

FINAL
Drainage Feasibility Study
Volume III (Geotechnical Component Vol. 2)

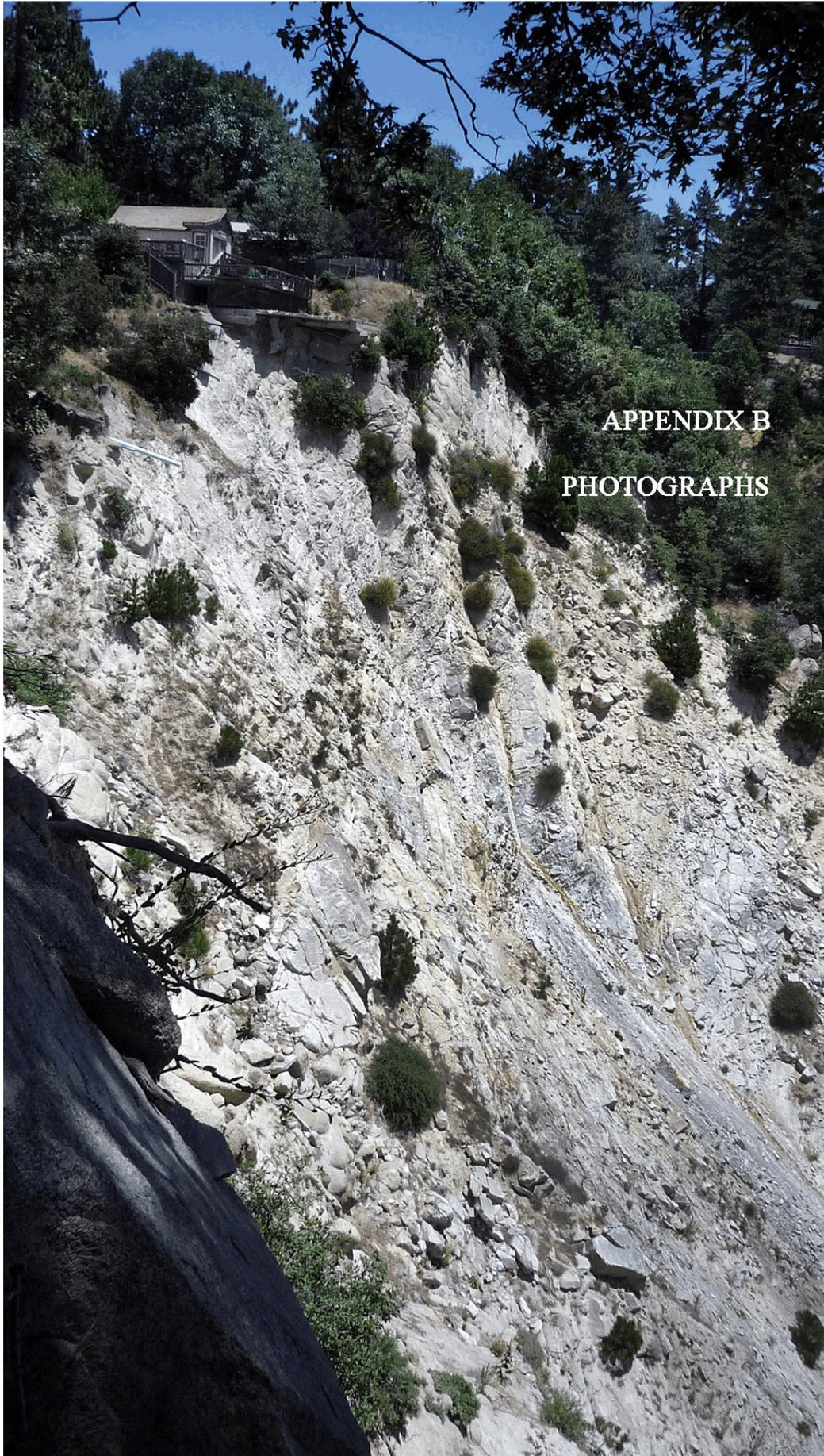
Community of Rimforest
County of San Bernardino, CA

Prepared For:



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APPENDIX B
PHOTOGRAPHS



The Rimforest landslides, as seen with a telephoto lens from the Hilltop Geotechnical, Inc. office in San Bernardino.



The west side of Rimforest, as seen from the edge of Highway 18.



Location of Arrowhead horizontal water production well.

The slope south of Rimforest. The Rimforest fault extends from the notch in the top center through the bare spot near the center bottom: the Arrowhead Water horizontal well

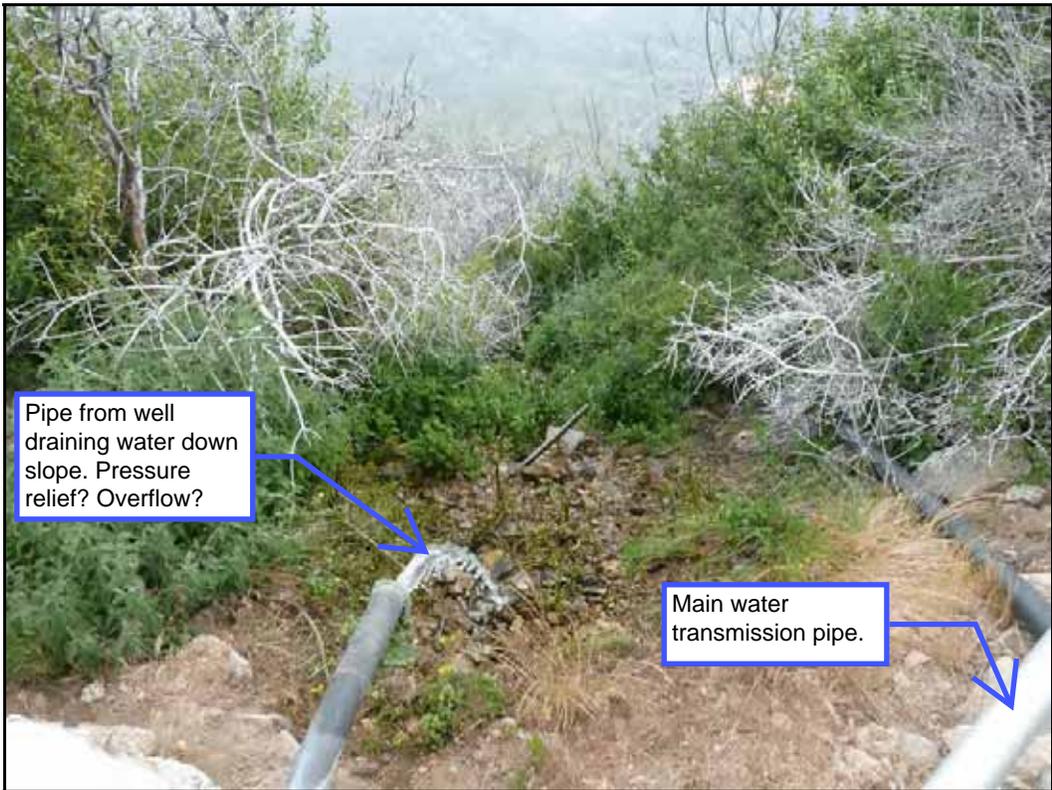


Fault location identified by USGS, CGS, and Dibblee.

The line of trees in the topographic notch represents the closest published fault to Rimforest. This view is from the Arrowhead Water well looking southwest.



The newer Arrowhead Water well.



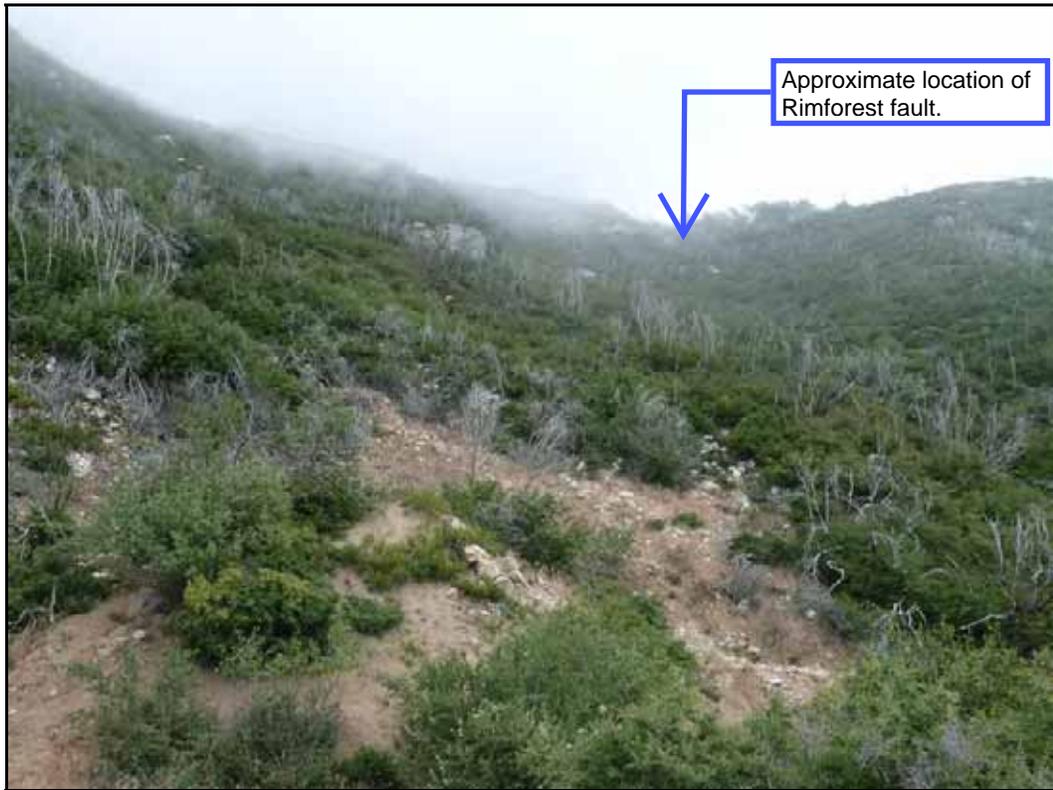
A single pipe from the operational water well was draining water downslope, south of the well building.



The original Arrowhead Water well is located within the brush. This well appears to no longer be in use. The Rimforest fault passes immediately south of the original well.



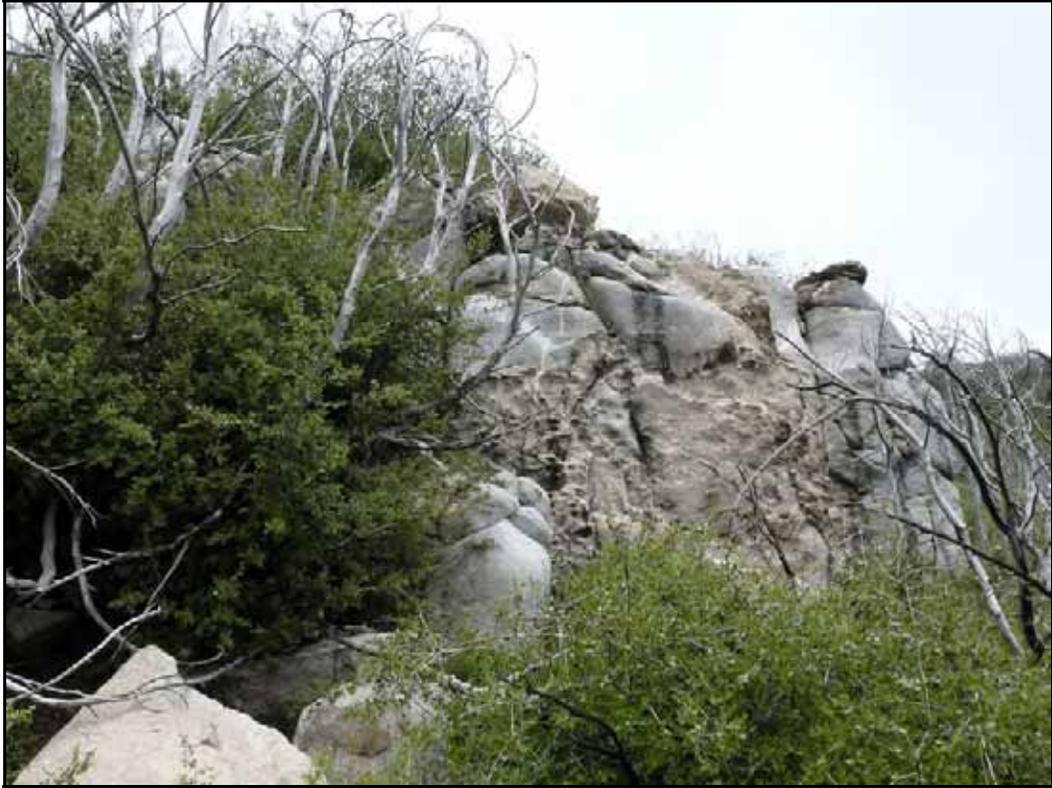
Abandoned water pipes, which extended southward from the original well.



The Rimforest fault passes through the notch at the top of the photo toward the photo location.



The Rimforest fault was exposed in the grading cut southwest of the original Arrowhead well. Fractured, but hard, granitic rock was observed within 100 feet on either side of the fault and fault gouge found within the fault zone.



Hard, resistant outcrop of Mzsl, mixed granitics, located 100 to 200 feet north of the Rimforest fault zone and the Arrowhead Water well.



A pile of construction debris, including wood, brick, concrete, and asphalt, was blocking the Arrowhead access road on the west end of Rimforest. This material was dumped from the empty commercial building pads at least 150 feet up slope.



Deep colluvial deposit on the west side of Rimforest, just below Highway 18.



A closer look at the west Rimforest deep colluvial soil. This material is poorly consolidated and appears to erode readily.



The mixed granitics of Silverwood lake (Mzsl) demonstrated great variability of composition and texture. Here is a typical sample from Rimforest showing the characteristic (for this location) white feldspar phenocrysts.



As with the Mzsl, the Monzogranite of City Creek (Kcc) unit had great variability of composition and texture. However, near Rimforest, relatively large crystals of pink orthoclase were only found in the Kcc.



Competent, hard rock often was observed next to highly weathered material. Here, age, composition, and textural differences all may have contributed to the highly weathered and friable granodiorite separated from monzogranite by a dike.



In other places, all the rock in an outcrop remained relatively hard and competent, despite age, textural, and compositional differences.



Some exposed bedrock east of Rimforest is very hard and resistant. This picture was taken adjacent to the Old Daley Canyon toll road.



Another photo from the Old Daley Canyon toll road shows deeply weathered and crumbling rock.



Jointed, hard rock within deeply weathered bedrock, east of Rimforest. The hard rock in this photo appeared to closer to granodiorite in composition.



Shattered, sheared, and deeply weathered granodiorite and diorite east of Rimforest.



Deepening erosion within a proposed alignment for runoff diversion just east of Rimforest.



Deepening erosion into colluvial soils and highly weathered bedrock within a proposed alignment for runoff diversion just east of Rimforest. The Old Daley Canyon toll road had been almost completely removed by erosion in this location.



Exposed gas pipeline along the Old Daley Canyon toll road. In one location, the pipe had been undermined and was unsupported for several feet.



A zone of relatively soft, weathered granitic rock, eroding from beneath tree roots east of Rimforest.



Shallow creek crossing the Old Daley Canyon toll road, fed by spring located up slope. The spring was still running in July, after four years of drought.



The northern edge of the southeastern landslide. View toward northwest. Rockfall area of the western landslide is visible in the background.



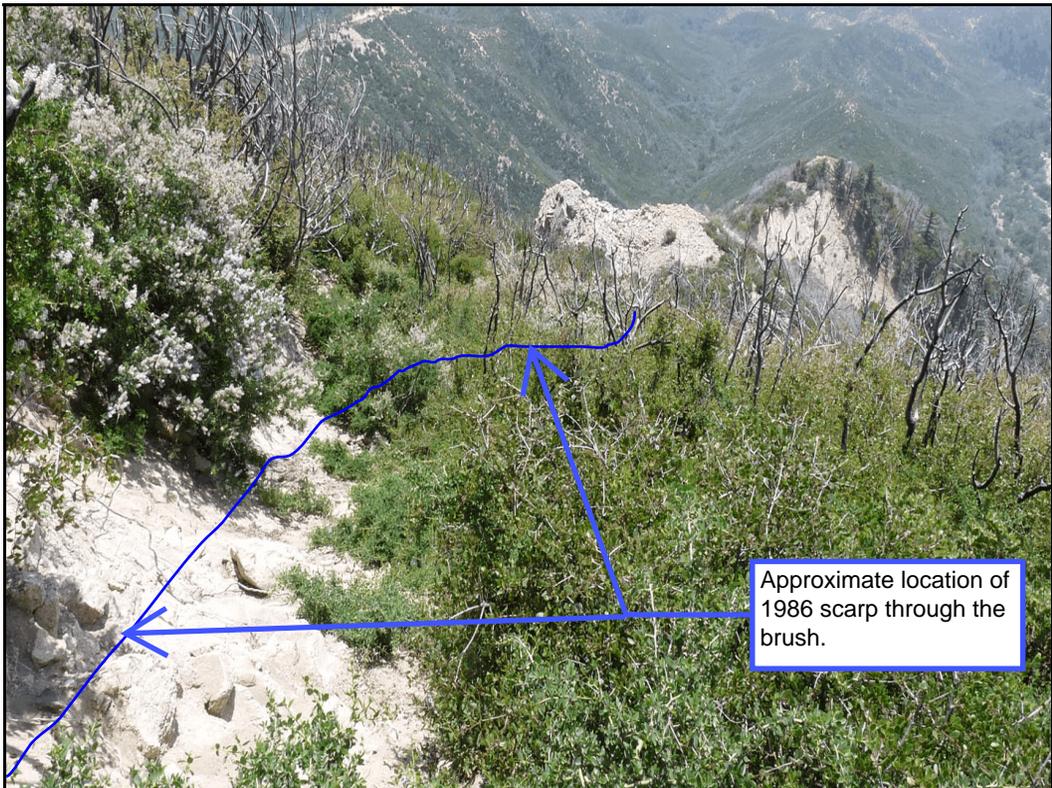
The northern edge of the southeastern landslide; the lower portion of the slope. The visible texture in lower third of the scar in this image appears to be more crushed and weathered than does the upper two-thirds.



The southeastern landslide. View from the top of the scar looking down toward the bottom of the canyon.



Southern edge of southeastern landslide, revealing the highly fractured and weathered nature of the bedrock.



Approximate location of 1986 scarp through the brush.

The 1986 scarp. The visible portion of this scarp reaches from the rock outcrop, visible in the upper middle of this photo, northward, nearly to the edge of the northeastern landslide.



This outcrop of hard, resistant rock is located at the southern end of the 1986 scarp. Based on aerial photo data, the west part of this scarp probably was flattened by a dozer during fire break construction prior to 1938.



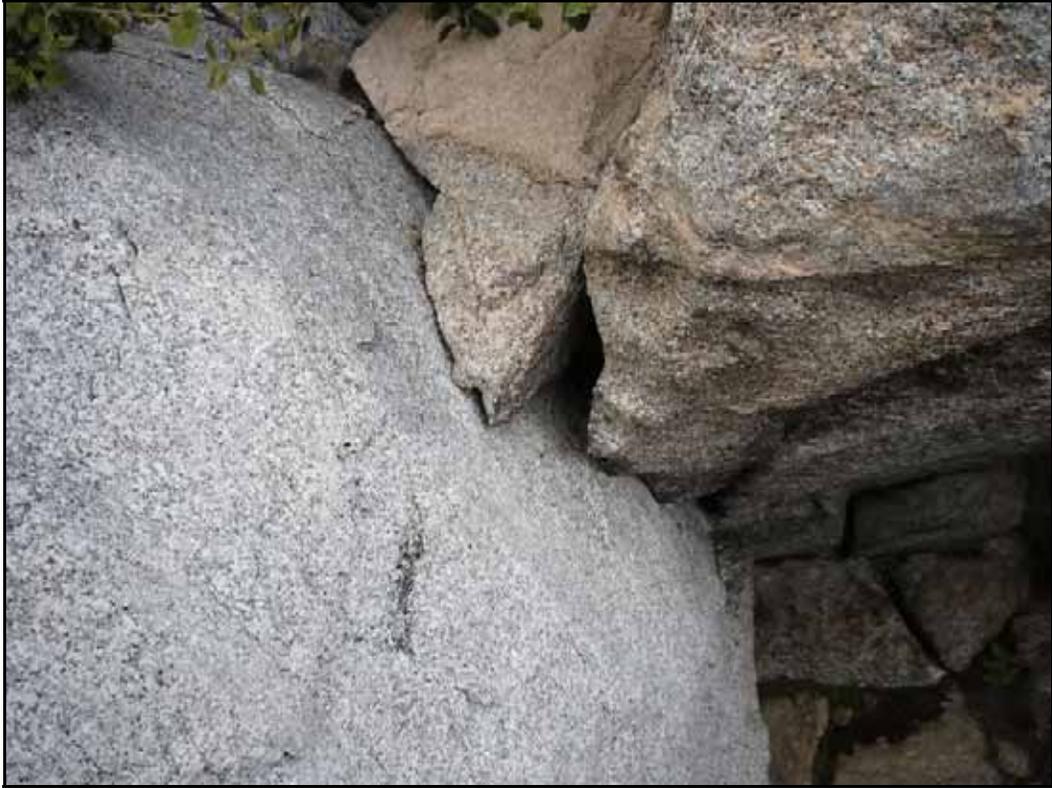
Accessible portions of the 1986 scarp ranged from ten feet in height, as seen in this photo, to less than one foot in height. The measured scarp incline ranged from 52 to 60 degrees.



Access to much of the 1986 scarp was difficult due to deep, heavy brush. This exposure was over seven feet in height. (vertical image)



An accessible portion of the 1986 scarp. This part of scarp was estimated to be six to seven feet in height; the top is obscured by brush. The pick handle was 26 inches in length. (vertical image)



Rock outcrops below the 1986 scarp were generally disturbed; rocks and boulders had shifted from their original position, as in this photo. Common within landslide areas, outcrops outside of slide areas in Rimforest did not demonstrate this characteristic.



The current headscarp of the northeastern landslide. View from the southeast.



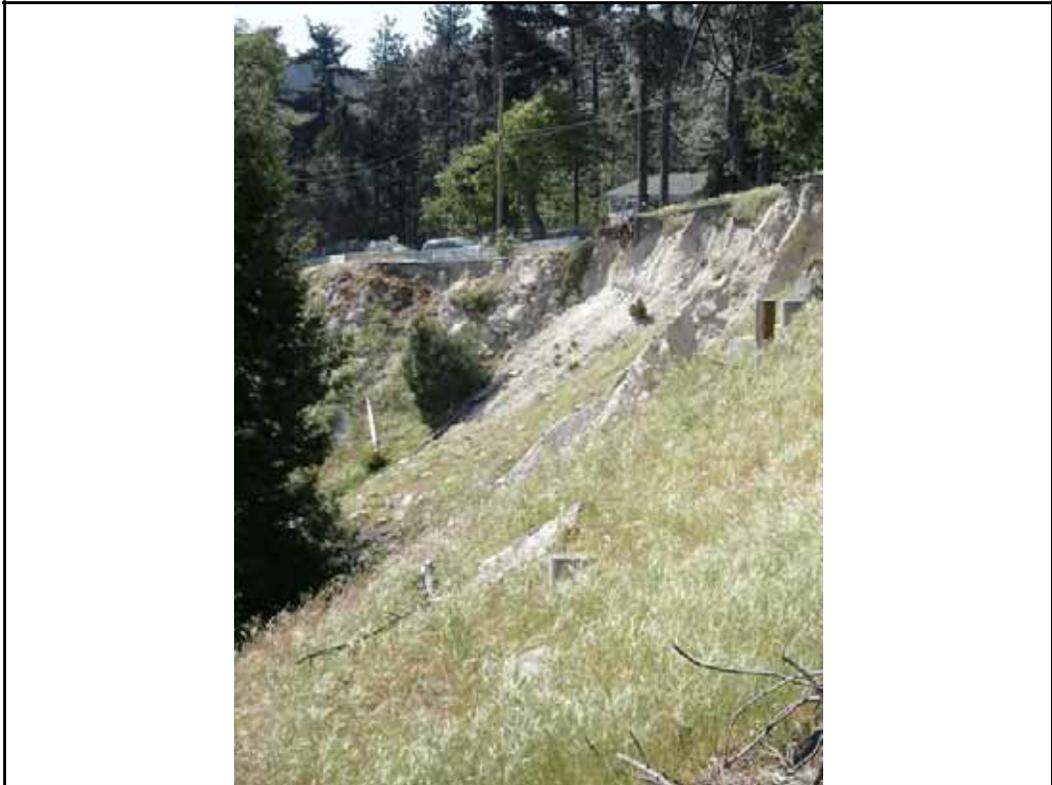
The current headscarp of the northeastern landslide. View from the west.



Northeastern landslide. The bench visible in this photo is the upper portion of the main slide block. View from the northwest.



Northeastern landslide. Current headscarp as seen from the eastern remnant of Blackfoot Trail East.



Northeastern landslide, current headscarp. (vertical image)



Northeastern landslide. Foundation remnant of building that was located at the northeastern edge of the landslide.



Northeastern landslide. View toward the current headscarp from the top of the main slide block. A chimney and plumbing from a house that moved more than 60 feet downslope during the slide.



Visible gouge-filled
slippage plane. Part of
head scarp fracture
complex.

Northeastern landslide, current headscarp. The scarp passes through the weathered bedrock in the foreground. A small slide plane is visible as a pink line extending toward the lower left from the top center of the photo.



Northeastern landslide, current headscarp. The slide plane visible in the previous photo was composed of gouge. Soft gouge smeared by finger pressure.



Northeastern landslide, current headscarp. A large block of bedrock within the scarp had moved downhill less than 10 feet. Continued downhill motion is expected in the future.



Northeastern landslide, current headscarp. The Rimforest fault passes through the headscarp. This zone of pulverized rock and gouge was located between more resistant bedrock to the northwest (on left side of photo) and to the southeast.



Northeastern landslide. The exposed eastern edge of the Rimforest fault as it contacts more resistant rock. The brown topsoil east of the fault is only a few inches thick. Above the fault it is more than 3 feet thick and forms a wedge that thins westward.



Northeastern landslide, view toward the west. Pulverized and weathered material within the Rimforest fault is seen in the middle of the photo. The brown topsoil wedge is visible above the fault zone.



Northeast landslide. Contact between the west edge of the Rimforest landslide and more resistant rock.



West of northeastern landslide. Erosion exposed crushed and powdered rock within the Rimforest fault zone. The prominent soil creep zone is visible as a diagonal line parallel to the soil surface and by significantly bent tree trunks.



Highly fractured and deeply weathered monzogranite, located immediately north of the Rimforest fault zone.



West of the northeastern landslide and north of the Rimforest fault. This highly eroded slope exposes numerous planar discontinuities that are parallel to each other and parallel to the slope above.



A closer view in the same location as the previous photo. The parallel planes are revealed as slip surfaces. Displacement was a few inches or less.



A closer view from the previous photo shows numerous slip planes in greater detail.



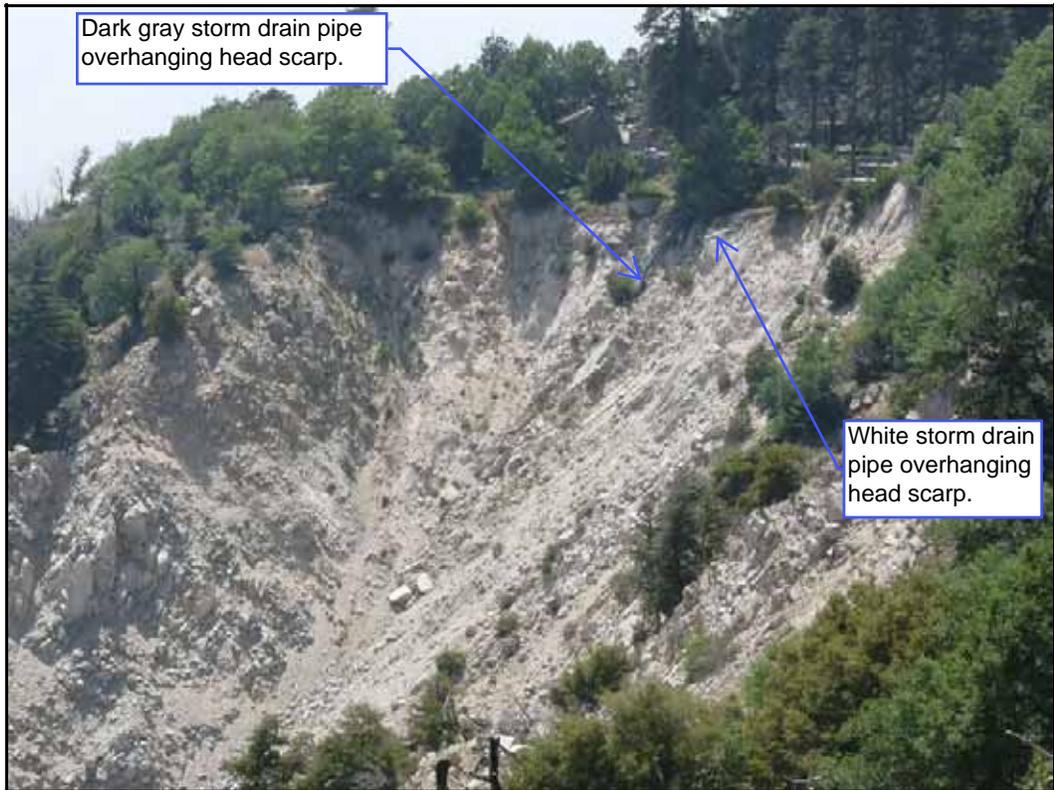
West of the northeastern landslide. Unlike crushed and powdered rock within the fault zone, the rock fabric here appears intact. However, this material is highly fractured, deeply weathered, and generally friable. (Note: photo full size. Aspect ratio 16:9)



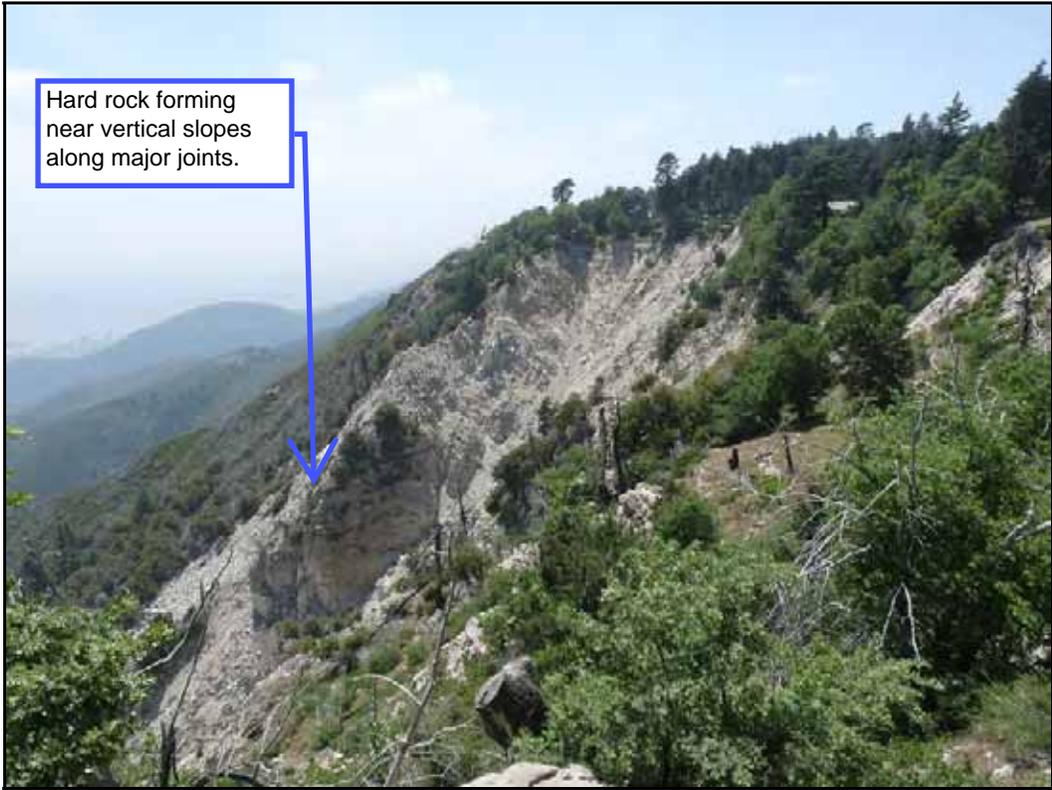
The western landslide. View toward the west from atop the 1986 scarp.



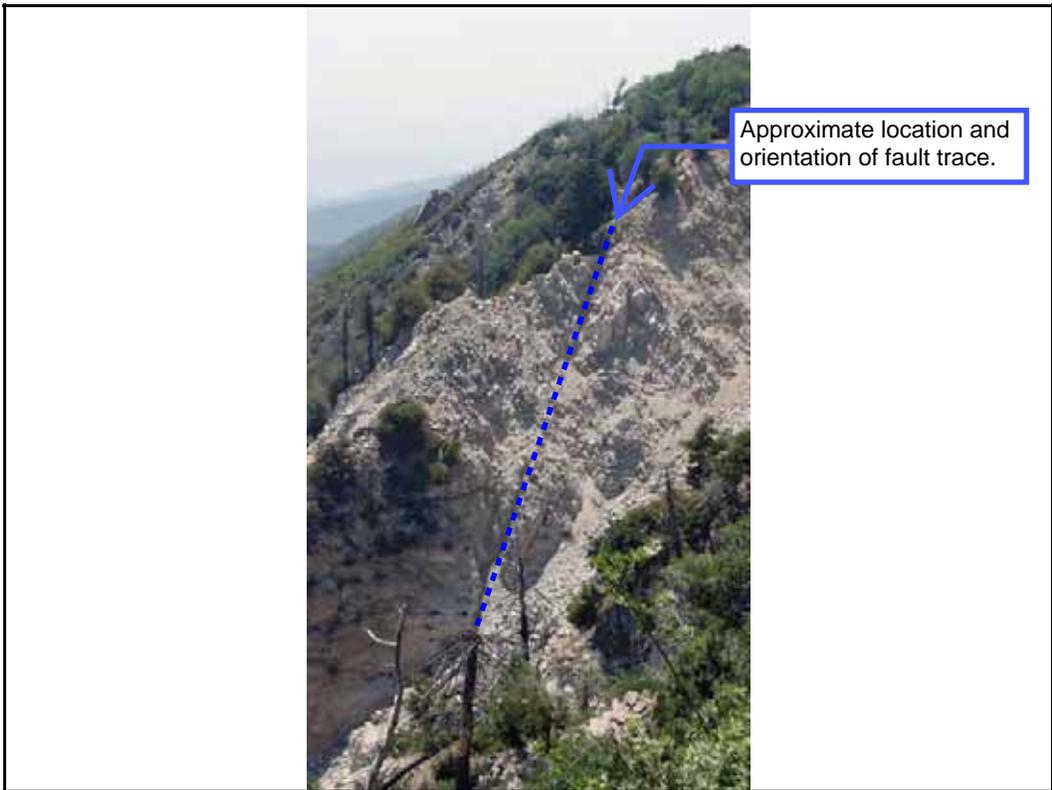
View of the western landslide from the northeastern landslide. (vertical photo orientation)



The upper portion of the western landslide.



Western landslide, view from east side of northeastern landslide. Large block of hard, resistant rock below and left of the slide scar.



Western landslide. One trace of the Rimforest fault visible within slope face. (vertical photo)



Imbrication of boulders along fault trace.

Western landslide. Closer view showing imbrication of some large rocks along the fault trace. (vertical photo)



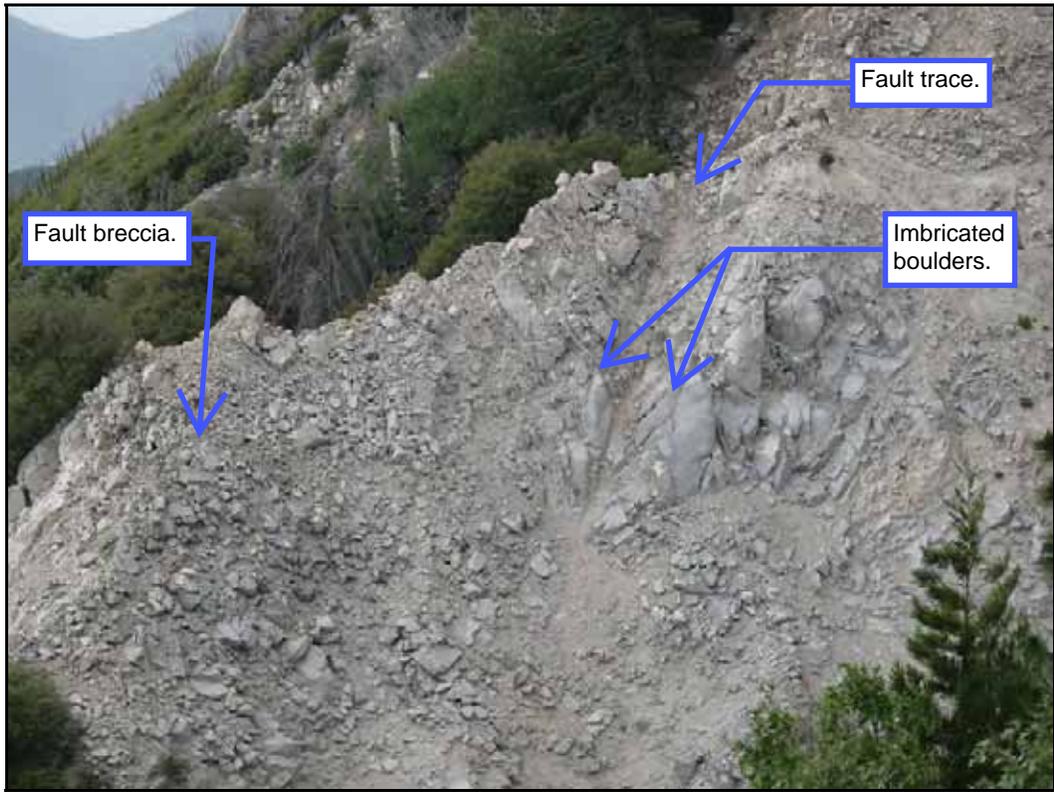
Western landslide. Intersection of two major, nearly vertical joint trends within large block of very hard, resistant rock that lies below the western landslide.



Western landslide. Several parallel failure planes are visible at the upper end of the slope, near the middle of the photo. Surface rupturing fissures, some over one foot wide, can be found on the ground surface in this location.



Western landslide. Two storm drain pipes extend out from the edge and direct runoff flow down into the landslide scar.



Western landslide. A closer view of one Rimforest fault trace, imbricated rocks, and fault breccia.



Western landslide. View toward south-southwest from empty lot on Apache Trail.



A long view of the western landslide, as seen from the southeastern landslide.



Western landslide. View of descending slope below condemned structure. (vertical photo)



South of western landslide. Notch in topography is the location of one of the failure planes. An open fissure was visible at the northeast end of this feature. This slide block has moved downslope more than six feet. (vertical photo)



Western landslide. Viewed from a point south of the Rimforest fault and above the block of hard rock that is below the landslide.

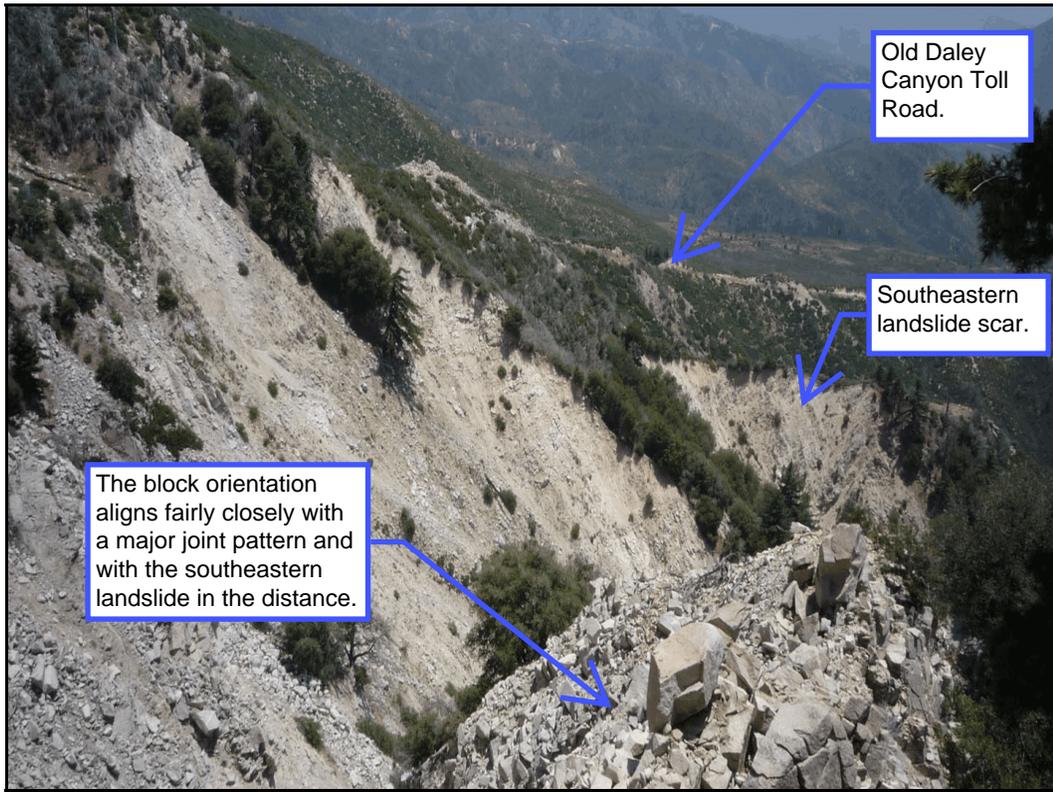


South of the western landslide. This overhang, from previous, small slide block movement, was outside active landslide areas and was unaffected by development or fire break construction. Slope failures in Rimforest would occur without human activity.



Two parallel traces define the Rimforest fault zone in this location.

The eastern edge of the western landslide. The Rimforest fault zone is visible in this slope as a pair of parallel traces. (both photos on this plate have vertical orientation)



Old Daley Canyon Toll Road.

Southeastern landslide scar.

The block orientation aligns fairly closely with a major joint pattern and with the southeastern landslide in the distance.

Western landslide. A major joint attitude trend within the hard rock block below the western landslide, in the lower right of the photo, aligns well with the location of the southeastern landslide, the V-shaped scar in the distance.



Strawberry Creek drainage, as seen from above the northeastern landslide. The drainage lies in a nearly straight line until intercepted by east-west faulting south of Rimforest.



Little Bear Creek, located northeast of Rimforest. The soft alluvium is easily eroded.



Work crew preparing to drill an exploratory boring within the Little Bear Creek drainage.



Drilling an exploratory boring next to State Highway 18.



Crew drilling an exploratory boring on Apache Trail in the residential neighborhood within the County designated landslide hazard area in Rimforest.



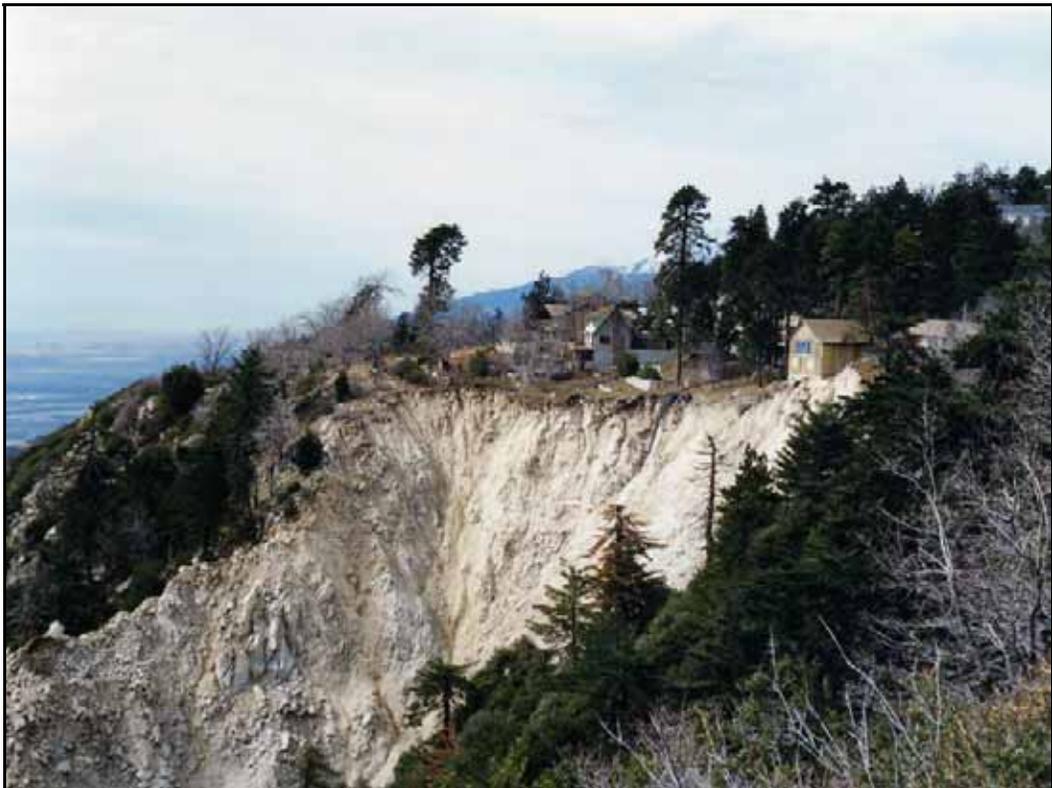
The upper edge of the western landslide shortly after the 1933 movement.
Photo supplied by Wes Reeder.



Large fissures above western landslide, 1933. Virtually all small fissures and most medium-sized fissures from this event were no longer visible in 2009. Only the larger fissures are still apparent.
Photo supplied by Wes Reeder.



Large fissures, like this one, by 2009 have eroded to form 'steps' in the topography above the western landslide. A few fissures remain open. Photo supplied by Wes Reeder.



The western landslide soon after the 1993 movement. The appearance of the slide scar has undergone relatively minor changes since 1993. Photo supplied by Wes Reeder.



The 1986 scarp, located south of Black Foot Trail East. The length of this feature does not seem to have changed significantly since it was first observed in 1986. However, the height previously was reported to be 2 meters; during the 2009 investigation, the maximum observed height was slightly more than 3 meters.

Photo supplied by Wes Reeder.

