                                        0       25.2     -999.      5.00      30.0
14 pH                                                                0       7.35     -999.     0.300      14.0
15 Organic carbon content (fract)                                    0      0.00E+00  -999.     -999.     -999.
16 Receptor distance from site(m)                                    0       40.      -999.     -999.     -999.
17 Angle off center (degree)                                         0      0.000E+00 -999.     0.000E+00  360.
18 Z-dist from watertable (fract)                                    0      0.000E+00 -999.     0.000E+00  1.00
END ARRAY

END AQUIFER SPECIFIC VARIABLE DATA

END ALL DATA
```

```
1

                         U. S.   E N V I R O N M E N T A L   P R O T E C T I O N   A G E N C Y

                                          E X P O S U R E   A S S E S S M E N T

                                             M U L T I M E D I A   M O D E L

                                       MULTIMED - (Version 2.00 Beta - October 1996)
1
 Run options
 --- -------
```

```
 COUNTY OF MAUI, CENTRAL MAUI LANDFILL


 Subtitle D Landfill Application of MULTIMED
 Chemical simulated is ANY CHEMICAL


 Option Chosen                         Saturated and unsaturated zone models
 Run was                               DETERMIN
 Infiltration input by user
 Run was steady-state
 Reject runs if Y coordinate outside plume
 Reject runs if Z coordinate outside plume
 Gaussian source used in saturated zone model
1
1
 UNSATURATED ZONE FLOW MODEL PARAMETERS
  (input parameter description and value)
 NP      - Total number of nodal points                240
 NMAT    - Number of different porous materials          1
 KPROP   - Van Genuchten or Brooks and Corey             1
 IMSHGN  - Spatial discretization option                 1
 NVFLAYR - Number of layers in flow model                1


 OPTIONS CHOSEN
 ------- ------
 Van Genuchten functional coefficients
 User defined coordinate system
1


 Layer information
 -----------------
 LAYER NO.    LAYER THICKNESS     MATERIAL PROPERTY
 ---------    ---------------     -----------------
     1                  60.00             1
```

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	19.6	-999.	0.100E-10	350.
Unsaturated zone porosity	--	CONSTANT	0.500	-999.	0.100E-08	0.990
Air entry pressure head	m	CONSTANT	0.000	-999.	0.000	-999.
Depth of the unsaturated zone	m	CONSTANT	60.0	-999.	0.100E-08	-999.

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.400	-999.	0.100E-08	1.00
Brook and Corey exponent,EN	--	CONSTANT	-999.	-999.	0.000	10.0
ALFA coefficient	1/cm	CONSTANT	0.145	-999.	0.000	0.150
Van Genuchten exponent, ENN	--	CONSTANT	2.68	-999.	1.00	1.50

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

```
NMAT   - Number of different porous materials          1
NTSTPS - Number of time values concentration calc     40
IBOUND - Type of boundary condition                    1
ITSGEN - Time values generated or input                1
NTIS   - Number of finite element time steps         100
ITSGN  - FE time steps generated or input              1
```

```
IKALL  - Time stepping scheme                              0
IFREUN - Type of adsorption                                0
IRESOL - Finite-element time step reduction                1
NITMAX - Max. # of non-linear iterations (FE)              1
IMBAL  - Mass balance calculations                         0
TMAX   - Max simulation time             --             10.0
WTFUN  - Convolution weighting factor    --              1.2
TIMA   - Analysis starting time         --               0.0
TIN     - Initial FE time step size      --              1.0
TFAC   - Weighting factor                --              1.0
TSMAX  - Maximum FE time step size       --              1.0
UWF  - Upstream weighting function       --              1.0
```

OPTIONS CHOSEN
------- ------

Numerical unsaturated zone model
Nondecaying Pulse Source Selected
Time values at water table are calculated
Time steps in numerical model are calculated
Linear isotherm used in numerical model

1

DATA FOR MATERIAL 1
---- --- --------
VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Longitudinal dispersivity of layer	m	CONSTANT	1.00	-999.	0.000	0.100E+05
Percent organic matter	--	CONSTANT	0.000	-999.	0.000	11.0
Bulk density of soil for layer	g/ml	CONSTANT	1.03	-999.	0.100E-01	5.00
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	0.000	-999.