APPENDIX C

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Aerial Photographs, San Bernardino County Flood Control:

Flight No.	Date	Photograph Nos.	Approximate Scale
AXL-74	7/28/38	108, 109	1"=1000'
AXL-28-K	1/15/53	176, 177	1"=1200'
C-139	12/4/65	169, 170	1"=2000'
AXL-12JJ	9/9/68	21, 22	1"=2000'
C-492	6/9/92	36, 37	1"=2000'
C-524	5/9/95	1-4	1"=2000'
C-527	6/13/95	1-4	1"=2000'
C-541	6/15/01	254	1"=2000'
C-551	12/20/04	2-8, 2-9	1"=1200'

Aerial Photographs, San Bernardino County Building and Safety, Infrared, False Color (three photos):

Flight No.	Date	Photograph Nos.	Approximate Scale
	4/25/74		1"=6000'

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Geo-Sec, March 26, 1996, *Rim Forest Lumber, Quarterly*

Geo-Sec, November 13, 1996, *Groundwater Monitoring, Quarterly*

Geo-Sec, May 22, 1998, *Groundwater Monitoring, Quarterly*

Geo-Sec, July 30, 1998, *Groundwater Monitoring, Quarterly*

Geo-Sec, December 30, 1998, *Groundwater Monitoring, Quarterly*

Geo-Sec, April 1, 1999, *Groundwater Monitoring, Quarterly*

Geo-Sec, July 13, 1999, *Request to Do Groundwater Monitoring*

Geo-Sec, July 22, 1999, *Groundwater Monitoring, Quarterly*

Geo-Sec, December 16, 1999, *Request to Prepare Closure Request*

Geo-Sec, April 18, 2001, *Response to Dehs about Possible Closure*

Geo-Sec, September 6, 2001, *Phase II Investigation Report*

Geo-Sec, February 18, 2003, *Rimforest Lumber, Remediation Plan*

Geo-Sec, May 30, 2003, *Vapor Extraction Pilot Report*

Geo-Sec, January 21, 2005, *Vapor Extraction Report*

Geo-Sec, June 7, 2005, *Vapor Extraction Report*

Geo-Sec, October 14, 2005, *Groundwater Monitoring, Quarterly*

Geo-Sec, January 16, 2006, *Vapor Extraction and Groundwater Monitoring*

Geo-Sec, May 24, 2006, *Vapor Extraction and Groundwater Monitoring*

Geo-Sec, August 30, 2006, *Vapor Extraction and Groundwater Monitoring*

Geo-Sec, December 13, 2006, *Vapor Extraction Install, Field Activities*

Geo-Sec, January 10, 2007, *Vapor Extraction and Groundwater Monitoring*

Geo-Sec, January 1, 2007, *Vapor Extraction and Groundwater Monitoring*

Geo-Sec, May 21, 2007, *Request to Do Groundwater Monitoring*

Geo-Sec, July 15, 2007, *Rebound Testing*

San Bernardino County Department of Health Services, October 10, 1996, *Failure to Conduct Quarterly Monitoring*

San Bernardino County Department of Health Services, December 17, 1999, *Review of File for Rimforest*

San Bernardino County Department of Health Services, February 2, 2003, *Review of File, Rimforest Lumber*

San Bernardino County Department of Health Services, March 3, 2003, *Review of Proposal for Vapor Extraction Pilot Test*

San Bernardino County Department of Health Services, August, 8, 2003, *Review of Request for Extension of Vapor Extraction*

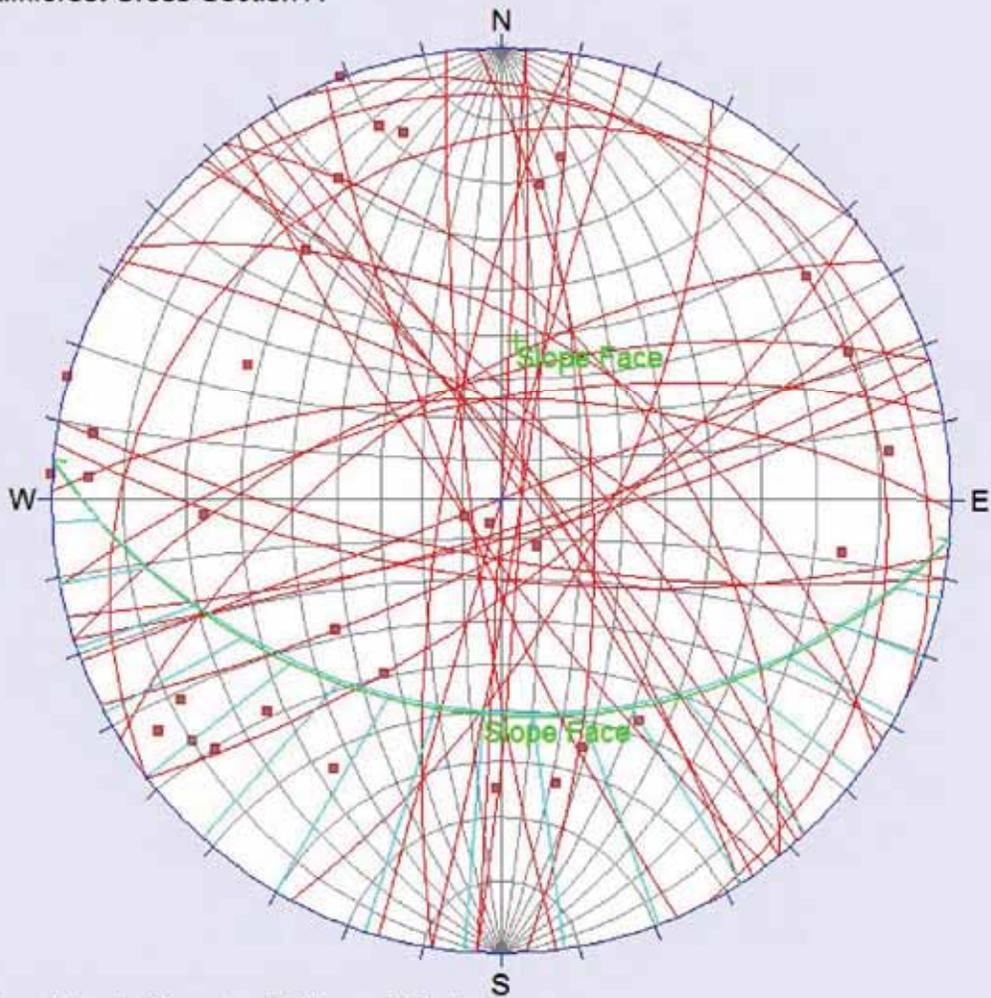
DRAFT

DRAFT

APPENDIX D

Rock Slope Stability Analysis

Rimforest Cross-Section A

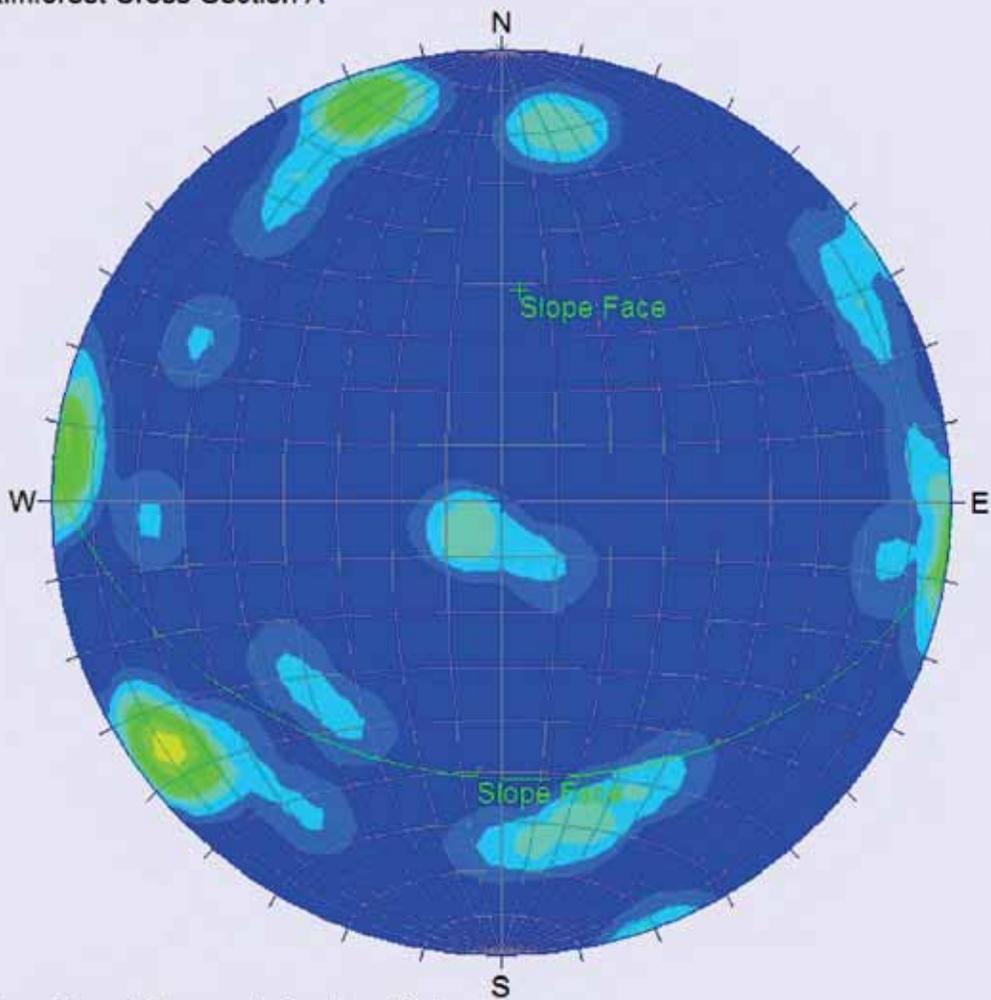


■ Poles

Equal Angle
Lower Hemisphere
32 Poles
32 Entries

Equal Angle Stereonet, Planar Attitudes

Rimforest Cross-Section A



Fisher
Concentrations
% of total per 1.0 % area

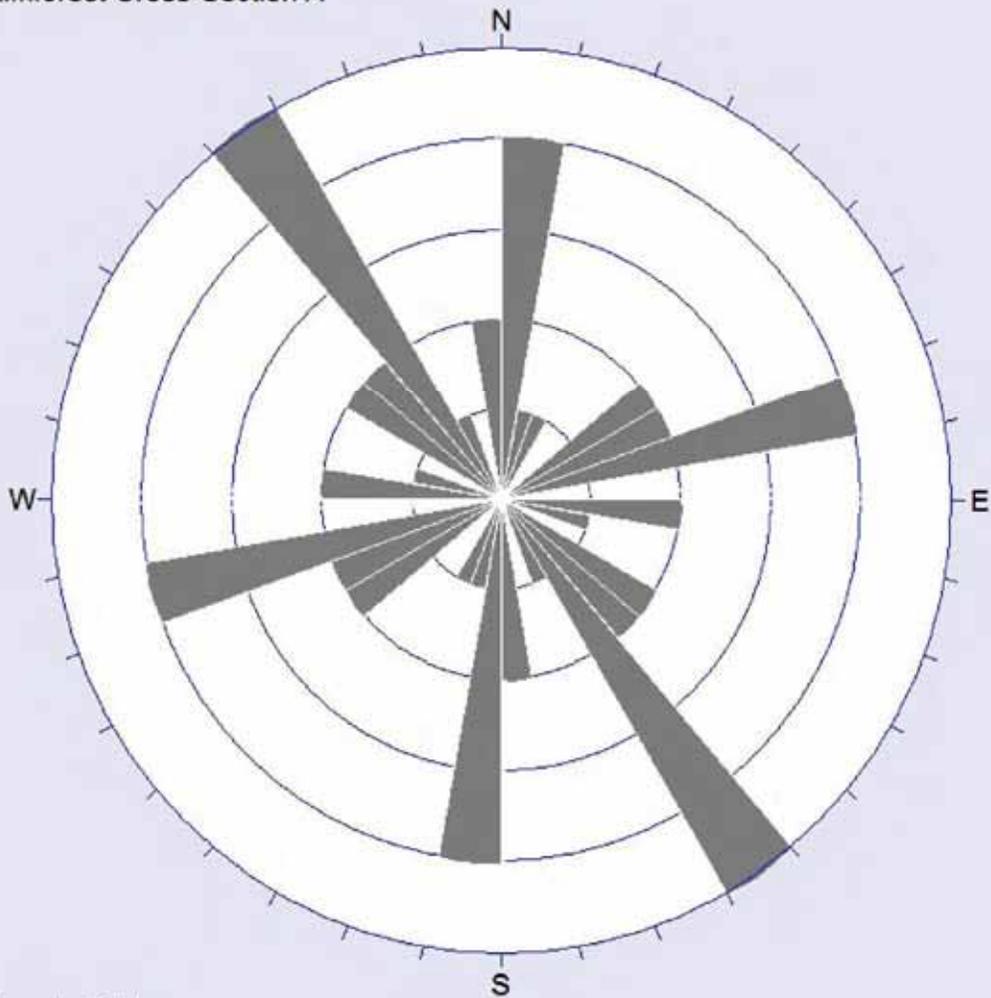


No Bias Correction
Max. Conc. = 11.4269%

Equal Area
Lower Hemisphere
32 Poles
32 Entries

Equal Area Stereonet, Contour Plot

Rimforest Cross-Section A



Rosette Plot

Apparent Strike
5 max planes / arc
at outer circle

Trend / Plunge of
Face Normal = 0, 90
(directed away from viewer)

No Bias Correction

29 Planes Plotted
Within 45 and 90
Degrees of Viewing
Face

RocPlane Analysis Information

Document Name:

RimforestXsectionA_Prob_REVISED

Job Title:

Rimforest Cross-Section A

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 0.335728
Lognormal Reliability Index = 0.0817632
Number of Trial Wedges = 1000
Number of Valid Wedges = 992
Number of Invalid Wedges = 8
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.62005
Wedge Weight = 3419.01 t/ft
Wedge Volume = 45586.8 ft³/ft
Normal Force = 2837.82 t/ft
Resisting Force = 3089.33 t/ft
Driving Force = 1906.93 t/ft

Geometry

Intersection Point (B) of slope and upper face = (740.938 , 600)
Intersection point (C) of failure plane and upper face = (892.894 , 600)
Upper face length (B --> C) = 151.956 ft
Failure plane length (Origin --> C) = 1075.76 ft
Slope length (Origin --> B) = 952.306 ft

Slope Properties:

Slope Angle

Mean value = 39 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 600 ft
Statistical distribution : Normal
Standard Deviation = 5 ft
Relative Minimum Value = 15 ft
Relative Maximum Value = 15 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.005 t/ft²
Relative Minimum Value = 0.015 t/ft²
Relative Maximum Value = 0.01 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 0 °
Statistical distribution : None
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 33.9 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 1 °
Relative Maximum Value = 1 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.05 t/ft²
Relative Maximum Value = 0.15 t/ft²
Friction Angle (phi)
Mean value = 40 °
Statistical distribution : Normal
Standard Deviation = 0.5 °
Relative Minimum Value = 0.5 °
Relative Maximum Value = 1.5 °
Mean Shear Strength: 2940.61 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

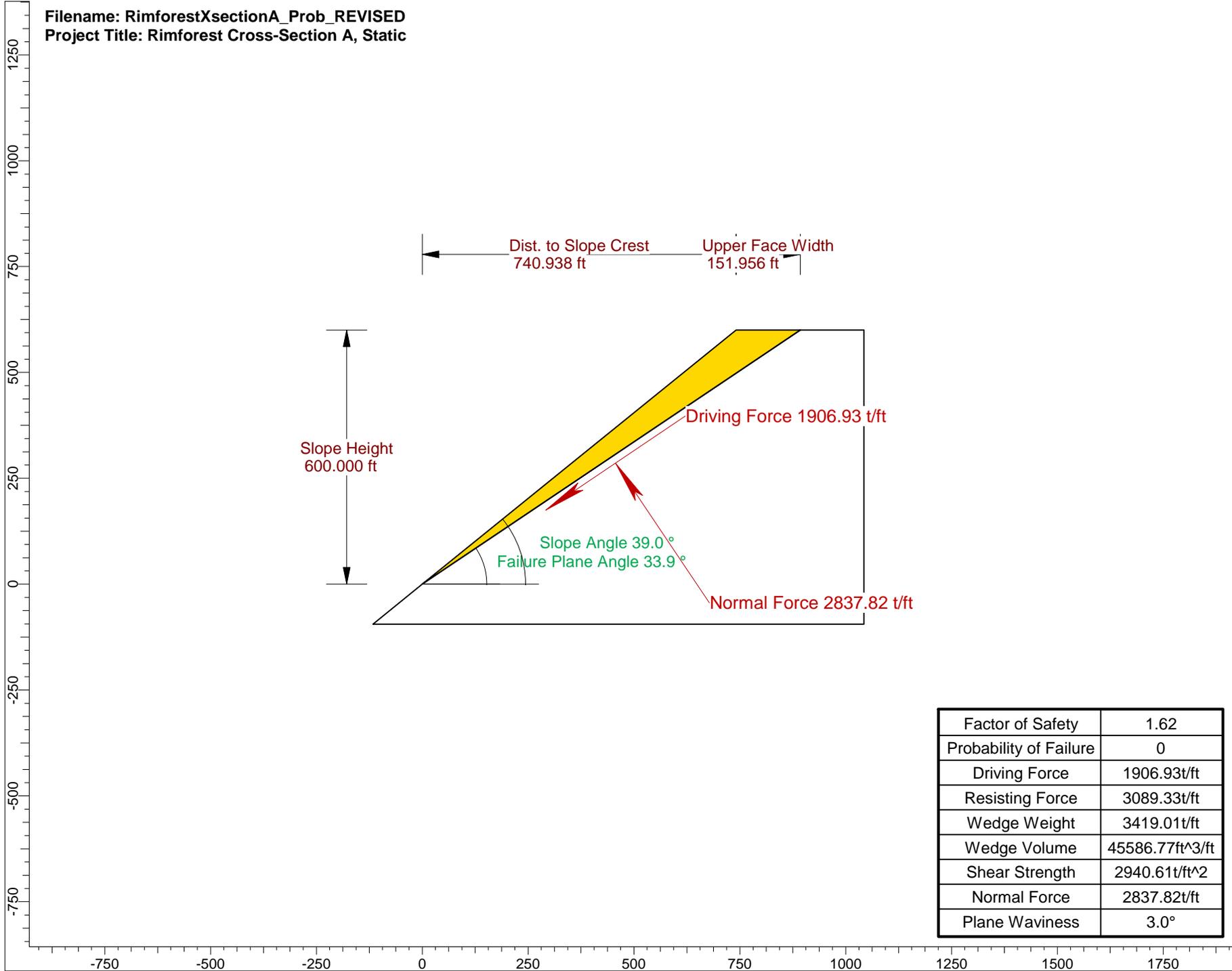
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

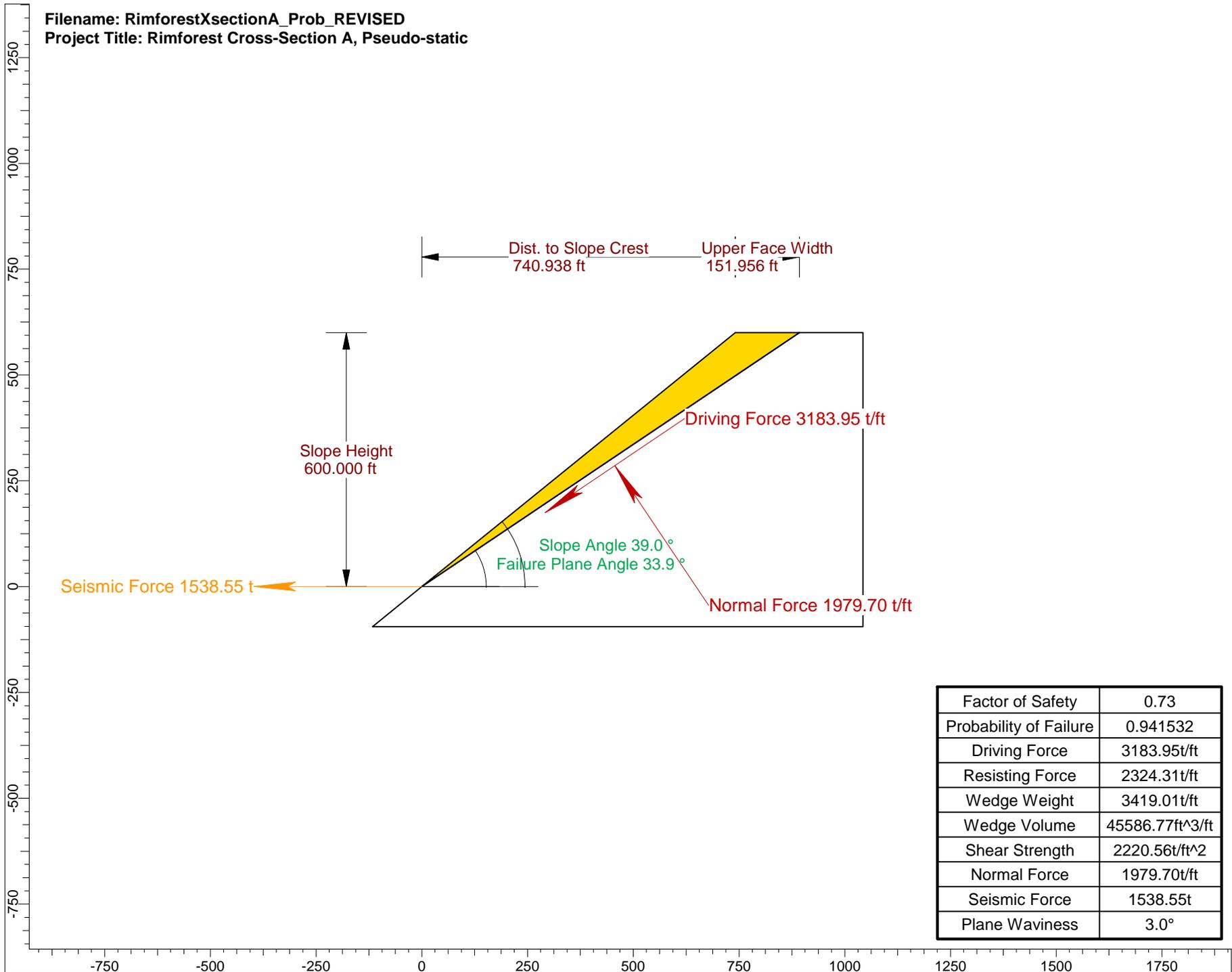
External Forces : Not Present

Filename: RimforestXsectionA_Prob_REVISED
 Project Title: Rimforest Cross-Section A, Static



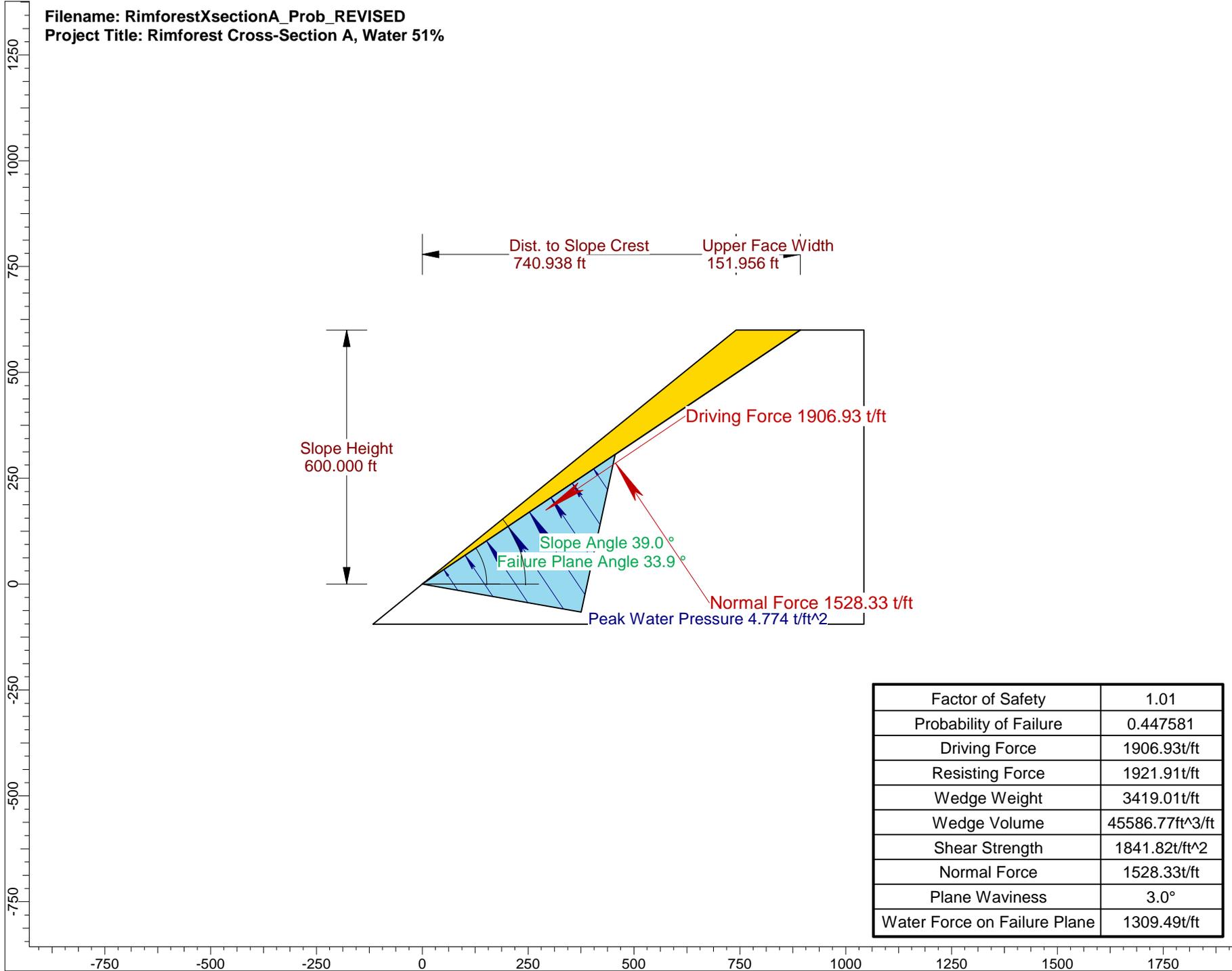
Factor of Safety	1.62
Probability of Failure	0
Driving Force	1906.93t/ft
Resisting Force	3089.33t/ft
Wedge Weight	3419.01t/ft
Wedge Volume	45586.77ft ³ /ft
Shear Strength	2940.61t/ft ²
Normal Force	2837.82t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionA_Prob_REVISED
 Project Title: Rimforest Cross-Section A, Pseudo-static



Factor of Safety	0.73
Probability of Failure	0.941532
Driving Force	3183.95t/ft
Resisting Force	2324.31t/ft
Wedge Weight	3419.01t/ft
Wedge Volume	45586.77ft ³ /ft
Shear Strength	2220.56t/ft ²
Normal Force	1979.70t/ft
Seismic Force	1538.55t
Plane Waviness	3.0°

Filename: RimforestXsectionA_Prob_REVISIED
 Project Title: Rimforest Cross-Section A, Water 51%



RocPlane Analysis Information

Document Name:

RimforestXsectionA_Prob_UPR_REVISED

Job Title:

Rimforest Cross-Section A, Above Fault

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 3.08774
Lognormal Reliability Index = 4.07055
Number of Trial Wedges = 1000
Number of Valid Wedges = 999
Number of Invalid Wedges = 1
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.75603
Wedge Weight = 1865.2 t/ft
Wedge Volume = 24869.4 ft³/ft
Normal Force = 1566.06 t/ft
Resisting Force = 1779.09 t/ft
Driving Force = 1013.13 t/ft

Geometry

Intersection Point (B) of slope and upper face = (493.959 , 400)
Intersection point (C) of failure plane and upper face = (618.306 , 400)
Upper face length (B --> C) = 124.347 ft
Failure plane length (Origin --> C) = 736.412 ft
Slope length (Origin --> B) = 634.87 ft

Slope Properties:

Slope Angle

Mean value = 39 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 400 ft
Statistical distribution : Normal
Standard Deviation = 5 ft
Relative Minimum Value = 15 ft
Relative Maximum Value = 15 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.005 t/ft²
Relative Minimum Value = 0.015 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 0 °
Statistical distribution : None
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 32.9 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.05 t/ft²
Relative Maximum Value = 0.15 t/ft²
Friction Angle (phi)
Mean value = 40 °
Statistical distribution : Normal
Standard Deviation = 0.5 °
Relative Minimum Value = 1.5 °
Relative Maximum Value = 1.5 °
Mean Shear Strength: 1697.02 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

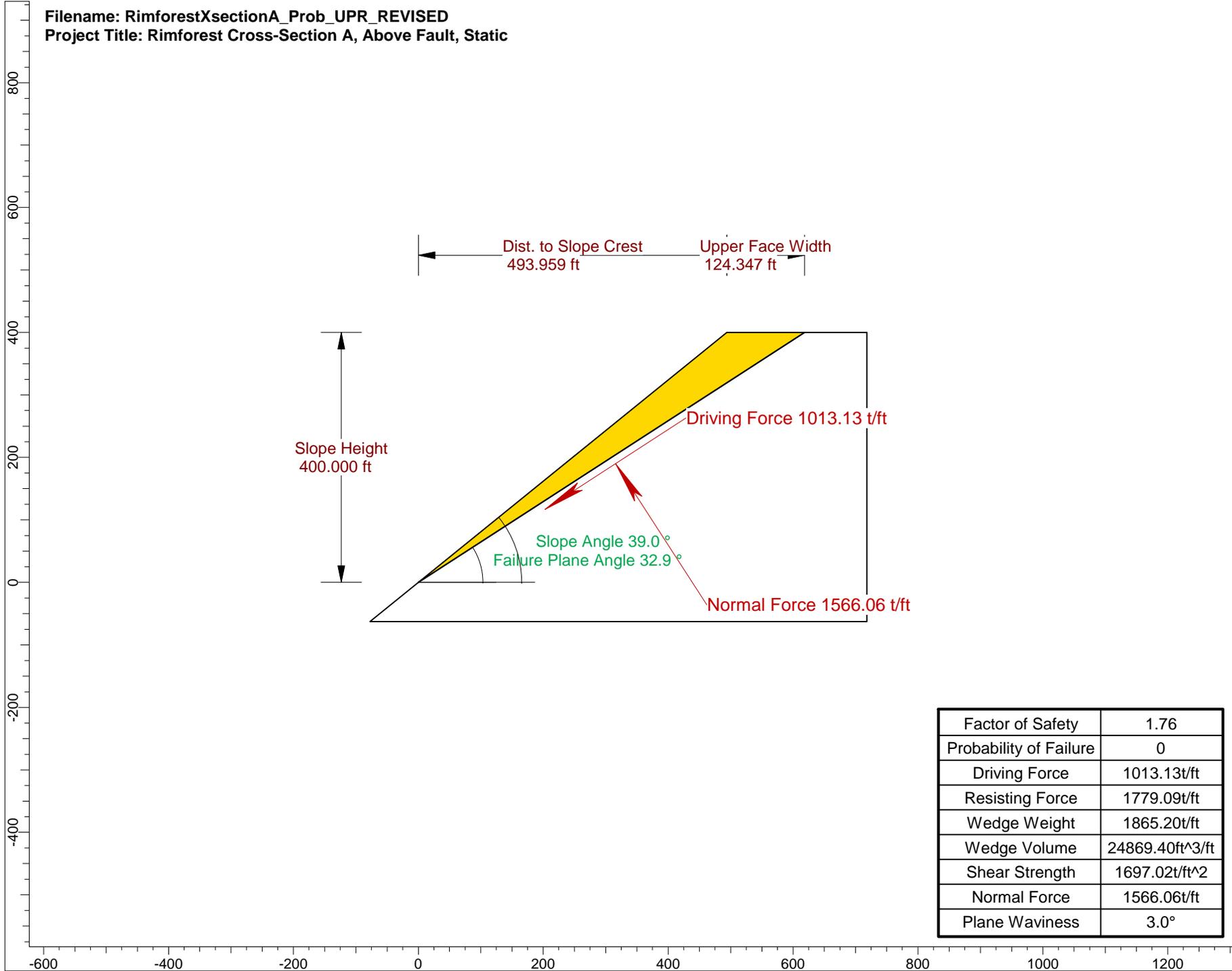
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

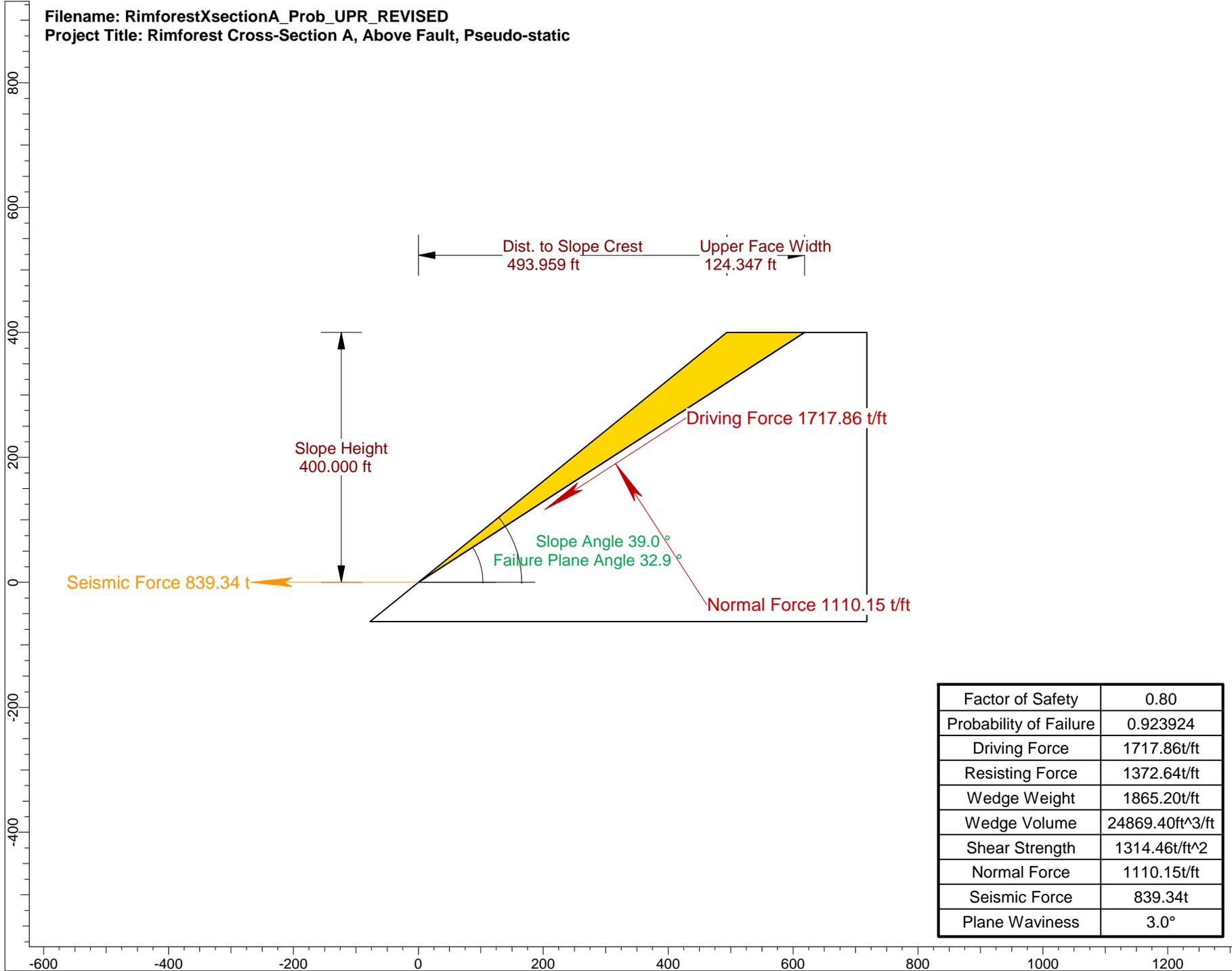
External Forces : Not Present

Filename: RimforestXsectionA_Prob_UPR_REVISIED
 Project Title: Rimforest Cross-Section A, Above Fault, Static

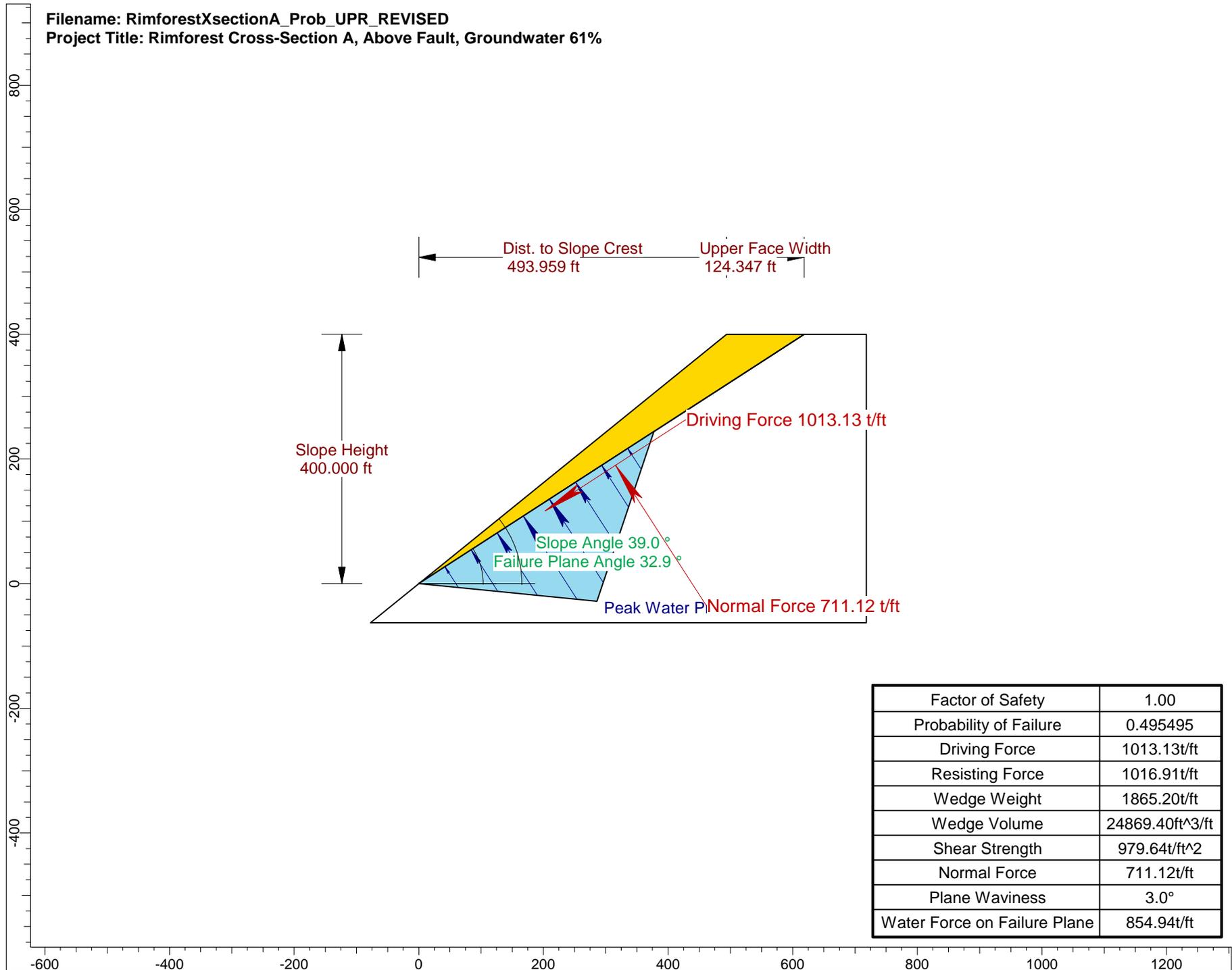


Factor of Safety	1.76
Probability of Failure	0
Driving Force	1013.13t/ft
Resisting Force	1779.09t/ft
Wedge Weight	1865.20t/ft
Wedge Volume	24869.40ft ³ /ft
Shear Strength	1697.02t/ft ²
Normal Force	1566.06t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionA_Prob_UPR_REVISIED
 Project Title: Rimforest Cross-Section A, Above Fault, Pseudo-static



Filename: RimforestXsectionA_Prob_UPR_REVISIED
 Project Title: Rimforest Cross-Section A, Above Fault, Groundwater 61%



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnA_UPPER

Project Summary:

- Job Title: Rimforest, Cross-Section A
- Analysis: Joint Intersection Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/6/2009, 4:34:28 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 0.7516
- Wedge height (on slope) [ft]: 400.00
- Bench width (on upper face) [ft]: 306.58
- Wedge volume [ft³]: 1036490.761
- Wedge weight [tons]: 77736.807
- Wedge area (joint1) [ft²]: 49495.62
- Wedge area (joint2) [ft²]: 47126.82
- Wedge area (slope) [ft²]: 21852.51
- Wedge area (upper face) [ft²]: 10775.85

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	4350.94	0.00
Effective Normal stress [t/ft²]	0.09	0.00
Shear Strength [t/ft²]	0.59	0.00
Strength due to Waviness [t/ft²]	0.00	0.00

- Driving force [tons]: 38830.93
- Resisting force [tons]: 29185.27

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	102647.50
Joint 2	N/A	97734.92
Fissures	2.07	N/A

Failure Mode:

- Sliding on joint1

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
29.96	177.83	931.33

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	645.13	313.58
Joint 2	636.97	318.93

Persistence:

- Joint 1 [ft]: 931.33
- Joint 2 [ft]: 931.33

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	6.11	12.44
Joint 1 & Crest	80.15	88.21
Joint 2 & Crest	93.75	79.34

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	67.00	102.00
Joint Set 2	80.00	262.00
Slope	39.00	185.00
Upper Face	12.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft^2]: 0.52
- Friction Angle [deg]: 36.50

Joint Set 2 Data:

- Cohesion [t/ft^2]: 0.52
- Friction Angle [deg]: 36.50

Slope Data:

- Slope height [ft]: 400.00
- Rock unit weight [t/ft³]: 0.07
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: NO

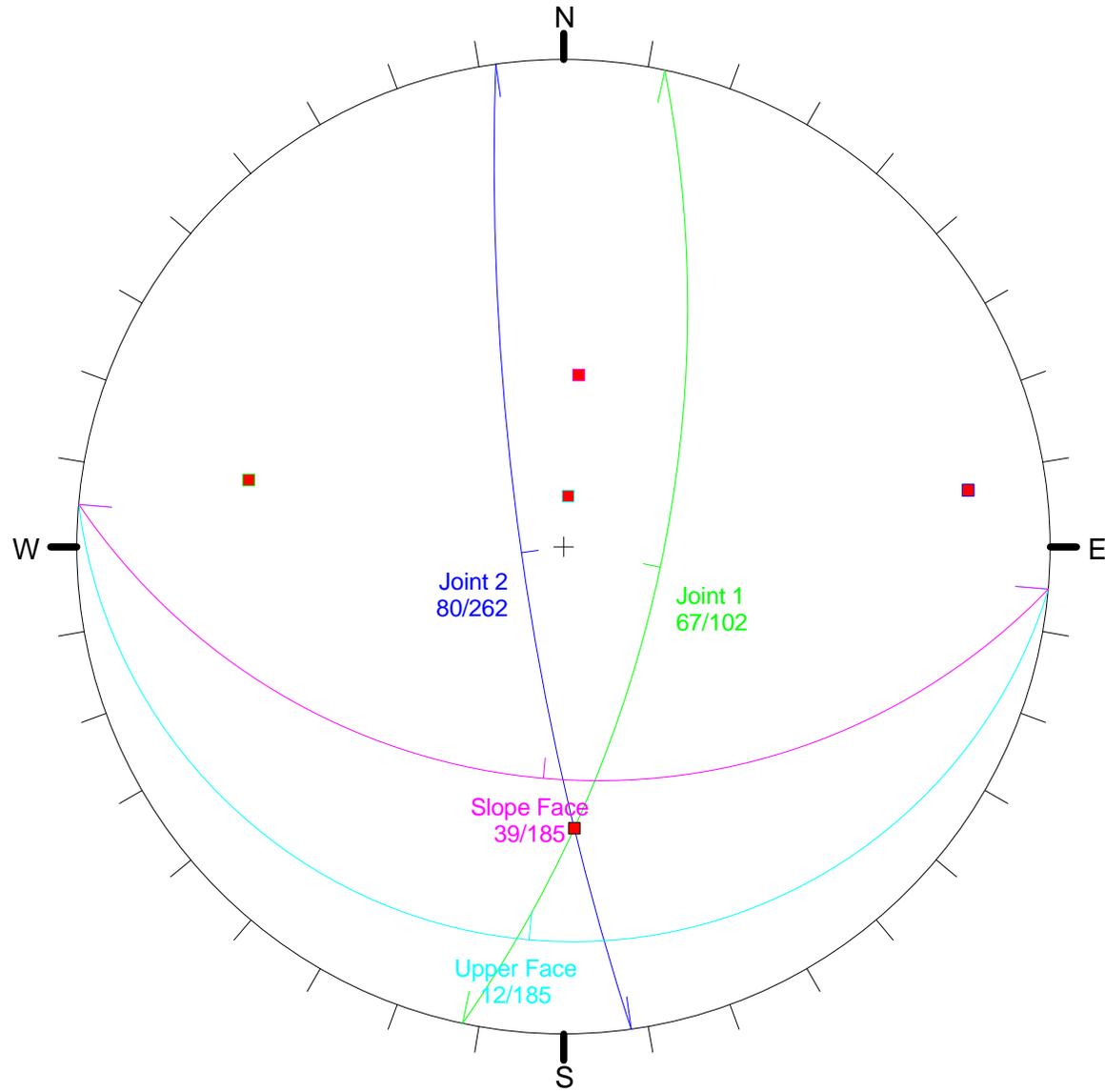
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 95.000 %

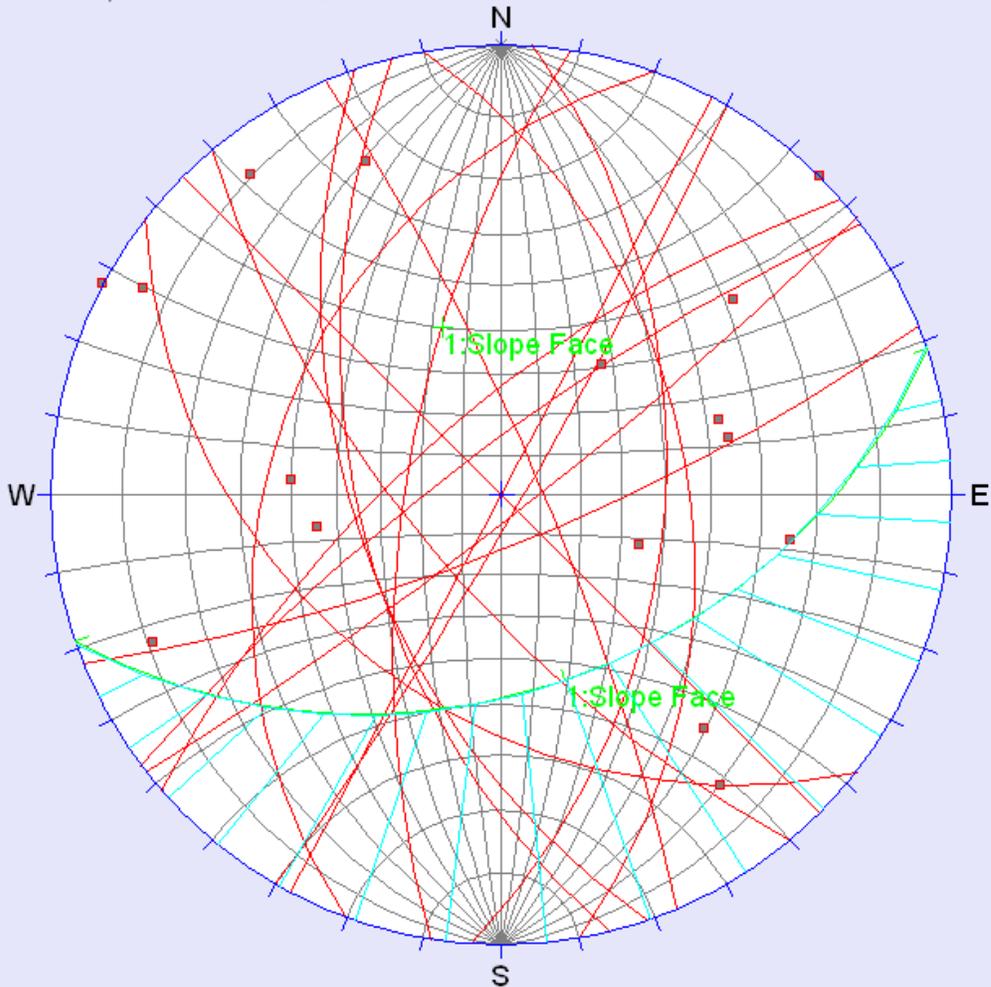
Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope

Point	x	y	z
124	0.000	0.000	0.000
134	-66.943	501.702	400.000
234	1.557	495.710	400.000
123	-30.486	806.263	465.165



Rimforest, Cross-Section B

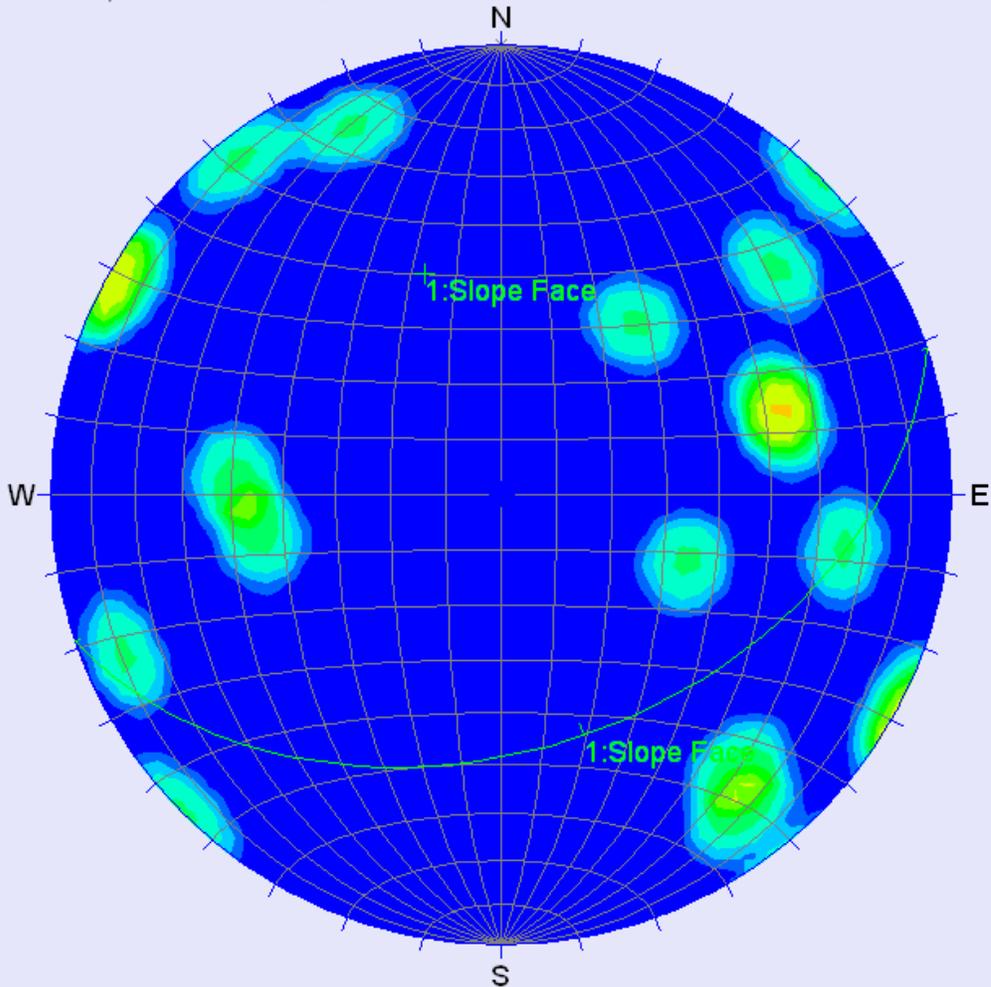


■ Poles

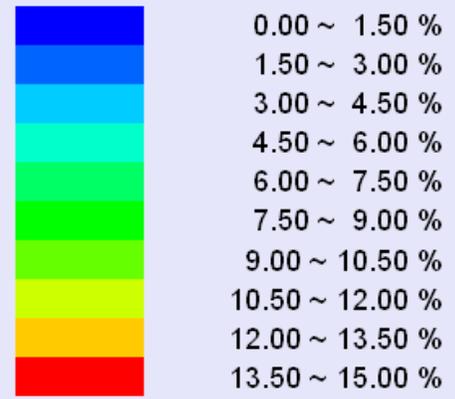
Equal Angle
Lower Hemisphere
16 Poles
16 Entries

Equal Angle Stereonet, Planar Attitudes

Rimforest, Cross-Section B



Fisher
Concentrations
% of total per 1.0 % area

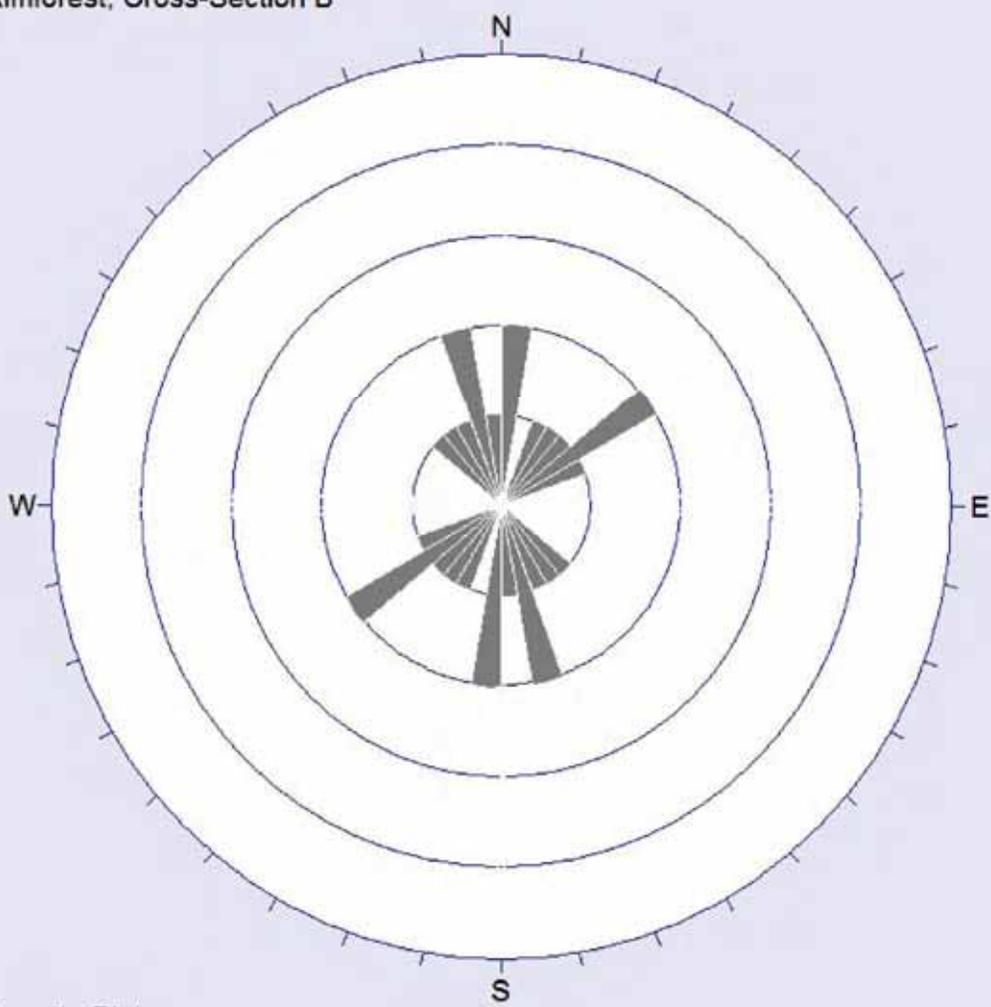


No Bias Correction
Max. Conc. = 12.0528%

Equal Area
Lower Hemisphere
16 Poles
16 Entries

Equal Area Stereonet, Contour Plot

Rimforest, Cross-Section B



Apparent Strike
5 max planes / arc
at outer circle

Trend / Plunge of
Face Normal = 0, 90
(directed away from viewer)

No Bias Correction

14 Planes Plotted
Within 45 and 90
Degrees of Viewing
Face

Rosette Plot

RocPlane Analysis Information

Document Name:

RimforestXsectionB_Prob_REVISED

Job Title:

Rimforest Cross-Section B

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 2.93446
Lognormal Reliability Index = 3.87036
Number of Trial Wedges = 1000
Number of Valid Wedges = 1000
Number of Invalid Wedges = 0
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.74713
Wedge Weight = 821.455 t/ft
Wedge Volume = 10952.7 ft³/ft
Normal Force = 672.073 t/ft
Resisting Force = 825.243 t/ft
Driving Force = 472.341 t/ft

Geometry

Intersection Point (B) of slope and upper face = (268.092 , 250)
Intersection point (C) of failure plane and upper face = (355.714 , 250)
Upper face length (B --> C) = 87.6218 ft
Failure plane length (Origin --> C) = 434.779 ft
Slope length (Origin --> B) = 366.163 ft

Slope Properties:

Slope Angle

Mean value = 43 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 250 ft
Statistical distribution : Normal
Standard Deviation = 2 ft
Relative Minimum Value = 6 ft
Relative Maximum Value = 6 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.005 t/ft²
Relative Minimum Value = 0.015 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 0 °
Statistical distribution : None
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 35.1 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 1 °
Relative Maximum Value = 1 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.15 t/ft²
Relative Maximum Value = 0.15 t/ft²
Friction Angle (phi)
Mean value = 40 °
Statistical distribution : Normal
Standard Deviation = 0.5 °
Relative Minimum Value = 1.5 °
Relative Maximum Value = 1.5 °
Mean Shear Strength: 790.021 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

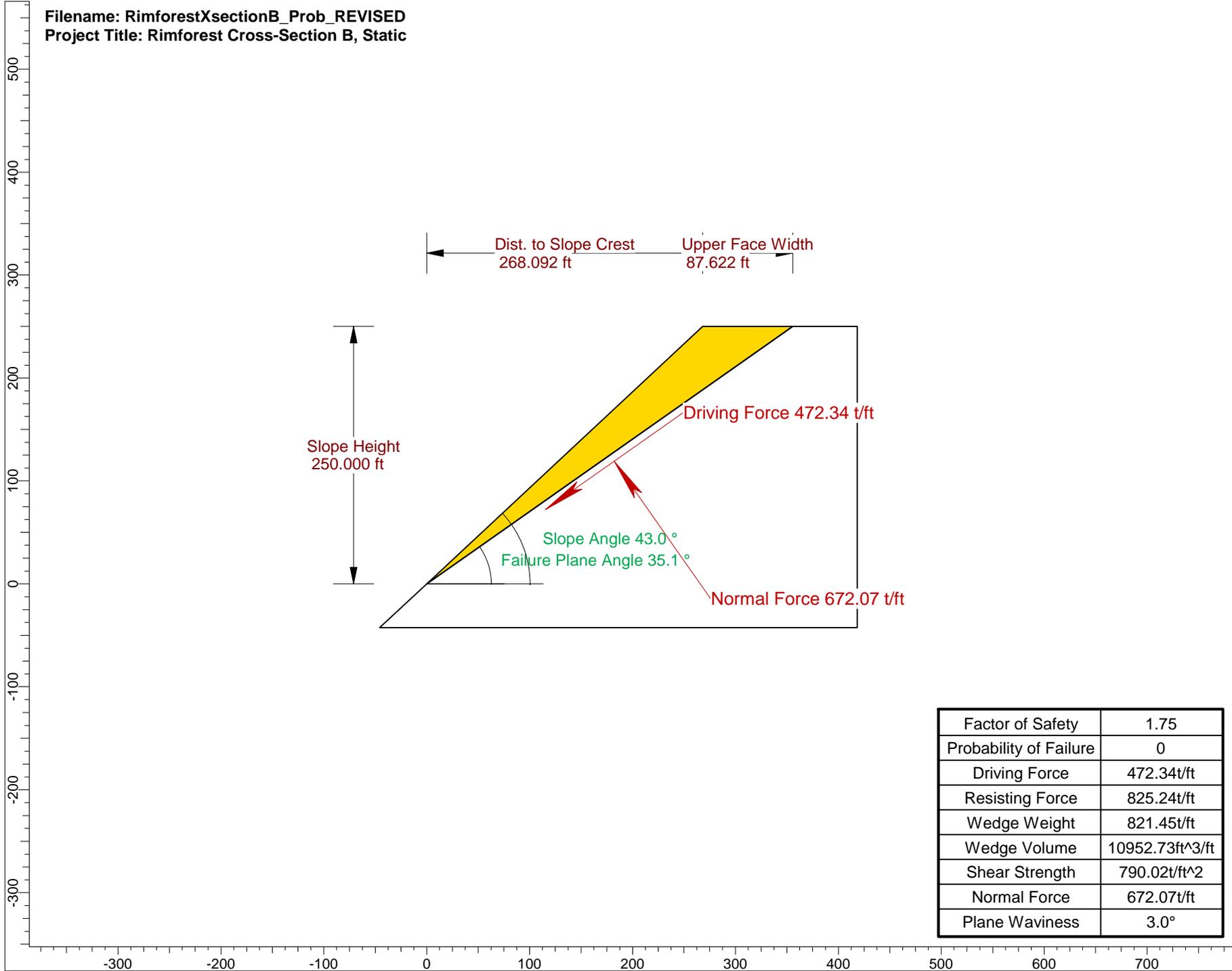
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

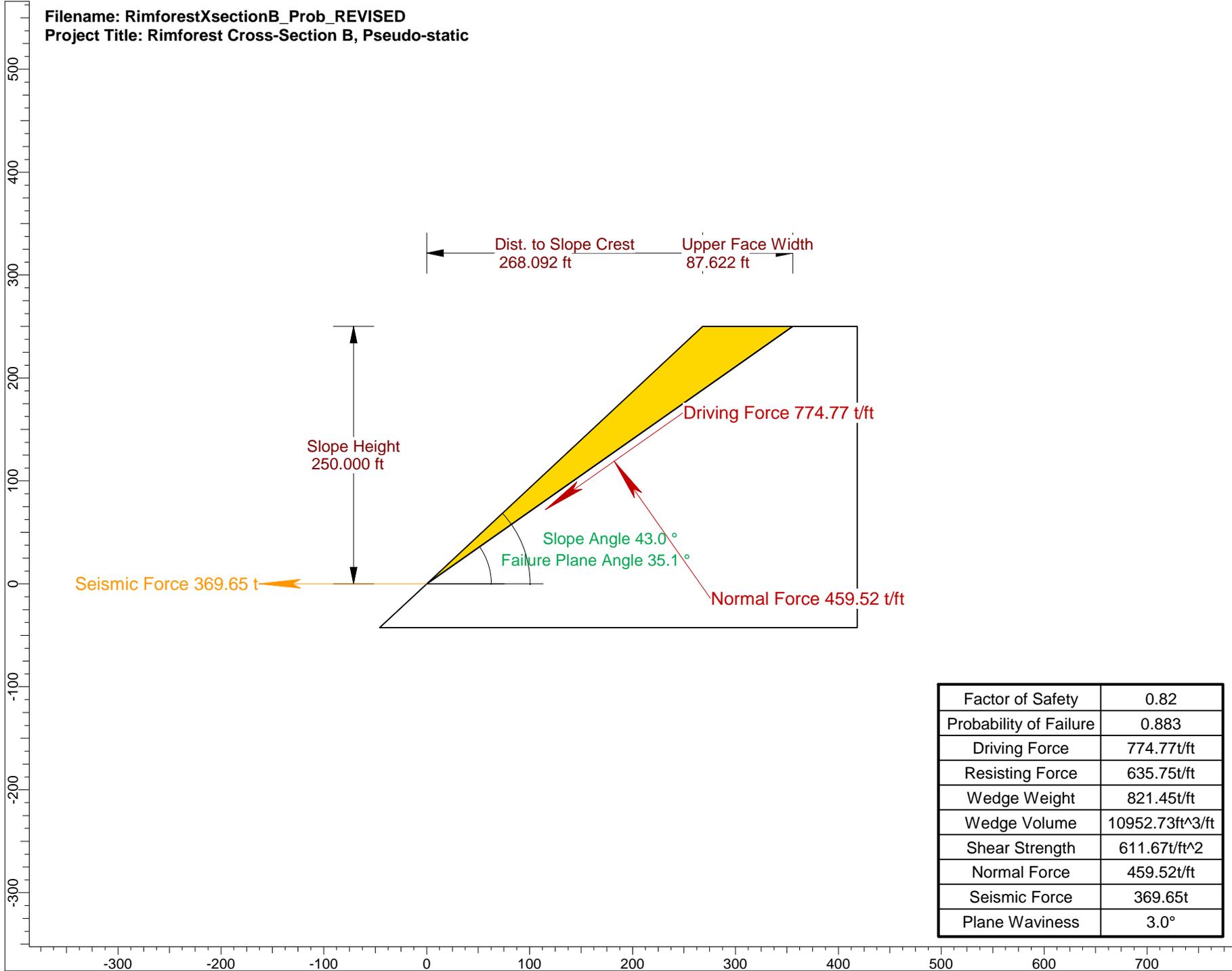
External Forces : Not Present

Filename: RimforestXsectionB_Prob_REVISED
 Project Title: Rimforest Cross-Section B, Static

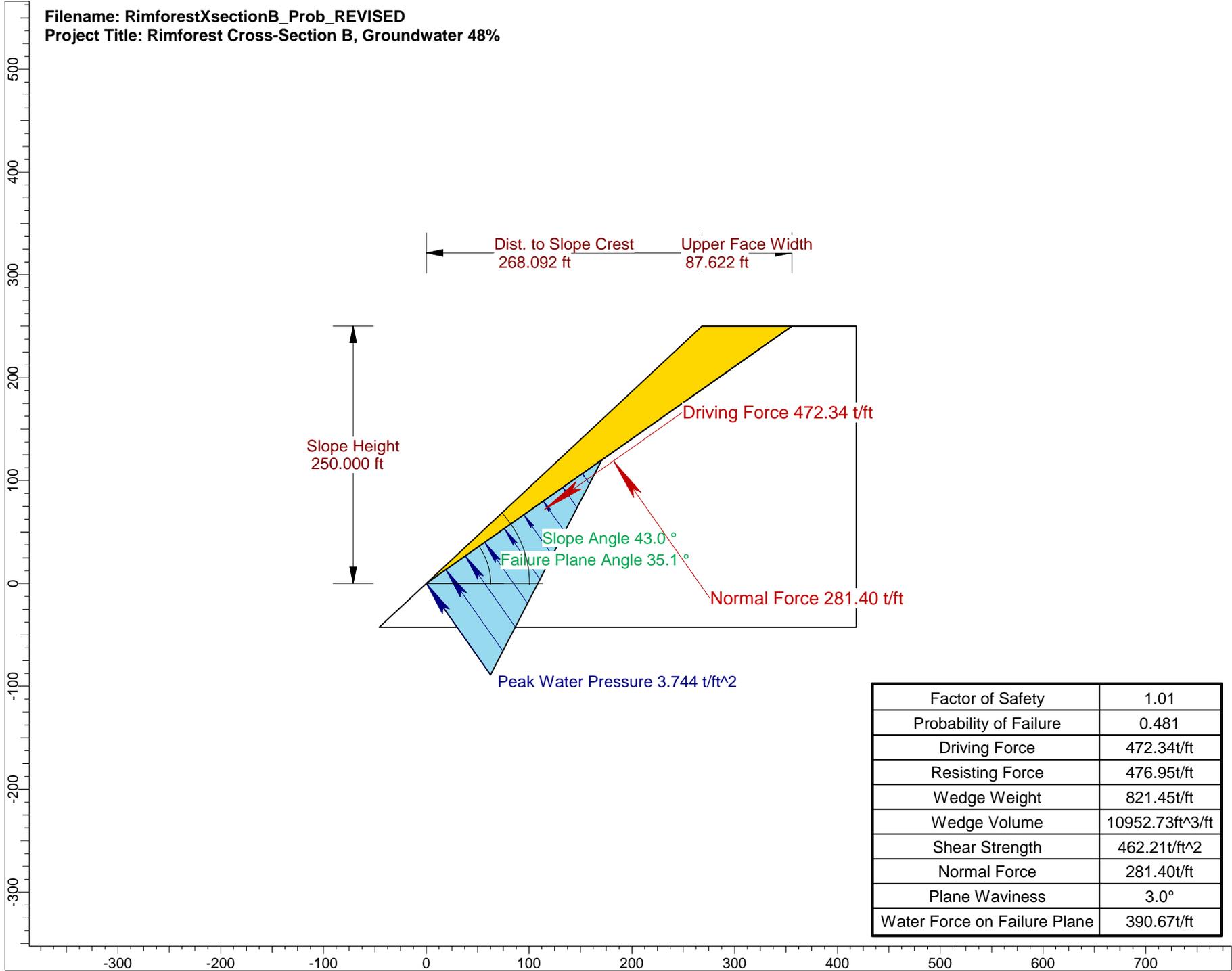


Factor of Safety	1.75
Probability of Failure	0
Driving Force	472.34t/ft
Resisting Force	825.24t/ft
Wedge Weight	821.45t/ft
Wedge Volume	10952.73ft ³ /ft
Shear Strength	790.02t/ft ²
Normal Force	672.07t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionB_Prob_REVISED
 Project Title: Rimforest Cross-Section B, Pseudo-static



Filename: RimforestXsectionB_Prob_REVISED
 Project Title: Rimforest Cross-Section B, Groundwater 48%



Factor of Safety	1.01
Probability of Failure	0.481
Driving Force	472.34t/ft
Resisting Force	476.95t/ft
Wedge Weight	821.45t/ft
Wedge Volume	10952.73ft ³ /ft
Shear Strength	462.21t/ft ²
Normal Force	281.40t/ft
Plane Waviness	3.0°
Water Force on Failure Plane	390.67t/ft

RocPlane Analysis Information

Document Name:

RimforestXsectionB_Prob_REVISED

Job Title:

Rimforest Cross-Section B

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 2.93446
Lognormal Reliability Index = 3.87036
Number of Trial Wedges = 1000
Number of Valid Wedges = 1000
Number of Invalid Wedges = 0
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.74713
Wedge Weight = 821.455 t/ft
Wedge Volume = 10952.7 ft³/ft
Normal Force = 672.073 t/ft
Resisting Force = 825.243 t/ft
Driving Force = 472.341 t/ft

Geometry

Intersection Point (B) of slope and upper face = (268.092 , 250)
Intersection point (C) of failure plane and upper face = (355.714 , 250)
Upper face length (B --> C) = 87.6218 ft
Failure plane length (Origin --> C) = 434.779 ft
Slope length (Origin --> B) = 366.163 ft

Slope Properties:

Slope Angle

Mean value = 43 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 250 ft
Statistical distribution : Normal
Standard Deviation = 2 ft
Relative Minimum Value = 6 ft
Relative Maximum Value = 6 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.005 t/ft²
Relative Minimum Value = 0.015 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 0 °
Statistical distribution : None
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 35.1 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 1 °
Relative Maximum Value = 1 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.15 t/ft²
Relative Maximum Value = 0.15 t/ft²
Friction Angle (phi)
Mean value = 40 °
Statistical distribution : Normal
Standard Deviation = 0.5 °
Relative Minimum Value = 1.5 °
Relative Maximum Value = 1.5 °
Mean Shear Strength: 790.021 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

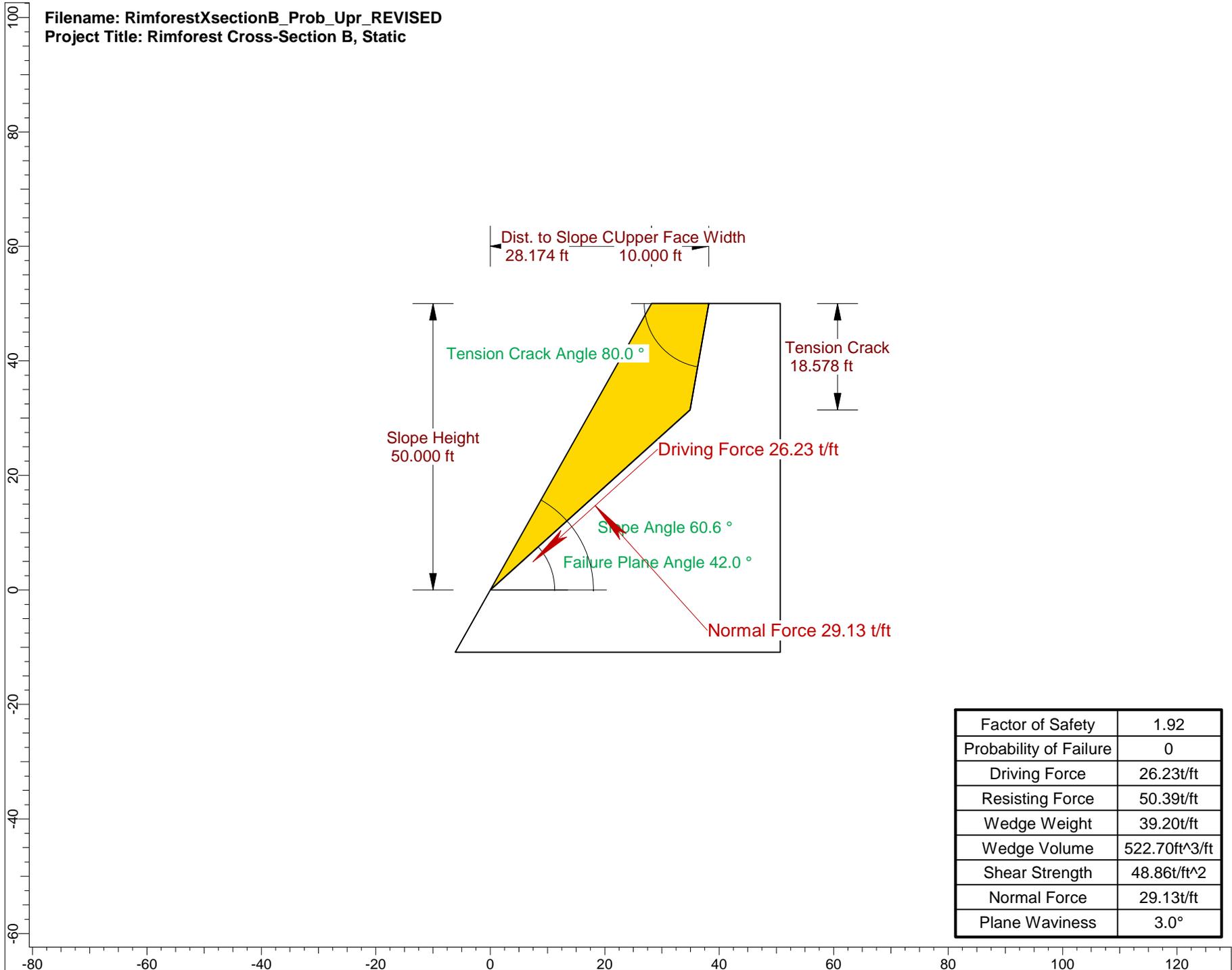
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

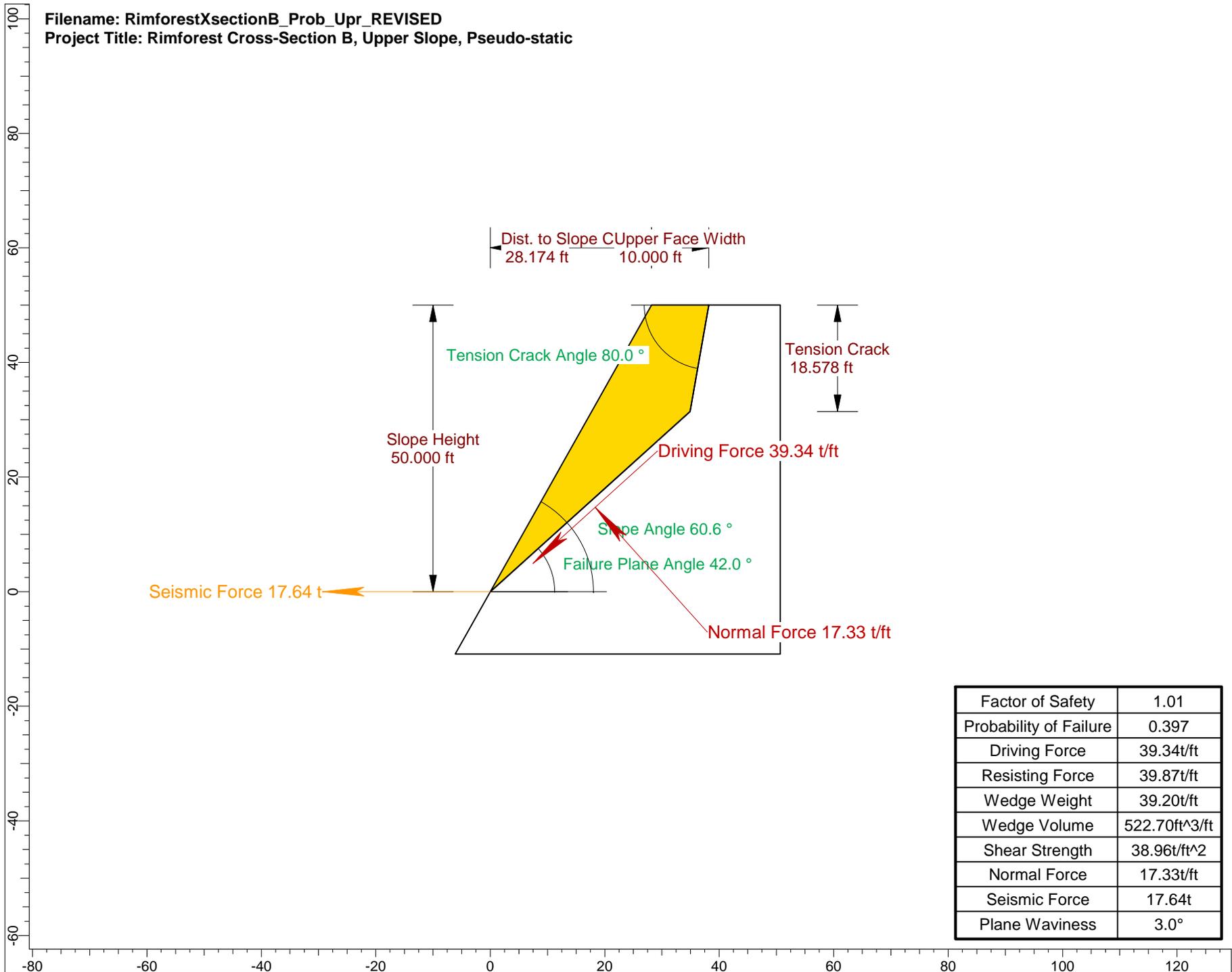
External Forces : Not Present

Filename: RimforestXsectionB_Prob_Upr_REVISED
 Project Title: Rimforest Cross-Section B, Static



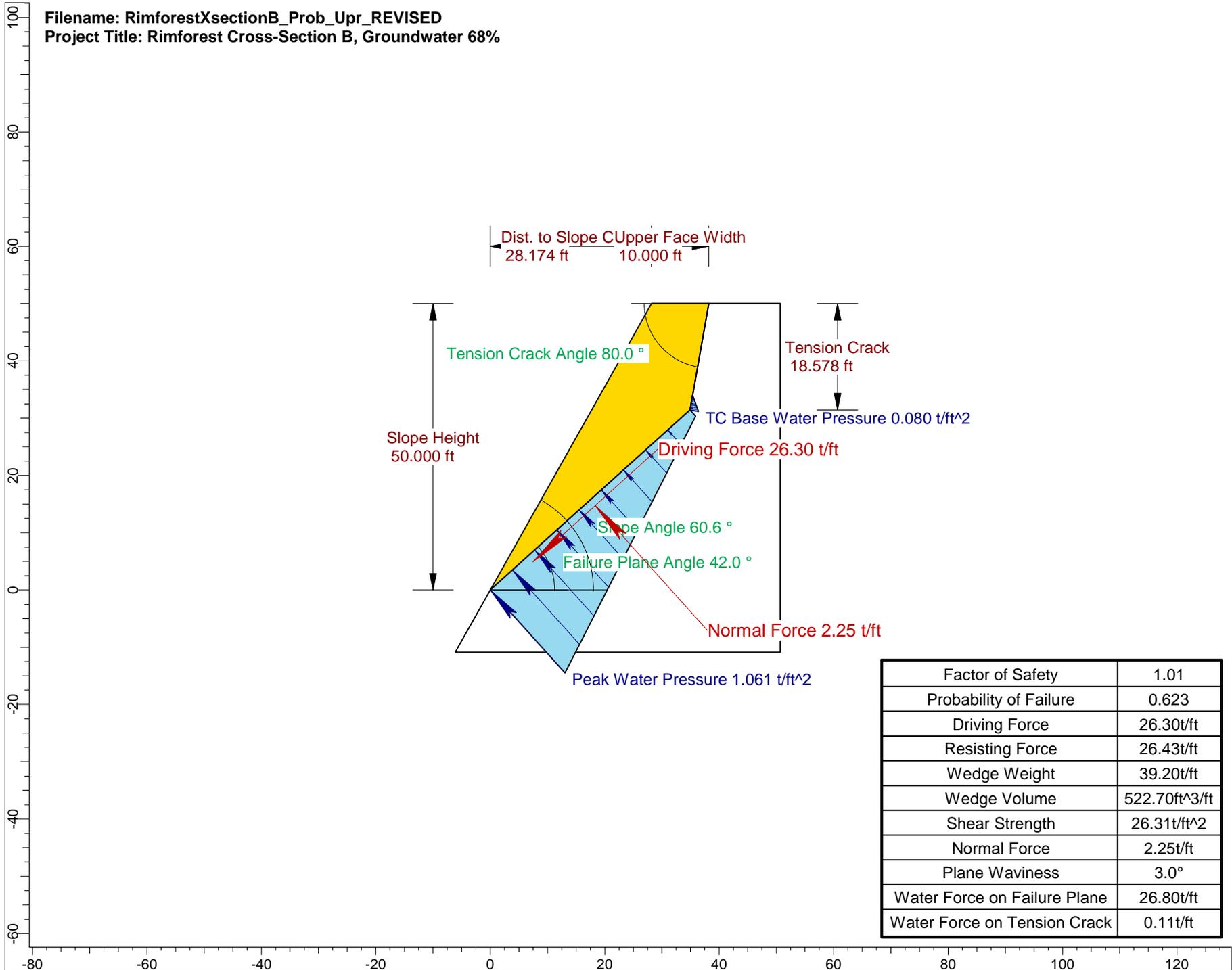
Factor of Safety	1.92
Probability of Failure	0
Driving Force	26.23t/ft
Resisting Force	50.39t/ft
Wedge Weight	39.20t/ft
Wedge Volume	522.70ft ³ /ft
Shear Strength	48.86t/ft ²
Normal Force	29.13t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionB_Prob_Upr_REVISED
 Project Title: Rimforest Cross-Section B, Upper Slope, Pseudo-static

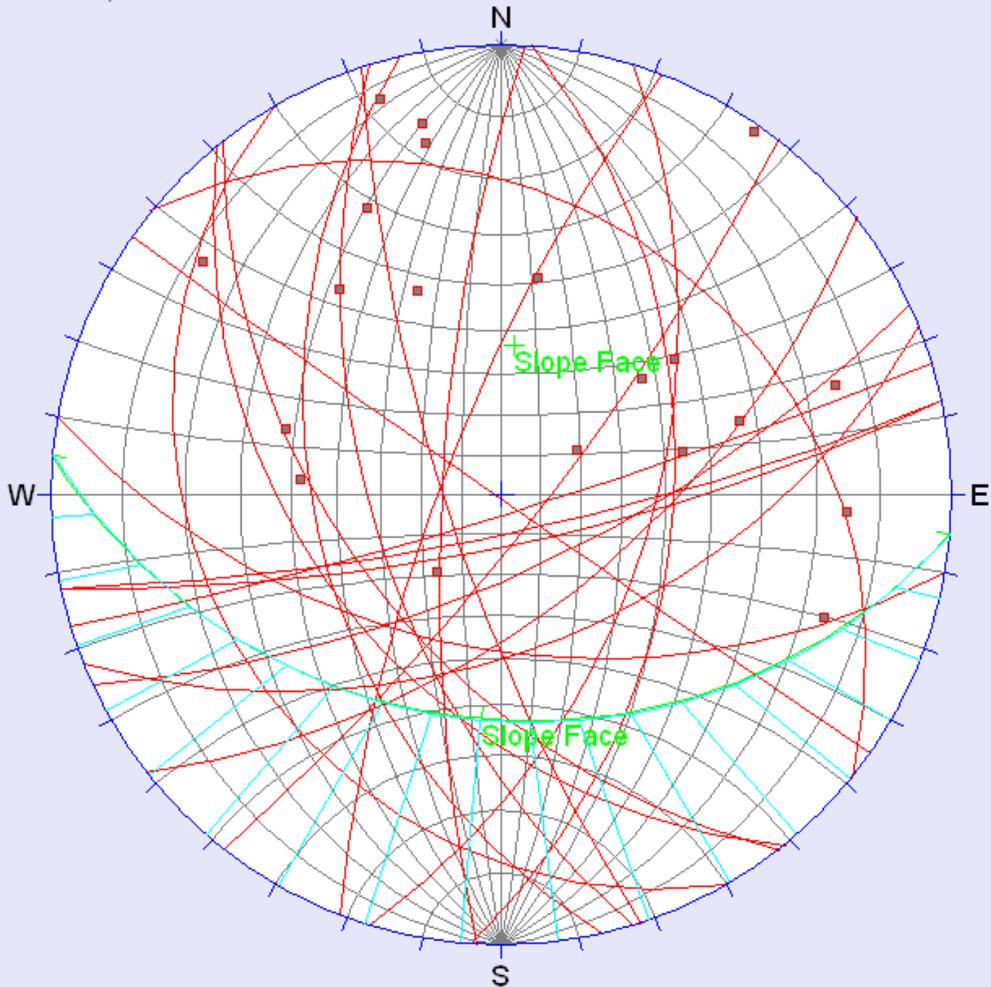


Factor of Safety	1.01
Probability of Failure	0.397
Driving Force	39.34t/ft
Resisting Force	39.87t/ft
Wedge Weight	39.20t/ft
Wedge Volume	522.70ft ³ /ft
Shear Strength	38.96t/ft ²
Normal Force	17.33t/ft
Seismic Force	17.64t
Plane Waviness	3.0°

Filename: RimforestXsectionB_Prob_Upr_REVISED
 Project Title: Rimforest Cross-Section B, Groundwater 68%



Rimforest, Cross-Section C

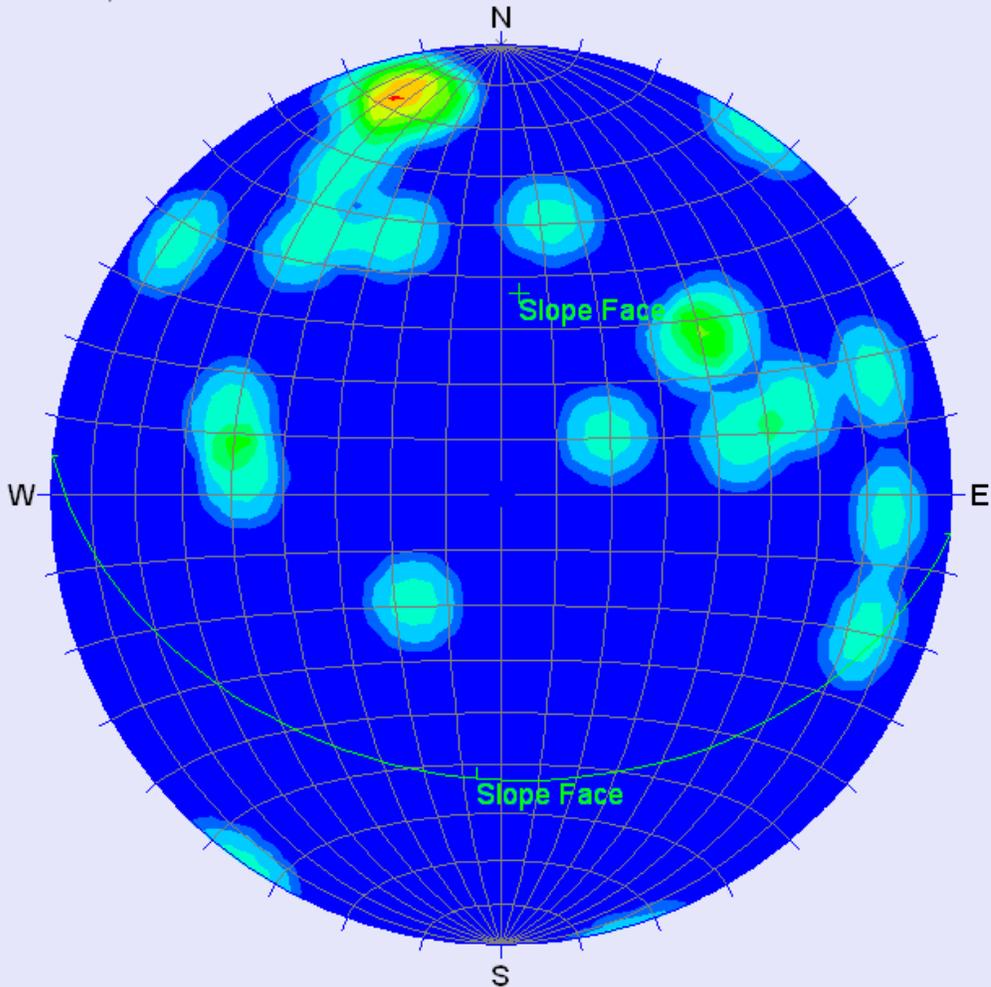


■ Poles

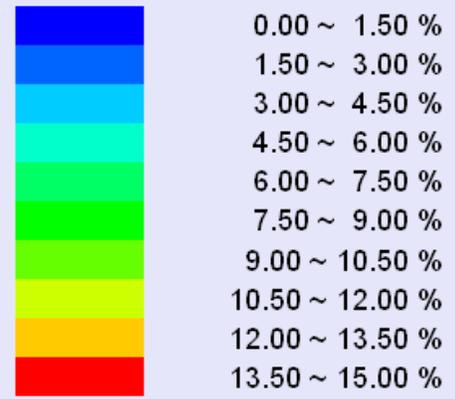
Equal Angle
Lower Hemisphere
20 Poles
20 Entries

Equal Angle Stereonet, Planar Attitudes

Rimforest, Cross-Section C



Fisher Concentrations
% of total per 1.0 % area

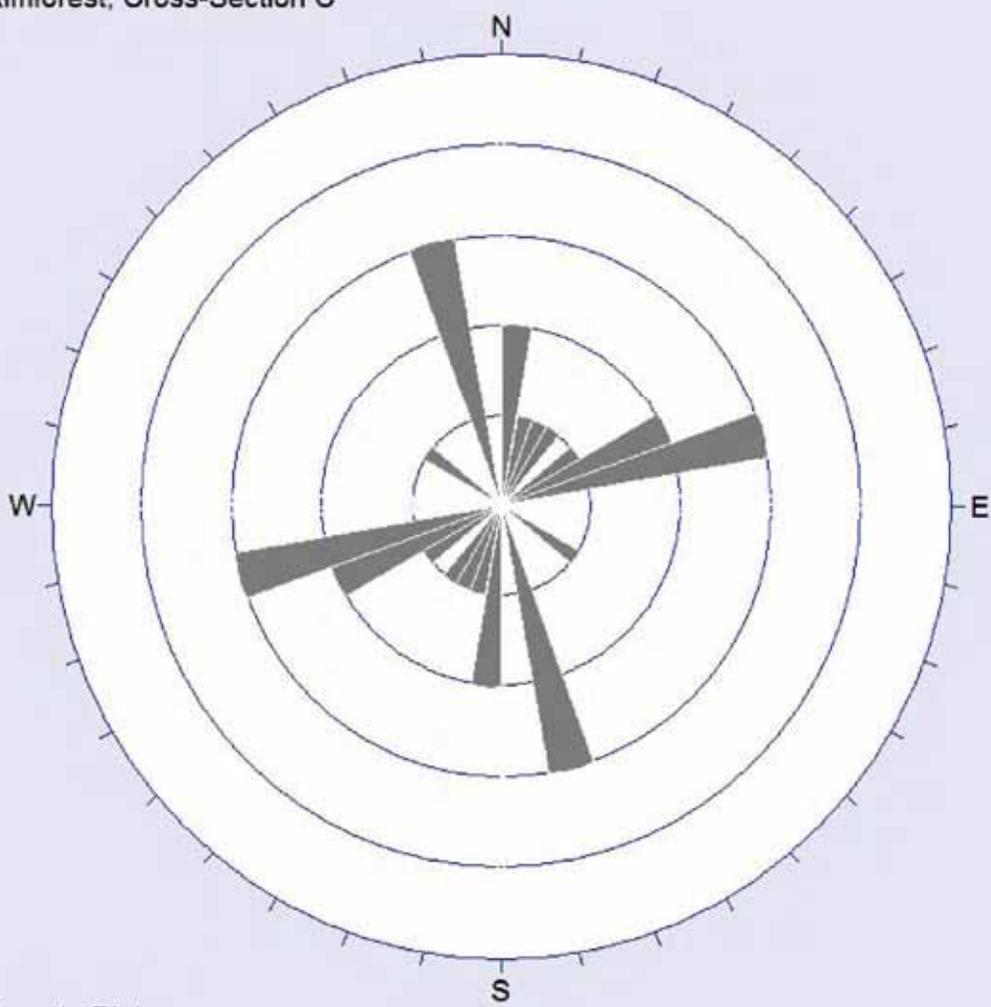


No Bias Correction
Max. Conc. = 13.8289%

Equal Area
Lower Hemisphere
20 Poles
20 Entries

Equal Area Stereonet, Contour Plot

Rimforest, Cross-Section C



Apparent Strike
5 max planes / arc
at outer circle

Trend / Plunge of
Face Normal = 0, 90
(directed away from viewer)

No Bias Correction

15 Planes Plotted
Within 45 and 90
Degrees of Viewing
Face

Rosette Plot

RocPlane Analysis Information

Document Name:

RimforestXsectionC_Prob_Upr_REVISED

Job Title:

Rimforest Cross-Section C

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 0.457635
Lognormal Reliability Index = 0.31883
Number of Trial Wedges = 1000
Number of Valid Wedges = 960
Number of Invalid Wedges = 40
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.63693
Wedge Weight = 7928.01 t/ft
Wedge Volume = 105707 ft³/ft
Normal Force = 6664.02 t/ft
Resisting Force = 7030.09 t/ft
Driving Force = 4294.67 t/ft

Geometry

Intersection Point (B) of slope and upper face = (1418.99 , 1050)
Intersection point (C) of tension crack and upper face = (1551.16 , 1073.3)
Intersection point (D) of failure plane and tension crack = (1435.27 , 924.966)
Upper face length (B --> C) = 134.207 ft
Slope length (Origin --> B) = 1763.14 ft
Tension Crack Length (C --> D) = 188.244 ft
Failure Plane length (Origin --> D) = 1707.5 ft

Slope Properties:

Slope Angle

Mean value = 36.5 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 1050 ft
Statistical distribution : Normal
Standard Deviation = 5 ft
Relative Minimum Value = 15 ft
Relative Maximum Value = 15 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.01 t/ft²
Relative Minimum Value = 0.005 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 10 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 32.8 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 1 °
Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.05 t/ft²
Relative Maximum Value = 0.15 t/ft²
Friction Angle (phi)
Mean value = 41 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °
Mean Shear Strength: 6680.84 t/ft²

Tension Crack:

Tension Crack : present
Tension Crack Angle
Mean value = 52 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
Mean Tension Crack Length = 148.339 ft

Water Pressure : Not Present

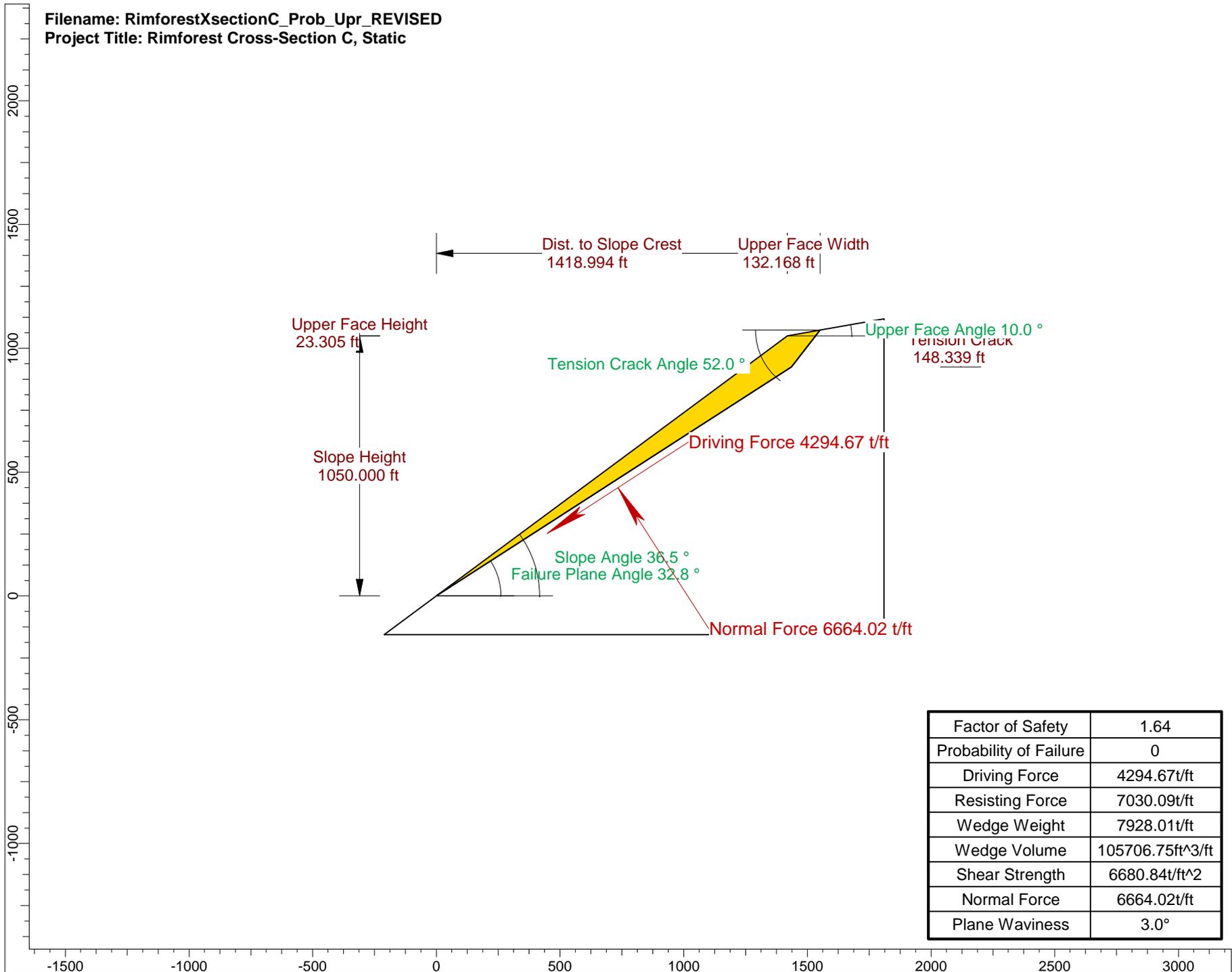
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

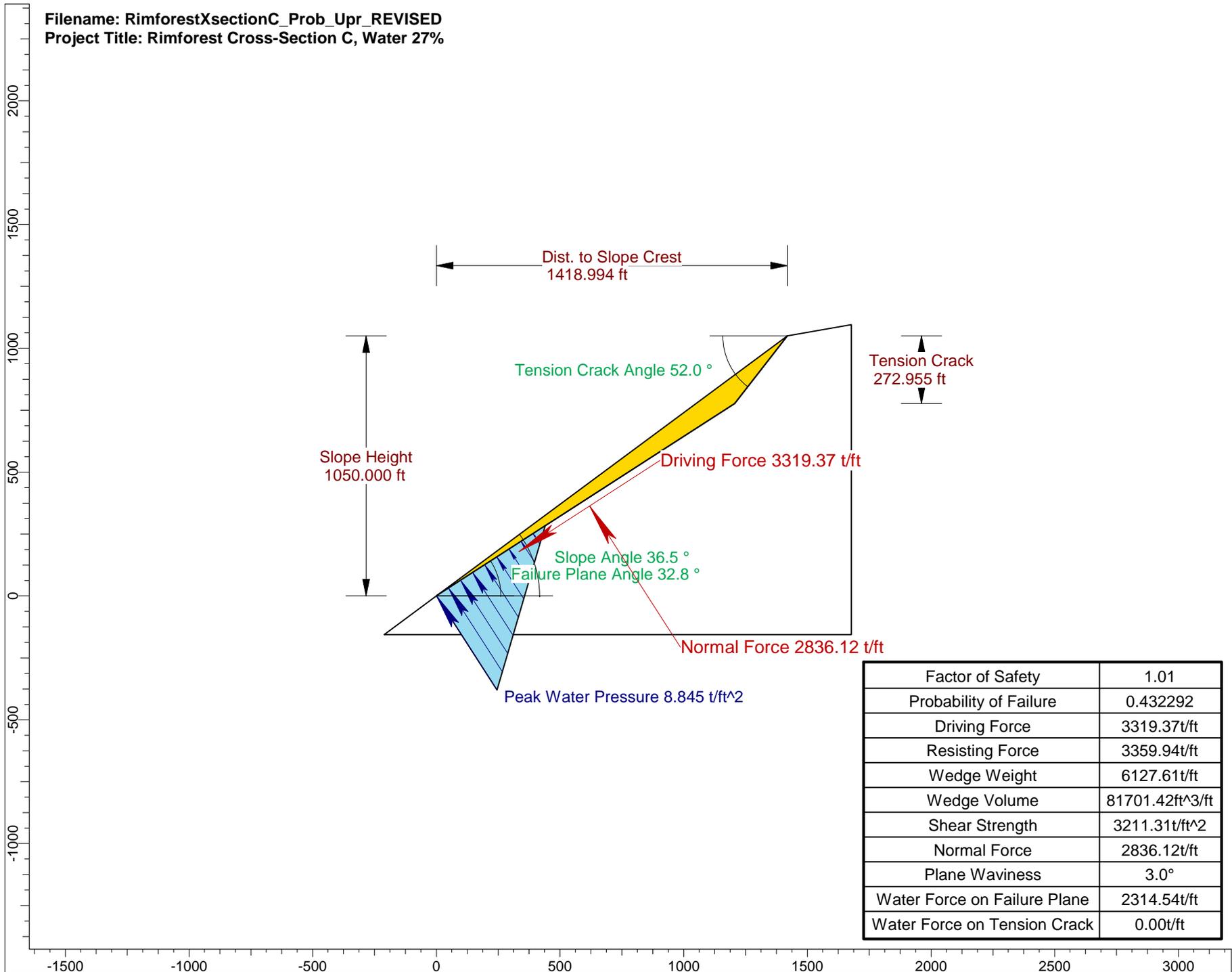
External Forces : Not Present

Filename: RimforestXsectionC_Prob_Upr_REVISED
 Project Title: Rimforest Cross-Section C, Static



Factor of Safety	1.64
Probability of Failure	0
Driving Force	4294.67t/ft
Resisting Force	7030.09t/ft
Wedge Weight	7928.01t/ft
Wedge Volume	105706.75ft ³ /ft
Shear Strength	6680.84t/ft ²
Normal Force	6664.02t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionC_Prob_Upr_REVISED
 Project Title: Rimforest Cross-Section C, Water 27%



RocPlane Analysis Information

Document Name:

RimforestXsectionC_Prob_Lwr_REVISED

Job Title:

Rimforest Cross-Section C, Lower Slope

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 5.30477
Lognormal Reliability Index = 6.43365
Number of Trial Wedges = 1000
Number of Valid Wedges = 1000
Number of Invalid Wedges = 0
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.43832
Wedge Weight = 453.531 t/ft
Wedge Volume = 6047.08 ft³/ft
Normal Force = 320.695 t/ft
Resisting Force = 461.262 t/ft
Driving Force = 320.695 t/ft

Geometry

Intersection Point (B) of slope and upper face = (69.282 , 120)
Intersection point (C) of failure plane and upper face = (238.459 , 238.459)
Upper face length (B --> C) = 206.527 ft
Failure plane length (Origin --> C) = 337.232 ft
Slope length (Origin --> B) = 138.449 ft

Slope Properties:

Slope Angle

Mean value = 60 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 120 ft
Statistical distribution : None
Relative Minimum Value = 1 ft
Relative Maximum Value = 1 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.01 t/ft²
Relative Minimum Value = 0.015 t/ft²
Relative Maximum Value = 0.005 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 35 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 45 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 1 °
Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.05 t/ft²
Relative Maximum Value = 0.15 t/ft²
Friction Angle (phi)
Mean value = 40 °
Statistical distribution : Normal
Standard Deviation = 0.5 °
Relative Minimum Value = 1.5 °
Relative Maximum Value = 1.5 °
Mean Shear Strength: 444.455 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

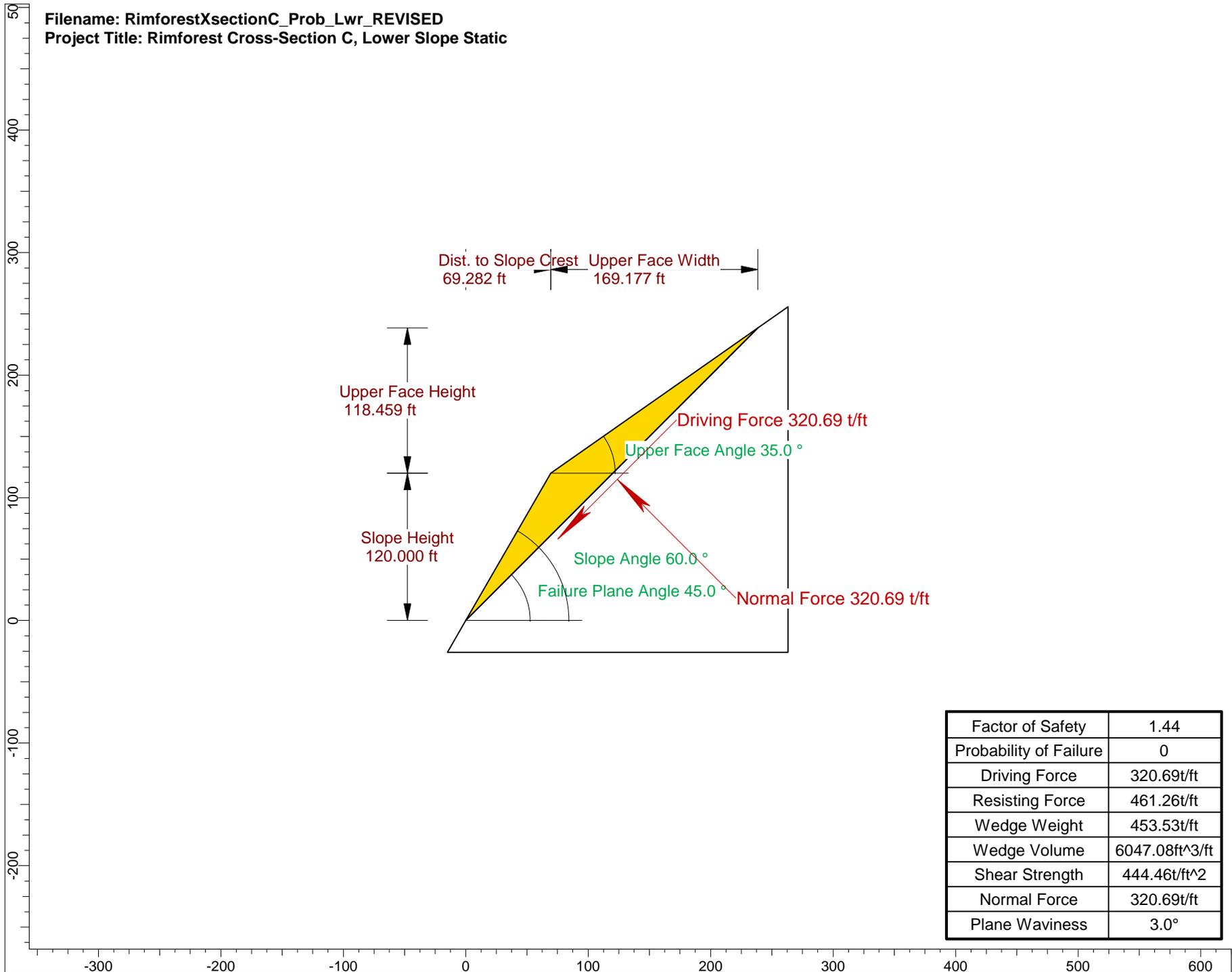
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