Freundlich coefficient	--	CONSTANT	0.000	-999.	0.000	-999.
Freundlich isotherm exponent	--	CONSTANT	0.000	-999.	0.000	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	CONSTANT	0.000	-999.	0.000	0.100E+11
Dissolved phase decay coefficient	1/yr	CONSTANT	0.000	-999.	0.000	0.100E+11
Overall chemical decay coefficient	1/yr	CONSTANT	0.000	-999.	0.000	0.100E+11
Acid catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	0.000	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	0.000	-999.
Base catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	0.000	-999.
Reference temperature	C	CONSTANT	25.0	-999.	0.000	100.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	0.000	-999.
Distribution coefficient	--	CONSTANT	0.000	-999.	0.000	0.100E+11
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	0.000	-999.
Air diffusion coefficient	cm2/s	CONSTANT	0.000	-999.	0.000	10.0
Reference temperature for air diffusion	C	CONSTANT	0.000	-999.	0.000	100.
Molecular weight	g/M	CONSTANT	0.000	-999.	0.000	-999.
Mole fraction of solute	--	CONSTANT	1.00	-999.	0.100E-08	1.00
Vapor pressure of solute	mm Hg	CONSTANT	0.000	-999.	0.000	100.
Henry`s law constant	atm-m^3/M	CONSTANT	0.000	-999.	0.100E-09	1.00
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Soil/Air Boundary Layer Thickness	cm	CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.276E-05	-999.	0.100E-09	0.100E+11
Area of waste disposal unit	m^2	CONSTANT	0.352E+05	-999.	1.00	0.100E+11
Duration of pulse	yr	CONSTANT	0.000	-999.	0.100E-08	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	0.100E-08	0.100E+11

Recharge rate	m/yr	CONSTANT	0.000	-999.	0.100E-09	0.100E+11
Source decay constant	1/yr	CONSTANT	0.000	-999.	0.000	-999.
Initial concentration at landfill	mg/l	CONSTANT	1.00	-999.	0.000	-999.
Length scale of facility	m	CONSTANT	293.	-999.	0.100E-08	0.100E+11
Width scale of facility	m	CONSTANT	120.	-999.	0.100E-08	0.100E+11
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Particle diameter	cm	DERIVED	-999.	-999.	0.400E-03	0.100
Aquifer porosity	--	CONSTANT	0.500	-999.	0.100E-08	0.990
Bulk density	g/cc	CONSTANT	1.03	-999.	0.100E-01	5.00
Aquifer thickness	m	CONSTANT	38.0	-999.	3.00	560.
Source thickness (mixing zone depth)	m	DERIVED	-999.	-999.	0.100E-08	0.100E+06
Conductivity (hydraulic)	m/yr	CONSTANT	0.171E+04	-999.	0.100E-06	0.100E+09
Gradient (hydraulic)		CONSTANT	0.420E-04	-999.	0.100E-04	0.100
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	0.100E-09	0.100E+09
Retardation coefficient	--	CONSTANT	1.00	-999.	1.00	0.100E+09
Longitudinal dispersivity	m	CONSTANT	3.00	-999.	-999.	-999.
Transverse dispersivity	m	CONSTANT	1.00	-999.	-999.	-999.
Vertical dispersivity	m	CONSTANT	0.200	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	25.2	-999.	5.00	30.0
pH	--	CONSTANT	7.35	-999.	0.300	14.0
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	40.0	-999.	-999.	-999.
Angle off center	degree	CONSTANT	0.000	-999.	0.000	360.