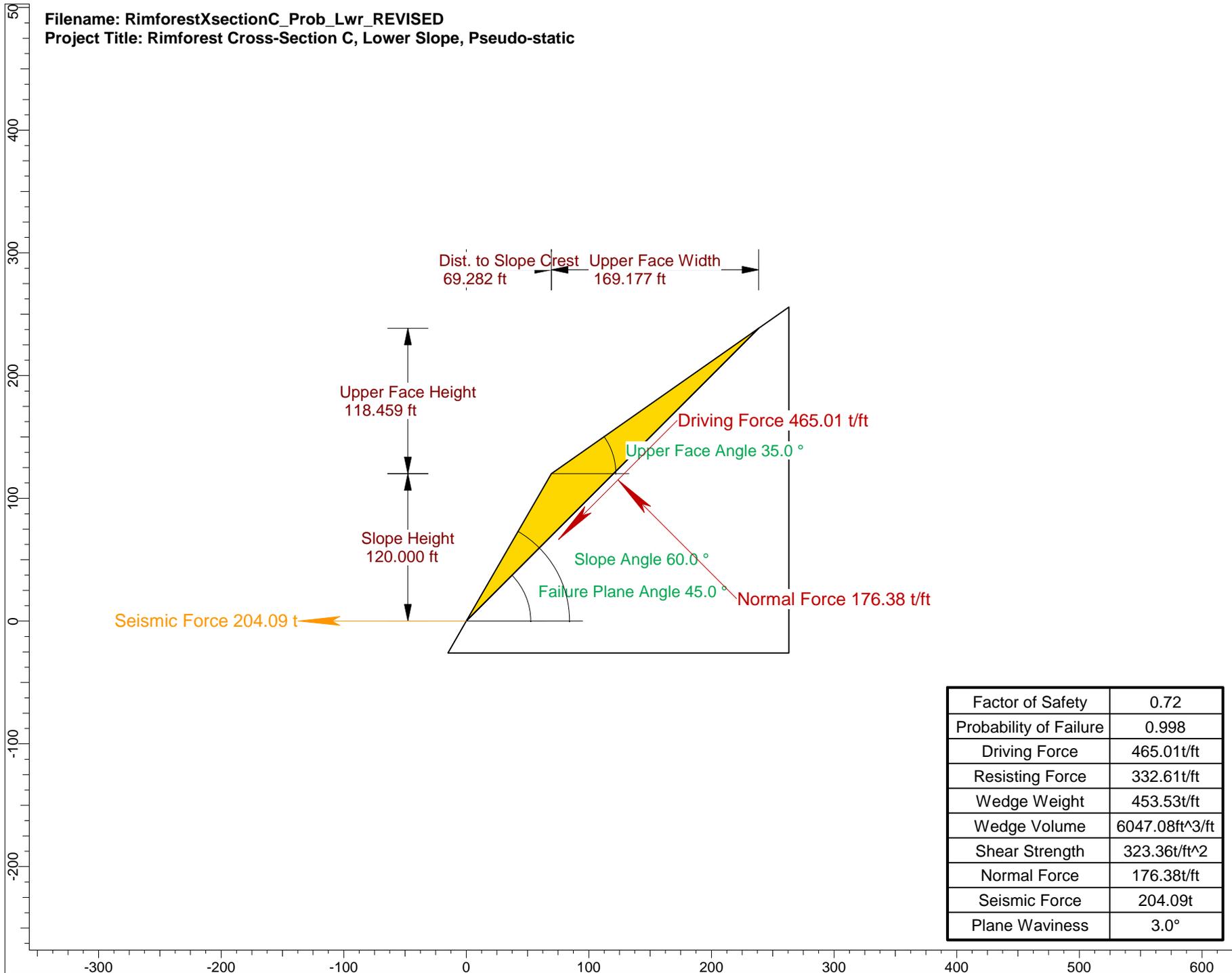
External Forces : Not Present

Filename: RimforestXsectionC_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section C, Lower Slope Static



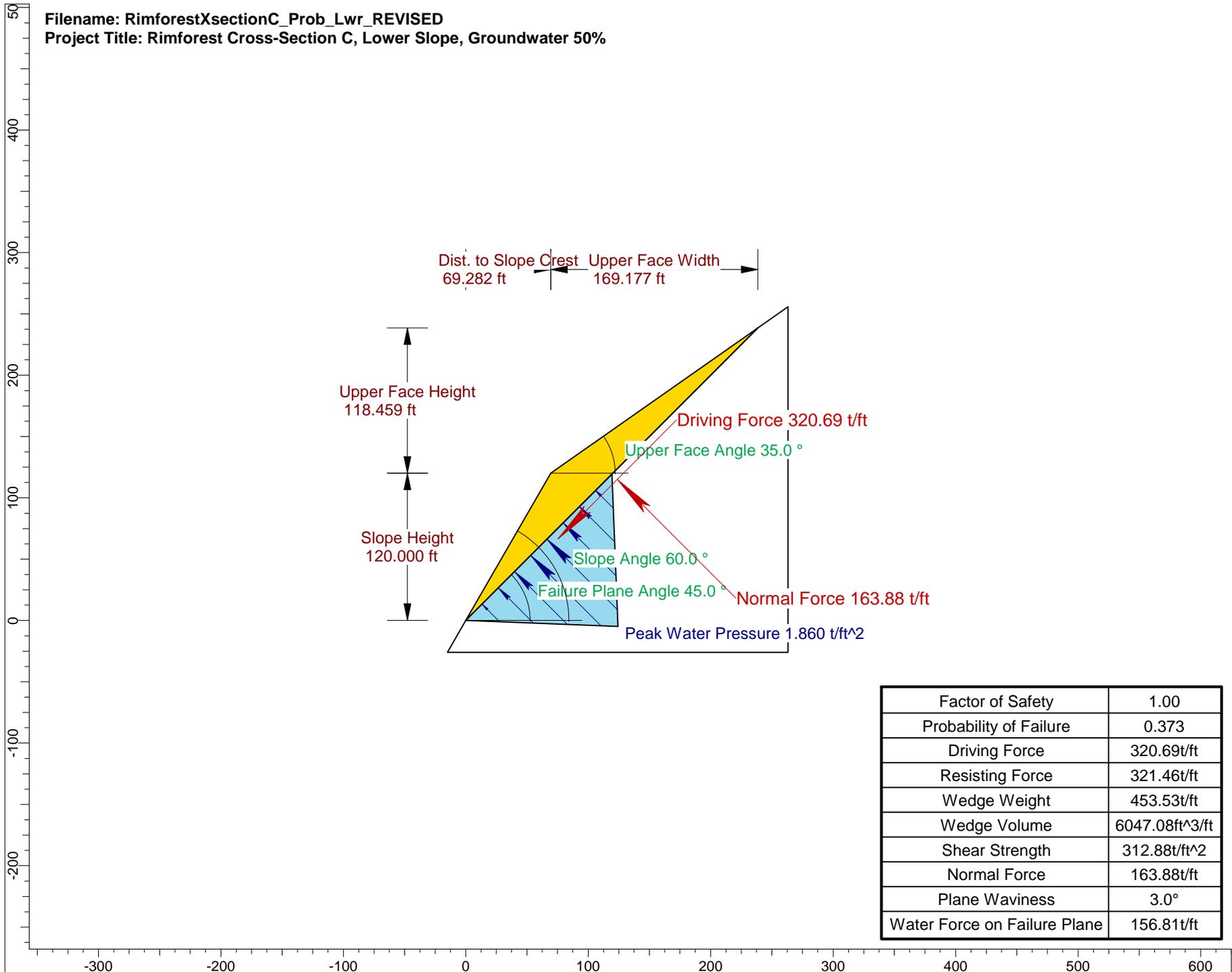
Factor of Safety	1.44
Probability of Failure	0
Driving Force	320.69t/ft
Resisting Force	461.26t/ft
Wedge Weight	453.53t/ft
Wedge Volume	6047.08ft ³ /ft
Shear Strength	444.46t/ft ²
Normal Force	320.69t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionC_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section C, Lower Slope, Pseudo-static



Factor of Safety	0.72
Probability of Failure	0.998
Driving Force	465.01t/ft
Resisting Force	332.61t/ft
Wedge Weight	453.53t/ft
Wedge Volume	6047.08ft ³ /ft
Shear Strength	323.36t/ft ²
Normal Force	176.38t/ft
Seismic Force	204.09t
Plane Waviness	3.0°

Filename: RimforestXsectionC_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section C, Lower Slope, Groundwater 50%



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 1
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 0.9871
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 54066562.752
- Wedge weight [tons]: 2973660.935
- Wedge area (joint1) [ft²]: 377492.85
- Wedge area (joint2) [ft²]: 440096.28
- Wedge area (slope) [ft²]: 1060068.88
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 343834.53

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	0.00	1267461.66
Effective Normal stress [t/ft²]	0.00	2.88
Shear Strength [t/ft²]	0.00	3.01
Strength due to Waviness [t/ft²]	0.00	0.15

- Driving force [tons]: 1410825.43
- Resisting force [tons]: 1392661.56

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	607554.77
Joint 2	N/A	708311.69
Fissures	1.61	N/A
Tension Crack	1.61	553383.49

Failure Mode:

- Sliding on joint2

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
21.69	229.89	1620.21

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	2018.03	0.00
Joint 2	2804.30	0.00
Tension Crack	N/A	1201.05

Persistence:

- Joint 1 [ft]: 2018.03
- Joint 2 [ft]: 2804.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	22.00	22.00
Joint 1 & Crest	118.99	118.99
Joint 2 & Crest	39.01	39.01
Joint 1 & Tension Crack	N/A	153.00
Joint 2 & Tension Crack	N/A	125.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	52.00	158.00
Joint Set 2	22.00	240.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

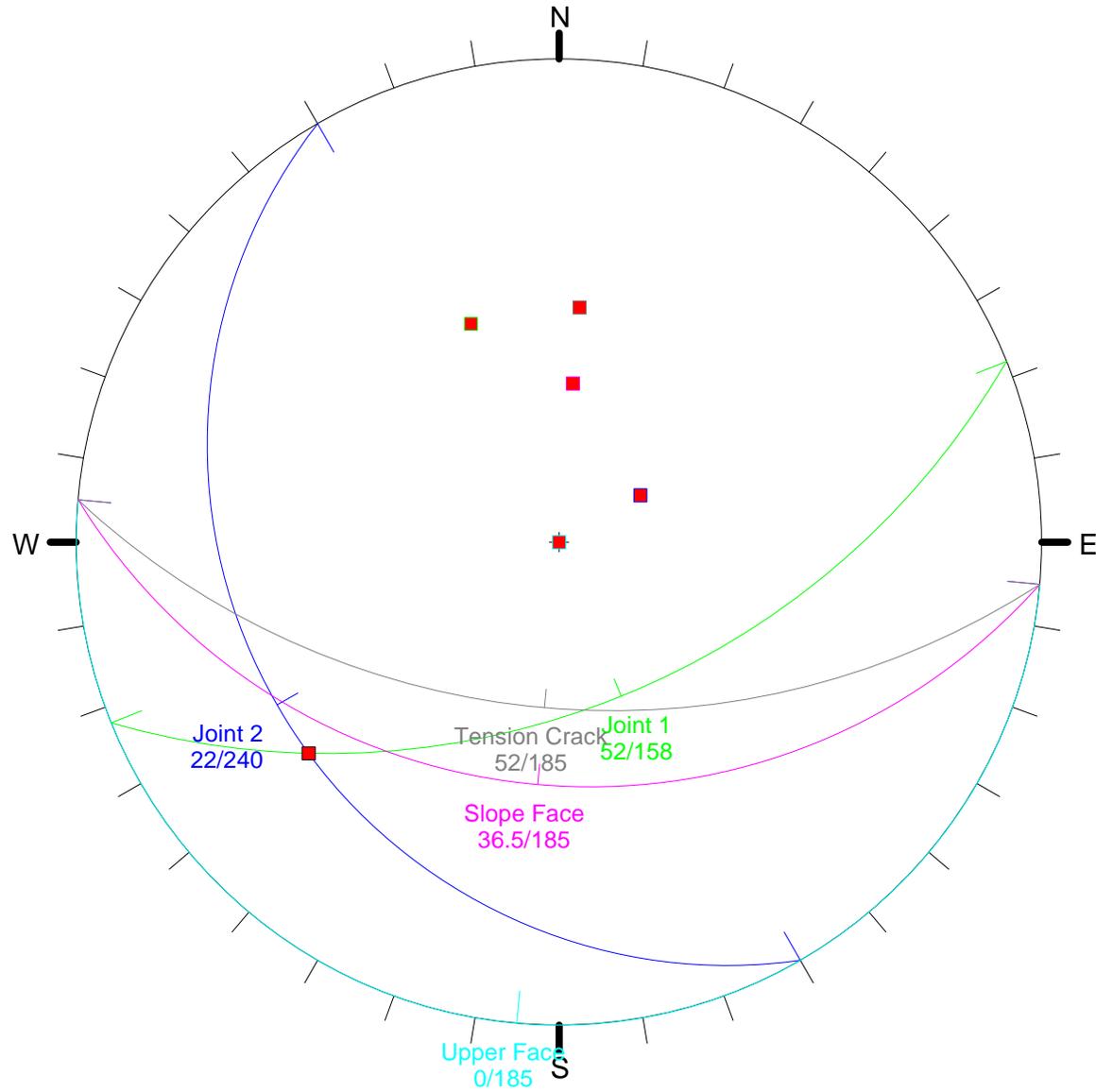
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 70.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	1097.908	1328.359	1050.000
234	2294.391	1223.681	1050.000
135	1097.908	1328.359	1050.000
125	1151.491	969.825	598.821
235	2294.391	1223.681	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 2
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 0.9947
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 32544430.219
- Wedge weight [tons]: 1789943.652
- Wedge area (joint1) [ft²]: 301279.15
- Wedge area (joint2) [ft²]: 192717.62
- Wedge area (slope) [ft²]: 572394.15
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 206965.23

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	345400.05	436587.61
Effective Normal stress [t/ft²]	1.15	2.27
Shear Strength [t/ft²]	1.51	2.48
Strength due to Waviness [t/ft²]	0.06	0.12

- Driving force [tons]: 977918.66
- Resisting force [tons]: 972692.09

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	540545.92
Joint 2	N/A	345768.12
Fissures	1.79	N/A
Tension Crack	1.79	371330.75

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
27.61	173.79	1180.40

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1770.87	0.00
Joint 2	1836.68	0.00
Tension Crack	N/A	648.52

Persistence:

- Joint 1 [ft]: 1770.87
- Joint 2 [ft]: 1836.68

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	20.61	20.61
Joint 1 & Crest	85.43	85.43
Joint 2 & Crest	73.97	73.97
Joint 1 & Tension Crack	N/A	134.00
Joint 2 & Tension Crack	N/A	102.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	44.00	231.00
Joint Set 2	53.00	107.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

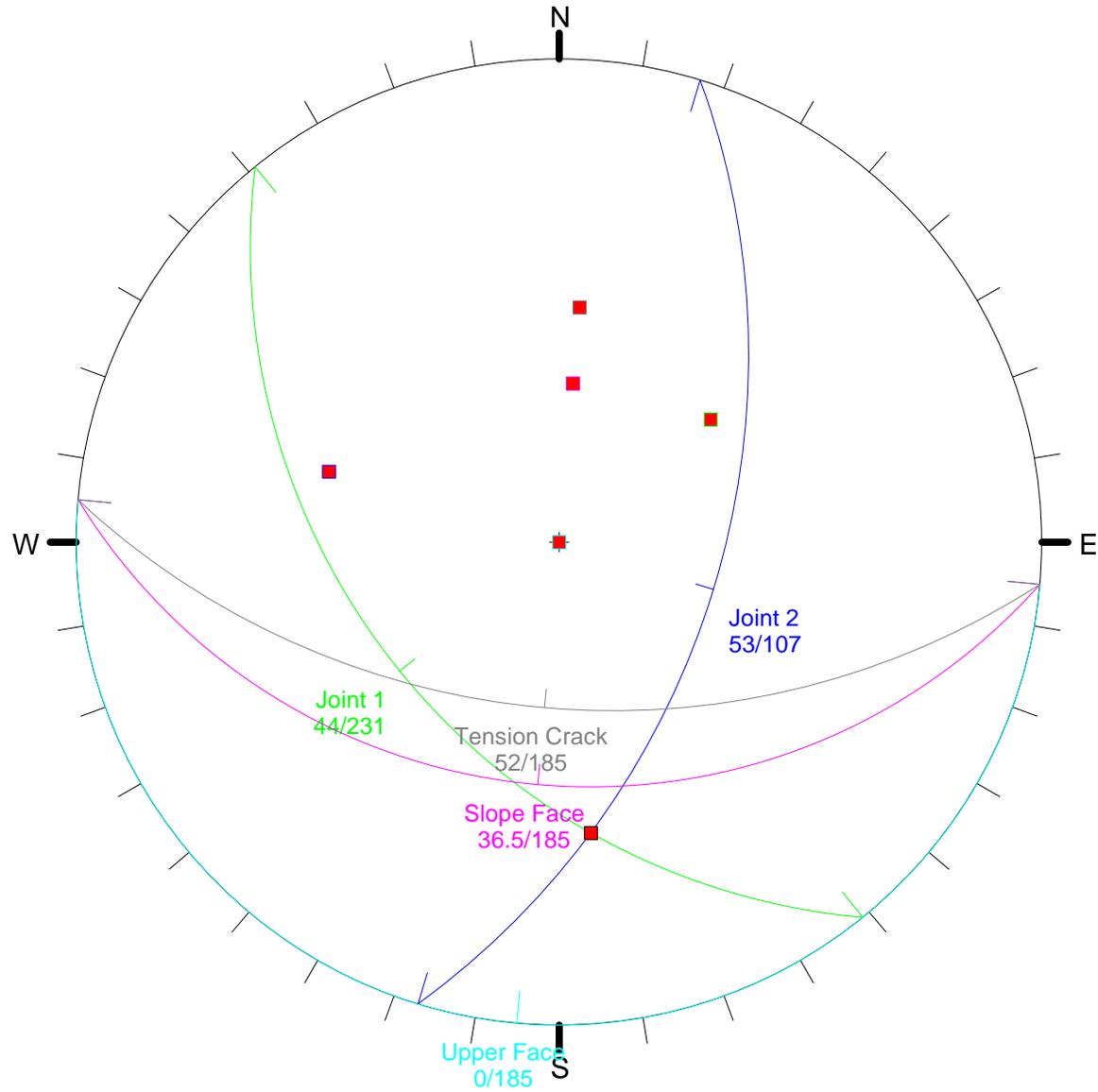
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 70.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	264.364	1401.285	1050.000
234	-381.688	1457.807	1050.000
135	264.364	1401.285	1050.000
125	-113.142	1039.854	547.037
235	-381.688	1457.807	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 3
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 0.9869
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 28201793.640
- Wedge weight [tons]: 1551098.642
- Wedge area (joint1) [ft²]: 368753.35
- Wedge area (joint2) [ft²]: 206305.66
- Wedge area (slope) [ft²]: 405254.98
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 179348.38

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	243616.60	399544.14
Effective Normal stress [t/ft²]	0.66	1.94
Shear Strength [t/ft²]	1.08	2.19
Strength due to Waviness [t/ft²]	0.03	0.10

- Driving force [tons]: 897807.34
- Resisting force [tons]: 886077.82

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	1254663.65
Joint 2	N/A	701944.02
Fissures	3.40	N/A
Tension Crack	3.40	610223.32

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
23.93	168.35	1071.11

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1770.87	0.00
Joint 2	1793.63	0.00
Tension Crack	N/A	459.15

Persistence:

- Joint 1 [ft]: 1770.87
- Joint 2 [ft]: 1793.63

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	14.78	14.78
Joint 1 & Crest	85.43	85.43
Joint 2 & Crest	79.79	79.79
Joint 1 & Tension Crack	N/A	134.00
Joint 2 & Tension Crack	N/A	67.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	44.00	231.00
Joint Set 2	76.00	252.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

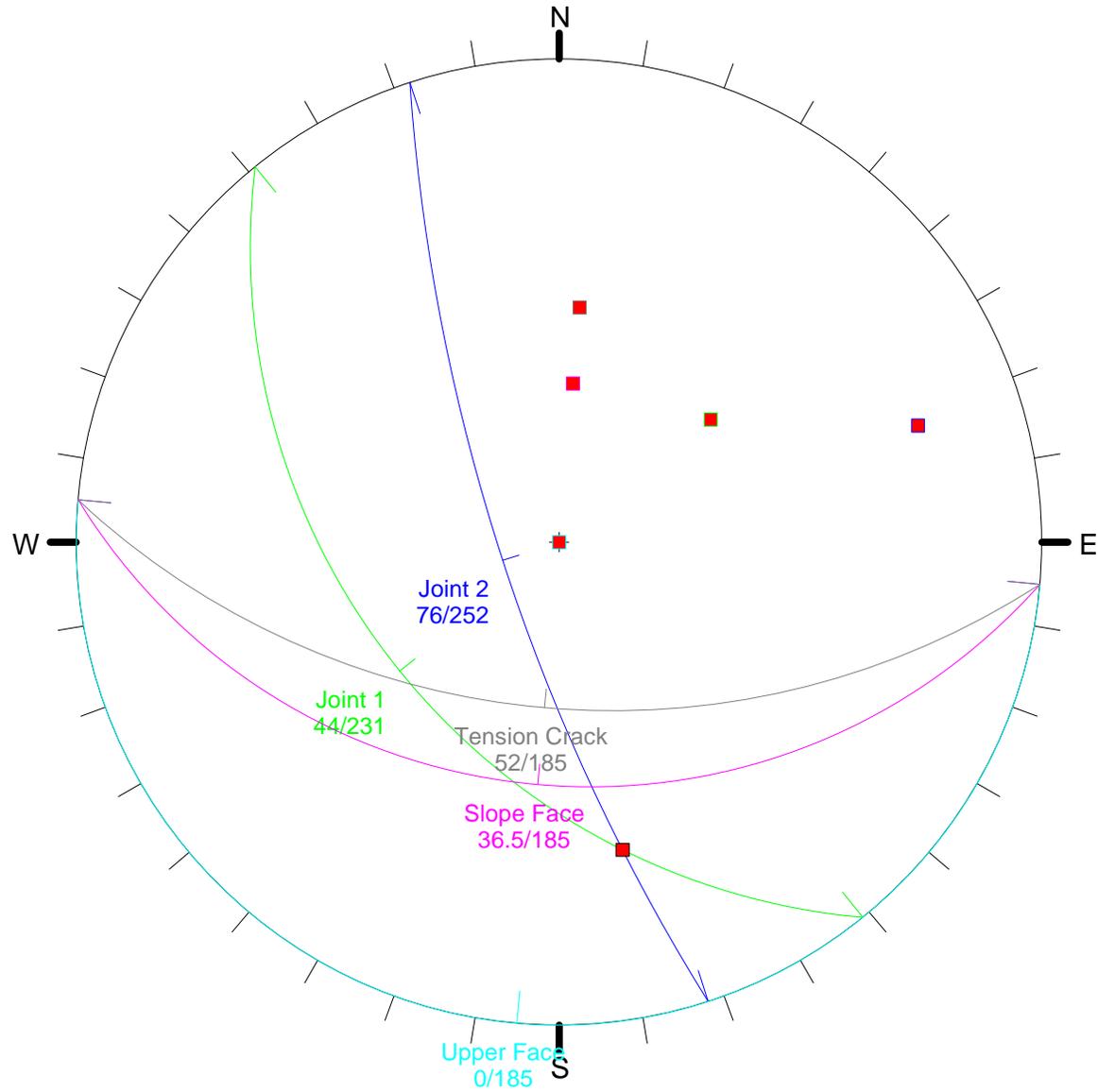
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 81.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	264.364	1401.285	1050.000
234	-193.041	1441.303	1050.000
135	264.364	1401.285	1050.000
125	-197.688	958.908	434.394
235	-193.041	1441.303	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 4
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 0.9990
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 42670455.882
- Wedge weight [tons]: 2346875.061
- Wedge area (joint1) [ft²]: 253736.58
- Wedge area (joint2) [ft²]: 255397.36
- Wedge area (slope) [ft²]: 566305.56
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 271361.36

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	458314.00	633930.14
Effective Normal stress [t/ft²]	1.81	2.48
Shear Strength [t/ft²]	2.08	2.67
Strength due to Waviness [t/ft²]	0.09	0.13

- Driving force [tons]: 1267654.37
- Resisting force [tons]: 1266373.73

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	684251.93
Joint 2	N/A	688730.57
Fissures	2.70	N/A
Tension Crack	2.70	731780.72

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
22.98	178.37	982.23

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1770.34	0.00
Joint 2	1836.68	0.00
Tension Crack	N/A	641.62

Persistence:

- Joint 1 [ft]: 1770.34
- Joint 2 [ft]: 1836.68

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	20.39	20.39
Joint 1 & Crest	85.65	85.65
Joint 2 & Crest	73.97	73.97
Joint 1 & Tension Crack	N/A	112.00
Joint 2 & Tension Crack	N/A	102.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	58.00	253.00
Joint Set 2	53.00	107.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

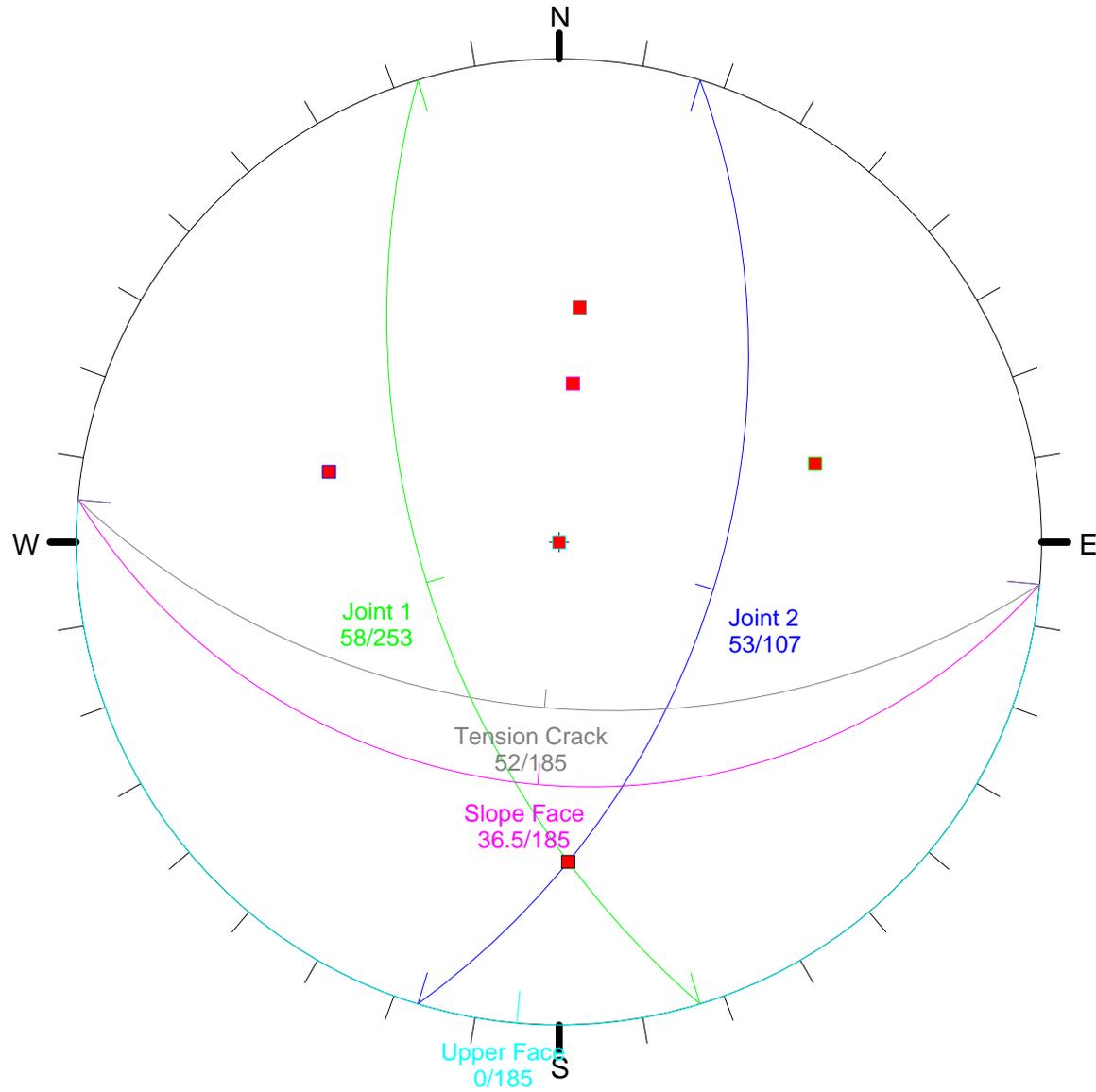
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 73.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	257.492	1401.886	1050.000
234	-381.688	1457.807	1050.000
135	257.492	1401.886	1050.000
125	-25.800	903.918	383.453
235	-381.688	1457.807	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 5
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.1064
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 48697425.936
- Wedge weight [tons]: 2678358.412
- Wedge area (joint1) [ft²]: 410826.71
- Wedge area (joint2) [ft²]: 361671.94
- Wedge area (slope) [ft²]: 399166.38
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 309689.68

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	533836.79	1324860.85
Effective Normal stress [t/ft²]	1.30	3.66
Shear Strength [t/ft²]	1.64	3.69
Strength due to Waviness [t/ft²]	0.07	0.19

- Driving force [tons]: 1904445.00
- Resisting force [tons]: 2107125.72

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	3590559.41
Joint 2	N/A	3160954.61
Fissures	8.74	N/A
Tension Crack	8.74	2706638.03

Failure Mode:

- Sliding up intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
-2.66	161.34	629.36

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1770.34	0.00
Joint 2	1793.63	0.00
Tension Crack	N/A	452.25

Persistence:

- Joint 1 [ft]: 1770.34
- Joint 2 [ft]: 1793.63

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	14.56	14.56
Joint 1 & Crest	85.65	85.65
Joint 2 & Crest	79.79	79.79
Joint 1 & Tension Crack	N/A	112.00
Joint 2 & Tension Crack	N/A	67.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	58.00	253.00
Joint Set 2	76.00	252.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

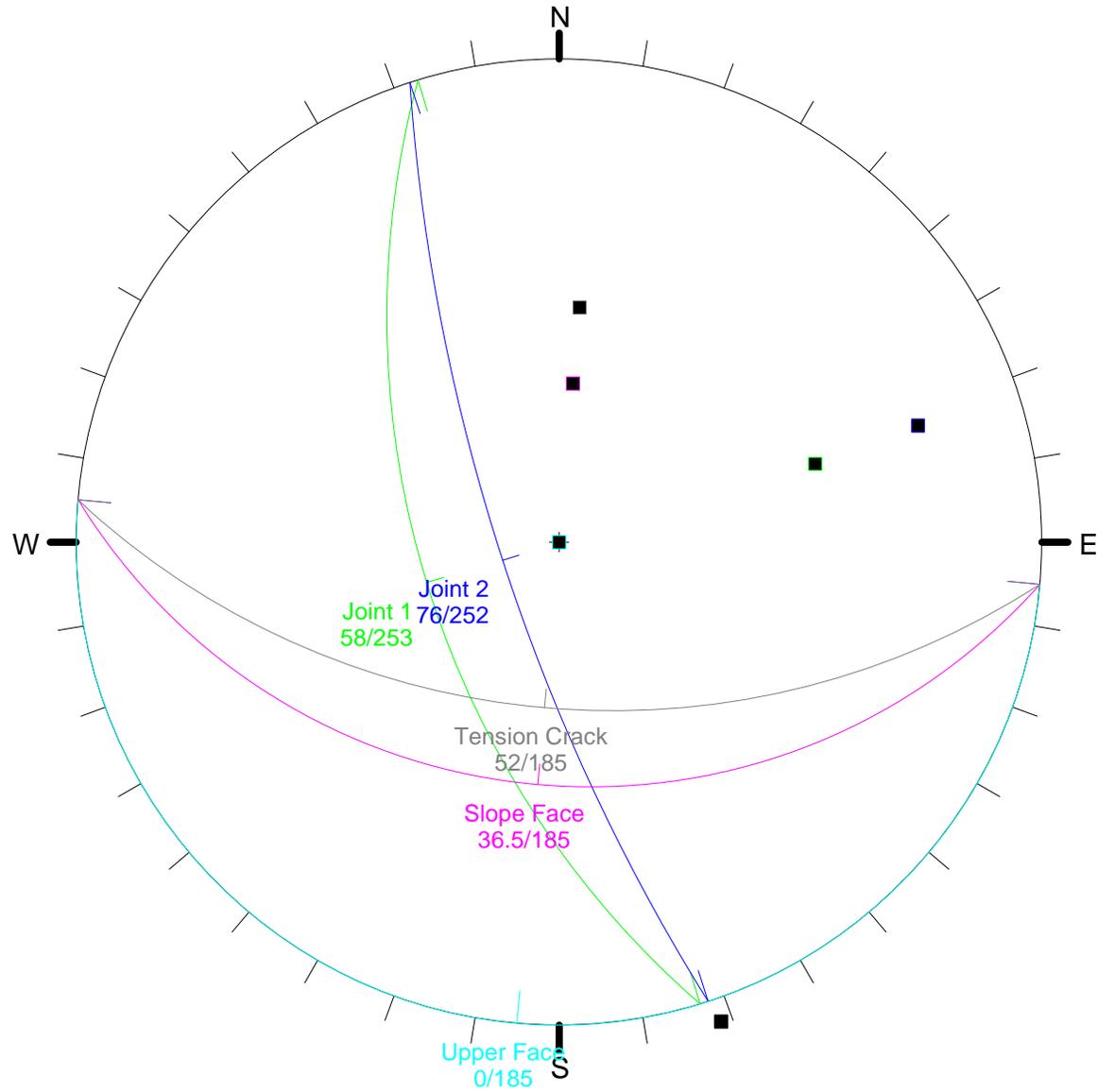
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 92.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	257.492	1401.886	1050.000
234	-193.041	1441.303	1050.000
135	257.492	1401.886	1050.000
125	-201.187	595.622	-29.212
235	-193.041	1441.303	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 6
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0212
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 197113095.128
- Wedge weight [tons]: 10841220.173
- Wedge area (joint1) [ft²]: 367811.37
- Wedge area (joint2) [ft²]: 942478.74
- Wedge area (slope) [ft²]: 1804666.42
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 1253534.25

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	3716249.71	2956937.54
Effective Normal stress [t/ft²]	10.10	3.14
Shear Strength [t/ft²]	9.29	3.24
Strength due to Waviness [t/ft²]	0.53	0.16

- Driving force [tons]: 6677009.13
- Resisting force [tons]: 6818888.05

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	2350861.06
Joint 2	N/A	6023839.18
Fissures	6.39	N/A
Tension Crack	6.39	8011945.93

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
6.85	167.31	702.09

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1770.34	0.00
Joint 2	2804.30	0.00
Tension Crack	N/A	2044.68

Persistence:

- Joint 1 [ft]: 1770.34
- Joint 2 [ft]: 2804.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	46.64	46.64
Joint 1 & Crest	94.35	94.35
Joint 2 & Crest	39.01	39.01
Joint 1 & Tension Crack	N/A	68.00
Joint 2 & Tension Crack	N/A	125.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	58.00	253.00
Joint Set 2	22.00	240.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

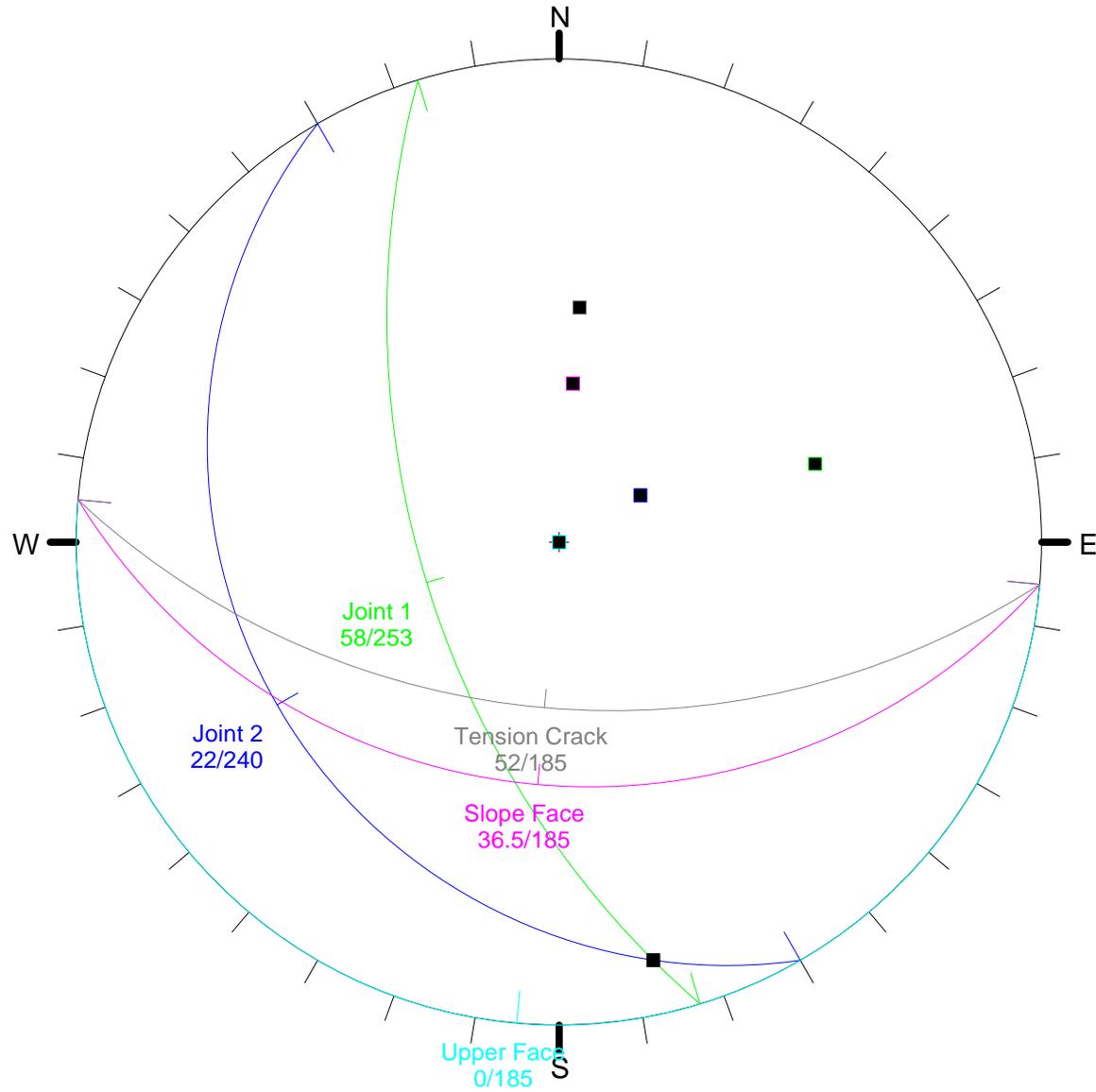
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 86.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	257.492	1401.886	1050.000
234	2294.391	1223.681	1050.000
135	257.492	1401.886	1050.000
125	-153.162	680.042	83.786
235	2294.391	1223.681	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 7
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0656
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 64517068.591
- Wedge weight [tons]: 3548438.753
- Wedge area (joint1) [ft²]: 271219.47
- Wedge area (joint2) [ft²]: 335155.99
- Wedge area (slope) [ft²]: 652480.58
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 410294.18

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	877339.33	1014679.32
Effective Normal stress [t/ft²]	3.23	3.03
Shear Strength [t/ft²]	3.32	3.14
Strength due to Waviness [t/ft²]	0.17	0.16

- Driving force [tons]: 1926744.86
- Resisting force [tons]: 2053114.69

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	1170845.56
Joint 2	N/A	1446857.44
Fissures	4.32	N/A
Tension Crack	4.32	1771226.53

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
13.40	186.66	756.50

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1780.41	0.00
Joint 2	1836.68	0.00
Tension Crack	N/A	739.26

Persistence:

- Joint 1 [ft]: 1780.41
- Joint 2 [ft]: 1836.68

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	23.52	23.52
Joint 1 & Crest	82.51	82.51
Joint 2 & Crest	73.97	73.97
Joint 1 & Tension Crack	N/A	92.00
Joint 2 & Tension Crack	N/A	102.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	75.00	273.00
Joint Set 2	53.00	107.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

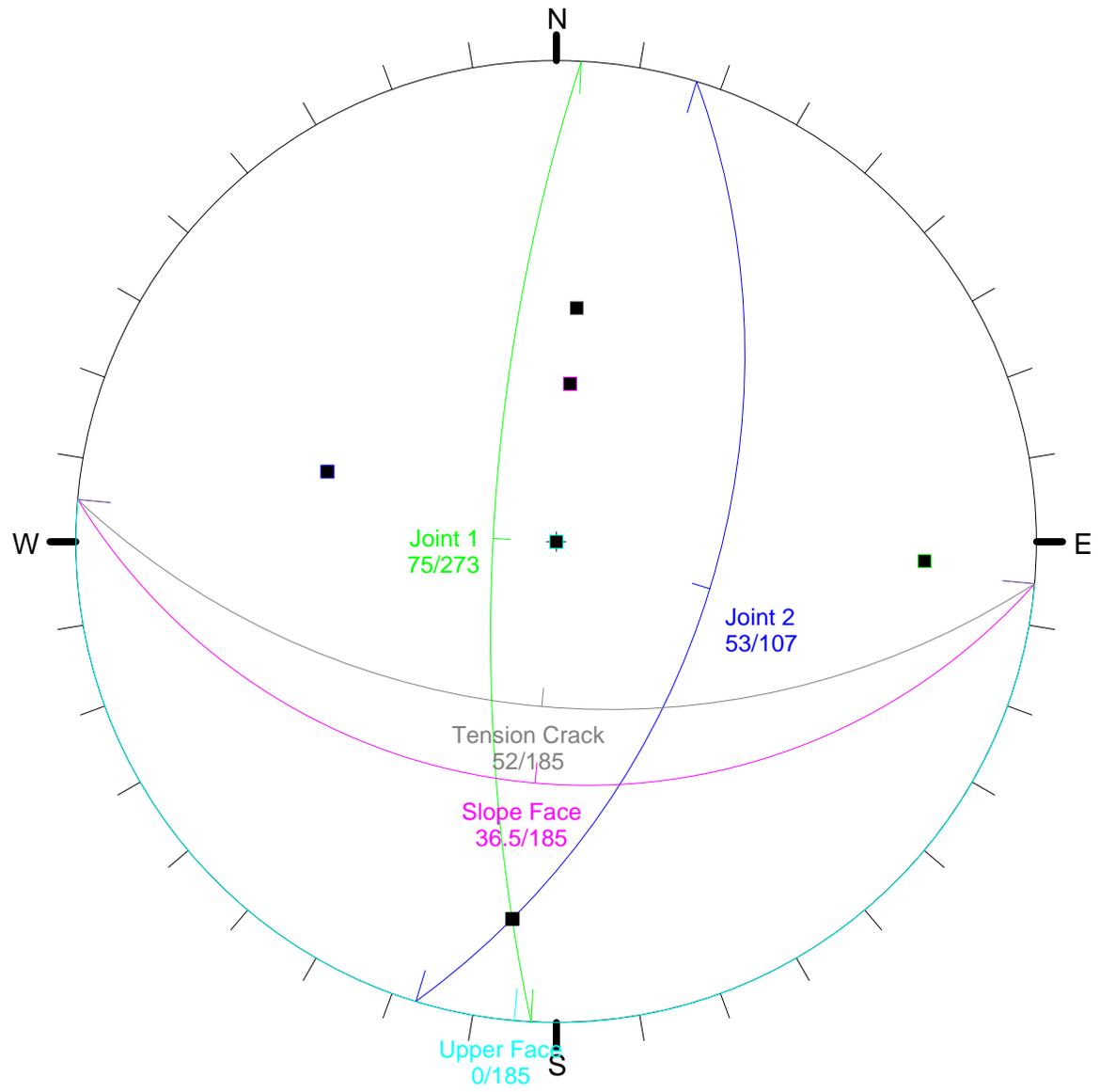
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 78.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	354.757	1393.377	1050.000
234	-381.688	1457.807	1050.000
135	354.757	1393.377	1050.000
125	85.342	730.943	175.295
235	-381.688	1457.807	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 8
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0590
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 169338962.696
- Wedge weight [tons]: 9313642.898
- Wedge area (joint1) [ft²]: 270285.88
- Wedge area (joint2) [ft²]: 850281.16
- Wedge area (slope) [ft²]: 1718491.40
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 1076905.57

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	1031451.74	3683867.91
Effective Normal stress [t/ft²]	3.82	4.33
Shear Strength [t/ft²]	3.83	4.28
Strength due to Waviness [t/ft²]	0.20	0.23

- Driving force [tons]: 4643711.20
- Resisting force [tons]: 4917573.45

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	992923.89
Joint 2	N/A	3123598.18
Fissures	3.67	N/A
Tension Crack	3.67	3956127.01

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
13.58	186.71	759.51

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1780.41	0.00
Joint 2	2804.30	0.00
Tension Crack	N/A	1947.04

Persistence:

- Joint 1 [ft]: 1780.41
- Joint 2 [ft]: 2804.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	43.50	43.50
Joint 1 & Crest	97.49	97.49
Joint 2 & Crest	39.01	39.01
Joint 1 & Tension Crack	N/A	88.00
Joint 2 & Tension Crack	N/A	125.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	75.00	273.00
Joint Set 2	22.00	240.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

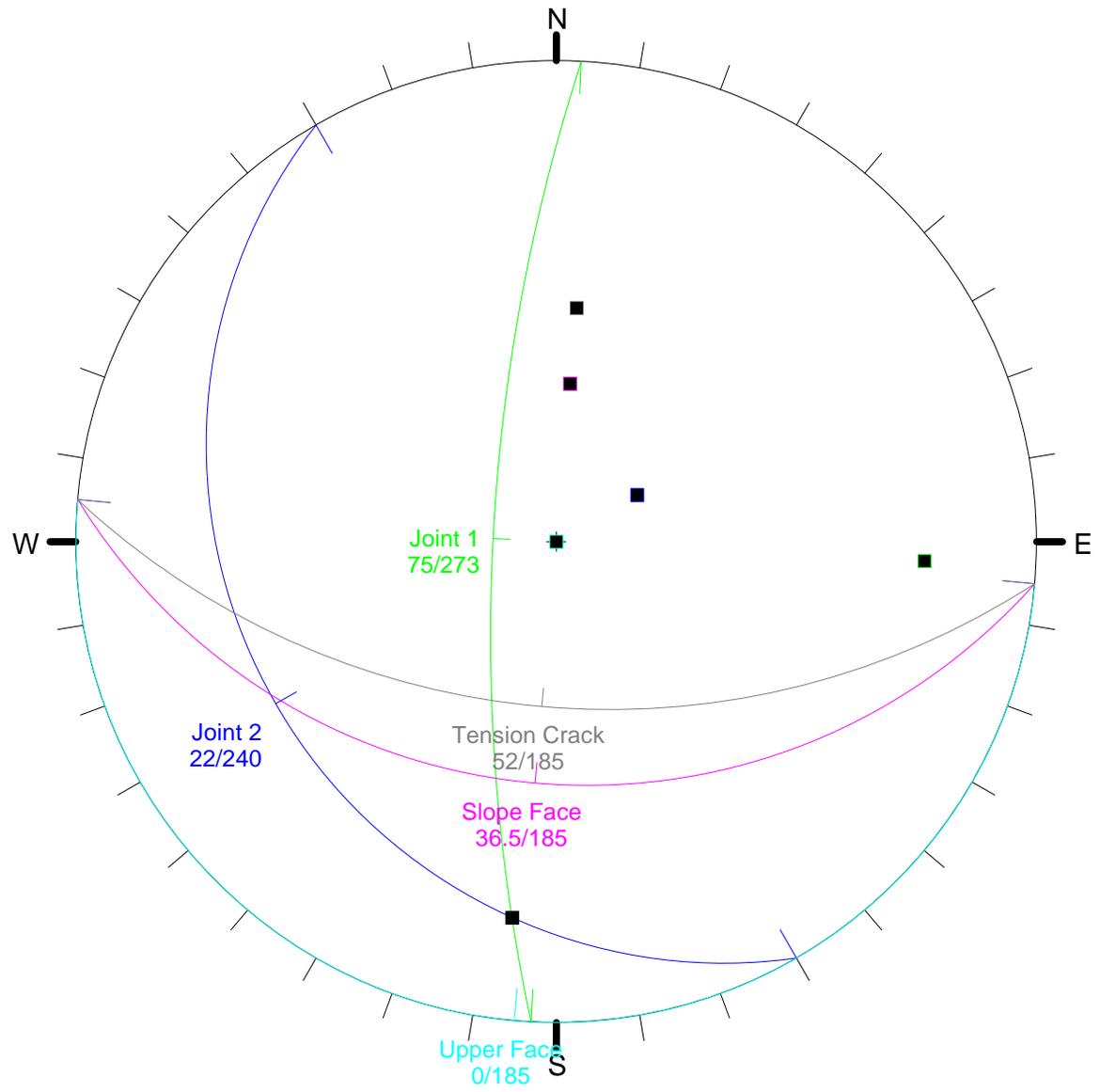
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 74.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	354.757	1393.377	1050.000
234	2294.391	1223.681	1050.000
135	354.757	1393.377	1050.000
125	86.269	733.223	178.306
235	2294.391	1223.681	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 9
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0601
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 30272012.633
- Wedge weight [tons]: 1664960.686
- Wedge area (joint1) [ft²]: 228891.89
- Wedge area (joint2) [ft²]: 328562.67
- Wedge area (slope) [ft²]: 362764.44
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 192513.87

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	284767.47	493371.49
Effective Normal stress [t/ft²]	1.24	1.50
Shear Strength [t/ft²]	1.59	1.82
Strength due to Waviness [t/ft²]	0.07	0.08

- Driving force [tons]: 944717.16
- Resisting force [tons]: 1001508.23

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	833909.11
Joint 2	N/A	1197034.11
Fissures	3.64	N/A
Tension Crack	3.64	701375.08

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
20.28	188.68	899.75

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1780.41	0.00
Joint 2	1878.69	0.00
Tension Crack	N/A	411.01

Persistence:

- Joint 1 [ft]: 1780.41
- Joint 2 [ft]: 1878.69

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	12.53	12.53
Joint 1 & Crest	97.49	97.49
Joint 2 & Crest	69.99	69.99
Joint 1 & Tension Crack	N/A	88.00
Joint 2 & Tension Crack	N/A	108.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	75.00	273.00
Joint Set 2	45.00	257.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

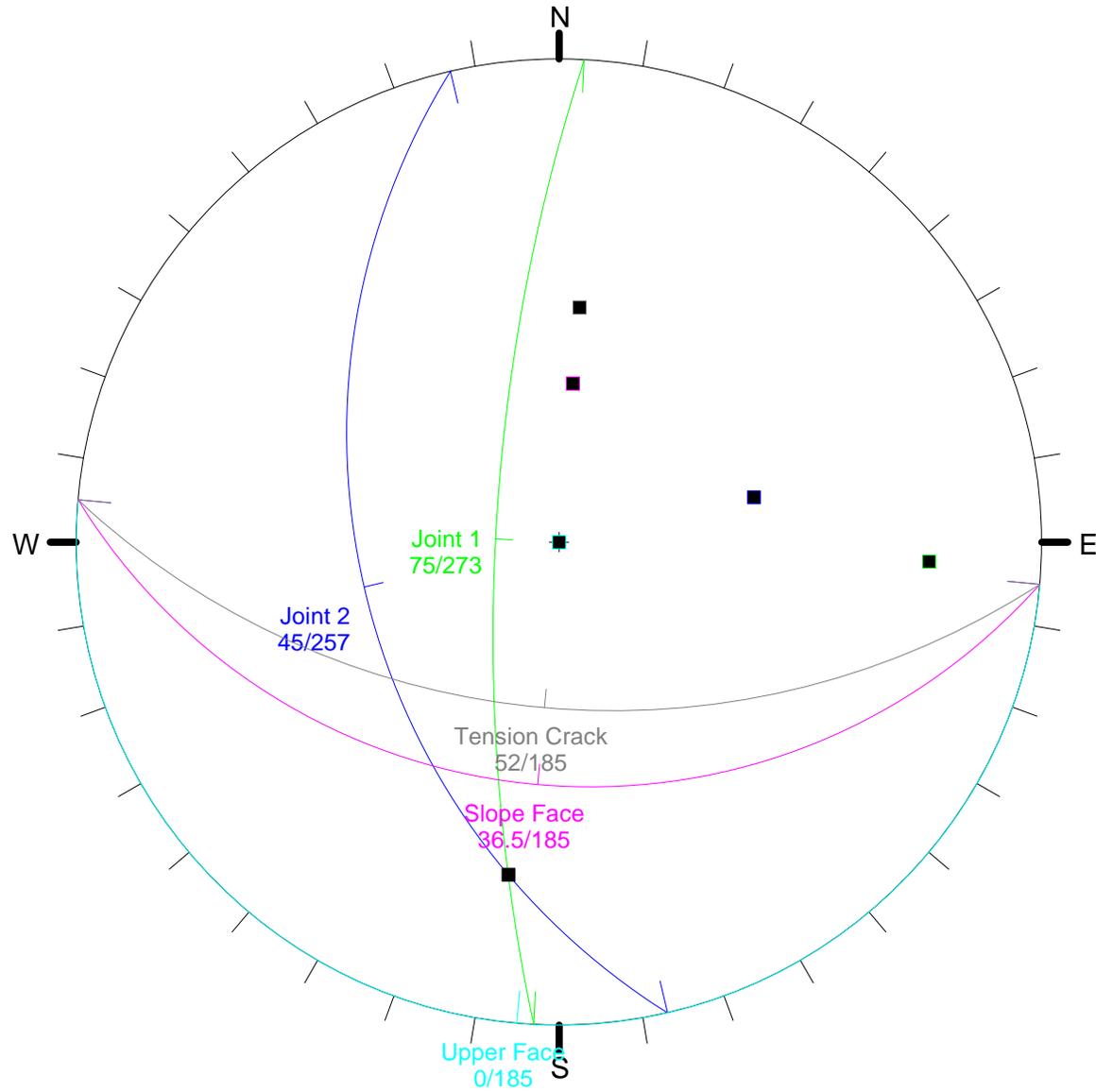
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 78.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	354.757	1393.377	1050.000
234	764.203	1357.555	1050.000
135	354.757	1393.377	1050.000
125	127.388	834.325	311.805
235	764.203	1357.555	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 10
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.1989
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 1506061.088
- Wedge weight [tons]: 82833.359
- Wedge area (joint1) [ft²]: 80509.80
- Wedge area (joint2) [ft²]: 112584.25
- Wedge area (slope) [ft²]: 59971.37
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 9577.75

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	49162.87	0.00
Effective Normal stress [t/ft²]	0.61	0.00
Shear Strength [t/ft²]	1.04	0.00
Strength due to Waviness [t/ft²]	0.03	0.00

- Driving force [tons]: 72045.51
- Resisting force [tons]: 86373.14

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	186009.57
Joint 2	N/A	260114.28
Fissures	2.31	N/A
Tension Crack	2.31	22128.39

Failure Mode:

- Sliding up joint1

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
30.64	212.01	1624.60

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1899.23	0.00
Joint 2	1875.23	0.00
Tension Crack	N/A	67.95

Persistence:

- Joint 1 [ft]: 1899.23
- Joint 2 [ft]: 1875.23

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	1.93	1.93
Joint 1 & Crest	68.35	68.35
Joint 2 & Crest	109.72	109.72
Joint 1 & Tension Crack	N/A	57.00
Joint 2 & Tension Crack	N/A	137.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	80.00	128.00
Joint Set 2	60.00	142.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

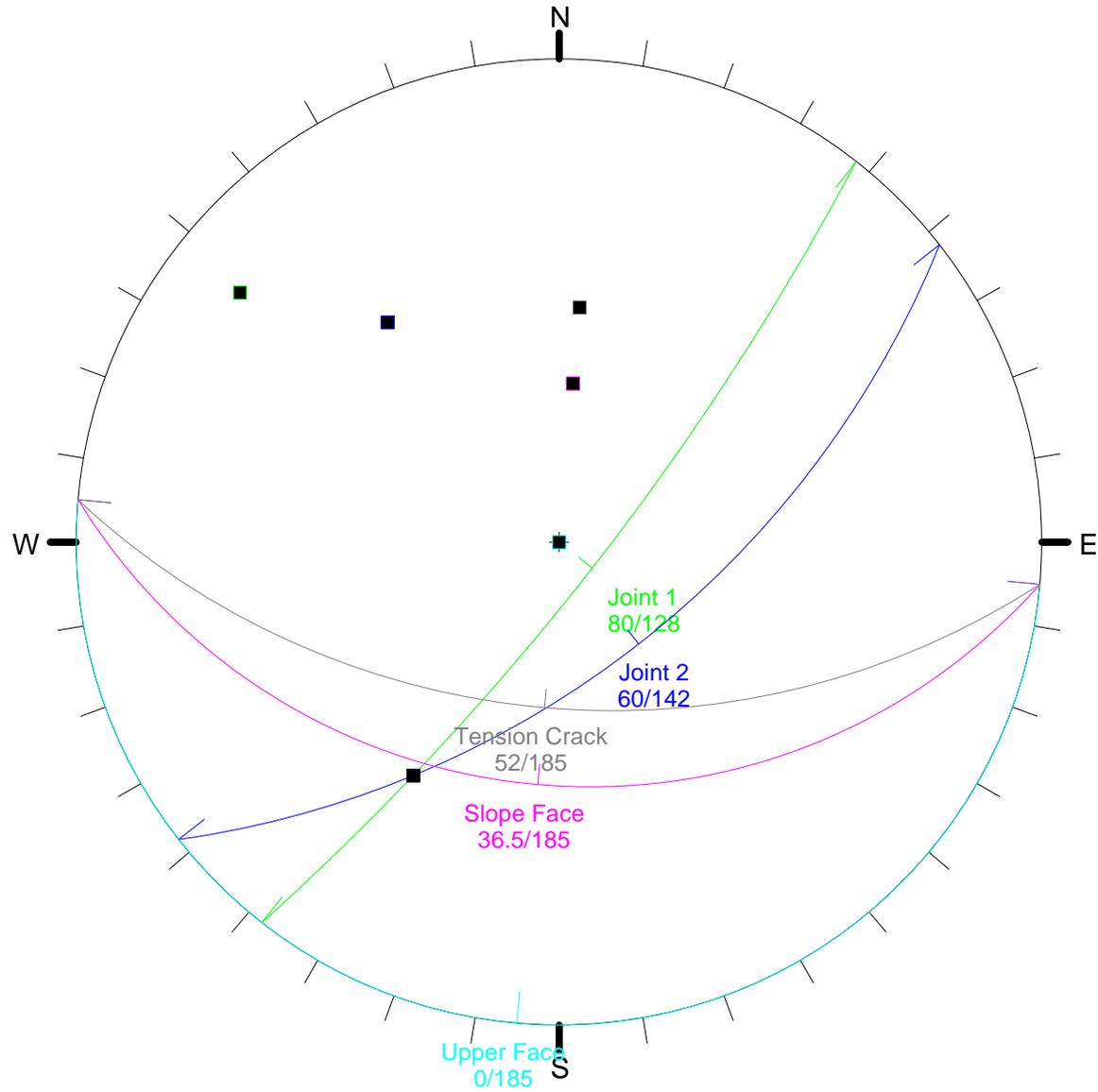
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Filled Fissures

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	821.754	1352.520	1050.000
234	754.065	1358.442	1050.000
135	821.754	1352.520	1050.000
125	740.870	1185.368	827.846
235	754.065	1358.442	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 11
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0137
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 100137103.646
- Wedge weight [tons]: 5507540.671
- Wedge area (joint1) [ft²]: 246049.19
- Wedge area (joint2) [ft²]: 662254.42
- Wedge area (slope) [ft²]: 1304737.62
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 636818.62

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	0.00	2464038.51
Effective Normal stress [t/ft²]	0.00	3.72
Shear Strength [t/ft²]	0.00	3.74
Strength due to Waviness [t/ft²]	0.00	0.19

- Driving force [tons]: 2573544.91
- Resisting force [tons]: 2608840.54

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	570727.72
Joint 2	N/A	1536143.86
Fissures	2.32	N/A
Tension Crack	2.32	1477143.81

Failure Mode:

- Sliding on joint2

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
20.01	214.32	1084.54

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1899.23	0.00
Joint 2	2804.30	0.00
Tension Crack	N/A	1478.26

Persistence:

- Joint 1 [ft]: 1899.23
- Joint 2 [ft]: 2804.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	29.34	29.34
Joint 1 & Crest	111.65	111.65
Joint 2 & Crest	39.01	39.01
Joint 1 & Tension Crack	N/A	123.00
Joint 2 & Tension Crack	N/A	125.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	80.00	128.00
Joint Set 2	22.00	240.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

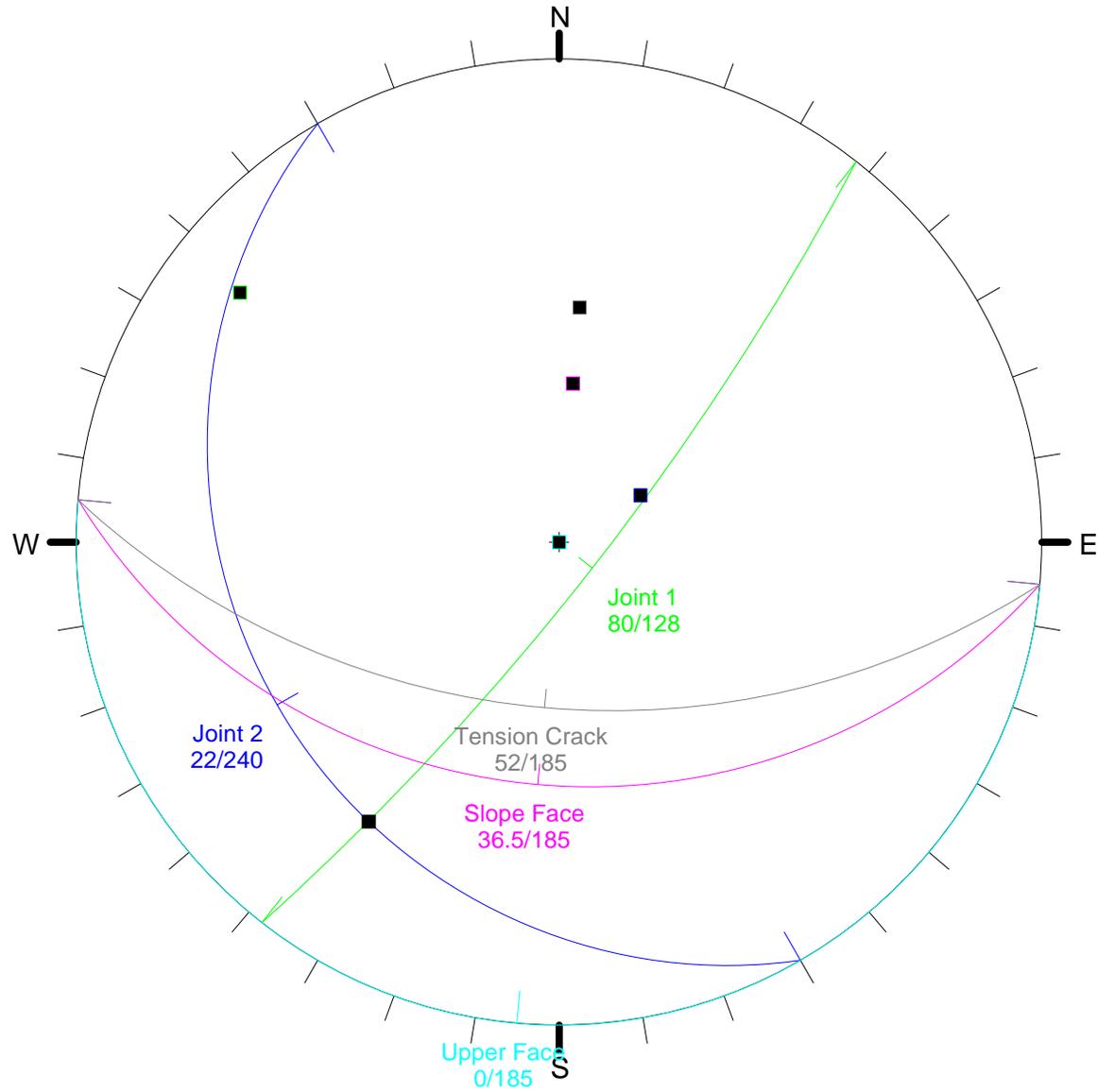
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 69.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	821.754	1352.520	1050.000
234	2294.391	1223.681	1050.000
135	821.754	1352.520	1050.000
125	574.562	841.680	371.068
235	2294.391	1223.681	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 12
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0495
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 6582552.663
- Wedge weight [tons]: 362040.394
- Wedge area (joint1) [ft²]: 133492.24
- Wedge area (joint2) [ft²]: 116755.90
- Wedge area (slope) [ft²]: 167139.18
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 41861.53

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	78094.83	18488.44
Effective Normal stress [t/ft²]	0.59	0.16
Shear Strength [t/ft²]	1.02	0.65
Strength due to Waviness [t/ft²]	0.03	0.01

- Driving force [tons]: 206424.01
- Resisting force [tons]: 216646.82

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	204053.39
Joint 2	N/A	178470.57
Fissures	1.53	N/A
Tension Crack	1.53	63988.64

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
30.64	170.49	1376.76

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1836.68	0.00
Joint 2	1793.63	0.00
Tension Crack	N/A	189.37

Persistence:

- Joint 1 [ft]: 1836.68
- Joint 2 [ft]: 1793.63

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	5.82	5.82
Joint 1 & Crest	73.97	73.97
Joint 2 & Crest	100.21	100.21
Joint 1 & Tension Crack	N/A	102.00
Joint 2 & Tension Crack	N/A	113.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	53.00	107.00
Joint Set 2	76.00	252.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

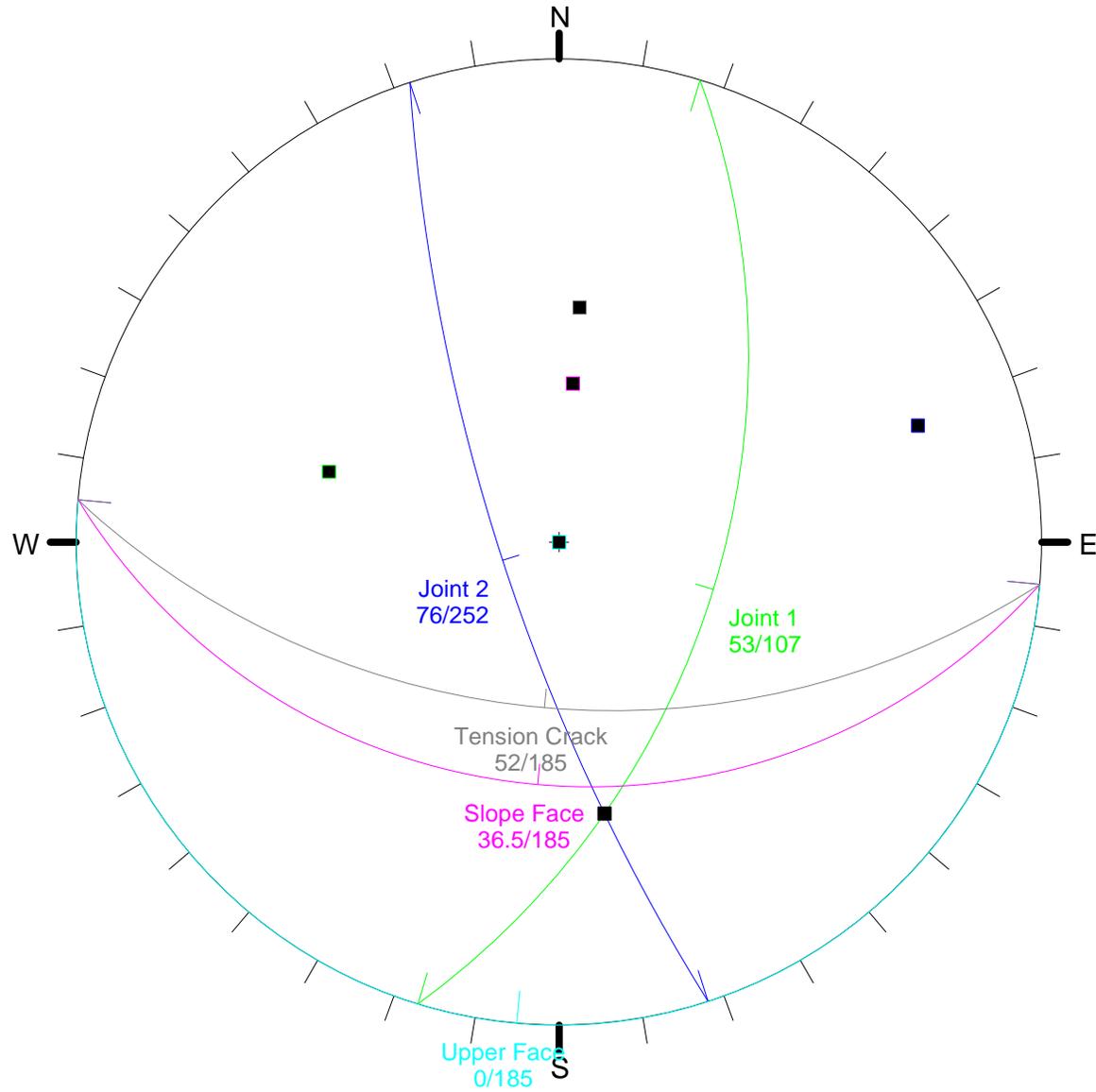
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 75.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	-381.688	1457.807	1050.000
234	-193.041	1441.303	1050.000
135	-381.688	1457.807	1050.000
125	-195.671	1168.298	701.606
235	-193.041	1441.303	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 13
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0580
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 233855476.666
- Wedge weight [tons]: 12862051.147
- Wedge area (joint1) [ft²]: 334319.01
- Wedge area (joint2) [ft²]: 851087.37
- Wedge area (slope) [ft²]: 2370971.98
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 1487196.22

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	1615949.88	4630102.30
Effective Normal stress [t/ft²]	4.83	5.44
Shear Strength [t/ft²]	4.71	5.24
Strength due to Waviness [t/ft²]	0.25	0.29

- Driving force [tons]: 6012514.18
- Resisting force [tons]: 6361509.29

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	1085788.30
Joint 2	N/A	2764128.51
Fissures	3.25	N/A
Tension Crack	3.25	4830058.09

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
13.53	186.55	758.63

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1836.68	0.00
Joint 2	2804.30	0.00
Tension Crack	N/A	2686.30

Persistence:

- Joint 1 [ft]: 1836.68
- Joint 2 [ft]: 2804.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	67.02	67.02
Joint 1 & Crest	73.97	73.97
Joint 2 & Crest	39.01	39.01
Joint 1 & Tension Crack	N/A	102.00
Joint 2 & Tension Crack	N/A	125.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	53.00	107.00
Joint Set 2	22.00	240.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

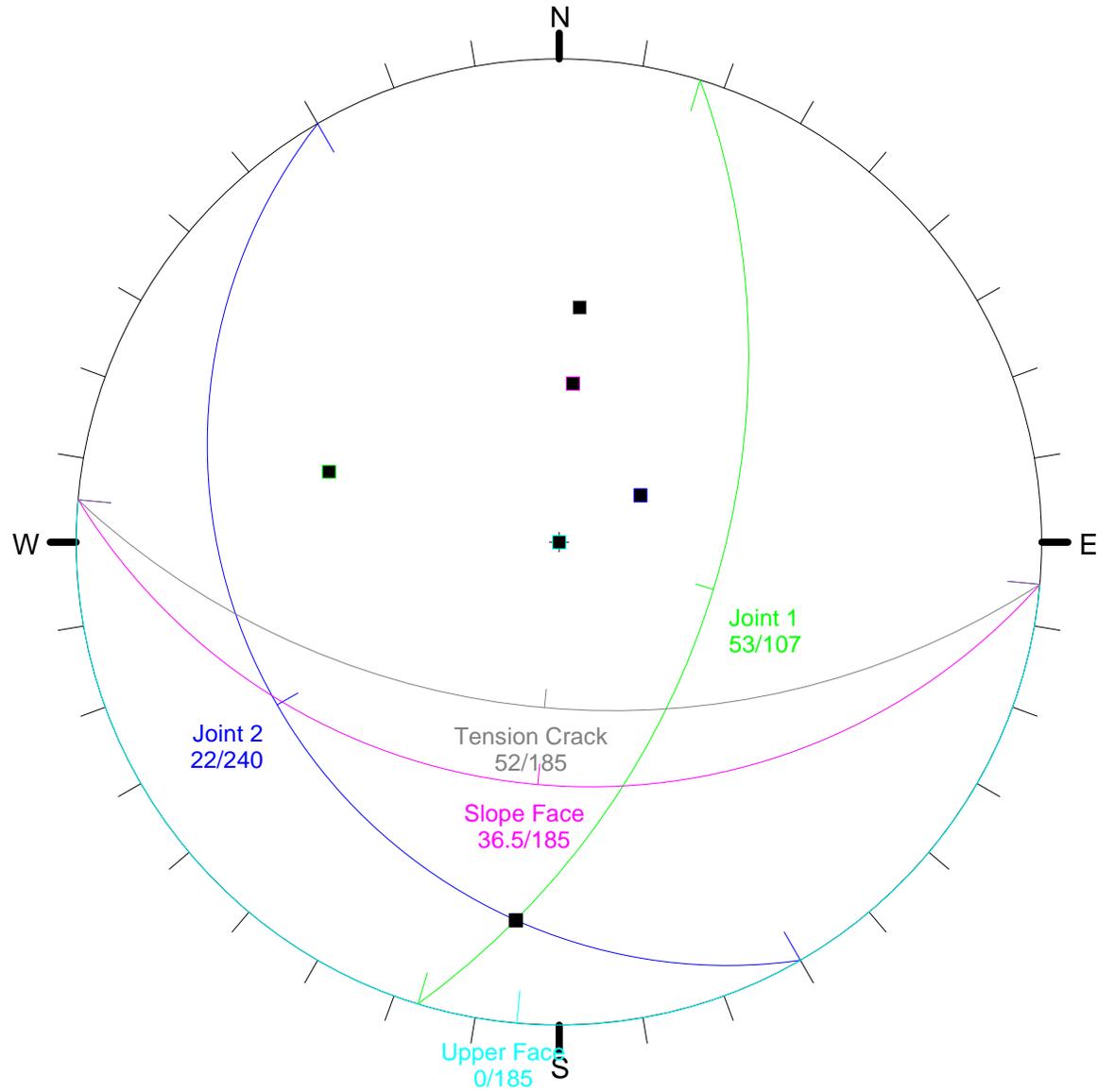
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 71.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	-381.688	1457.807	1050.000
234	2294.391	1223.681	1050.000
135	-381.688	1457.807	1050.000
125	84.175	732.758	177.479
235	2294.391	1223.681	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 14
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0079
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 96060228.402
- Wedge weight [tons]: 5283312.533
- Wedge area (joint1) [ft²]: 315560.45
- Wedge area (joint2) [ft²]: 607374.55
- Wedge area (slope) [ft²]: 1364708.99
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 610891.86

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	0.00	2363720.28
Effective Normal stress [t/ft²]	0.00	3.89
Shear Strength [t/ft²]	0.00	3.89
Strength due to Waviness [t/ft²]	0.00	0.20

- Driving force [tons]: 2468768.35
- Resisting force [tons]: 2488389.03

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	671307.21
Joint 2	N/A	1292097.65
Fissures	2.13	N/A
Tension Crack	2.13	1299580.21

Failure Mode:

- Sliding on joint2

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
20.71	219.39	1208.11

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1875.23	0.00
Joint 2	2804.30	0.00
Tension Crack	N/A	1546.21

Persistence:

- Joint 1 [ft]: 1875.23
- Joint 2 [ft]: 2804.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	31.27	31.27
Joint 1 & Crest	109.72	109.72
Joint 2 & Crest	39.01	39.01
Joint 1 & Tension Crack	N/A	137.00
Joint 2 & Tension Crack	N/A	125.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	60.00	142.00
Joint Set 2	22.00	240.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

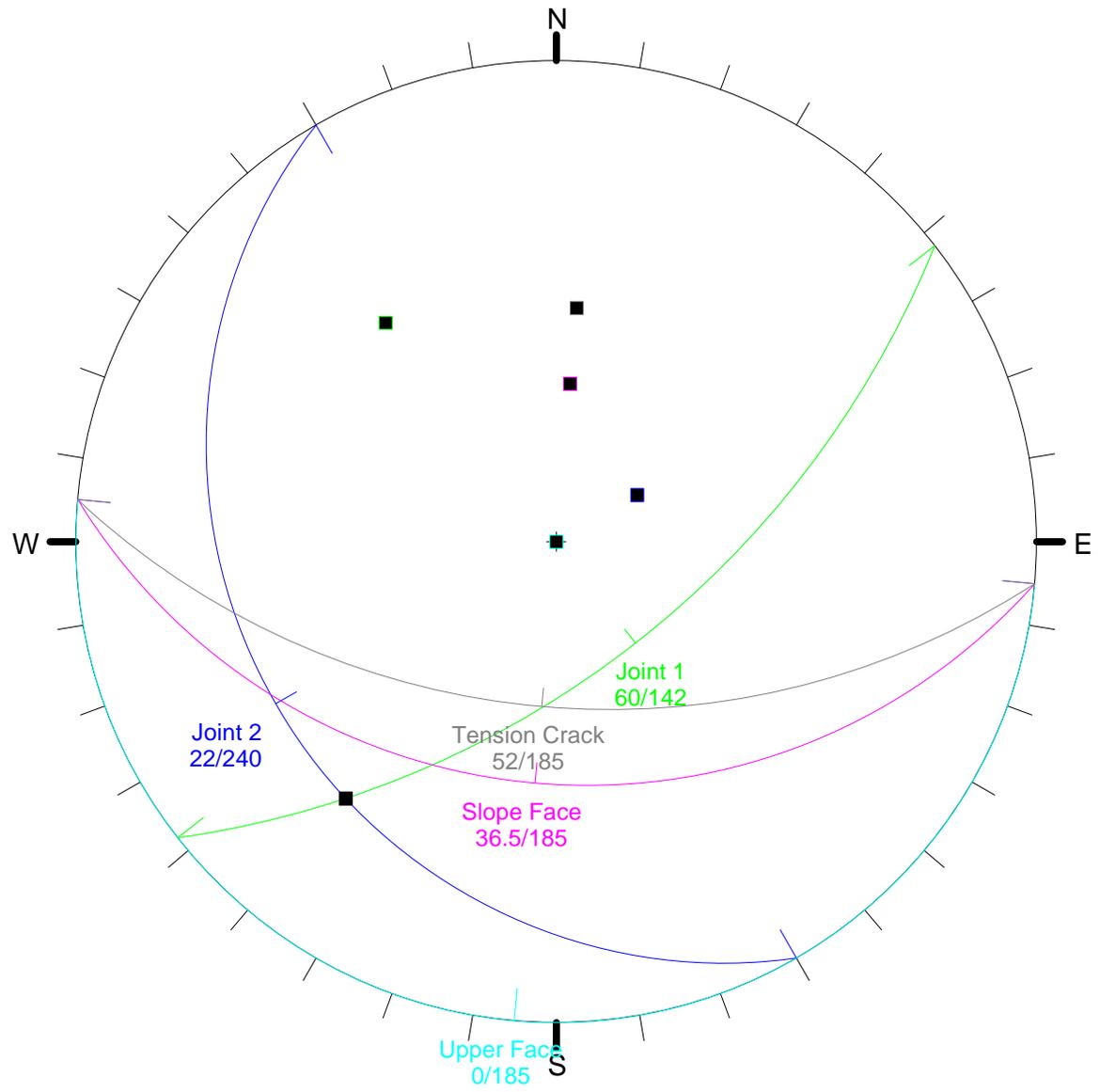
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 69.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	754.065	1358.442	1050.000
234	2294.391	1223.681	1050.000
135	754.065	1358.442	1050.000
125	717.081	873.336	427.330
235	2294.391	1223.681	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 15
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 6.5407
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 12814.624
- Wedge weight [tons]: 704.804
- Wedge area (joint1) [ft²]: 6396.03
- Wedge area (joint2) [ft²]: 5617.37
- Wedge area (slope) [ft²]: 8982.03
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 81.49

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	0.00	10.36
Effective Normal stress [t/ft²]	0.00	0.00
Shear Strength [t/ft²]	0.00	0.51
Strength due to Waviness [t/ft²]	0.00	0.00

- Driving force [tons]: 439.46
- Resisting force [tons]: 2874.41

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	497.59
Joint 2	N/A	437.01
Fissures	0.08	N/A
Tension Crack	0.08	6.34

Failure Mode:

- Sliding on joint2

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
33.88	209.19	1860.75

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1875.23	0.00
Joint 2	1878.69	0.00
Tension Crack	N/A	10.18

Persistence:

- Joint 1 [ft]: 1875.23
- Joint 2 [ft]: 1878.69

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	0.29	0.29
Joint 1 & Crest	109.72	109.72
Joint 2 & Crest	69.99	69.99
Joint 1 & Tension Crack	N/A	137.00
Joint 2 & Tension Crack	N/A	108.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	60.00	142.00
Joint Set 2	45.00	257.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

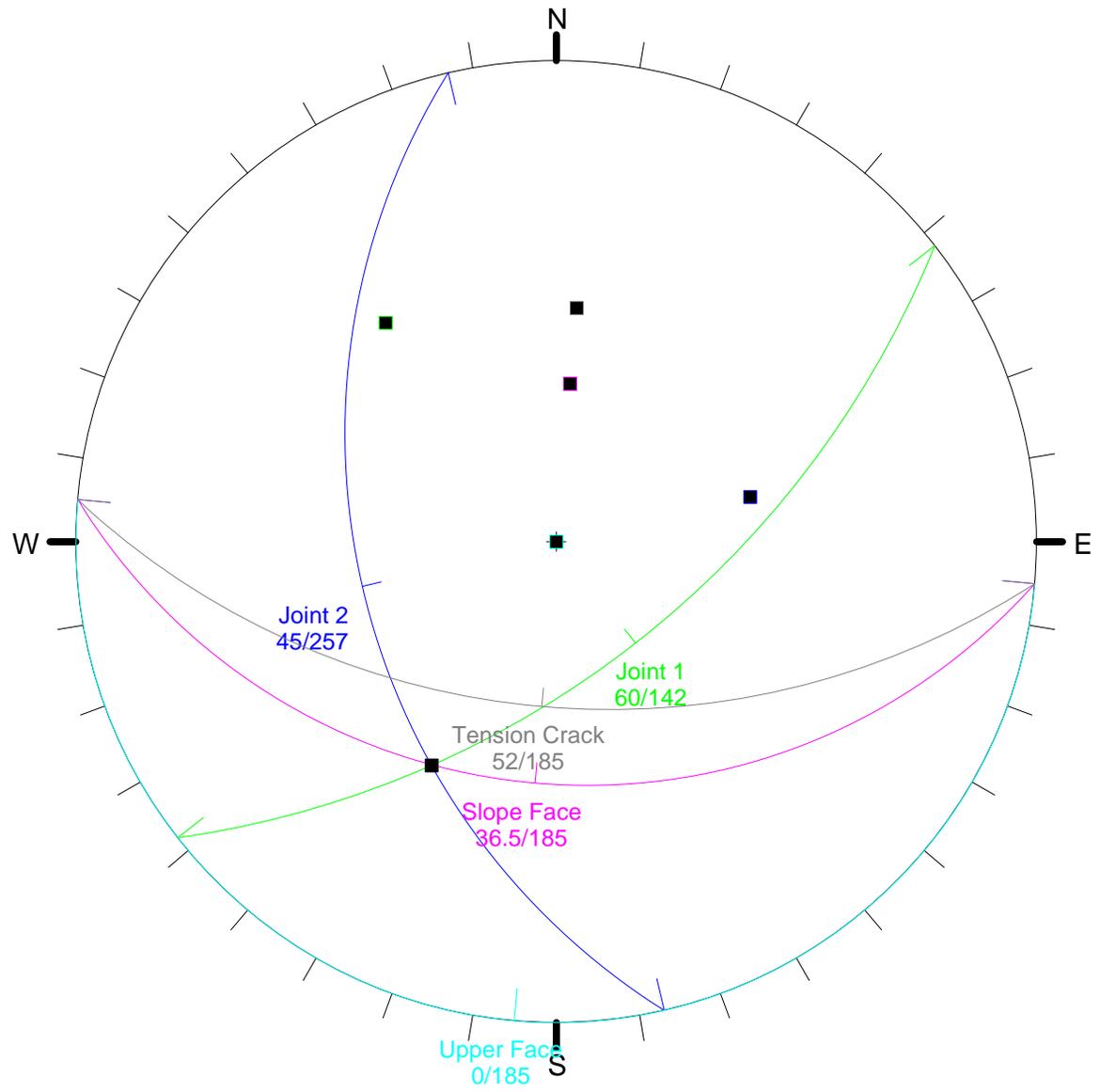
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 84.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	754.065	1358.442	1050.000
234	764.203	1357.555	1050.000
135	754.065	1358.442	1050.000
125	753.316	1348.609	1037.379
235	764.203	1357.555	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 16
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0035
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 245364896.831
- Wedge weight [tons]: 13495069.253
- Wedge area (joint1) [ft²]: 330062.78
- Wedge area (joint2) [ft²]: 960697.84
- Wedge area (slope) [ft²]: 2203832.80
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 1560390.00

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	4272317.89	3307683.55
Effective Normal stress [t/ft²]	12.94	3.44
Shear Strength [t/ft²]	11.76	3.50
Strength due to Waviness [t/ft²]	0.68	0.18

- Driving force [tons]: 7618255.87
- Resisting force [tons]: 7644733.67

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	2003808.00
Joint 2	N/A	5832387.50
Fissures	6.07	N/A
Tension Crack	6.07	9473112.96

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
5.32	163.33	701.93

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1793.63	0.00
Joint 2	2804.30	0.00
Tension Crack	N/A	2496.93

Persistence:

- Joint 1 [ft]: 1793.63
- Joint 2 [ft]: 2804.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	61.20	61.20
Joint 1 & Crest	79.79	79.79
Joint 2 & Crest	39.01	39.01
Joint 1 & Tension Crack	N/A	67.00
Joint 2 & Tension Crack	N/A	125.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	76.00	252.00
Joint Set 2	22.00	240.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

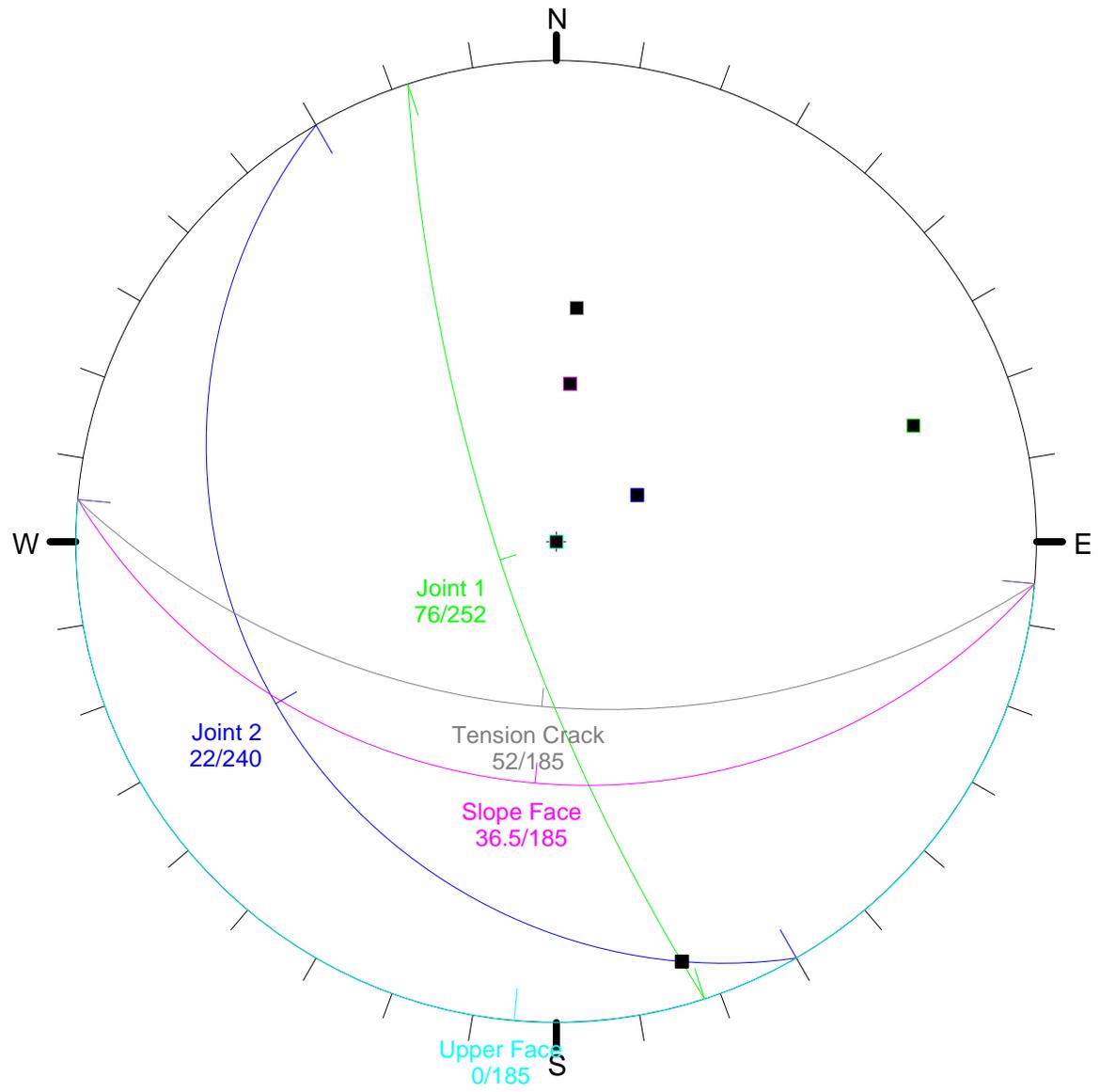
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 84.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	-193.041	1441.303	1050.000
234	2294.391	1223.681	1050.000
135	-193.041	1441.303	1050.000
125	-200.475	669.532	65.109
235	2294.391	1223.681	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 17
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0291
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 107322961.620
- Wedge weight [tons]: 5902762.857
- Wedge area (joint1) [ft²]: 375150.35
- Wedge area (joint2) [ft²]: 498246.47
- Wedge area (slope) [ft²]: 848105.84
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 682516.85

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	2889015.21	1273138.16
Effective Normal stress [t/ft²]	7.70	2.56
Shear Strength [t/ft²]	7.20	2.73
Strength due to Waviness [t/ft²]	0.40	0.13

- Driving force [tons]: 4160699.10
- Resisting force [tons]: 4281666.31

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	3400942.91
Joint 2	N/A	4516876.49
Fissures	9.07	N/A
Tension Crack	9.07	6187388.19

Failure Mode:

- Sliding up intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
-6.61	160.34	603.02

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1793.63	0.00
Joint 2	1878.69	0.00
Tension Crack	N/A	960.90

Persistence:

- Joint 1 [ft]: 1793.63
- Joint 2 [ft]: 1878.69

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	30.22	30.22
Joint 1 & Crest	79.79	79.79
Joint 2 & Crest	69.99	69.99
Joint 1 & Tension Crack	N/A	67.00
Joint 2 & Tension Crack	N/A	108.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	76.00	252.00
Joint Set 2	45.00	257.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

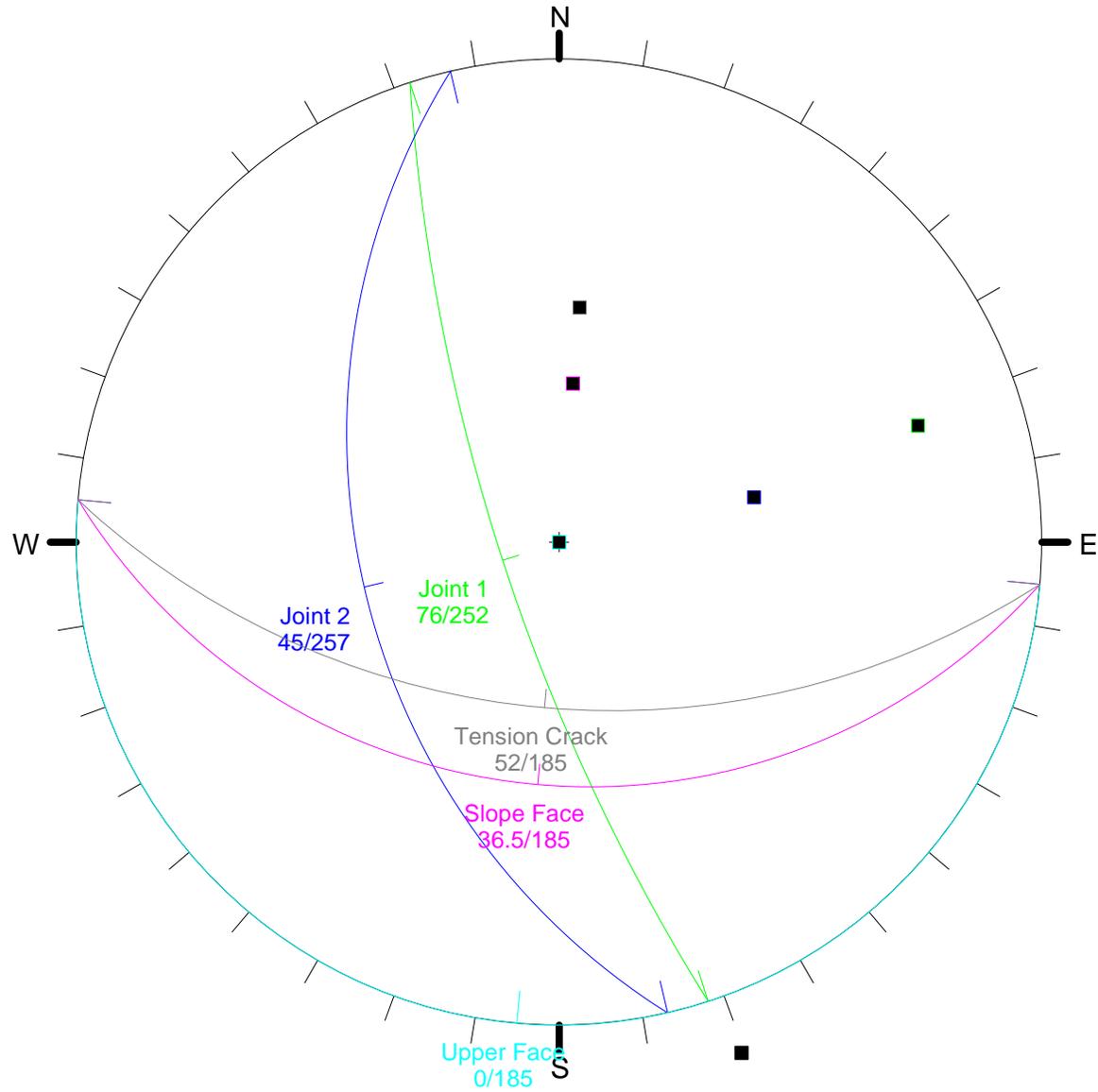
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 92.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	-193.041	1441.303	1050.000
234	764.203	1357.555	1050.000
135	-193.041	1441.303	1050.000
125	-201.491	564.106	-69.431
235	764.203	1357.555	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 18
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0404
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 140385726.700
- Wedge weight [tons]: 7721214.927
- Wedge area (joint1) [ft²]: 893518.91
- Wedge area (joint2) [ft²]: 407710.93
- Wedge area (slope) [ft²]: 1355726.96
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 892778.41

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	2509800.06	1979028.89
Effective Normal stress [t/ft²]	2.81	4.85
Shear Strength [t/ft²]	2.95	4.73
Strength due to Waviness [t/ft²]	0.15	0.25

- Driving force [tons]: 4614656.38
- Resisting force [tons]: 4800956.23

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	4867171.61
Joint 2	N/A	2220880.89
Fissures	5.45	N/A
Tension Crack	5.45	4863138.00

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
10.70	177.90	721.31

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	2804.30	0.00
Joint 2	1878.69	0.00
Tension Crack	N/A	1536.03

Persistence:

- Joint 1 [ft]: 2804.30
- Joint 2 [ft]: 1878.69

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	30.97	30.97
Joint 1 & Crest	39.01	39.01
Joint 2 & Crest	110.01	110.01
Joint 1 & Tension Crack	N/A	125.00
Joint 2 & Tension Crack	N/A	72.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	22.00	240.00
Joint Set 2	45.00	257.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

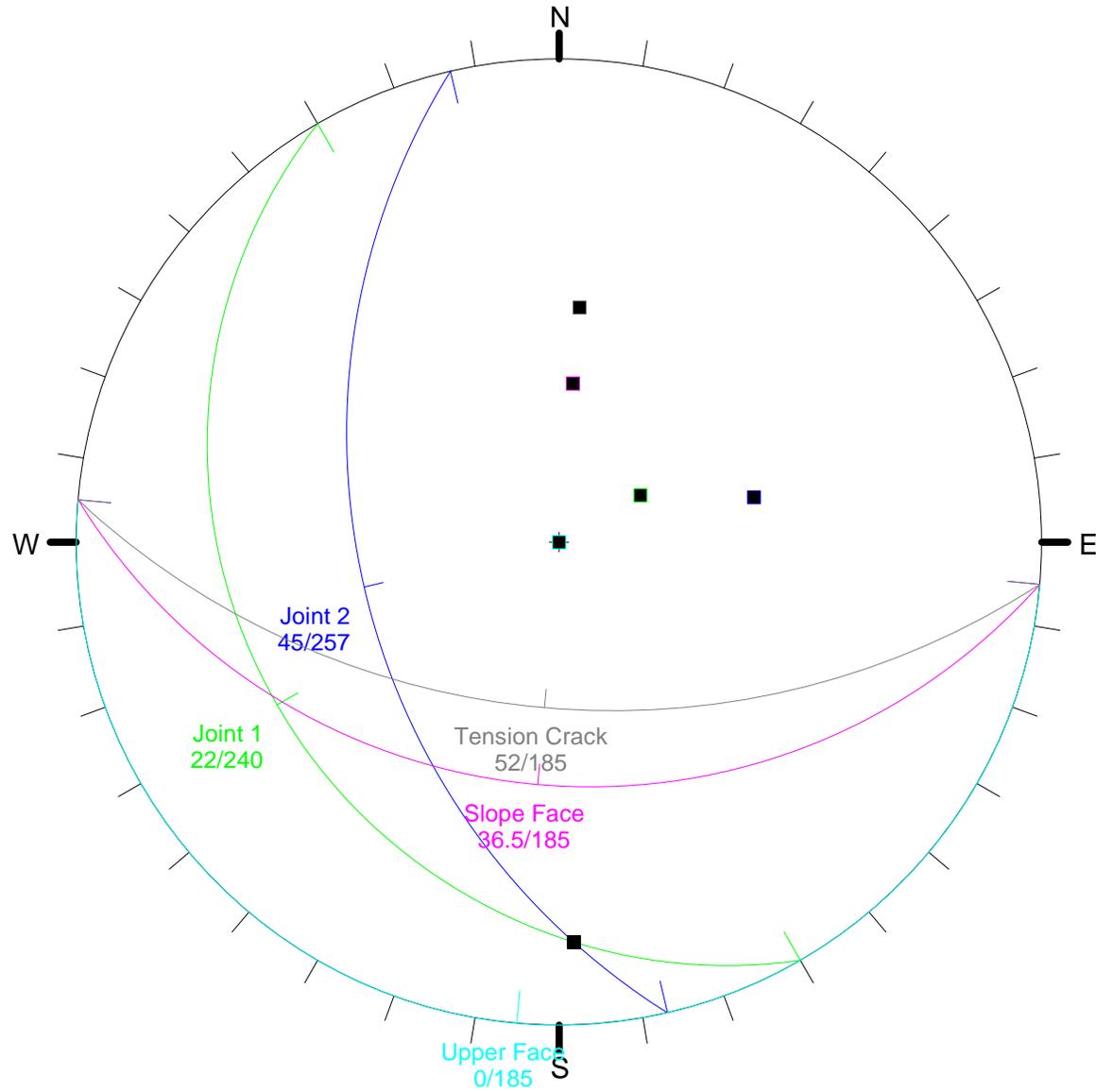
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 83.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	2294.391	1223.681	1050.000
234	764.203	1357.555	1050.000
135	2294.391	1223.681	1050.000
125	-26.016	708.282	133.979
235	764.203	1357.555	1050.000



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnC

Project Summary:

- Job Title: Rimforest Cross-Section C, Wedge 19
- Analysis: Joint Set Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0386
- Wedge height (on slope) [ft]: 1050.00
- Bench width (on upper face) [ft]: 0.00
- Wedge volume [ft³]: 12722042.379
- Wedge weight [tons]: 699712.327
- Wedge area (joint1) [ft²]: 256141.11
- Wedge area (joint2) [ft²]: 167287.46
- Wedge area (slope) [ft²]: 428578.70
- Wedge area (upper face) [ft²]: 0.00
- Wedge area (tension crack) [ft²]: 80905.41

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	251211.53	0.00
Effective Normal stress [t/ft²]	0.98	0.00
Shear Strength [t/ft²]	1.36	0.00
Strength due to Waviness [t/ft²]	0.05	0.00

- Driving force [tons]: 348713.08
- Resisting force [tons]: 362172.25

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	272120.98
Joint 2	N/A	177724.03
Fissures	1.06	N/A
Tension Crack	1.06	85952.86

Failure Mode:

- Sliding on joint1

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
21.96	236.56	2105.22

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	2804.30	0.00
Joint 2	2446.17	0.00
Tension Crack	N/A	485.58

Persistence:

- Joint 1 [ft]: 2804.30
- Joint 2 [ft]: 2446.17

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	7.18	7.18
Joint 1 & Crest	39.01	39.01
Joint 2 & Crest	133.81	133.81
Joint 1 & Tension Crack	N/A	125.00
Joint 2 & Tension Crack	N/A	150.00

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	22.00	240.00
Joint Set 2	70.00	155.00
Slope	36.50	185.00
Upper Face	0.00	185.00
Tension Crack	52.00	185.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.51
- Friction Angle [deg]: 41.00

Slope Data:

- Slope height [ft]: 1050.00
- Rock unit weight [t/ft³]: 0.05
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

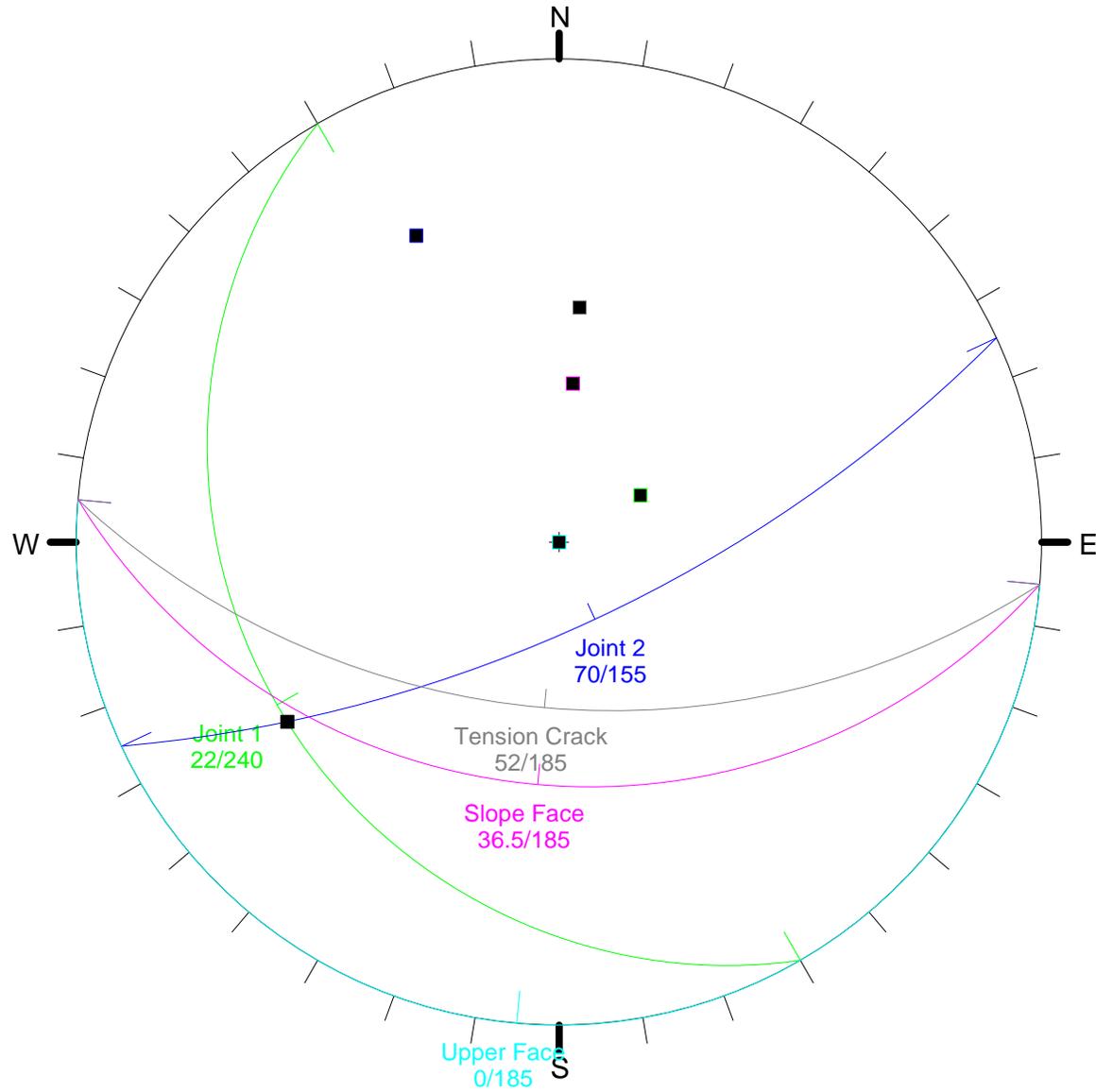
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 73.000 %