Well vertical distance	m	CONSTANT	0.000	-999.	0.000	1.00

CONCENTRATION AFTER SATURATED ZONE MODEL 0.1049E-02

MODEL SENSITIVITY ANALYSIS SUMMARY
MULTIMED MODEL RUNS
COUNTY OF MAUI, CENTRAL MAUI LANDFILL

	MODEL INPUT						MODEL OUTPUT	
RUN	Hydraulic Gradient (m/m)	Infiltration Rate (m/yr)	Unsat. Zone Longitudinal Dispersivity (m)	Saturated Zone Longitudinal Dispersivity (m)	Saturated Zone Transverse Dispersivity (m)	Saturated Zone Vertical Dispersivity (m)	CONCENTRATION (mg/l)	DAF (1/mg/l)
1	0.001	8.90E-07	1	3	1	0.2	1.421E-05	70,373
2	0.00011	8.90E-07	1	3	1	0.2	1.292E-04	7,740
3	0.000042	8.90E-07	1	3	1	0.2	3.383E-04	2,956
4	0.000042	2.76E-06	1	3	1	0.2	1.049E-03	953
5	0.000042	2.76E-06	0.2	3	1	0.2	1.049E-03	953
6	0.000042	2.76E-06	1	30	10	2	4.662E-04	2,145
7	0.000042	2.76E-06	1	300	100	20	3.623E-04	2,760

Appendix E

Optimum Waste Fill Lift Height

THEORETICAL OPTIMUM LIFT HEIGHT FOR MINIMUM COVER SOIL

Compacted Waste Denstiy = 1200 lb. per cu.yd.
Cover Soil Use Thickness 6 inches plus 30% extra

OPTIMUM HEIGHT FOR 50 FT. WIDE LIFT

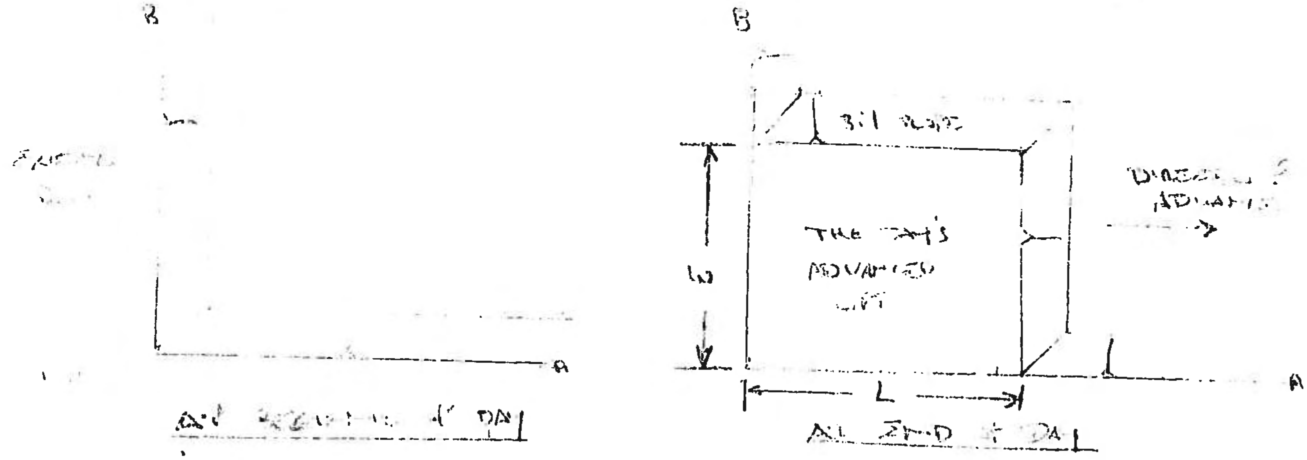
V	V	V	W	H-optimum	Length	Cover	Refuse:Soil Ratio
Tons	cu. yd	cu.ft.	ft.	ft.	ft.	cu. yd.	
100	167	4,500	50	5.3	17	47	3.5
200	333	9,000	50	7.5	24	71	4.7
300	500	13,500	50	9.2	29	91	5.5
400	667	18,000	50	10.7	34	109	6.1
500	833	22,500	50	11.9	38	125	6.7
600	1,000	27,000	50	13.1	41	141	7.1
700	1,167	31,500	50	14.1	45	155	7.5
800	1,333	36,000	50	15.1	48	170	7.9
900	1,500	40,500	50	16.0	51	183	8.2
1,000	1,667	45,000	50	16.9	53	197	8.5
1,100	1,833	49,500	50	17.7	56	210	8.7
1,200	2,000	54,000	50	18.5	58	223	9.0
1,300	2,167	58,500	50	19.2	61	235	9.2
1,400	2,333	63,000	50	20.0	63	248	9.4
1,500	2,500	67,500	50	20.7	65	260	9.6
1,600	2,667	72,000	50	21.3	67	272	9.8
1,700	2,833	76,500	50	22.0	70	284	10.0
1,800	3,000	81,000	50	22.6	72	295	10.2
1,900	3,167	85,500	50	23.3	74	307	10.3
2,000	3,333	90,000	50	23.9	75	318	10.5
2,100	3,500	94,500	50	24.5	77	330	10.6

OPTIMUM HEIGHT FOR 100 FT. WIDE LIFT

V	V	V	W	H-optimum	Length	Cover	Refuse:Soil Ratio
Tons	cu. yd	cu.ft.	ft.	ft.	ft.	cu. yd.	
100	167	4,500	100	3.8	12	61	2.7
200	333	9,000	100	5.3	17	88	3.8
300	500	13,500	100	6.5	21	110	4.6
400	667	18,000	100	7.5	24	129	5.2
500	833	22,500	100	8.4	27	146	5.7
600	1,000	27,000	100	9.2	29	161	6.2
700	1,167	31,500	100	10.0	32	176	6.6
800	1,333	36,000	100	10.7	34	190	7.0
900	1,500	40,500	100	11.3	36	203	7.4
1,000	1,667	45,000	100	11.9	38	216	7.7
1,100	1,833	49,500	100	12.5	40	228	8.0
1,200	2,000	54,000	100	13.1	41	240	8.3
1,300	2,167	58,500	100	13.6	43	252	8.6
1,400	2,333	63,000	100	14.1	45	263	8.9
1,500	2,500	67,500	100	14.6	46	274	9.1
1,600	2,667	72,000	100	15.1	48	284	9.4
1,700	2,833	76,500	100	15.6	49	295	9.6
1,800	3,000	81,000	100	16.0	51	305	9.8
1,900	3,167	85,500	100	16.4	52	315	10.0
2,000	3,333	90,000	100	16.9	53	325	10.2
2,100	3,500	94,500	100	17.3	55	335	10.4

[illegible] LIFT HEIGHT OF [illegible]

CONSIDER AN ADVANCING LIFT OF REFUSE AS FOLLOWS (PLAN VIEW)



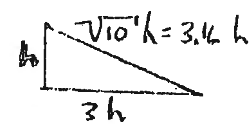
LET W = WIDTH OF ADVANCING LIFT (WORKING FACE WIDTH)

L = LENGTH OF LIFT ADVANCED DURING THE DAY

h = HEIGHT OF LIFT

V = DAILY VOLUME

S = SURFACE AREA TO RECEIVE DAILY COVER



THEN: $V = Lwh$

$S = Lw + 3.16\,h\,(L + w)$ where 3.16 is the slope length

THEN $L = \dfrac{V}{wh}$

THEN $S = \dfrac{V}{h} + 3.16\,\dfrac{V}{w} + 3.16\,hw$

However since h and w may vary [illegible] kept as small as possible to minimize [illegible] expense. [illegible] when the [illegible]

$$\frac{dS}{dh} = 0, \quad \text{or} \quad \frac{dS}{dh} = -\frac{V}{h^2} + 3.16\,w = 0$$

A-MEHR, INC.

PLATE

DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE [illegible] $\frac{V}{h^2}$ = [illegible]

$$h^2 = \frac{V}{3.16 w}$$

$$h_{opt} = \sqrt{\frac{V}{3.16 w}}$$

where h_{opt} is the [illegible] lift [illegible] to produce the least volume of daily cover

Example

Assume [illegible] /cy, 50 ft. lift [illegible]

[illegible] $V = 50 \cdot [illegible] \cdot \frac{2000}{1200} \frac{lb}{ton} \frac{cy}{lb} \cdot 27 \frac{ft^3}{cy} = 22,500\ ft^3$

$w = 50$ ft

$$h_{opt} = \sqrt{\frac{22,500}{(3.16)(50)}} = 11.9\ ft$$

[illegible] the cover volume (C) for 10, 11.9 and 13 ft. [illegible]

$C = \frac{0.5}{27}$ [illegible] , $S = \frac{V}{h} + 3.16 \frac{V}{[illegible]} + 3.16\ h [illegible]$

h (ft)	10	11.9	13	20	5
$\frac{22,500}{h}$	[illegible]	1891	1730	1125	4500
[illegible]	[illegible]	1422	1422	[illegible]	[illegible]
[illegible]	1,580	[illegible]	2,054	[illegible]	[illegible]
[illegible] ft^2	5,252	[illegible]	5206	[illegible]	[illegible]
[illegible]	77.2	96.2	76.4	[illegible]	124.3
[illegible]	1.01	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

PLATE

A-MEHR, INC.