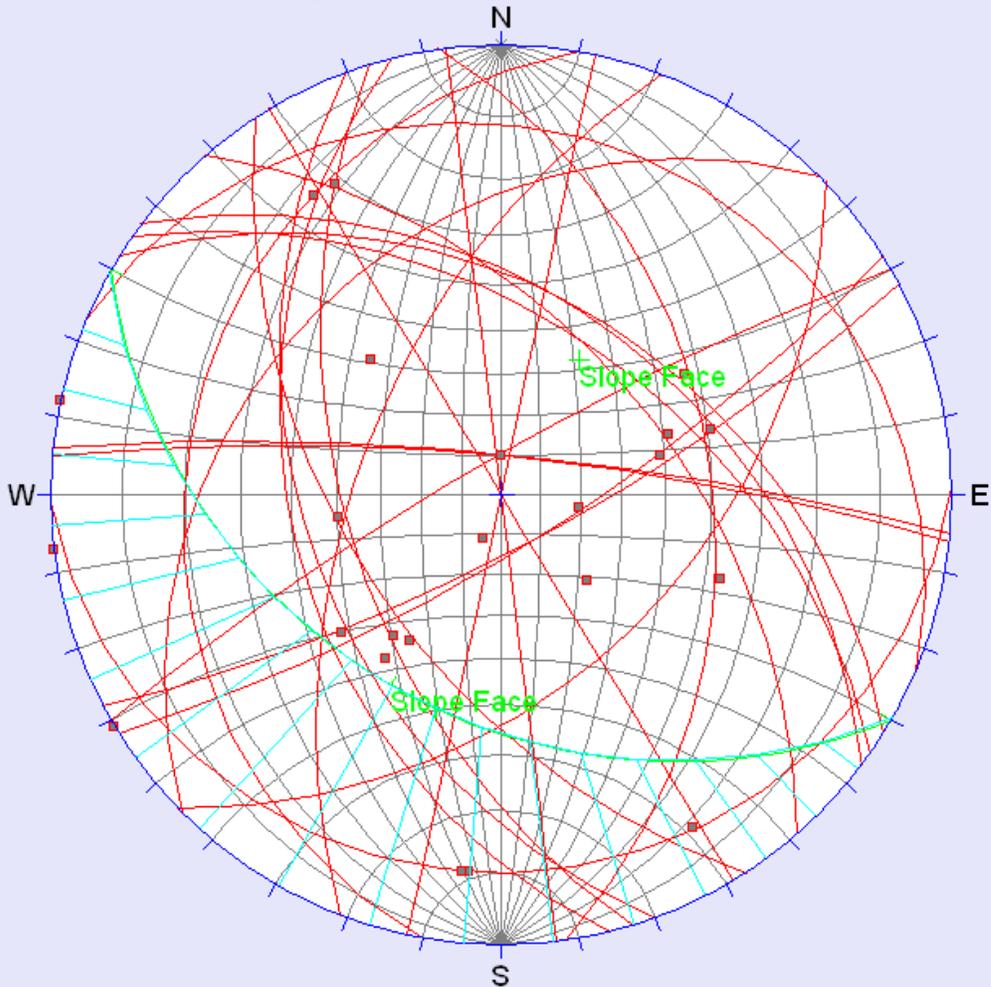
Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	2294.391	1223.681	1050.000
234	1810.661	1266.002	1050.000
135	2294.391	1223.681	1050.000
125	1629.210	1075.934	787.408
235	1810.661	1266.002	1050.000



Rimforest Cross-Section D

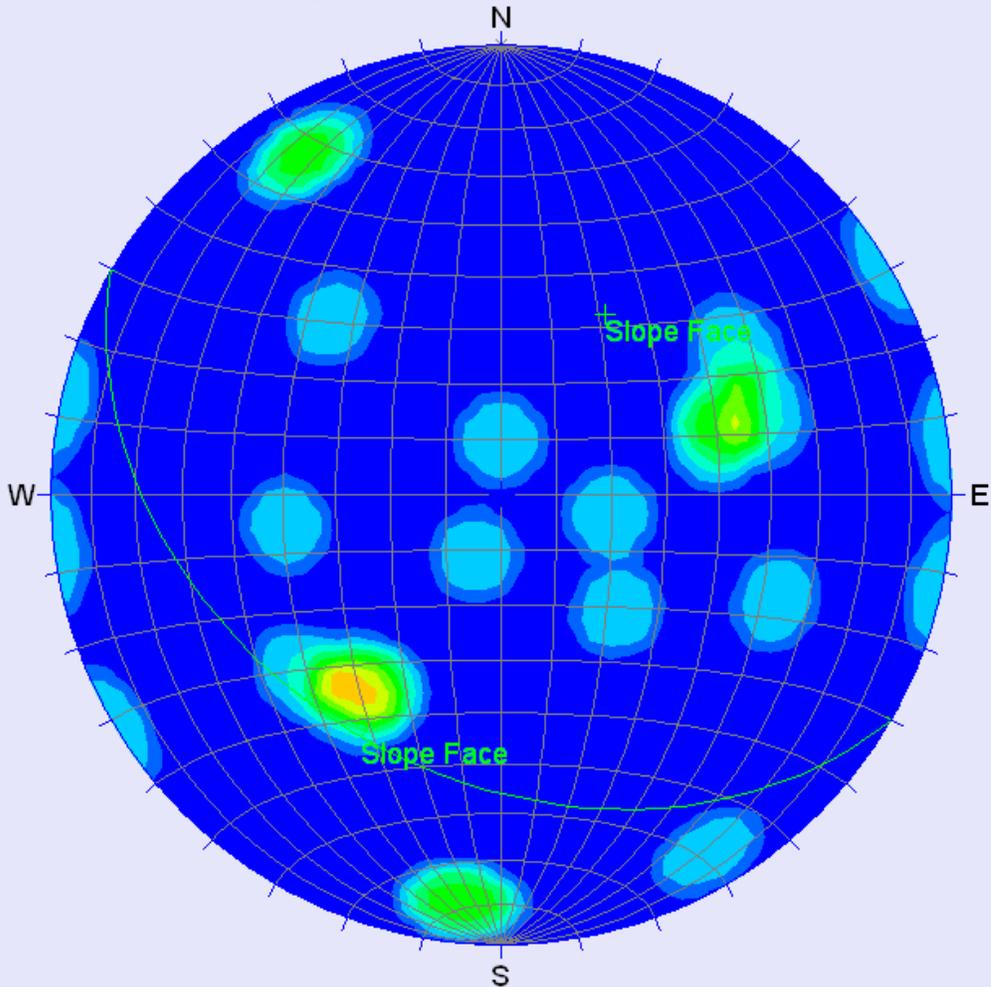


■ Poles

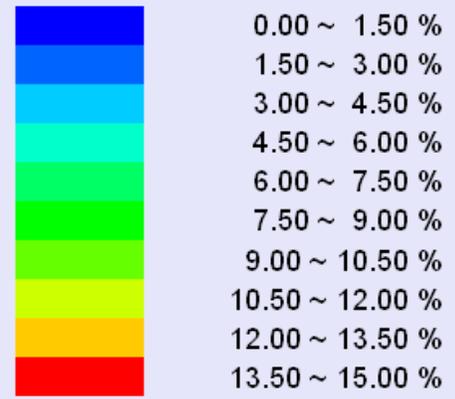
Equal Angle
Lower Hemisphere
23 Poles
23 Entries

Equal Angle Stereonet, Planar Attitudes

Rimforest Cross-Section D



Fisher Concentrations
% of total per 1.0 % area

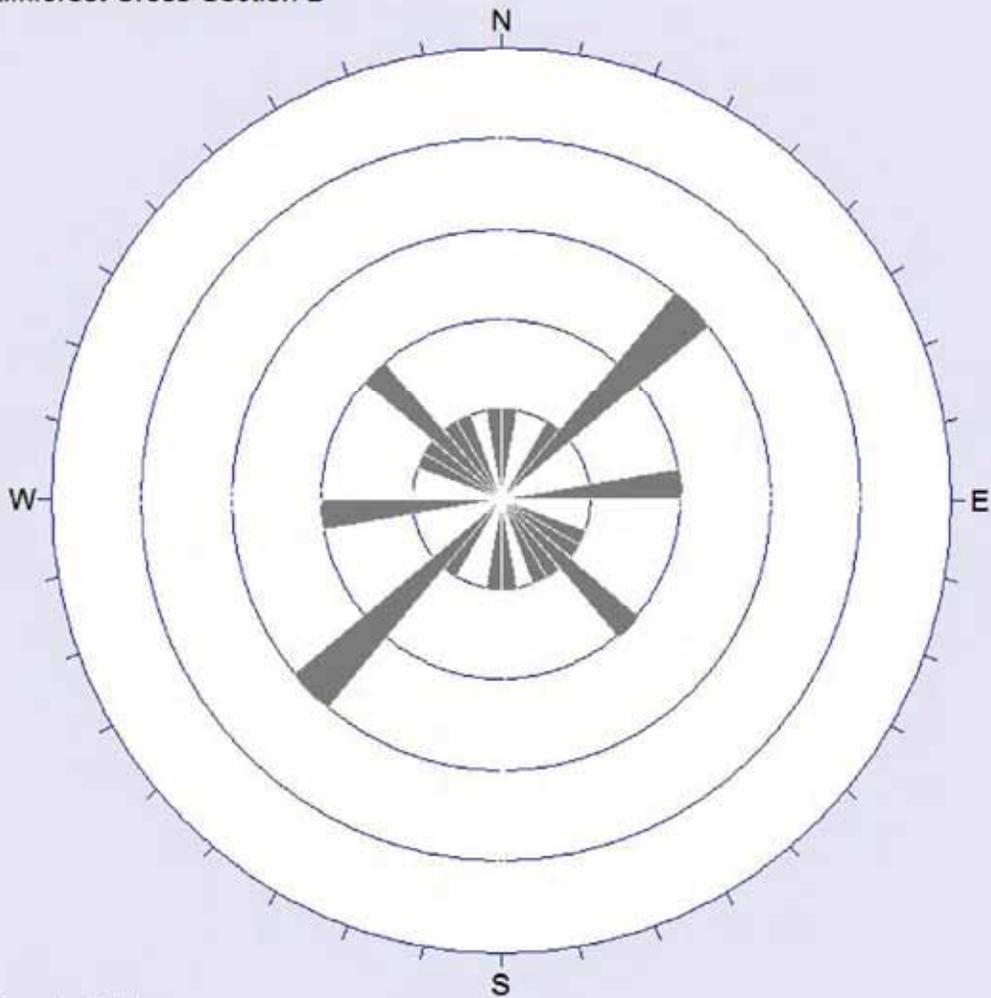


No Bias Correction
Max. Conc. = 13.2393%

Equal Area
Lower Hemisphere
23 Poles
23 Entries

Equal Area Stereonet, Contour Plot

Rimforest Cross-Section D



Rosette Plot

Apparent Strike
5 max planes / arc
at outer circle

Trend / Plunge of
Face Normal = 0, 90
(directed away from viewer)

No Bias Correction

14 Planes Plotted
Within 45 and 90
Degrees of Viewing
Face

RocPlane Analysis Information

Document Name:

RimforestXsectionD_Prob_REVISED

Job Title:

Rimforest Cross-Section D

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 0.238225
Lognormal Reliability Index = -0.124693
Number of Trial Wedges = 1000
Number of Valid Wedges = 981
Number of Invalid Wedges = 19
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.63432
Wedge Weight = 3613.26 t/ft
Wedge Volume = 60221 ft³/ft
Normal Force = 3006.06 t/ft
Resisting Force = 3276.47 t/ft
Driving Force = 2004.8 t/ft

Geometry

Intersection Point (B) of slope and upper face = (1160.27 , 900)
Intersection point (C) of tension crack and upper face = (1160.27 , 900)
Intersection point (D) of failure plane and tension crack = (954.418 , 636.518)
Upper face length (B --> C) = 0 ft
Wedge Slope length (Origin --> B) = 1468.41 ft
Tension Crack Length (C --> D) = 334.364 ft
Failure Plane length (Origin --> D) = 1147.2 ft

Slope Properties:

Slope Angle

Mean value = 37.8 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 900 ft
Statistical distribution : Normal
Standard Deviation = 5 ft
Relative Minimum Value = 15 ft
Relative Maximum Value = 15 ft

Unit Weight

Mean value = 0.06 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.01 t/ft²
Relative Minimum Value = 0.005 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle

Mean value = 26 °

Statistical distribution : None

Relative Minimum Value = 5 °

Relative Maximum Value = 5 °

Bench Width

Mean value = 300 ft

Statistical distribution : None

Relative Minimum Value = 1 ft

Relative Maximum Value = 1 ft

Failure Plane Properties:

Failure Plane Angle

Mean value = 33.7 °

Statistical distribution : Normal

Standard Deviation = 1 °

Relative Minimum Value = 2 °

Relative Maximum Value = 2 °

Plane Waviness

Mean value = 3 °

Statistical distribution : Normal

Standard Deviation = 1 °

Relative Minimum Value = 1 °

Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb

Cohesion

Mean value = 0.52 t/ft²

Statistical distribution : Normal

Standard Deviation = 0.05 t/ft²

Relative Minimum Value = 0.05 t/ft²

Relative Maximum Value = 0.15 t/ft²

Friction Angle (phi)

Mean value = 40 °

Statistical distribution : Normal

Standard Deviation = 0.5 °

Relative Minimum Value = 0.15 °

Relative Maximum Value = 0.15 °

Mean Shear Strength: 3118.93 t/ft²

Tension Crack:

Tension Crack : present

Tension Crack Angle

Mean value = 52 °

Statistical distribution : None

Relative Minimum Value = 5 °

Relative Maximum Value = 5 °

Distance From Crest

Mean value = 0 ft

Statistical distribution : None

Relative Minimum Value = 5 ft

Relative Maximum Value = 5 ft

Mean Tension Crack Length = 263.482 ft

Water Pressure : Not Present

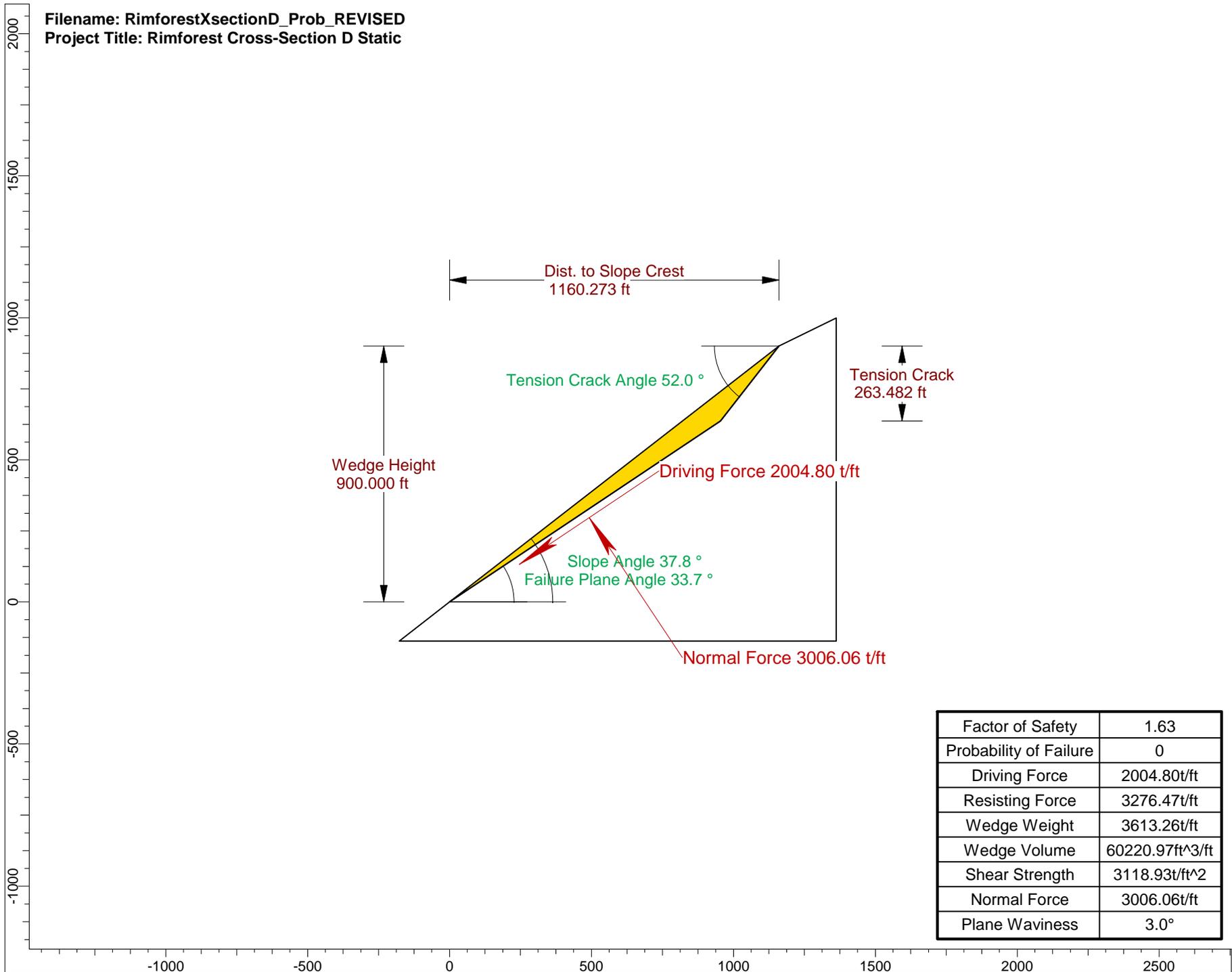
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

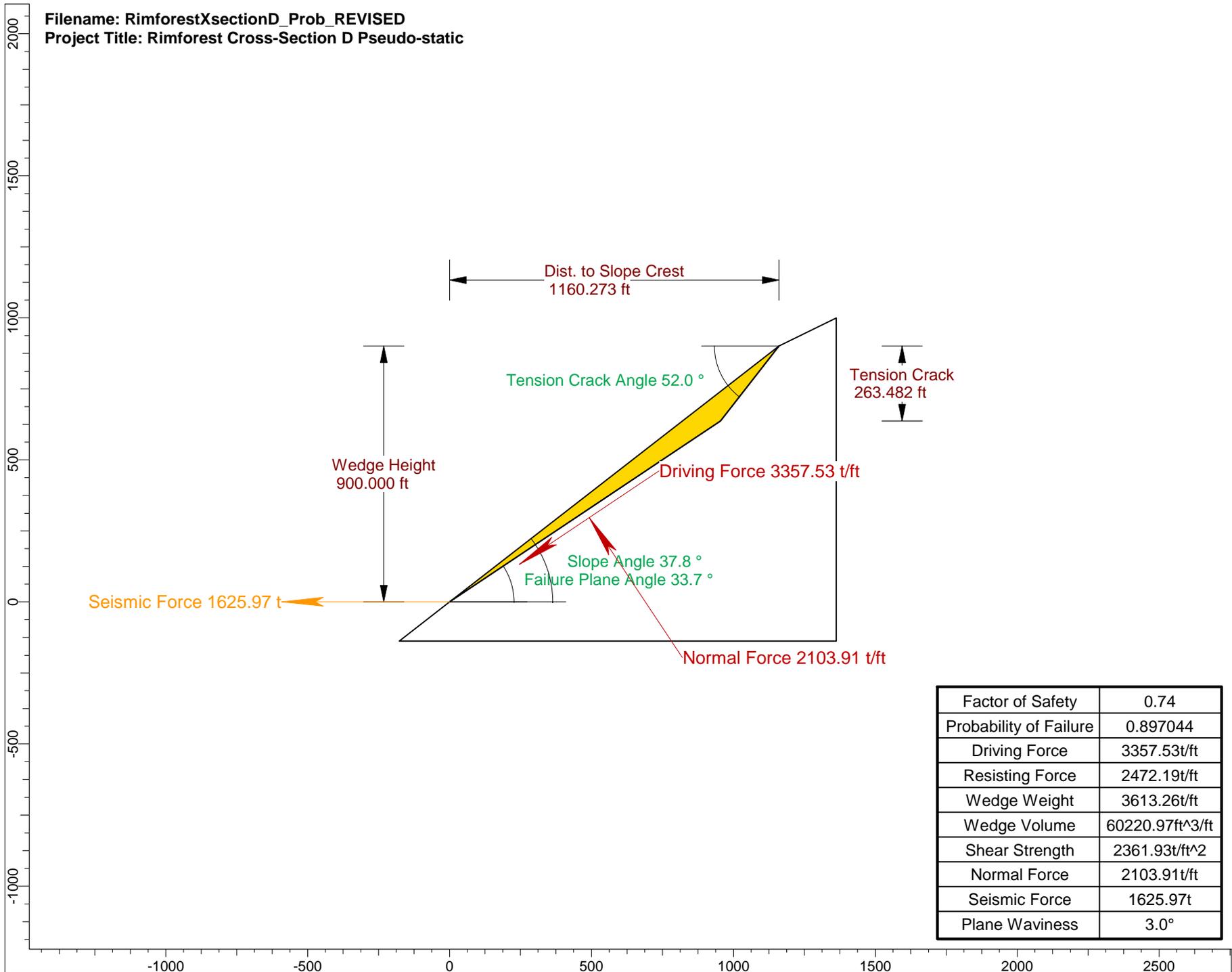
External Forces : Not Present

Filename: RimforestXsectionD_Prob_REVISIED
 Project Title: Rimforest Cross-Section D Static



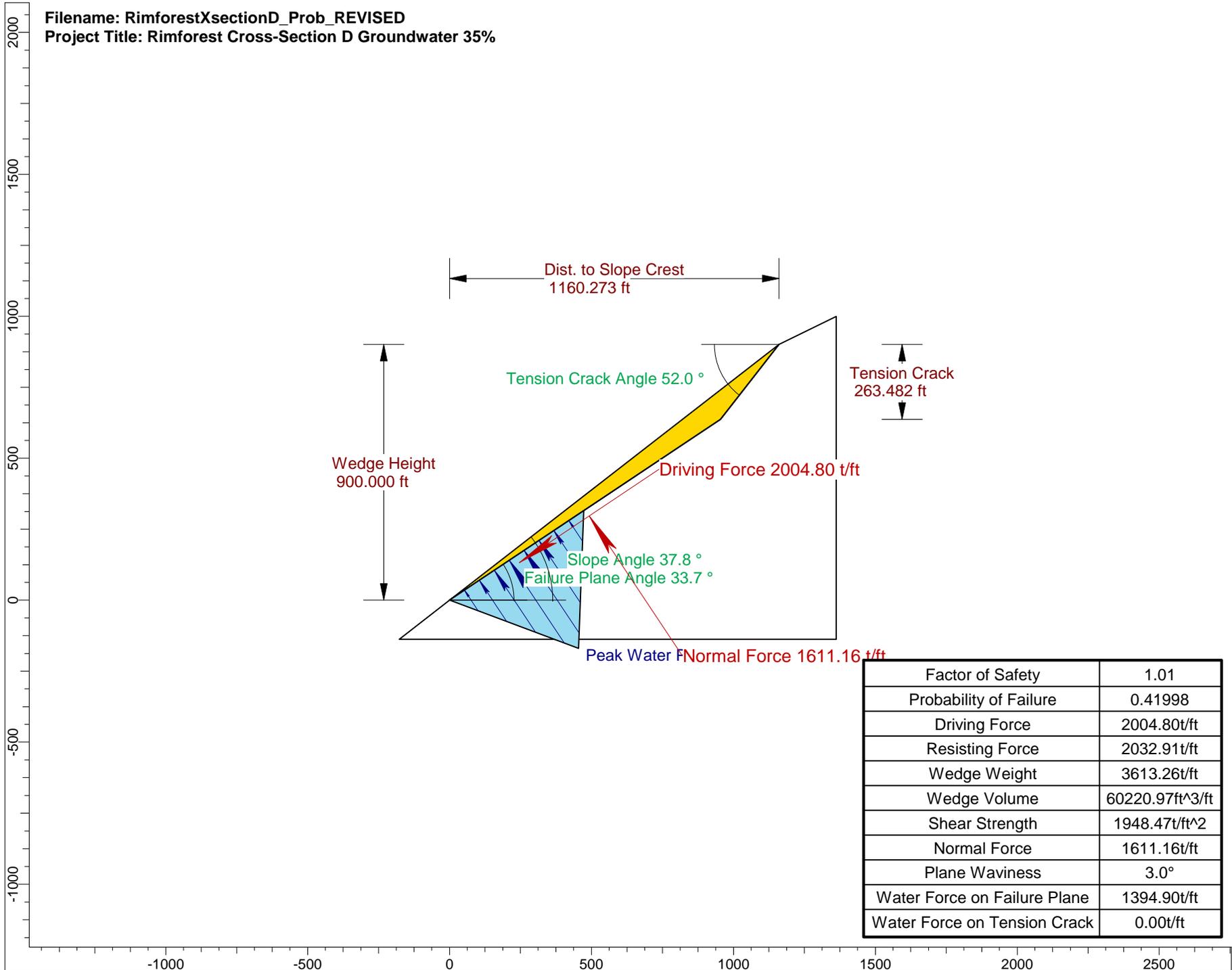
Factor of Safety	1.63
Probability of Failure	0
Driving Force	2004.80t/ft
Resisting Force	3276.47t/ft
Wedge Weight	3613.26t/ft
Wedge Volume	60220.97ft ³ /ft
Shear Strength	3118.93t/ft ²
Normal Force	3006.06t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionD_Prob_REVISED
 Project Title: Rimforest Cross-Section D Pseudo-static



Factor of Safety	0.74
Probability of Failure	0.897044
Driving Force	3357.53t/ft
Resisting Force	2472.19t/ft
Wedge Weight	3613.26t/ft
Wedge Volume	60220.97ft ³ /ft
Shear Strength	2361.93t/ft ²
Normal Force	2103.91t/ft
Seismic Force	1625.97t
Plane Waviness	3.0°

Filename: RimforestXsectionD_Prob_REVISED
 Project Title: Rimforest Cross-Section D Groundwater 35%



Factor of Safety	1.01
Probability of Failure	0.41998
Driving Force	2004.80t/ft
Resisting Force	2032.91t/ft
Wedge Weight	3613.26t/ft
Wedge Volume	60220.97ft ³ /ft
Shear Strength	1948.47t/ft ²
Normal Force	1611.16t/ft
Plane Waviness	3.0°
Water Force on Failure Plane	1394.90t/ft
Water Force on Tension Crack	0.00t/ft

RocPlane Analysis Information

Document Name:

RimforestXsectionD_Prob_Lwr_REVISED

Job Title:

Rimforest Cross-Section D Lower Slope

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 5.86467
Lognormal Reliability Index = 6.99432
Number of Trial Wedges = 1000
Number of Valid Wedges = 1000
Number of Invalid Wedges = 0
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.46098
Wedge Weight = 535.816 t/ft
Wedge Volume = 7144.22 ft³/ft
Normal Force = 378.879 t/ft
Resisting Force = 553.537 t/ft
Driving Force = 378.879 t/ft

Geometry

Intersection Point (B) of slope and upper face = (76.3003 , 125)
Intersection point (C) of failure plane and upper face = (293.399 , 293.399)
Upper face length (B --> C) = 274.754 ft
Failure plane length (Origin --> C) = 414.929 ft
Slope length (Origin --> B) = 146.321 ft

Slope Properties:

Slope Angle

Mean value = 58.6 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °

Slope Height

Mean value = 125 ft
Statistical distribution : Normal
Standard Deviation = 2 ft
Relative Minimum Value = 6 ft
Relative Maximum Value = 6 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.005 t/ft²
Relative Minimum Value = 0.0015 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 37.8 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 45 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 0.5 °
Relative Minimum Value = 1 °
Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.1 t/ft²
Relative Maximum Value = 0.1 t/ft²
Friction Angle (phi)
Mean value = 40 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
Mean Shear Strength: 533.68 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

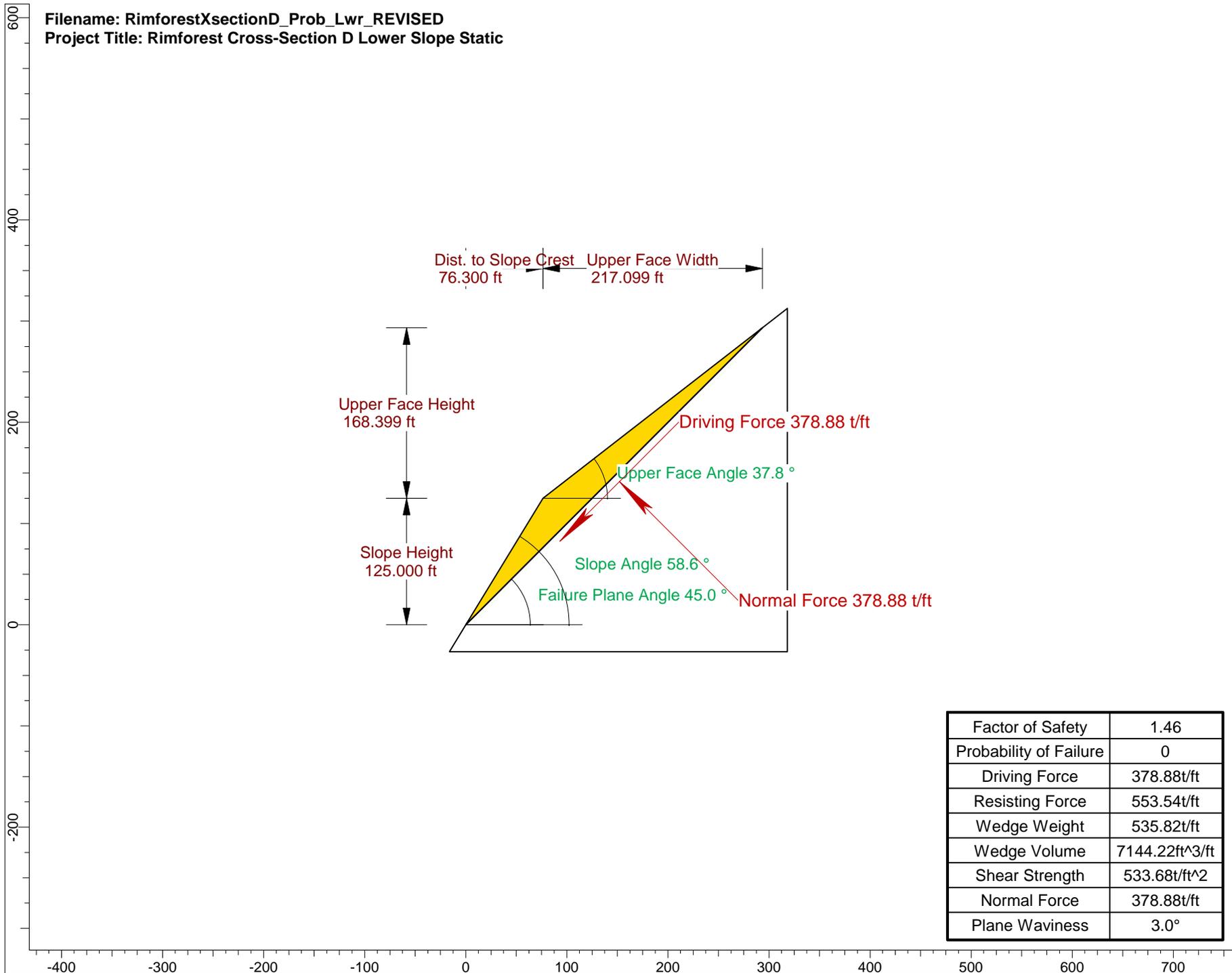
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

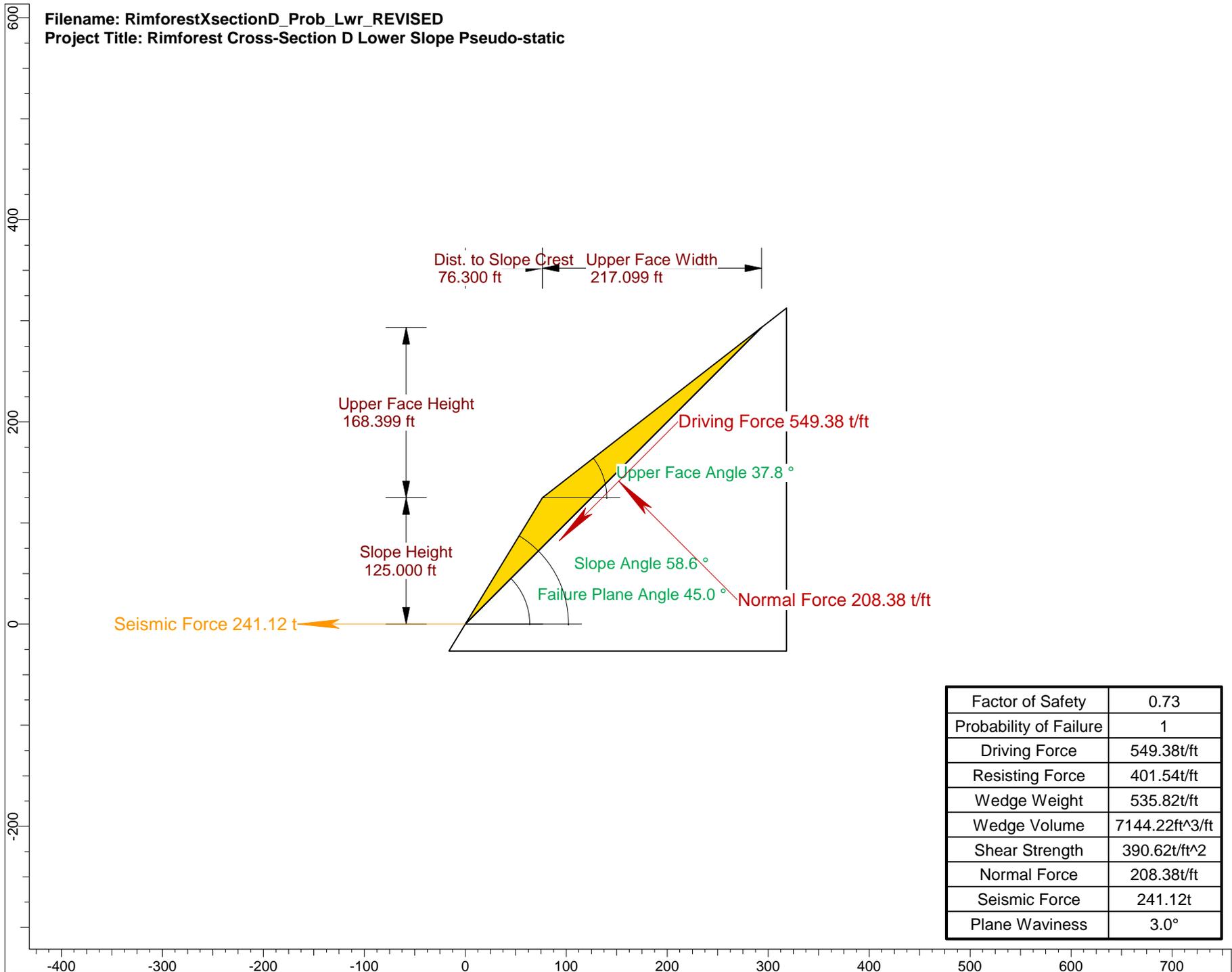
External Forces : Not Present

Filename: RimforestXsectionD_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section D Lower Slope Static

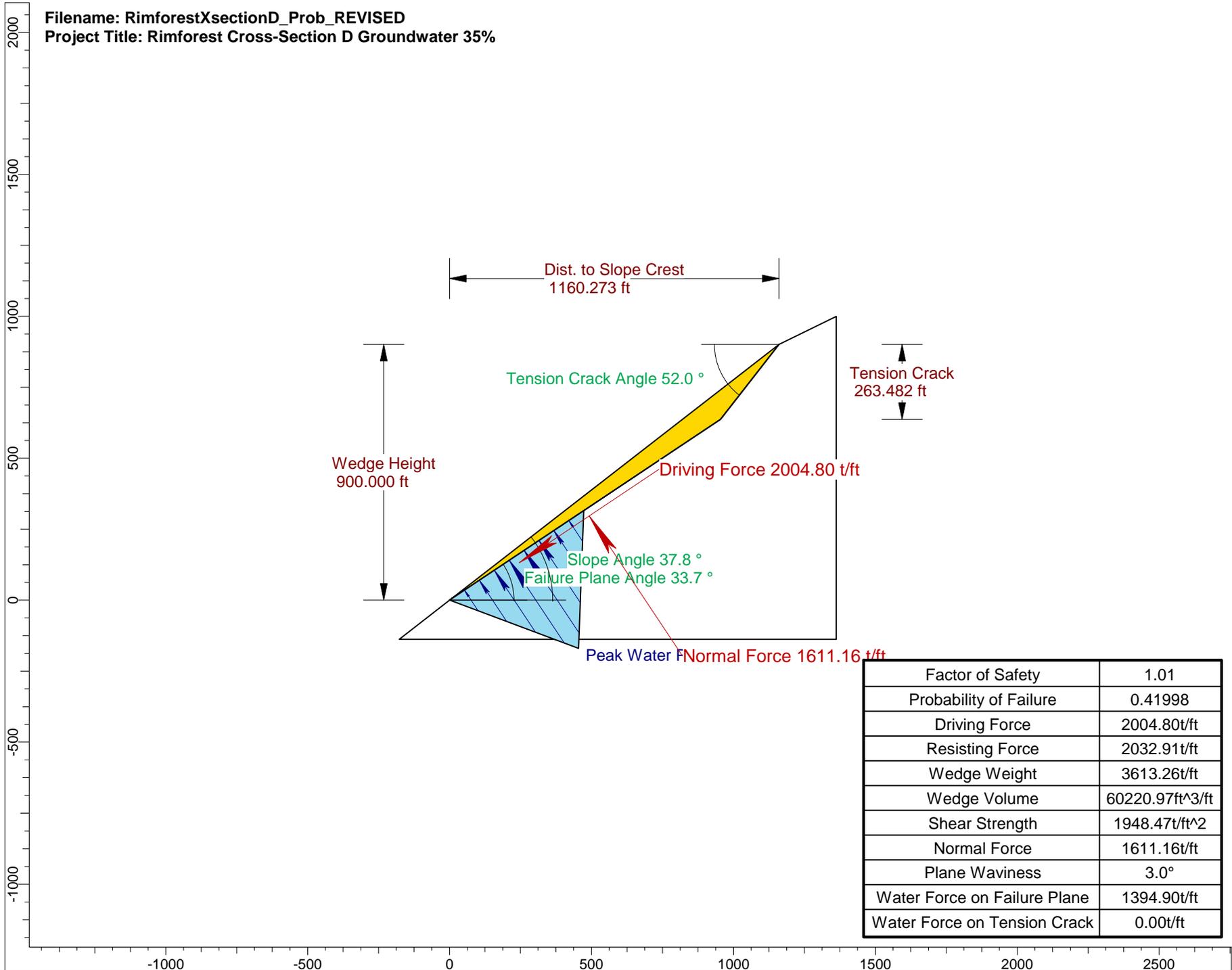


Factor of Safety	1.46
Probability of Failure	0
Driving Force	378.88t/ft
Resisting Force	553.54t/ft
Wedge Weight	535.82t/ft
Wedge Volume	7144.22ft ³ /ft
Shear Strength	533.68t/ft ²
Normal Force	378.88t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionD_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section D Lower Slope Pseudo-static



Filename: RimforestXsectionD_Prob_REVISED
 Project Title: Rimforest Cross-Section D Groundwater 35%



Factor of Safety	1.01
Probability of Failure	0.41998
Driving Force	2004.80t/ft
Resisting Force	2032.91t/ft
Wedge Weight	3613.26t/ft
Wedge Volume	60220.97ft ³ /ft
Shear Strength	1948.47t/ft ²
Normal Force	1611.16t/ft
Plane Waviness	3.0°
Water Force on Failure Plane	1394.90t/ft
Water Force on Tension Crack	0.00t/ft

RocPlane Analysis Information

Document Name:

RimforestXsectionD_Prob_Lwr_REVISED

Job Title:

Rimforest Cross-Section D Lower Slope

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 5.86467
Lognormal Reliability Index = 6.99432
Number of Trial Wedges = 1000
Number of Valid Wedges = 1000
Number of Invalid Wedges = 0
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.46098
Wedge Weight = 535.816 t/ft
Wedge Volume = 7144.22 ft³/ft
Normal Force = 378.879 t/ft
Resisting Force = 553.537 t/ft
Driving Force = 378.879 t/ft

Geometry

Intersection Point (B) of slope and upper face = (76.3003 , 125)
Intersection point (C) of failure plane and upper face = (293.399 , 293.399)
Upper face length (B --> C) = 274.754 ft
Failure plane length (Origin --> C) = 414.929 ft
Slope length (Origin --> B) = 146.321 ft

Slope Properties:

Slope Angle

Mean value = 58.6 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °

Slope Height

Mean value = 125 ft
Statistical distribution : Normal
Standard Deviation = 2 ft
Relative Minimum Value = 6 ft
Relative Maximum Value = 6 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.005 t/ft²
Relative Minimum Value = 0.0015 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 37.8 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 45 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 0.5 °
Relative Minimum Value = 1 °
Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.1 t/ft²
Relative Maximum Value = 0.1 t/ft²
Friction Angle (phi)
Mean value = 40 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
Mean Shear Strength: 533.68 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

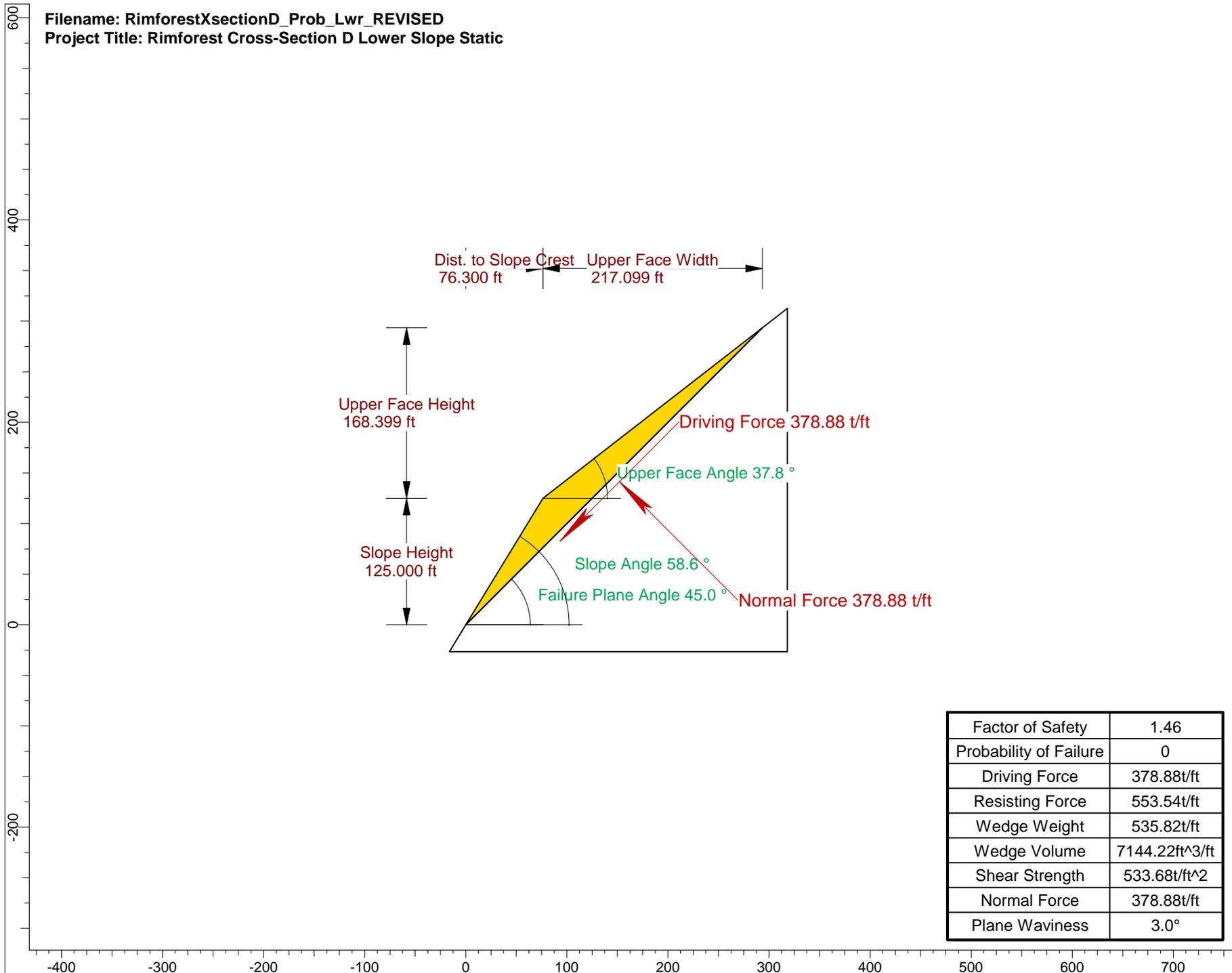
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

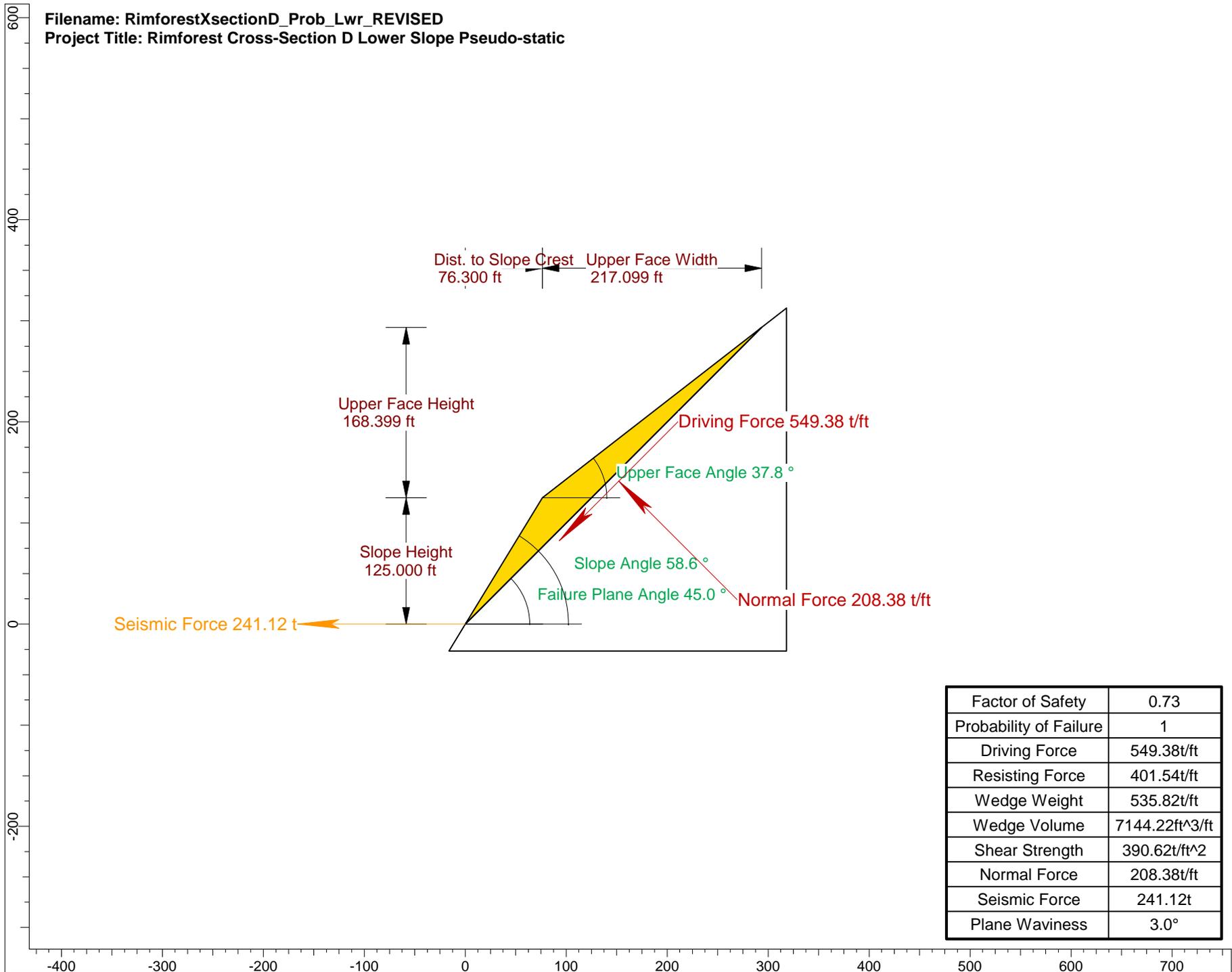
External Forces : Not Present

Filename: RimforestXsectionD_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section D Lower Slope Static



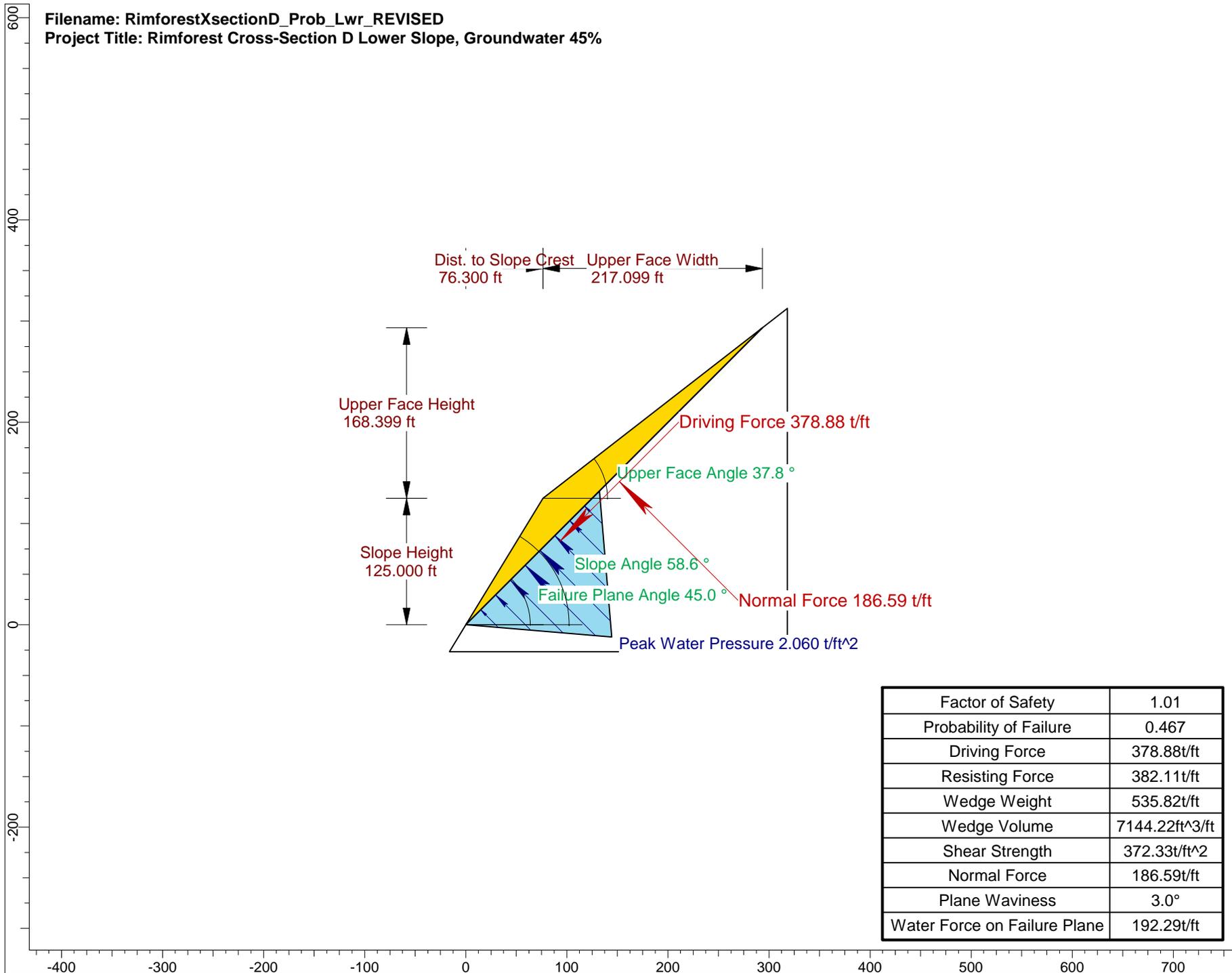
Factor of Safety	1.46
Probability of Failure	0
Driving Force	378.88t/ft
Resisting Force	553.54t/ft
Wedge Weight	535.82t/ft
Wedge Volume	7144.22ft ³ /ft
Shear Strength	533.68t/ft ²
Normal Force	378.88t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionD_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section D Lower Slope Pseudo-static