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE

Appendix F

Hazardous Waste Exclusion Program

Hazardous Waste Exclusion Program
For
Central Maui Landfill

Prepared For:

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(Updated October 2013)

CENTRAL MAUI LANDFILL
HAZARDOUS WASTE EXCLUSION PROGRAM

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1 INTRODUCTION

This Hazardous Waste Exclusion Program (Program) was prepared at the request of the County of Maui (County) for the Central Maui Landfill in accordance with 40 CFR Subpart C, Section 258.20, "Procedures for excluding the receipt of hazardous waste". Section 258.20 states that "Owners or operators of all Municipal Solid Waste Landfill (MSWL) units must implement a program at the facility for detecting and preventing the disposal of regulated hazardous wastes as defined in part 261 of this chapter (40 CFR Ch. 1) and polychlorinated biphenyls (PCB) wastes as defined in part 761 of this chapter (40 CFR Ch. 1)". This program must include, at a minimum:

- Random inspections of incoming loads unless the owner or operator takes other steps to ensure that incoming loads do not contain regulated hazardous wastes.
- Records of any inspections.
- Training of facility personnel to recognize regulated hazardous wastes.
- Notification of Hawaii Department of Health (HDOH) under Subtitle C of RCRA if a regulated hazardous waste is discovered at the facility.

For purposes of this Program, regulated hazardous waste means "A solid waste that is a hazardous waste, as defined in 40 CFR 261.3, that is not excluded from regulation as a hazardous waste under 40 CFR 261.4(b) or was not generated by a conditionally exempt small quantity generator as defined in subsection 261.5 of this chapter (40 CFR Ch. 1)".

The intent of this Program is to address the need for implementing a hazardous waste exclusion program at the Central Maui Landfill, which is located in the agricultural lowlands of Central Maui, about three miles south-southeast of the Kahului Airport and two miles southeast of the town of Puunene. The site currently accepts an average of approximately 700 tons of refuse daily based on a six-day workweek.

The Program has been designed to prevent, to the extent possible, the acceptance of prohibited wastes into the landfill's waste stream. Specific elements of the program include:

- Descriptions of acceptable and prohibited wastes.
- Specifying methods for determining the acceptability of wastes.
- Processes for screening incoming wastes and reporting.
- Descriptions of proper hazardous waste handling and storage.

The details of the Program are presented in Sections 2.0 through 10.0 and are supplemented by reporting forms presented in the appendices.

2 DESCRIPTION OF ACCEPTABLE AND PROHIBITED WASTES

This section describes the types of waste that can be accepted at the Central Maui Landfill and those that are prohibited. In addition, the characteristics of hazardous and designated wastes are described.

2.1 ACCEPTABLE WASTES

The Central Maui Landfill can accept the following wastes:

- Residential and commercial refuse, including garbage and rubbish.
- Nonhazardous solid waste from industrial sources.
- Construction and demolition waste, in the event that the currently operating C&D landfill become unavailable.
- Other nonhazardous solid wastes not prohibited from being accepted at the landfill as defined in HAR 11-58.1-3.

2.2 PROHIBITED WASTES

The Central Maui Landfill is prohibited from accepting the following wastes:

- Hazardous or PCB contaminated wastes
- Untreated infectious and pathological waste from hospitals, veterinary facilities, and other similar facilities
- Liquids
- Agricultural waste unless approved by landfill personnel
- Green waste (Commercial loads containing greater that 25% green waste and residential containing greater than 50% green waste)
- White goods (accepted for recycling at the CML entrance facility)
- Commercial construction and demolition waste unless C&D Landfill is not available.
- Vehicles
- Tires
- Unflattened cardboard boxes
- Tree trunks, roots, telephone poles, piling, cables, wire fences, and similar types of materials (longer than 4 feet)
- Drums unless perforated and one end is completely open
- Sewage sludge
- Fats, oils and greases
- Automobile batteries
- Radioactive wastes

Common examples of prohibited wastes include: oil-based paint, paint thinner, glues and solvents, flammable liquids, household cleaners and polishes, arsenic, pesticides, asbestos, acid and alkaline solutions, PCBs, inks, photographic and pool chemicals, oxidizers, gasoline, automotive products, poisons, explosives, pyrophorics, cyanides, sulfides, sulfuric and hydrochloric acid, and water reactives. Compressed gas cylinders, pharmaceuticals, and radioactive wastes also are prohibited.

3 METHODS FOR DETERMINING WASTE ACCEPTABILITY

3.1 PHYSICAL ASSESSMENT

One means for determining the acceptability of a suspect waste is to examine a product label. Warning labels such as "harmful if inhaled", or "use only in a well ventilated area" are often useful in identifying the waste type. In some cases, physical signs (i.e., odor, color) of the presence of a prohibited waste are detected. This observation coupled with a customer's response to questions, often provides sufficient data to prohibit the wastes.

In physically assessing a waste load, the inspector may note an incompatibility in waste type that draws attention to a part of the load that seems out of place. An example would be one or more 55 gallon drums within a load of residential refuse. Once noted, the customer/driver would be questioned, and if needed, additional assessment undertaken.

Special care should be taken in assessing containers, as true contents may differ from the label.

3.2 ADDITONAL ASSESSMENT

In some cases, the steps outlined above may be insufficient to identify whether the waste can be accepted at the facility. Since it is the customer's responsibility to ensure that a waste is permissible, the load-checking inspector may require that additional measures be undertaken by the customer at the customer's expense prior to accepting the waste. When this occurs, the customer will be advised to exercise one or more of the following options in order to dispose of waste at the facility:

- Written clarification by regulatory agencies.
- Material Safety Data Sheets (MSDS)
- Written clearance from the County of Maui, operator of the Central Maui Landfill.
- Analysis by a state-certified hazardous waste laboratory.

Ultimately, the responsibility for obtaining the laboratory analysis and incurring costs lies with the customer.

3.3 KNOWN OFFENDERS

Special caution will be taken when accepting wastes from sources that have previously attempted to deliver hazardous wastes to the site. Precautionary measures will include: (1) questioning of the vehicle driver by the scalehouse attendant concerning the contents of the load, (2) visually inspecting the load prior to discharging, and (3) additional efforts by site personnel at the working face to observe the wastes discharged from such sources. Repeat offenders will be banned from the site.

4 <u>INITIAL SCREENING PROGRAM</u>

4.1 OBJECTIVE

The first element in the hazardous waste exclusion program for the Central Maui Landfill is initial screening process which is designed to detect and discourage attempts to dispose of prohibited wastes before it is offloaded in the landfill. Initial screening entails the visual inspections at the scalehouse and at the residential drop-off area.

The County of Maui will designate and train members of the landfill staff who will be responsible for conducting initial screening and load checking at the site. Back-up personnel will also be trained. The training program will consist of both classroom lectures and hands on field training and shall be held once per year.

4.2 INITIAL SCREENING PROCEDURES

The preliminary step in initial screening is controlling access to the disposal areas and to the landfill itself. CML has 2 disposal areas designed to receive incoming MSW, the residential drop-off area and the commercial drop-off area. Both residential and commercial vehicles access the facility through a single road which splits, diverting residential customers to the residential waste drop-off are and commercial customers to the scalehouse. The CML is fully enclosed by perimeter fencing preventing the bypass of these checkpoints.