Factor of Safety	0.73
Probability of Failure	1
Driving Force	549.38t/ft
Resisting Force	401.54t/ft
Wedge Weight	535.82t/ft
Wedge Volume	7144.22ft ³ /ft
Shear Strength	390.62t/ft ²
Normal Force	208.38t/ft
Seismic Force	241.12t
Plane Waviness	3.0°

Filename: RimforestXsectionD_Prob_Lwr_REVISED
 Project Title: Rimforest Cross-Section D Lower Slope, Groundwater 45%



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnD.swd

Project Summary:

- Job Title: Rimforest Cross-Section D, Wedge 1
- Analysis: Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0168
- Wedge height (on slope) [ft]: 900.00
- Bench width (on upper face) [ft]: 263.61
- Wedge volume [ft³]: 14647986.594
- Wedge weight [tons]: 878879.176
- Wedge area (joint1) [ft²]: 158996.07
- Wedge area (joint2) [ft²]: 163059.74
- Wedge area (slope) [ft²]: 288399.30
- Wedge area (upper face) [ft²]: 57862.74
- Wedge area (tension crack) [ft²]: 107331.76

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	100204.50	290144.59
Effective Normal stress [t/ft²]	0.63	1.78
Shear Strength [t/ft²]	0.99	1.86
Strength due to Waviness [t/ft²]	0.03	0.09

- Driving force [tons]: 474098.51
- Resisting force [tons]: 482075.49

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	212150.13
Joint 2	N/A	217572.34
Fissures	1.33	N/A
Tension Crack	1.33	143213.90

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
30.33	190.20	1160.16

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1479.60	0.00
Joint 2	1589.09	299.88
Tension Crack	N/A	543.06

Persistence:

- Joint 1 [ft]: 1479.60
- Joint 2 [ft]: 1879.30

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	14.20	14.20
Joint 1 & Crest	98.88	98.88
Joint 2 & Crest	66.91	66.91
Joint 1 & Tension Crack	N/A	148.63
Joint 2 & Tension Crack	N/A	45.29

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	52.00	253.00
Joint Set 2	45.00	136.00
Slope	38.00	211.00
Upper Face	26.00	211.00
Tension Crack	52.00	230.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.52
- Friction Angle [deg]: 37.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.52
- Friction Angle [deg]: 37.00

Slope Data:

- Slope height [ft]: 900.00
- Rock unit weight [t/ft³]: 0.06
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

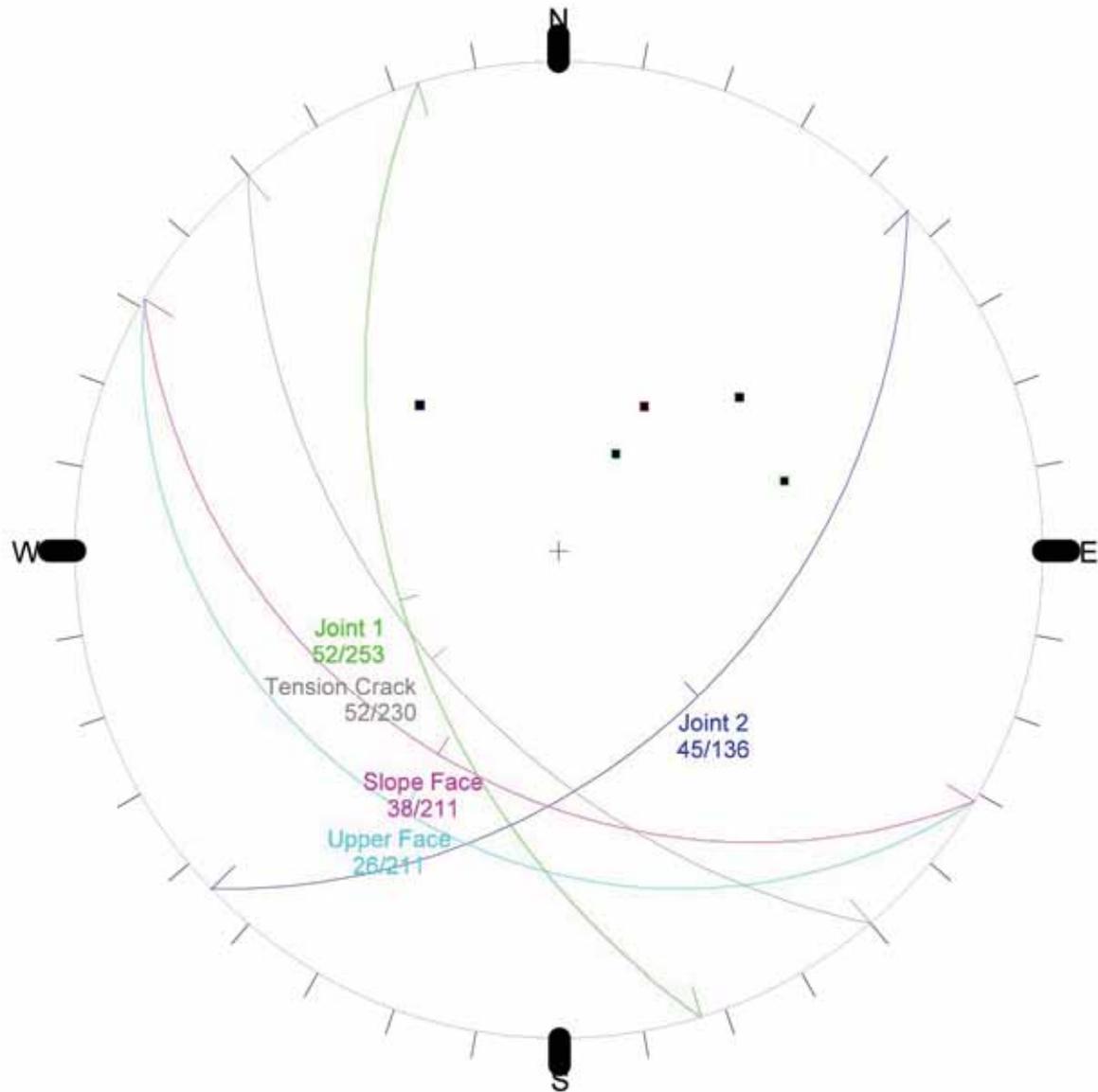
Water Pressure Data:

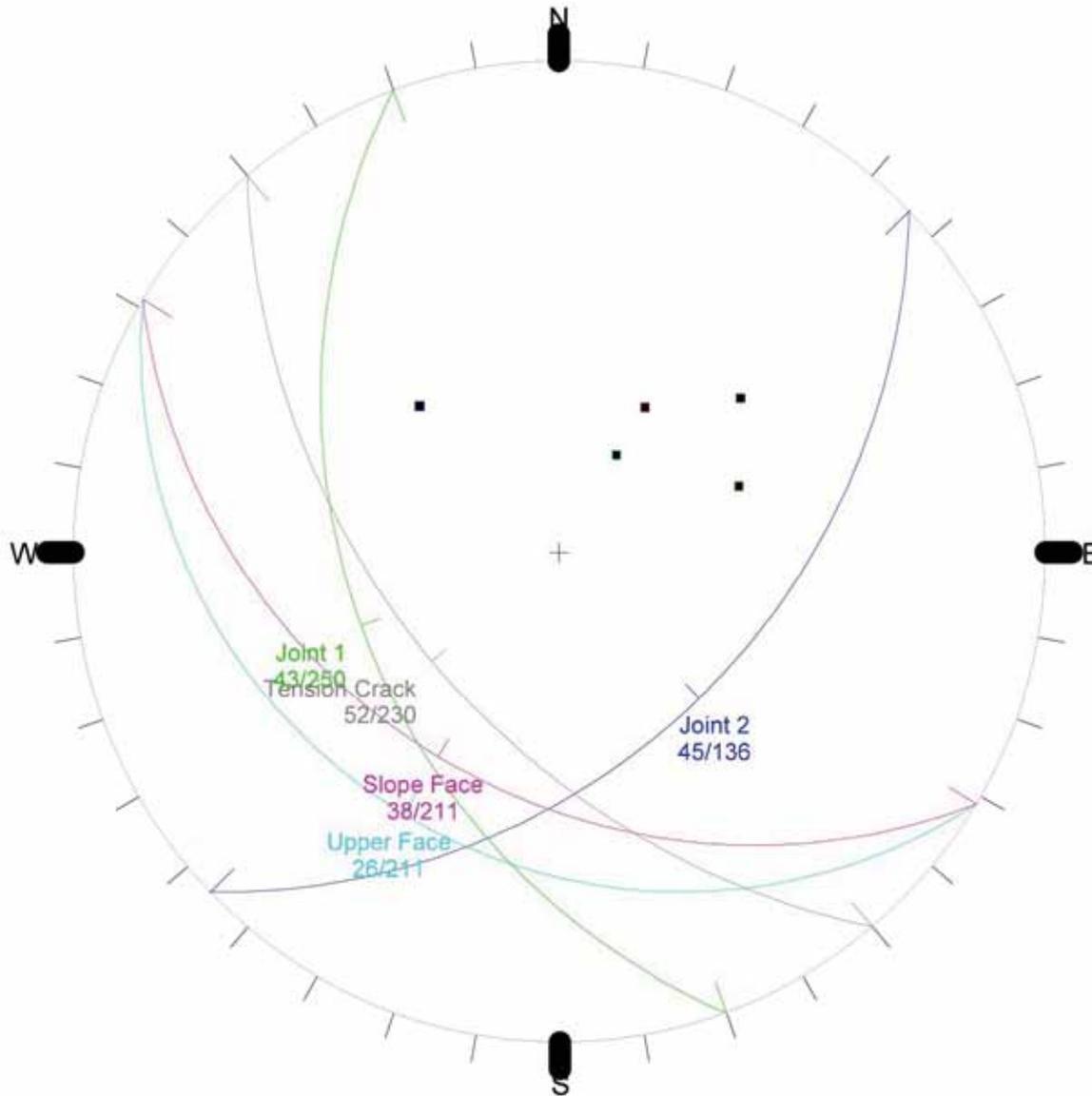
- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 85.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	397.421	1105.106	900.000
234	59.209	1308.324	900.000
135	397.421	1105.106	900.000
125	177.281	985.580	585.817
235	141.429	1566.460	1028.572





Swedge Analysis Information

Document Name:

- RimForest Swedge SctnD

Project Summary:

- Job Title: Rimforest Cross-Section D, Wedge 3
- Analysis: Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0027
- Wedge height (on slope) [ft]: 900.00
- Bench width (on upper face) [ft]: 660.08
- Wedge volume [ft³]: 98092219.735
- Wedge weight [tons]: 5885533.053
- Wedge area (joint1) [ft²]: 394226.48
- Wedge area (joint2) [ft²]: 436087.30
- Wedge area (slope) [ft²]: 722144.54
- Wedge area (upper face) [ft²]: 362792.95
- Wedge area (tension crack) [ft²]: 462556.99

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	1353901.72	1709386.52
Effective Normal stress [t/ft²]	3.43	3.92
Shear Strength [t/ft²]	3.11	3.47
Strength due to Waviness [t/ft²]	0.18	0.21

- Driving force [tons]: 2892723.64
- Resisting force [tons]: 2900656.54

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	1074683.39
Joint 2	N/A	1188798.33
Fissures	2.73	N/A
Tension Crack	2.73	1260956.17

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
24.50	198.89	1109.15

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1506.70	0.00
Joint 2	1589.09	750.88
Tension Crack	N/A	1359.80

Persistence:

- Joint 1 [ft]: 1506.70
- Joint 2 [ft]: 2320.39

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	37.10	37.10
Joint 1 & Crest	75.98	75.98
Joint 2 & Crest	66.91	66.91
Joint 1 & Tension Crack	N/A	131.78
Joint 2 & Tension Crack	N/A	45.29

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	40.00	256.00
Joint Set 2	45.00	136.00
Slope	38.00	211.00
Upper Face	26.00	211.00
Tension Crack	52.00	230.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.52
- Friction Angle [deg]: 37.00

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.52
- Friction Angle [deg]: 37.00

Slope Data:

- Slope height [ft]: 900.00
- Rock unit weight [t/ft³]: 0.06
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: YES

Tension Crack Data:

- Location: User specified
- Trace length [ft]: 0.00

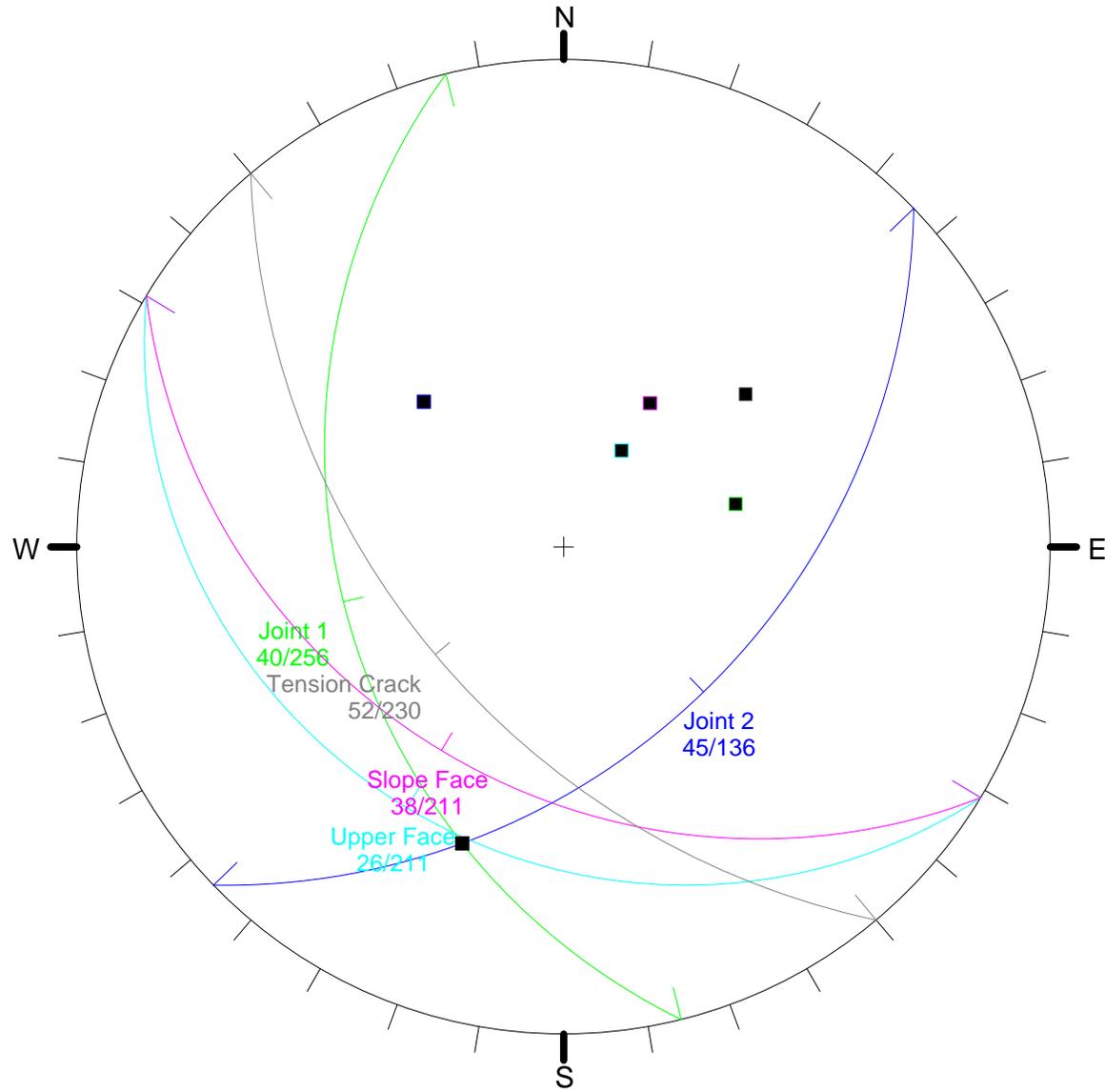
Water Pressure Data:

- Water unit weight [t/ft³]: 0.031
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 90.000 %

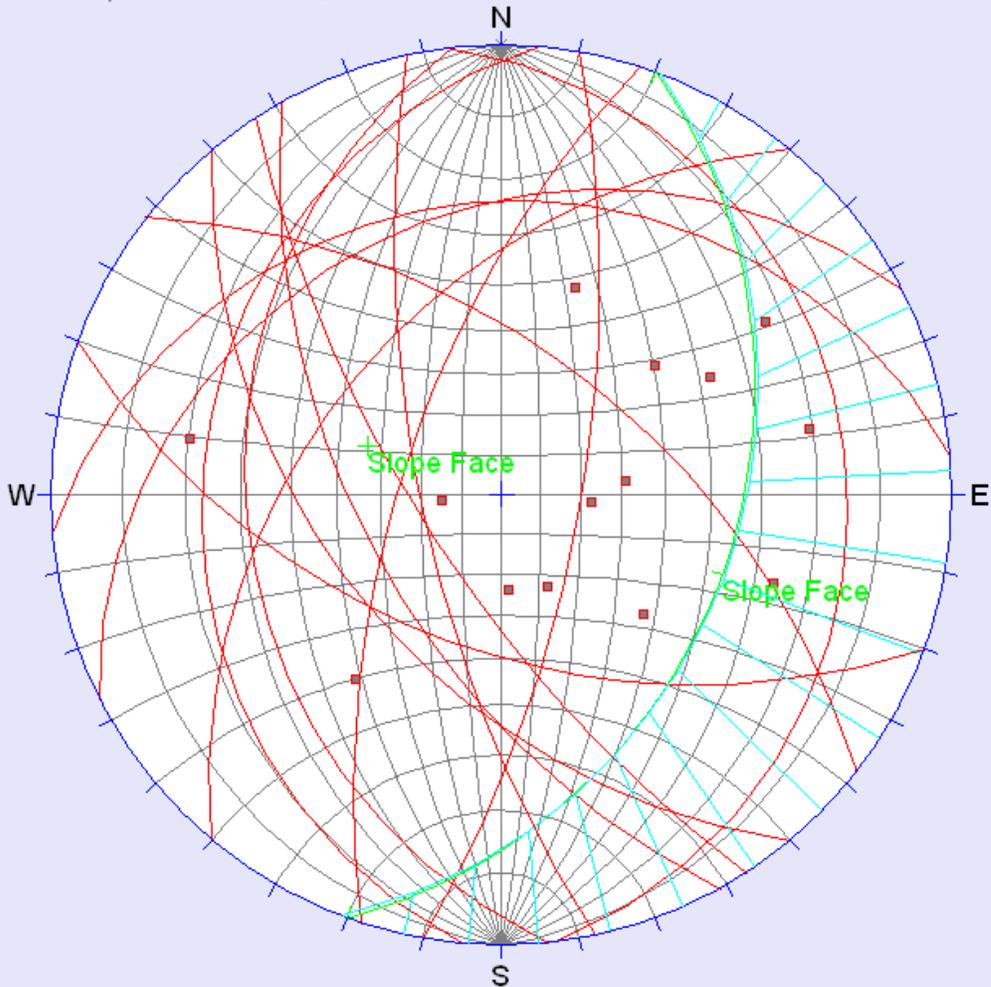
Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope, 5=Tension Crack

Point	x	y	z
124	0.000	0.000	0.000
134	906.083	799.471	900.000
234	59.209	1308.324	900.000
135	906.083	799.471	900.000
125	326.792	954.935	459.914
235	265.086	1954.690	1221.942



Rimforest, Cross-Section E

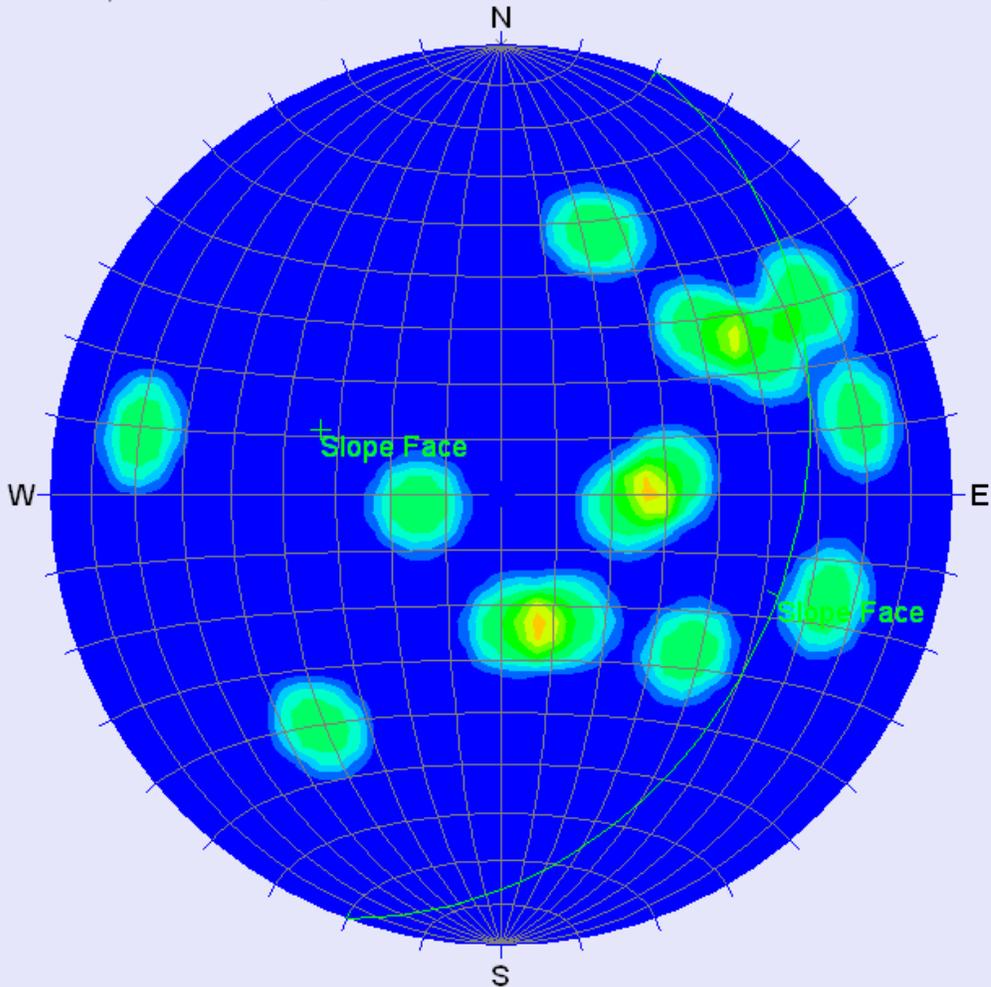


■ Poles

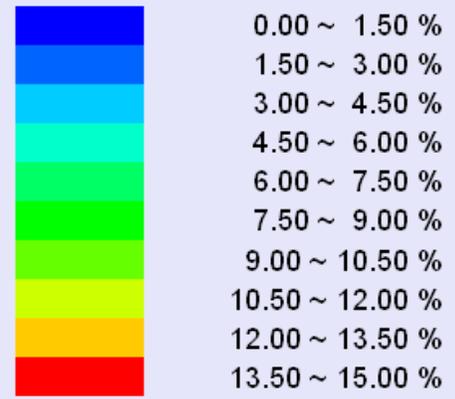
Equal Angle
Lower Hemisphere
14 Poles
14 Entries

Equal Angle Stereonet, Planar Attitudes

Rimforest, Cross-Section E



Fisher Concentrations
% of total per 1.0 % area

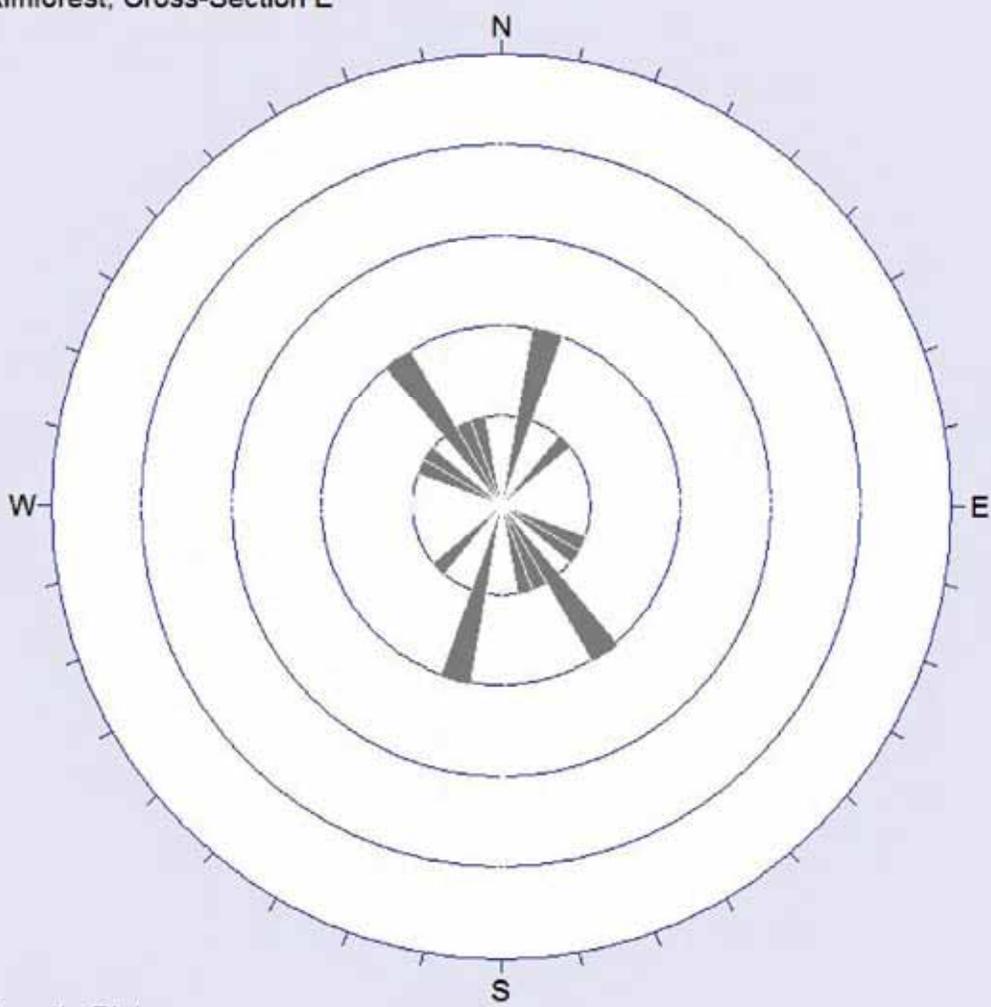


No Bias Correction
Max. Conc. = 12.8117%

Equal Area
Lower Hemisphere
14 Poles
14 Entries

Equal Area Stereonet, Contour

Rimforest, Cross-Section E



Apparent Strike
5 max planes / arc
at outer circle

Trend / Plunge of
Face Normal = 0, 90
(directed away from viewer)

No Bias Correction

9 Planes Plotted
Within 45 and 90
Degrees of Viewing
Face

Rosette Plot

RocPlane Analysis Information

Document Name:

RimforestXsectionE_Prob_REVISED

Job Title:

Rimforest Cross-Section E

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 1.2072
Lognormal Reliability Index = 1.5049
Number of Trial Wedges = 1000
Number of Valid Wedges = 989
Number of Invalid Wedges = 11
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.73313
Wedge Weight = 4556.25 t/ft
Wedge Volume = 60750 ft³/ft
Normal Force = 3921.76 t/ft
Resisting Force = 4019.68 t/ft
Driving Force = 2319.32 t/ft

Geometry

Intersection Point (B) of slope and upper face = (971.141 , 680)
Intersection point (C) of failure plane and upper face = (1149.82 , 680)
Upper face length (B --> C) = 178.677 ft
Failure plane length (Origin --> C) = 1335.84 ft
Slope length (Origin --> B) = 1184.12 ft

Slope Properties:

Slope Angle

Mean value = 35 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 680 ft
Statistical distribution : Normal
Standard Deviation = 0.2 ft
Relative Minimum Value = 15 ft
Relative Maximum Value = 15 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.015 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 0 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 30.6 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 1 °
Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.1 t/ft²
Relative Maximum Value = 0.1 t/ft²
Friction Angle (phi)
Mean value = 38.5 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °
Mean Shear Strength: 3814.15 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

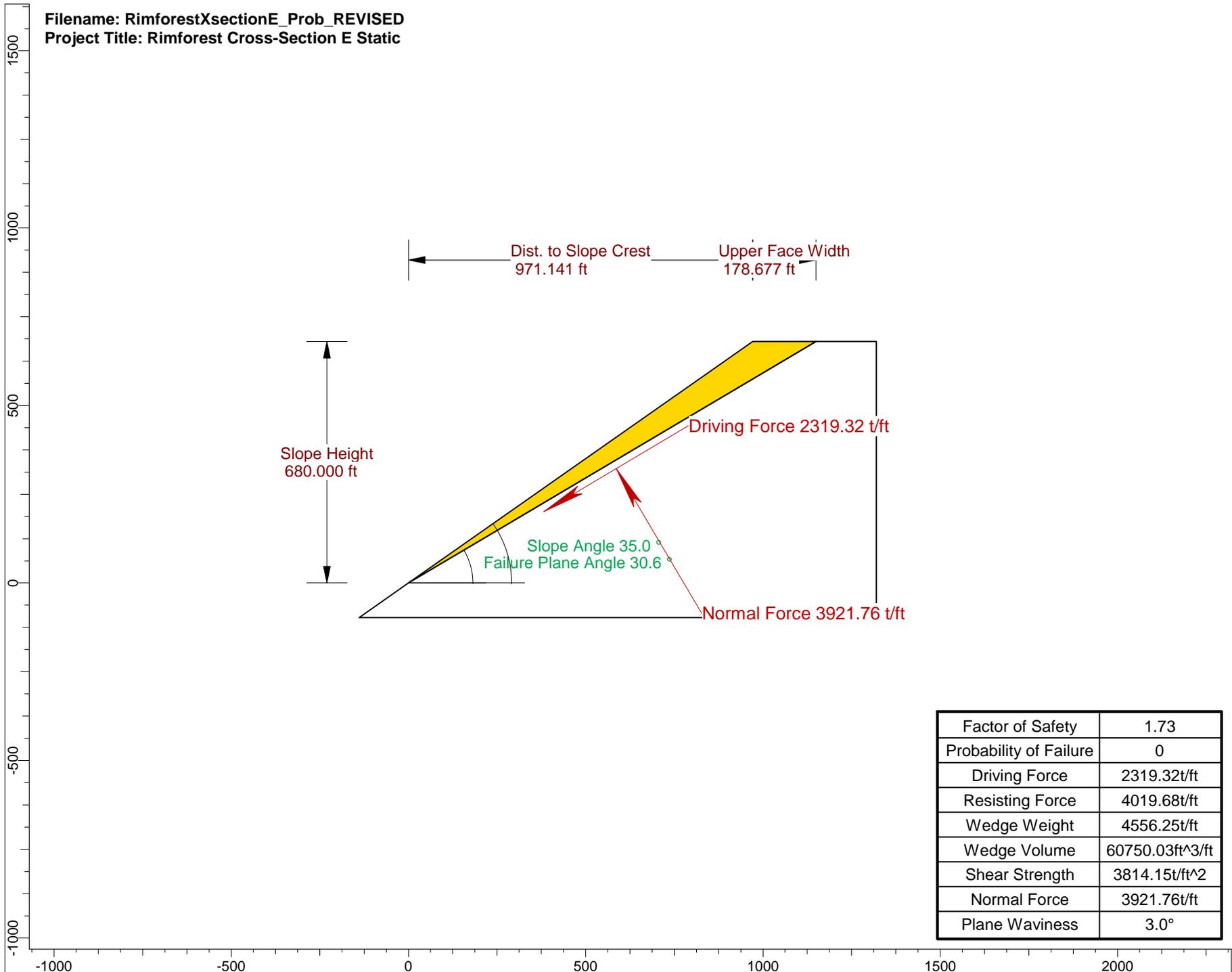
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

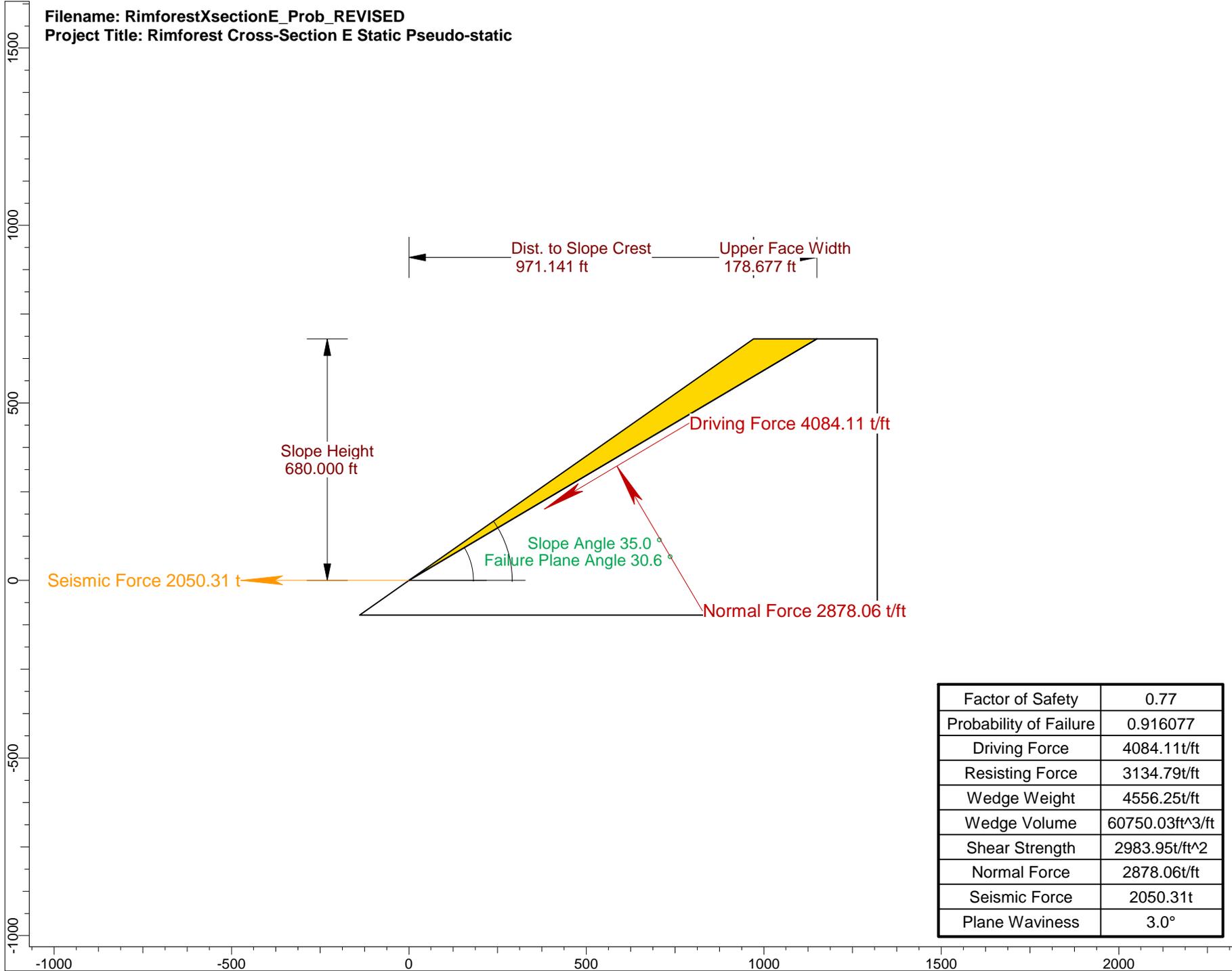
External Forces : Not Present

Filename: RimforestXsectionE_Prob_REVISED
 Project Title: Rimforest Cross-Section E Static

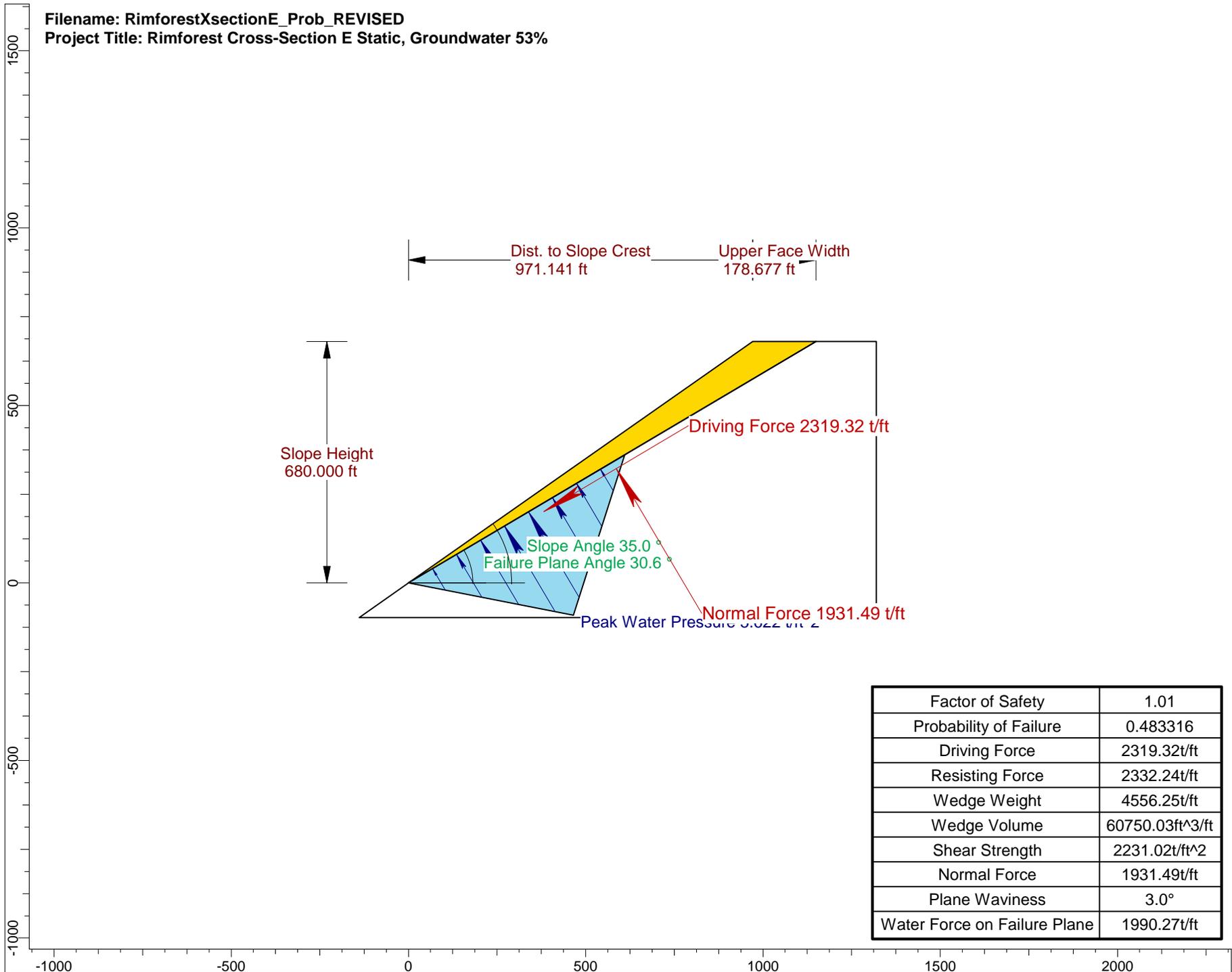


Factor of Safety	1.73
Probability of Failure	0
Driving Force	2319.32t/ft
Resisting Force	4019.68t/ft
Wedge Weight	4556.25t/ft
Wedge Volume	60750.03ft ³ /ft
Shear Strength	3814.15t/ft ²
Normal Force	3921.76t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionE_Prob_REVISIED
 Project Title: Rimforest Cross-Section E Static Pseudo-static



Filename: RimforestXsectionE_Prob_REVISED
 Project Title: Rimforest Cross-Section E Static, Groundwater 53%



RocPlane Analysis Information

Document Name:

RimforestXsectionE_AfterWaterReroute_REVISED

Job Title:

Rimforest Cross-Section E, After Runoff Rerouted

Analysis Results:

Analysis type = Probabilistic
Probability of Failure (PF) = 0 (0 %)
Normal Reliability Index = 3.93402
Lognormal Reliability Index = 4.57358
Number of Trial Wedges = 1000
Number of Valid Wedges = 1000
Number of Invalid Wedges = 0
Number of Failed Wedges = 0
Number of Failed Wedges that are Floating = 0

Current Wedge Data - Mean Wedge

Factor of Safety = 1.36937
Wedge Weight = 385.352 t/ft
Wedge Volume = 5138.02 ft³/ft
Normal Force = 278.132 t/ft
Resisting Force = 365.237 t/ft
Driving Force = 266.719 t/ft

Geometry

Intersection Point (B) of slope and upper face = (57.735 , 100)
Intersection point (C) of failure plane and upper face = (230.229 , 220.781)
Upper face length (B --> C) = 210.576 ft
Failure plane length (Origin --> C) = 318.982 ft
Slope length (Origin --> B) = 115.374 ft

Slope Properties:

Slope Angle

Mean value = 60 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °

Slope Height

Mean value = 100 ft
Statistical distribution : Normal
Standard Deviation = 2 ft
Relative Minimum Value = 6 ft
Relative Maximum Value = 6 ft

Unit Weight

Mean value = 0.075 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.005 t/ft²
Relative Minimum Value = 0.015 t/ft²
Relative Maximum Value = 0.015 t/ft²

Upper Face Properties:

Upper Face Angle
Mean value = 35 °
Statistical distribution : Normal
Standard Deviation = 2 °
Relative Minimum Value = 5 °
Relative Maximum Value = 5 °
No Bench Width.

Failure Plane Properties:

Failure Plane Angle
Mean value = 43.8 °
Statistical distribution : Normal
Standard Deviation = 1 °
Relative Minimum Value = 2 °
Relative Maximum Value = 2 °
Plane Waviness
Mean value = 3 °
Statistical distribution : Normal
Standard Deviation = 0.05 °
Relative Minimum Value = 1 °
Relative Maximum Value = 2 °

Failure Plane Strength:

Shear Strength Model: Mohr Coulomb
Cohesion
Mean value = 0.52 t/ft²
Statistical distribution : Normal
Standard Deviation = 0.05 t/ft²
Relative Minimum Value = 0.15 t/ft²
Relative Maximum Value = 0.15 t/ft²
Friction Angle (phi)
Mean value = 33.6 °
Statistical distribution : None
Relative Minimum Value = 0 °
Relative Maximum Value = 0 °
Mean Shear Strength: 350.661 t/ft²

Tension Crack:

Tension Crack : Not Present

Water Pressure : Not Present

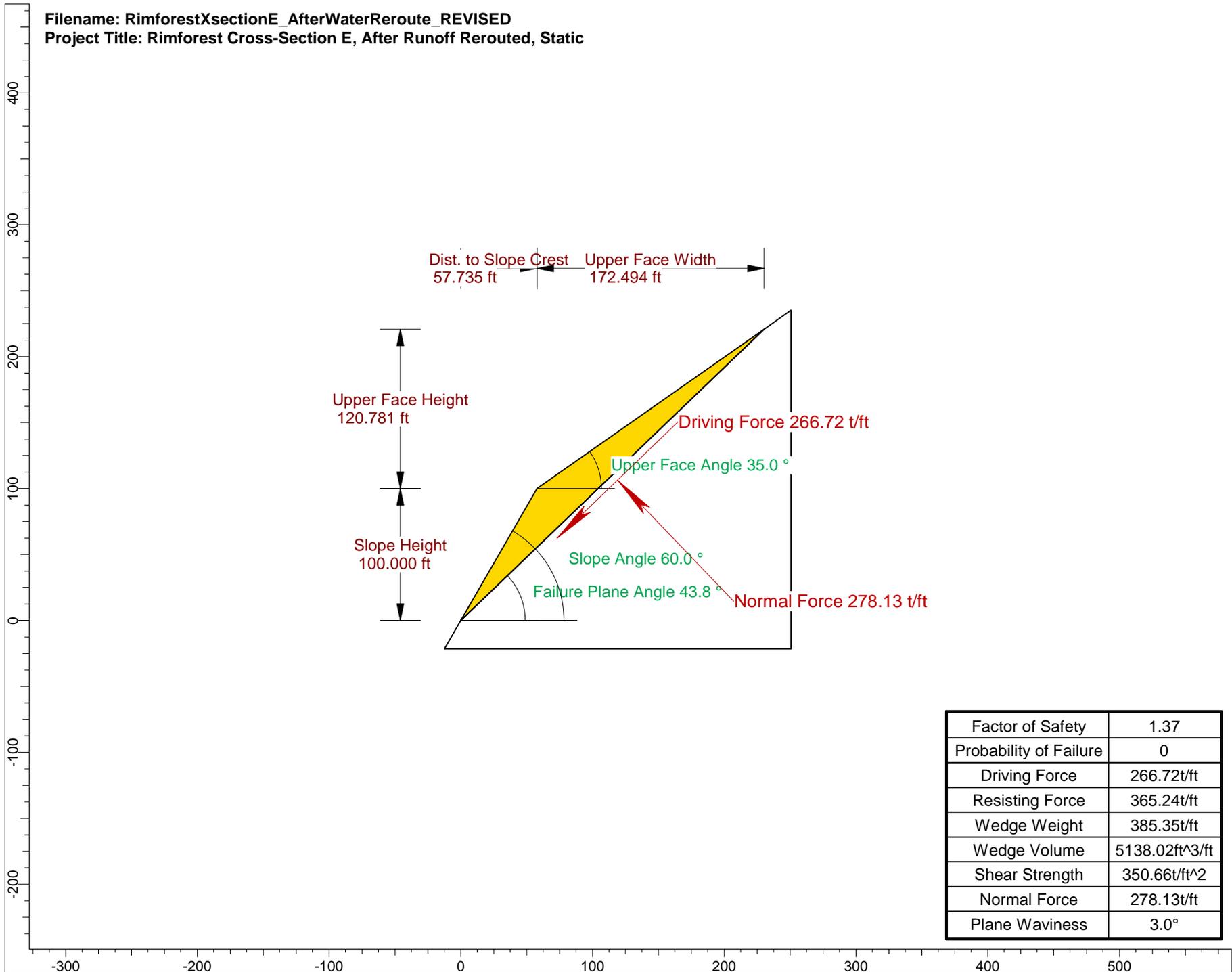
Seismic Force : Not Present

Sampling :

Sampling Method : Monte Carlo
Number of Samples = 1000

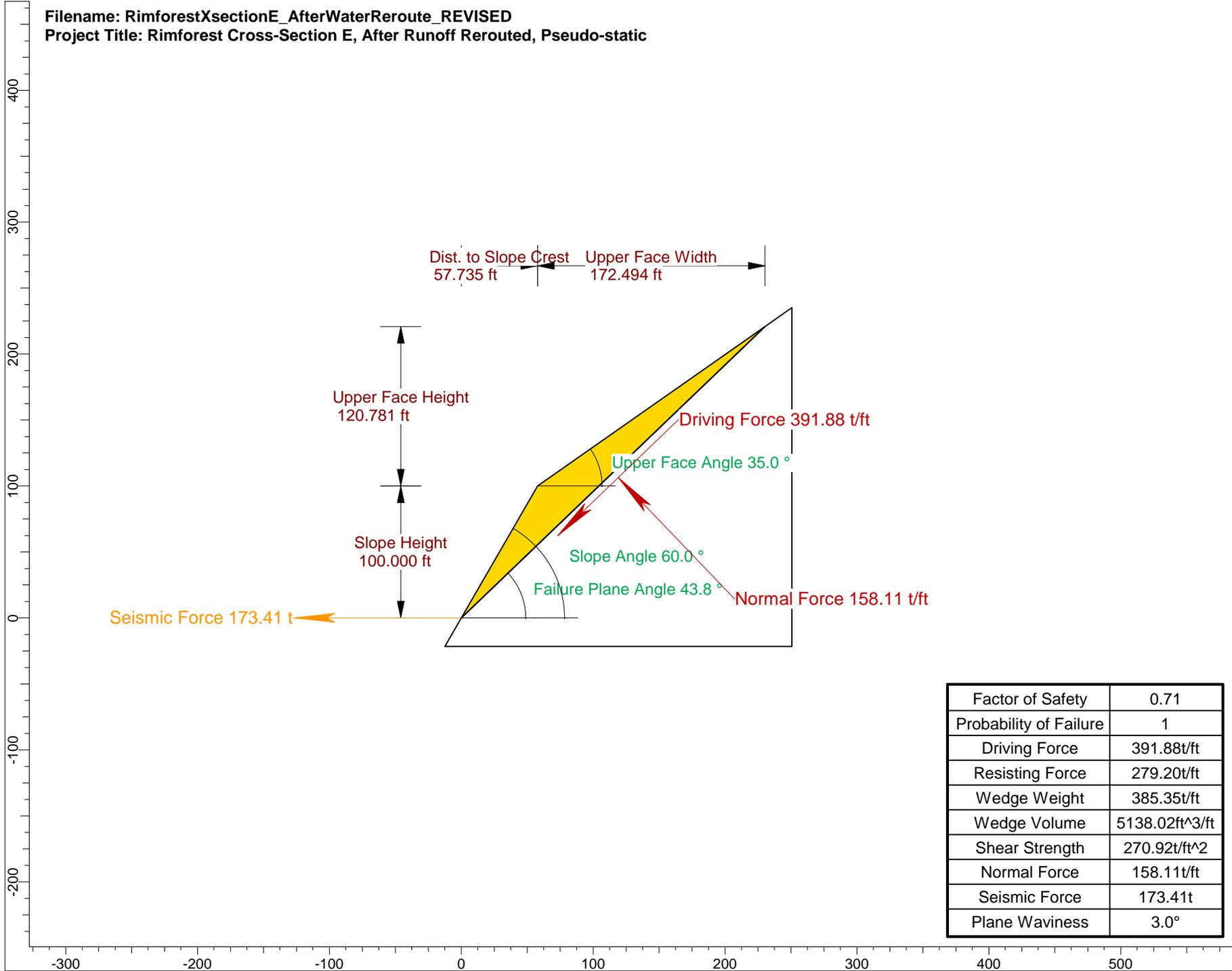
External Forces : Not Present

Filename: RimforestXsectionE_AfterWaterReroute_REVISED
 Project Title: Rimforest Cross-Section E, After Runoff Rerouted, Static

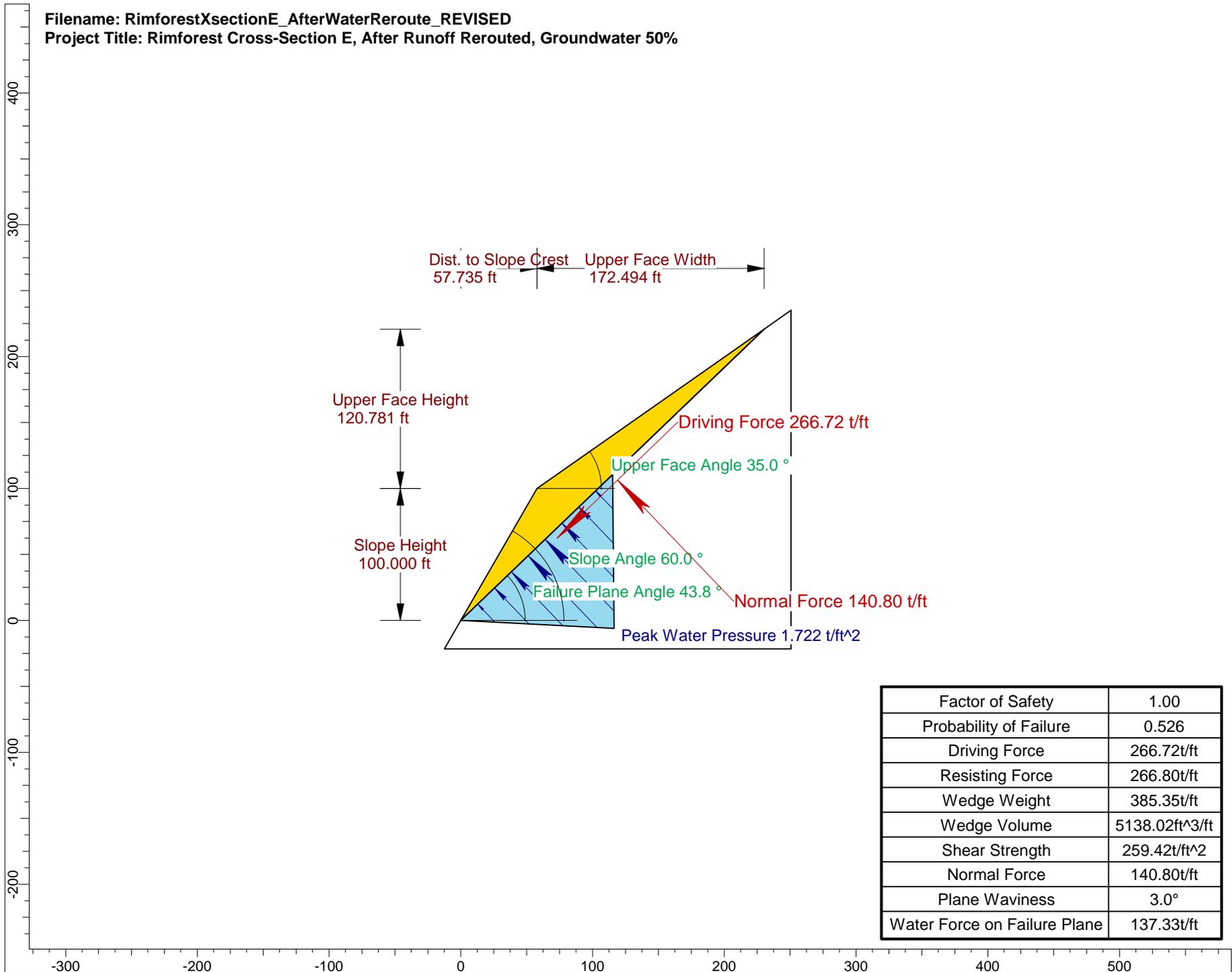


Factor of Safety	1.37
Probability of Failure	0
Driving Force	266.72t/ft
Resisting Force	365.24t/ft
Wedge Weight	385.35t/ft
Wedge Volume	5138.02ft ³ /ft
Shear Strength	350.66t/ft ²
Normal Force	278.13t/ft
Plane Waviness	3.0°