Visual inspections shall be conducted for all incoming commercial vehicles at the scalehouse. The trained inspector will check manifests and observe incoming loads for any indication (i.e., unusual odors or leaks, radiation detector activation, smoke, suspicious behavior, etc.) of prohibited wastes. If the inspector encounters suspicious looking loads; he will summon the Supervisor to conduct a load check to determine if the waste is acceptable. Should prohibited wastes be positively identified during initial screening, the driver will be notified that the wastes must be removed from the facility and THE HAZARDOUS WASTE INCIDENT FORM will need to be completed and submitted to HDOH within 24 hours. If possible, the scalehouse attendant will provide the driver with information on how to properly dispose of the rejected waste.

Similarly, the attendant at the residential waste drop-off area is to monitor refuse being deposited. Should unacceptable waste be discovered, again Supervisor is notified and the customer will be instructed to remove wastes from the facility. The HAZARDOUS WASTE INCIDENT FORM will need to be filled out and submitted to HDOH. If possible, the attendant will provide information on how to properly dispose of the waste. This area should not require load checking as refuse is typically already exposed, however the attendant may call for it should they suspect that hazardous waste is being hidden.

In the case of radiation detector activation, refer to the **Radiation Monitoring Plan (2012)** located in the Central Maui Landfill Office.

5 LOAD CHECKING

5.1 OBJECTIVE

Should a vehicle be suspected of containing hazardous waste during the initial screening process the vehicle shall be load checked. This is a process where the vehicle is escorted to the landfill area and waste contents examined for hazardous waste.

5.2 LOAD CHECKING

Upon failing initial screening, the vehicle driver will be asked to unload the wastes at a designated location. The location shall be above the lined portion in the landfill, but away from the active work area. The driver will be instructed to pull forward while discharging the waste, resulting in the formation of a long, narrow windrow no taller than 4 feet. The inspector will then tear down the windrow, using a rake or shovel. The discharged material will be carefully observed for the presence of any prohibited wastes in the load. The methods by which the acceptability of wastes are to be determined are described in Section 3.0. If prohibited waste is not discovered during the load check, the County equipment operator shall reload the vehicle and permit the customer to resume normal dumping operations.

Should hazardous or other unacceptable wastes are identified, it shall be safely separated away from the remaining waste in accordance with the methods for handling hazardous waste (Section 5-3) below, and the responsible party for transporting the wastes to the landfill will be notified that the wastes must be removed from the facility premises and arrangements made for their proper disposal. The Incident will be recorded on THE HAZARDOUS WASTE INCIDENT FORM and reported to the State of Hawaii Department of Health within 24 hours. The remaining acceptable waste will be disposed of through normal operations.

5.3 REQUIRED WEEKY RANDOM LOAD CHECKING

The Central Maui Landfill Operations Permit currently requires that random load checking be conducted once per week.

The load-checking inspector will conduct the load check in accordance with 5.2 above and record information on the RANDOM WEEKLY LOAD CHECK FORM and will be signed by both the driver and the load-checking inspector. A copy of the random inspection form and any associated documents will be placed on file onsite at the Central Maui Landfill.

6 ACTIVE FACE SCREENING

6.1 OBJECTIVE

In addition to the measures implemented for the detection of hazardous wastes conducted in the initial screening and load checking programs, the landfill operator will be trained and directed to identify potentially prohibited wastes that may be delivered to the site. Equipment operators will also be trained to identify prohibited wastes as they are spread and exposed on the working face of the site. Operator visual surveillance and unacceptable waste training should be conducted yearly.

6.2 VISUAL INSPECTION OF THE ACTIVE FACE

- AS REFUSE IS DUMPED AND COMPACTED

  Equipment operators and spotters shall observe the working face for suspicious objects in accordance to Section 3.0. Objects to look out for include but are not limited to:

  - Red bags (infectious waste).
  - Containers which are 5 gallons or larger.
  - Other hazardous type material listed in Section 2.2.

- IF ANY SUSPICIOUS MATERIAL IS SPOTTED

  - Stop compacting operations in the immediate vicinity of the suspicious material.
  - Summon the Supervisor.

- PROCEDURE FOR HANDLING, REMOVAL AND STORAGE

  Should the examined material turn out to be hazardous, personnel will follow procedures described in Sections 7.0 of this report for handling and removing hazardous waste and hazardous waste storage.

- INCIDENT FORM

  An incident form (The HAZARDOUS WASTE INCIDENT FORM) must be completed for any dangerous or significant quantity of hazardous waste discovered and sent to the HDOH within 24 hours.

7 PROCEDURES FOR HANDLING IDENTIFIED PROHIBITED WASTES

7.1 OBJECTIVE

Upon identifying suspected hazardous wastes, the area will be isolated and people shall be moved upwind. The Maui County Fire Department (911) shall then be notified as well as the landfill Supervisor and First Aid administered if necessary. To maintain the necessary level of safety training, all personnel involved with the identification, handling and storage of prohibited waste should be trained in the procedures outlined in this program as well as basic Occupational Safety and Health Administration (OSHA) hazardous waste training.

7.2 PROTECTIVE CLOTHING

All personnel involved in the handling and/or removal of hazardous waste must wear, at a minimum, the following protective clothing:

- Chemical resistant gloves (heavy industrial or nitryl with cotton liner)
- Steel toe boots
- Dust mask
- Goggles
- Hardhat
- High-visibility safety vest

Other Protective Clothing/Equipment (optional):

- Tyvek suit: Required when used oil or other recyclable materials are bulked. A tyvek suit may also be worn at the discretion of personnel handling household hazardous waste in their routine duties.
- Half-facepiece respirator: All personnel handling household hazardous waste should be fit-tested for and should have accessible a half-facepiece air purification respirator. Each respirator shall be equipped with cartridges designed to remove dusts, acid gases, organic vapors, and radionclides. (Such cartridges are typically color-coded yellow and magenta).

7.3 HOUSEHOLD HAZARDOUS WASTE HANDLING PROCEDURES

Household hazardous wastes are generally those unwanted chemical products found in homes such as pesticides, household cleaners, automotive products, paints, solvents, etc. These wastes may be detected through the load checking program or by site personnel in the working face. These materials should be removed and set aside for proper disposal. Handling and storage procedures are discussed below.

7.4 PROHIBITED WASTE HANDLING PROCEDURES

If hazardous or other unacceptable wastes are detected by site personnel, the area will be immediately cordoned off from the general public and site personnel not involved in the incident. The Maui County Fire Department shall be contacted along with the landfill Supervisor. Upon approval from the Fire Department Hazmat Team, the unacceptable waste shall be safely separated and moved away from the active face and either:

IF CUSTOMER IS KNOWN:

The unacceptable waste is returned to the customer and reported to the HDOH with in 24 hours. If possible, landfill personnel will advise the customer on how/where to properly dispose of the waste. If the generator of the waste is known, they will be contacted and notified of the incident and the operations action. The producer will be billed for all costs incurred in the proper cleanup, transport, and disposal of waste.

IF CUSTOMER IS UNKNOWN:

The exact nature of the unacceptable waste shall be identified. This may include sending samples away for identification to approved testing facilities as advised by HDOH. Till results are received, the material shall be labeled, sealed in 55 gallon drums and warehoused per Section 9.0. The identified wastes shall then be disposed/recycled properly in accordance with HDOH regulations and notification shall be issued to the HDOH with in 7 days of hazardous waste disposal or shipment from CML.

8 ADDITIONAL WASTE ACCEPTANCE CONTROL PROCEDURES

8.1 SIGNS

Signs will be posted at the site entrance that clearly state the types of wastes not accepted at the site. In addition to stating that hazardous wastes are not accepted at the site, the signs will cite examples of such materials in non- technical language. In addition, a sign will be posted at the site entrance stating that a random load-checking program is in effect. Figure 1 shows the sign posted at the landfill entrance prohibiting hazardous wastes.

8.2 SOURCE CONTROL

In order to further prevent the disposal of known hazardous wastes, franchised commercial haulers, as well as businesses with commercial/industrial accounts at the Central Maui Landfill, will receive notices by mail, through advertisements, or by handouts given out at the landfill by the scalehouse attendant alerting them to the Hazardous Waste Exclusion Program.