Filename: RimforestXsectionE_AfterWaterReroute_REVISED
 Project Title: Rimforest Cross-Section E, After Runoff Rerouted, Pseudo-static



Filename: RimforestXsectionE_AfterWaterReroute_REVISED
 Project Title: Rimforest Cross-Section E, After Runoff Rerouted, Groundwater 50%



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnE

Project Summary:

- Job Title: Rimforest Cross-Section E Wedge Analysis
- Analysis: Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 0.8309
- Wedge height (on slope) [ft]: 680.00
- Bench width (on upper face) [ft]: 12493.77
- Wedge volume [ft³]: 758922595.124
- Wedge weight [tons]: 56919196.896
- Wedge area (joint1) [ft²]: 4079499.83
- Wedge area (joint2) [ft²]: 4033161.57
- Wedge area (slope) [ft²]: 424647.52
- Wedge area (upper face) [ft²]: 4544152.18

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	2684304.46	5063060.05
Effective Normal stress [t/ft²]	0.66	1.26
Shear Strength [t/ft²]	0.96	1.35
Strength due to Waviness [t/ft²]	0.03	0.07

- Driving force [tons]: 11760644.39
- Resisting force [tons]: 9771942.32

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	42150687.15
Joint 2	N/A	41671905.52
Fissures	10.33	N/A

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
11.92	119.50	13953.09

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1199.91	12918.55
Joint 2	1299.14	12802.72

Persistence:

- Joint 1 [ft]: 13953.09
- Joint 2 [ft]: 13953.09

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	33.01	3.15
Joint 1 & Crest	81.13	79.12
Joint 2 & Crest	65.86	97.73

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	55.00	38.00
Joint Set 2	52.00	200.00
Slope	35.00	110.00
Upper Face	10.00	110.00

Joint Set 1 Data:

- Cohesion [t/ft^2]: 0.52
- Friction Angle [deg]: 33.60

Joint Set 2 Data:

- Cohesion [t/ft^2]: 0.52
- Friction Angle [deg]: 33.60

Slope Data:

- Slope height [ft]: 680.00
- Rock unit weight [t/ft³]: 0.08
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: NO

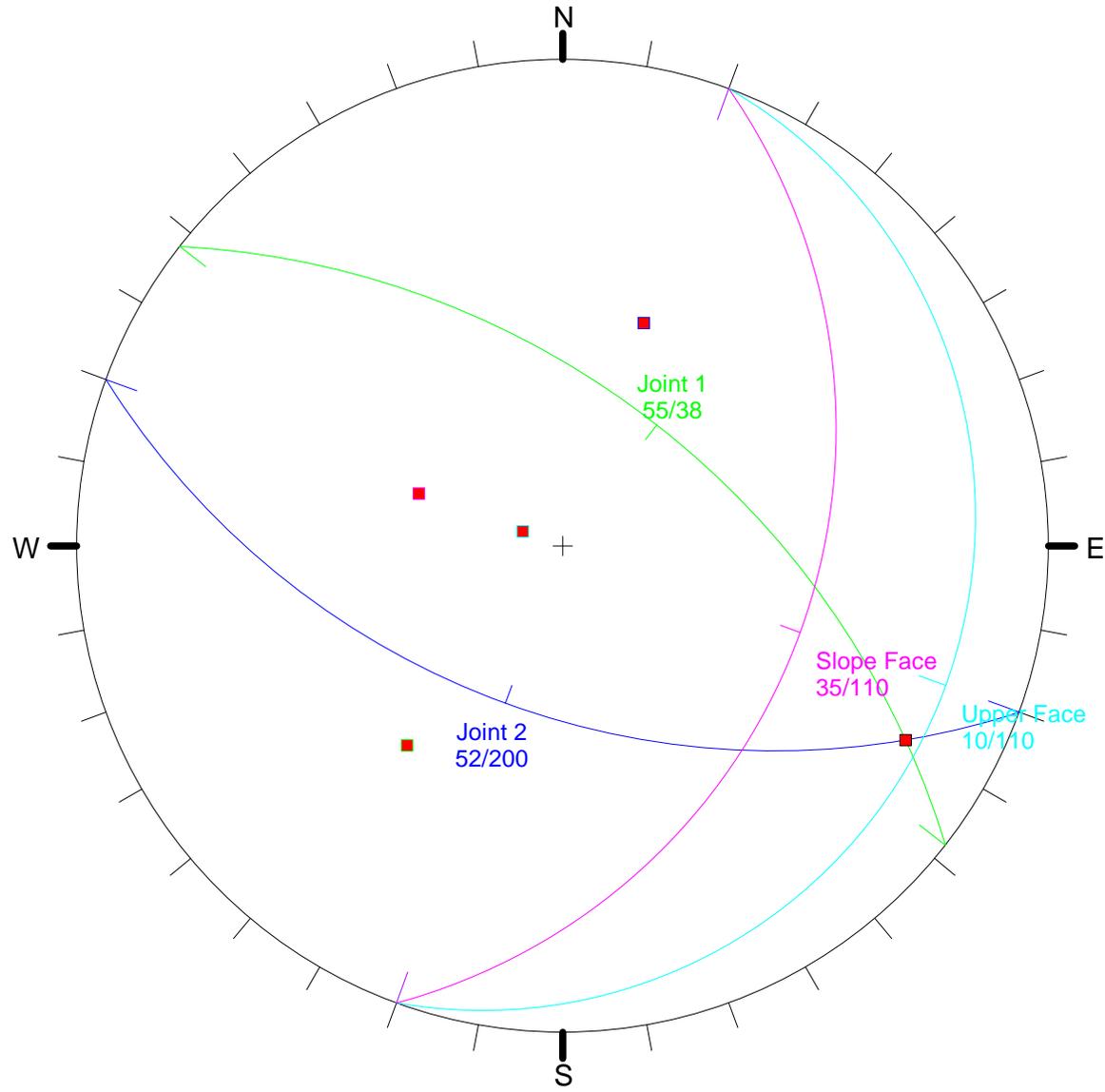
Water Pressure Data:

- Water unit weight [t/ft³]: 0.312
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 41.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope

Point	x	y	z
124	0.000	0.000	0.000
134	-975.882	158.211	680.000
234	-730.867	831.384	680.000
123	-11882.494	6721.868	2882.988



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnE

Project Summary:

- Job Title: Rimforest Cross-Section E Wedge Analysis
- Analysis: Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 0.9383
- Wedge height (on slope) [ft]: 680.00
- Bench width (on upper face) [ft]: 11002.64
- Wedge volume [ft³]: 3264310515.706
- Wedge weight [tons]: 244823298.406
- Wedge area (joint1) [ft²]: 3592611.92
- Wedge area (joint2) [ft²]: 23819802.52
- Wedge area (slope) [ft²]: 2074049.81
- Wedge area (upper face) [ft²]: 19545502.85

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	15366783.02	32389592.01
Effective Normal stress [t/ft²]	4.28	1.36
Shear Strength [t/ft²]	3.36	1.42
Strength due to Waviness [t/ft²]	0.22	0.07

- Driving force [tons]: 51675660.82
- Resisting force [tons]: 48486518.43

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	36263775.25
Joint 2	N/A	240436758.36
Fissures	10.09	N/A

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
12.19	119.30	12413.04

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1199.91	11376.72
Joint 2	3870.06	12517.74

Persistence:

- Joint 1 [ft]: 12413.04
- Joint 2 [ft]: 12517.74

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	63.29	15.93
Joint 1 & Crest	98.87	100.88
Joint 2 & Crest	17.84	63.19

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	55.00	38.00
Joint Set 2	15.00	83.00
Slope	35.00	110.00
Upper Face	10.00	110.00

Joint Set 1 Data:

- Cohesion [t/ft²]: 0.52
- Friction Angle [deg]: 33.60

Joint Set 2 Data:

- Cohesion [t/ft²]: 0.52
- Friction Angle [deg]: 33.60

Slope Data:

- Slope height [ft]: 680.00
- Rock unit weight [t/ft³]: 0.08
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: NO

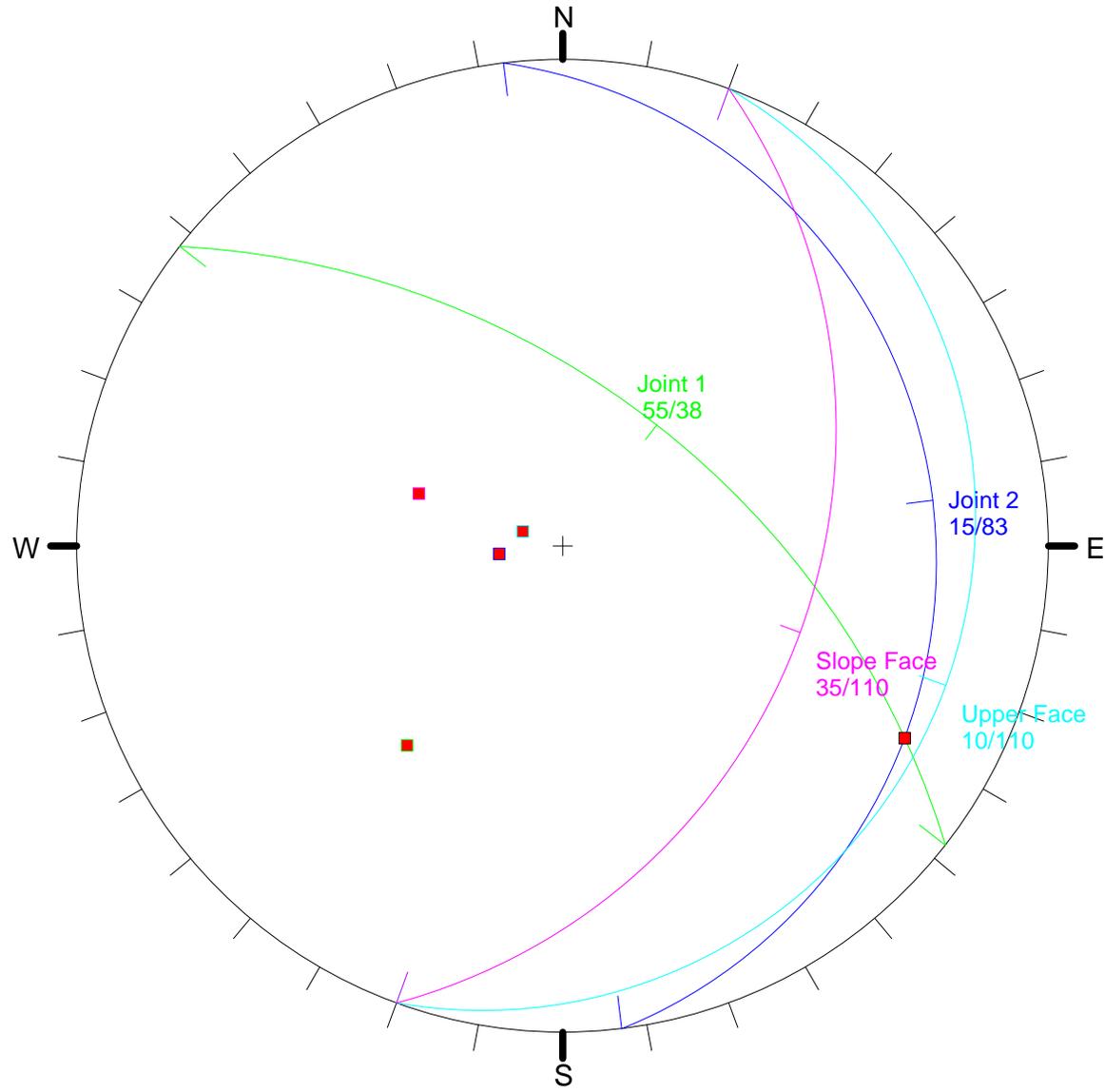
Water Pressure Data:

- Water unit weight [t/ft³]: 0.312
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 42.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope

Point	x	y	z
124	0.000	0.000	0.000
134	-975.882	158.211	680.000
234	-2172.577	-3129.680	680.000
123	-10580.791	5938.496	2620.062



Swedge Analysis Information

Document Name:

- RimForest Swedge SctnE

Project Summary:

- Job Title: Rimforest Cross-Section E Wedge Analysis
- Analysis: Wedge Failure Analysis
- Author: Richard George
- Company: Hilltop Geotechnical, Inc.
- Date Created: 9/12/2009, 5:22:56 PM

Analysis Results:

- Analysis type: Deterministic
- Safety Factor: 1.0188
- Wedge height (on slope) [ft]: 680.00
- Bench width (on upper face) [ft]: 11230.42
- Wedge volume [ft³]: 4014074141.442
- Wedge weight [tons]: 301055572.571
- Wedge area (joint1) [ft²]: 3625337.67
- Wedge area (joint2) [ft²]: 24312947.50
- Wedge area (slope) [ft²]: 2498697.33
- Wedge area (upper face) [ft²]: 24034814.45

Effective Normal and Strength Properties:

	Joint 1	Joint 2
Effective Normal force [tons]	20506452.82	49137909.75
Effective Normal stress [t/ft²]	5.66	2.02
Shear Strength [t/ft²]	4.28	1.86
Strength due to Waviness [t/ft²]	0.30	0.11

- Driving force [tons]: 63260527.36
- Resisting force [tons]: 64449415.33

Water Pressures/Forces:

	Average pressure [t/ft ²]	Water force [tons]
Joint 1	N/A	32095967.16
Joint 2	N/A	215248243.27
Fissures	8.85	N/A

Failure Mode:

- Sliding on intersection line (joints 1&2)

Joint Sets 1&2 line of Intersection:

Plunge [deg]	Trend [deg]	Length [ft]
12.13	119.67	12659.97

Trace Lengths:

	Slope Face [ft]	Upper Face [ft]
Joint 1	1299.14	11508.14
Joint 2	3870.06	12776.89

Persistence:

- Joint 1 [ft]: 12659.97
- Joint 2 [ft]: 12776.89

Intersection Angles:

	Slope Face	Upper Face
Joint 1 & Joint 2	96.30	19.08
Joint 1 & Crest	65.86	97.73
Joint 2 & Crest	17.84	63.19

Dip and Dip Direction:

	Dip [deg]	Dip Direction [deg]
Joint Set 1	52.00	200.00
Joint Set 2	15.00	83.00
Slope	35.00	110.00
Upper Face	10.00	110.00

Joint Set 1 Data:

- Cohesion [t/ft^2]: 0.52
- Friction Angle [deg]: 33.60

Joint Set 2 Data:

- Cohesion [t/ft^2]: 0.52
- Friction Angle [deg]: 33.60

Slope Data:

- Slope height [ft]: 680.00
- Rock unit weight [t/ft³]: 0.08
- Water pressures in the slope: YES
- Overhanging slope face: NO
- Externally applied force: NO
- Tension crack: NO

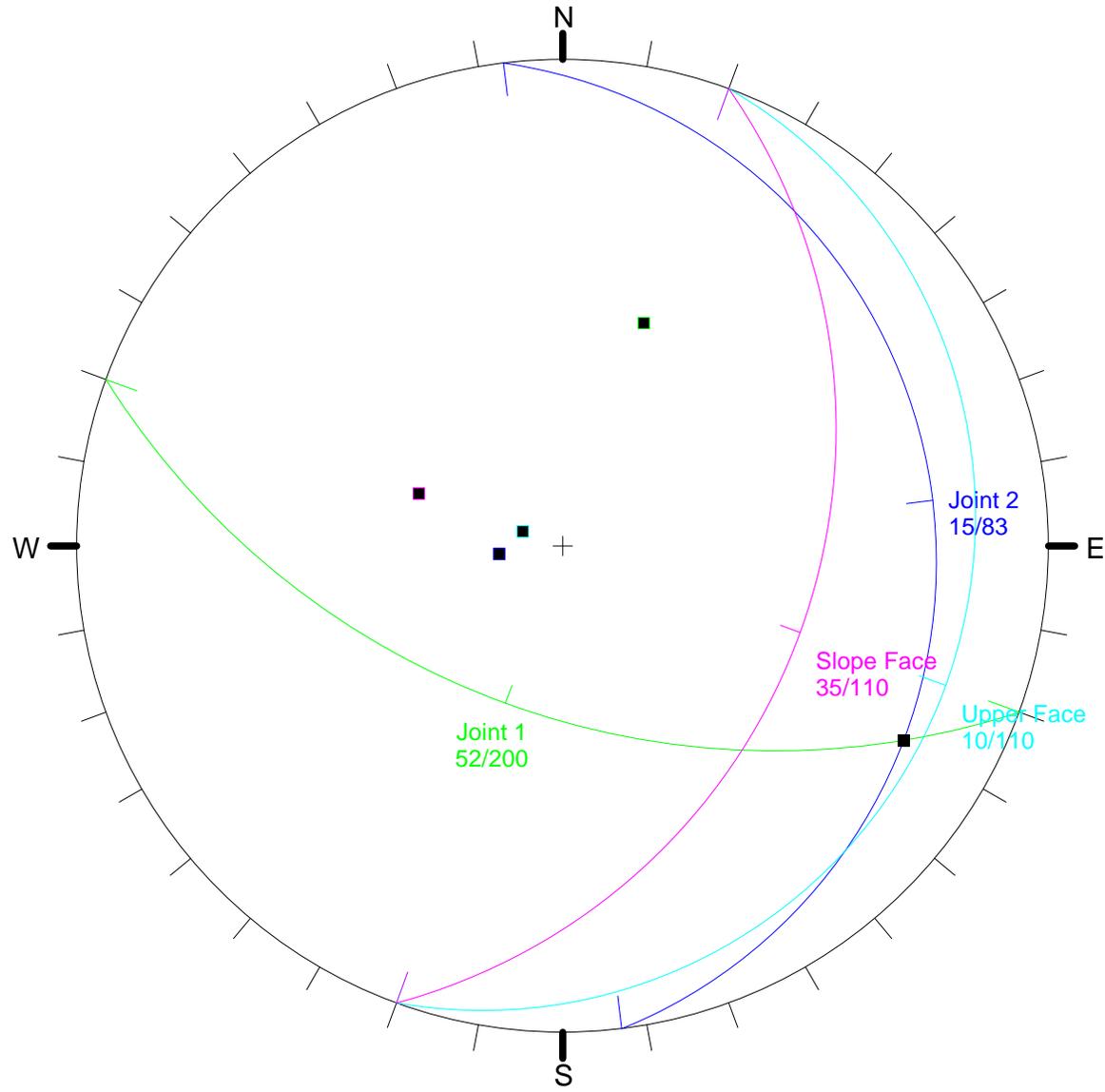
Water Pressure Data:

- Water unit weight [t/ft³]: 0.312
- Pressure definition method: Percent Filled Fissures
- Percent Filled: 40.000 %

Wedge Vertices:

- Coordinates in Easting,Northing,Up Format
- 1=Joint1, 2=Joint2, 3=Upper Face, 4=Slope

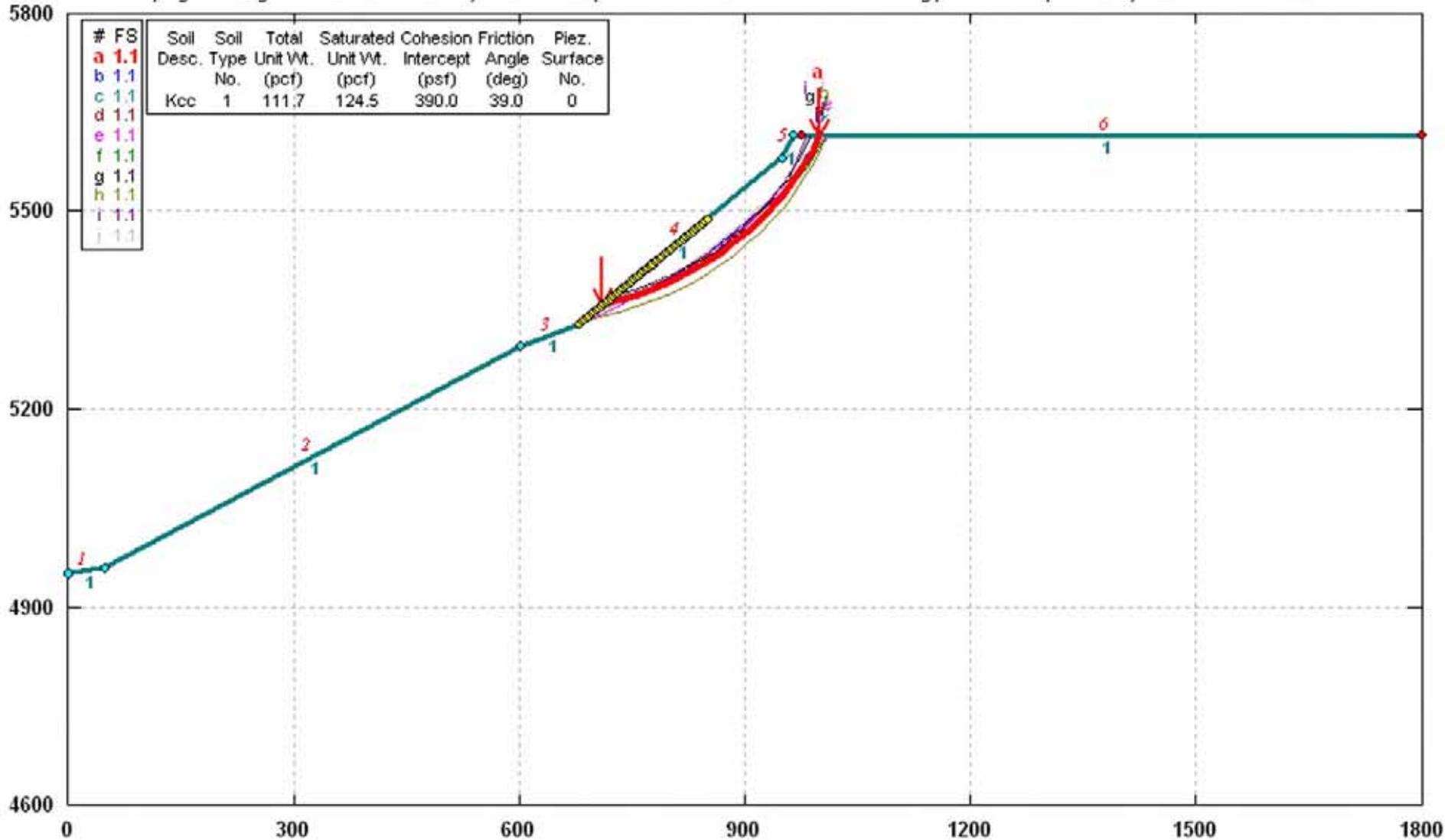
Point	x	y	z
124	0.000	0.000	0.000
134	-730.867	831.384	680.000
234	-2172.577	-3129.680	680.000
123	-10754.868	6126.236	2660.227



APPENDIX E
Soil Slope Stability Analysis

168-H09.1, Rim Forest Landslide Study Section B-B', Seismic Avg. Peak FS 1.1

c:\program files\g72sw\168-h09\final stability runs for the report\seismic b-b'\168-h09.1 b-b' seismic avg peak str fs1.1.pl2 Run By: DLC 10/9/2009 09:03AM



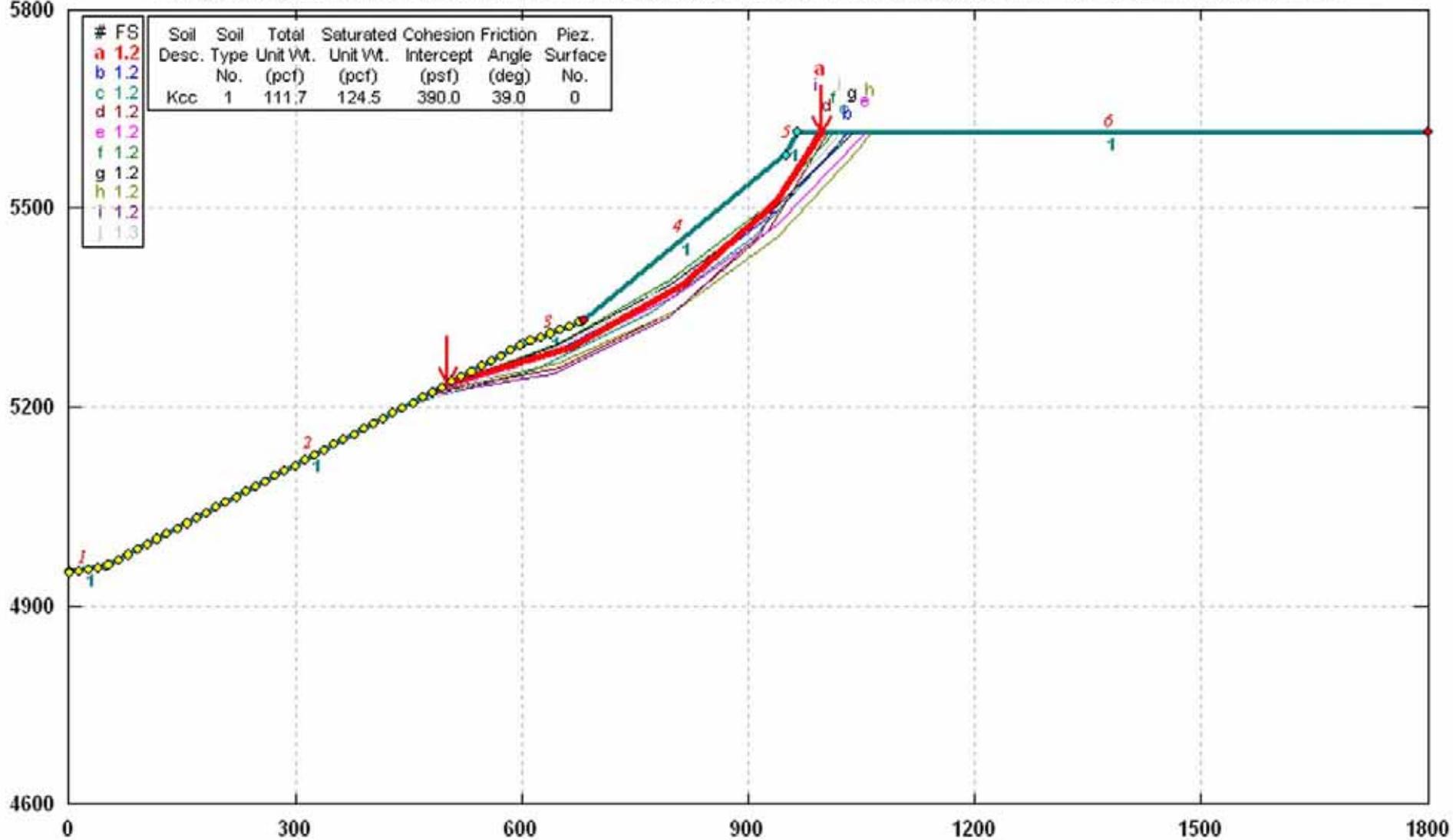
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Safety Factors Are Calculated By The Simplified Janbu Method



168-H09.1, Rim Forest Landslide Study Section B-B', Seismic Avg. Peak Str.

c:\program files\g72sw\168-h09\final stability runs for the report\seismic b-b'\168-h09.1 b-b' seismic avg peak str.pl2 Run By: DLC 10/9/2009 09:01 AM



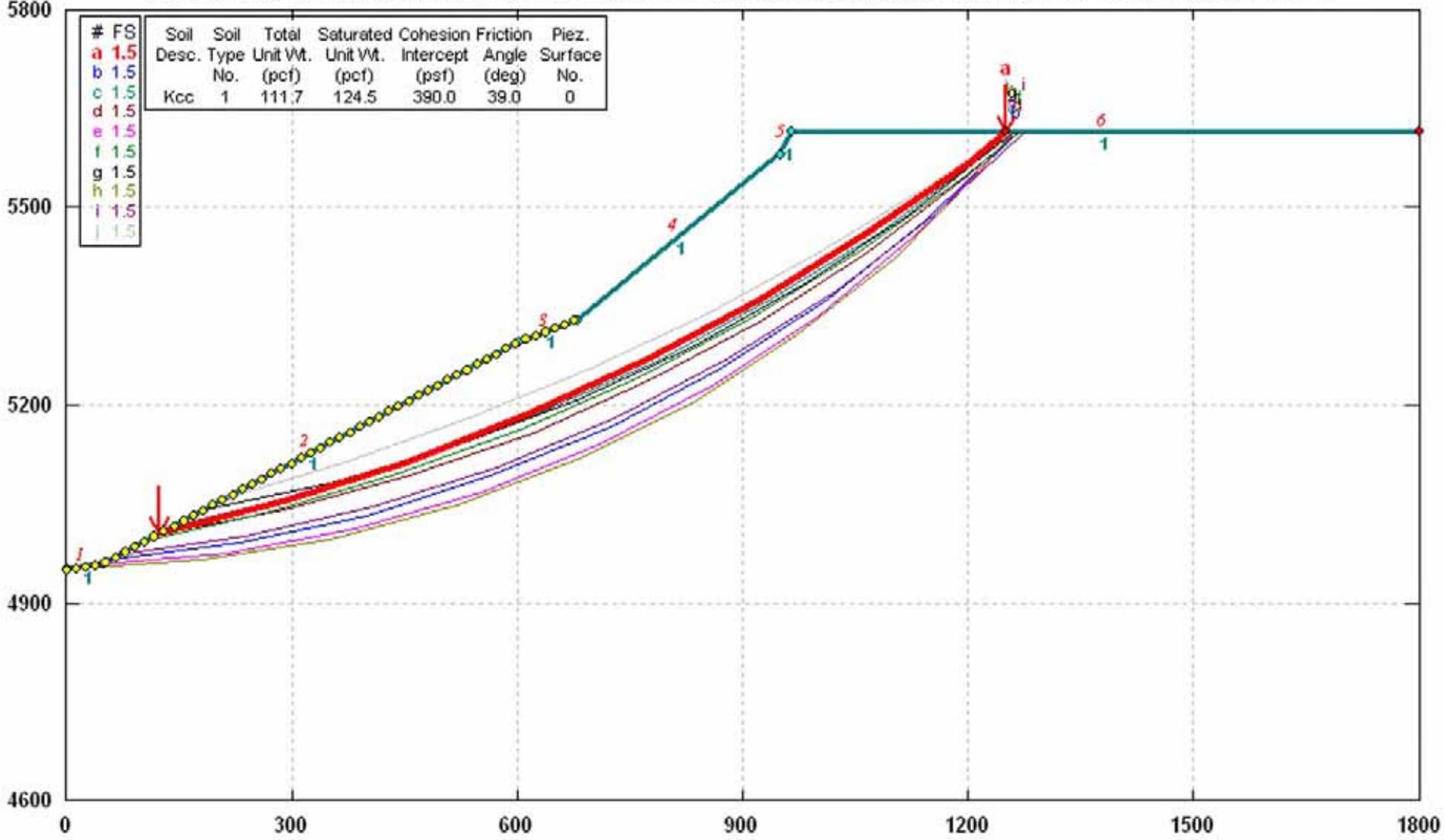
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Safety Factors Are Calculated By The Simplified Janbu Method



168-H09.1, Rim Forest Landslide Study Section B-B', Static Avg. Peak FS 1.5

c:\program files\g72sw\168-h09\final stability runs for the report\static b-b'\168-h09.1 b-b' static avg peak str fs1.5.pl2 Run By: DLC 10/9/2009 08:59AM



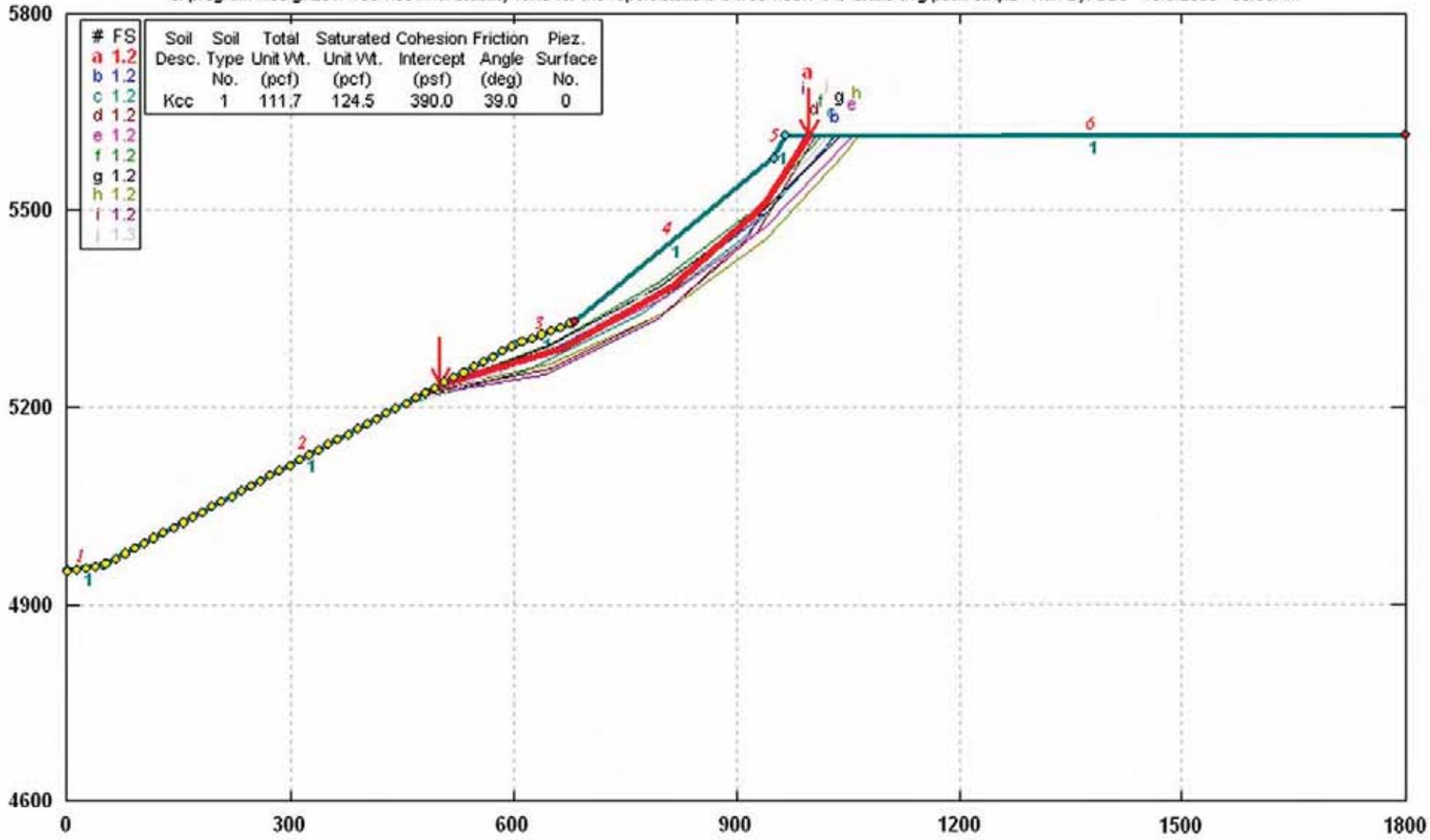
GSTABL7 v.2 FSmin=1.5

Safety Factors Are Calculated By The Simplified Janbu Method



168-H09.1, Rim Forest Landslide Study Section B-B', Static Avg. Peak Str.

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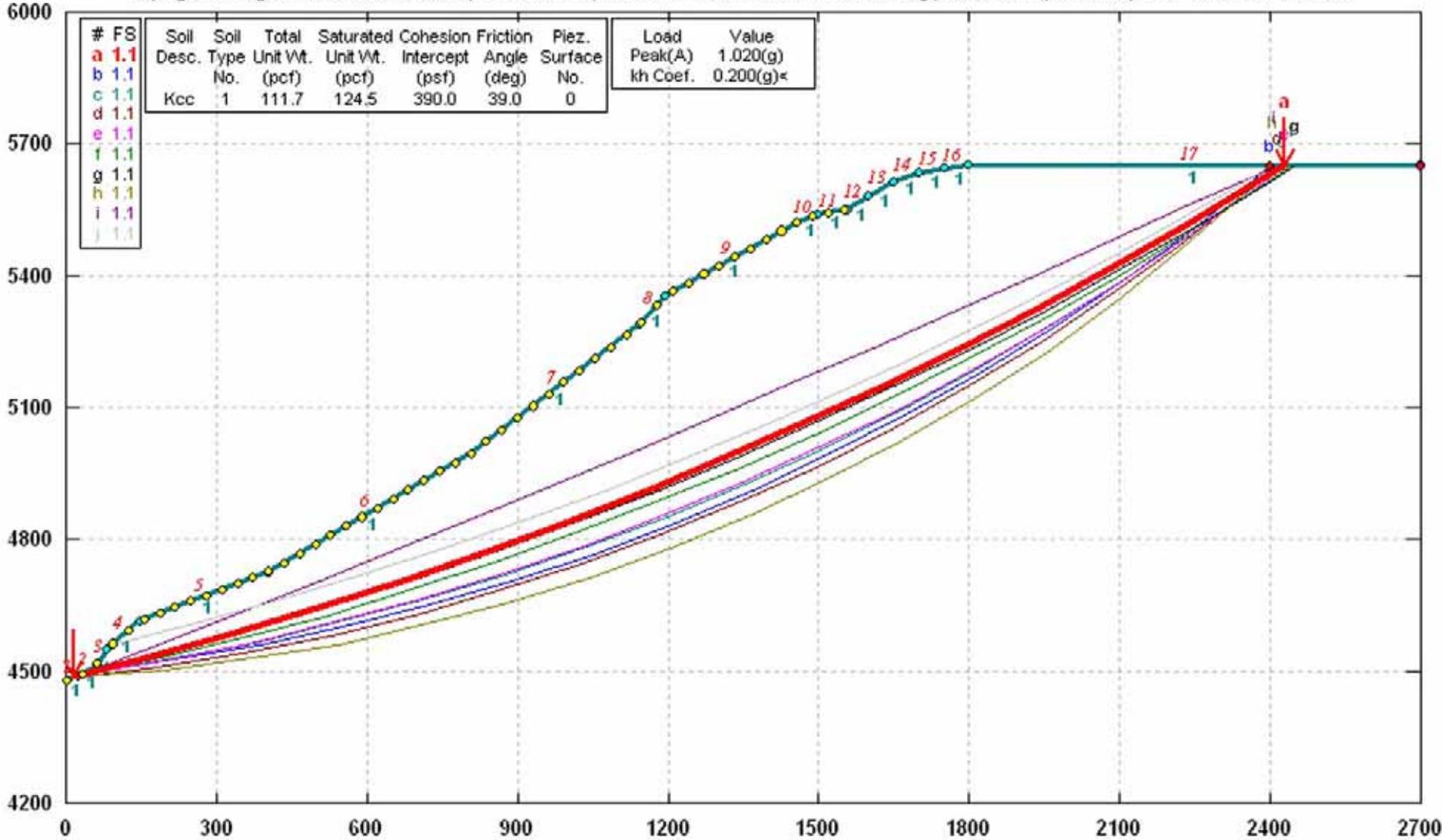
GSTABL7 v.2 FSmin=1.2

Safety Factors Are Calculated By The Simplified Janbu Method



168-H09.1, Rim Forest Landslide Study Section C-C', Seismic Avg. Peak FS 1.1

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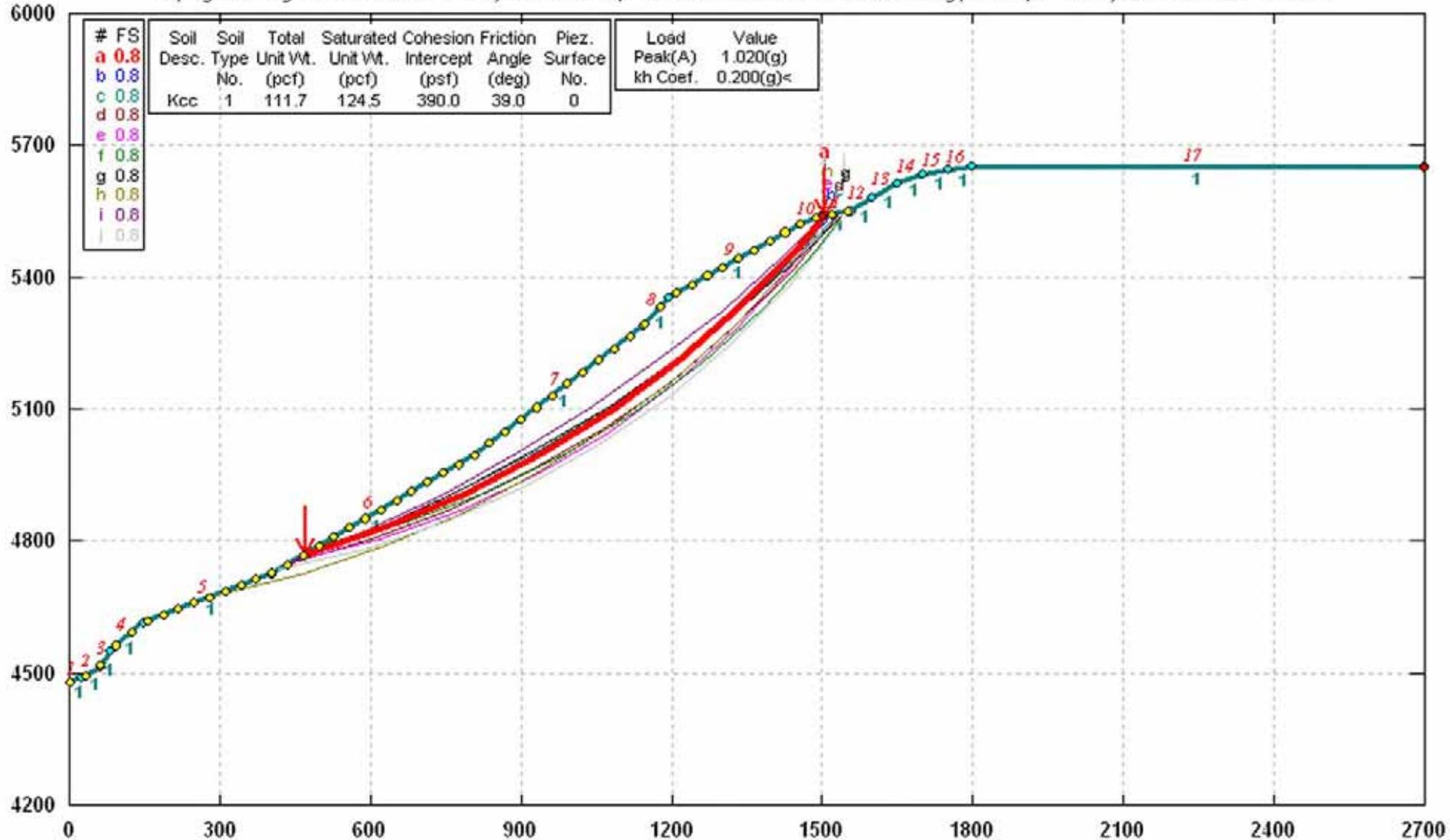
GSTABL7 v.2 FSmin=1.1

Safety Factors Are Calculated By The Simplified Janbu Method



168-H09.1, Rim Forest Landslide Study Section C-C', Seismic Avg. Peak Str.

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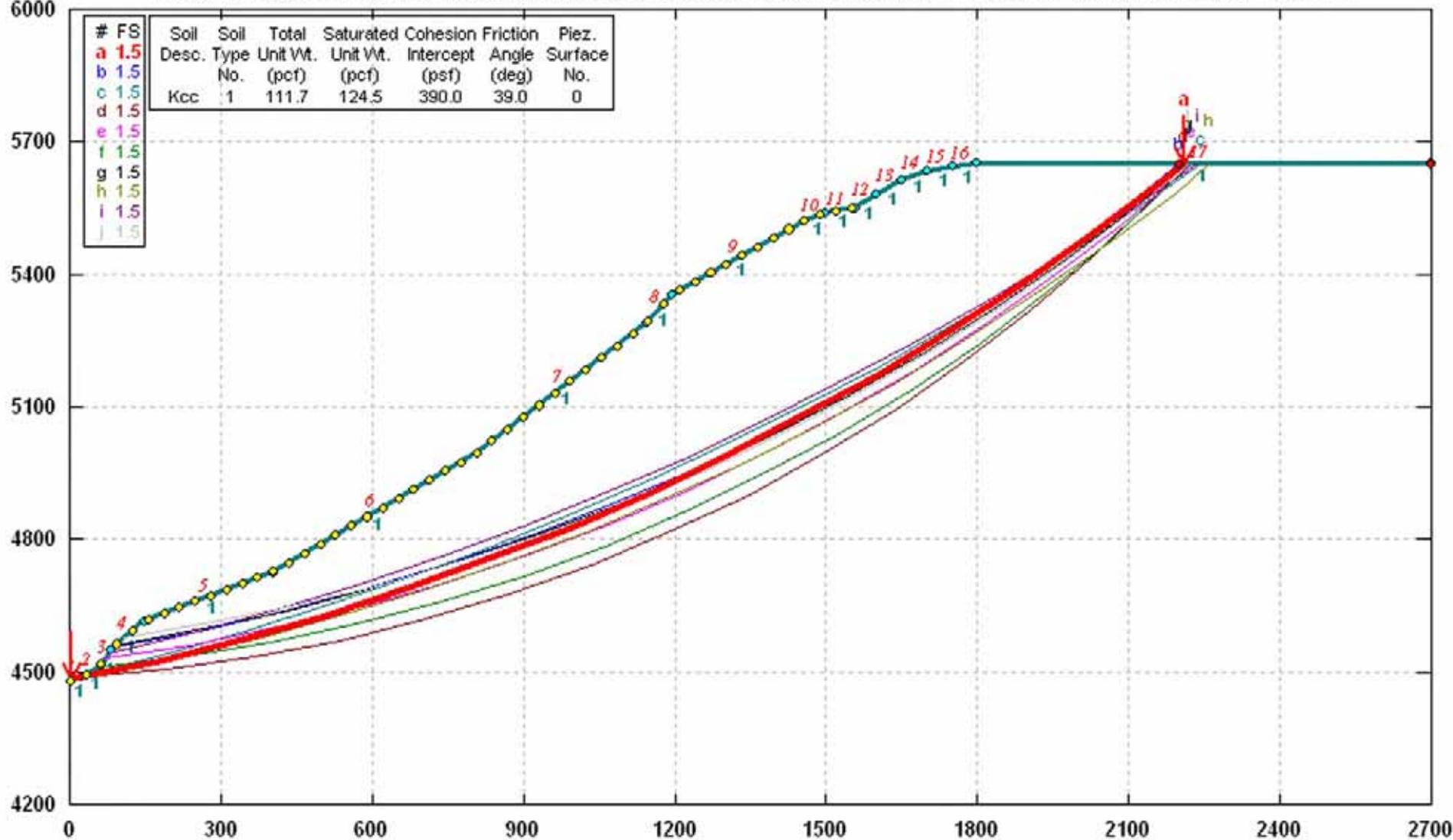
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Safety Factors Are Calculated By The Simplified Janbu Method



168-H09.1, Rim Forest Landslide Study Section C-C', Static Avg. Peak FS 1.5

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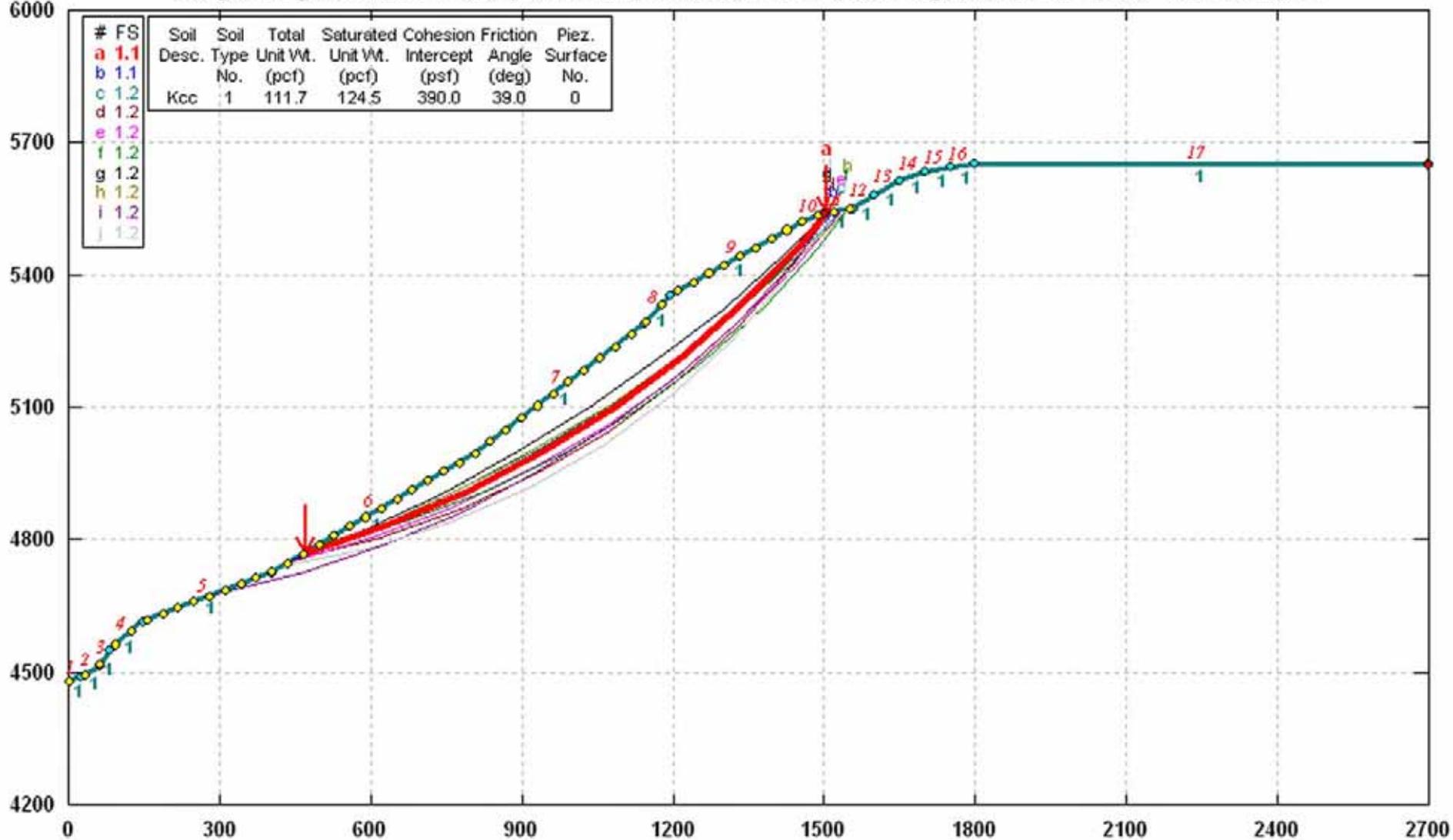
GSTABL7 v.2 FSmin=1.5

Safety Factors Are Calculated By The Simplified Janbu Method



168-H09.1, Rim Forest Landslide Study Section C-C', Static Avg. Peak Str.

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GSTABL7 v.2 FSmin=1.1

Safety Factors Are Calculated By The Simplified Janbu Method

