Appendix G-3:

Geotechnical Report Addendum (2020)

April 13, 2020
IC 16010-I

Manny Valencia
3003 Runyon Canyon Road
Los Angeles, California 90046

Subject

Geologic and Soils Engineering Exploration Update and Addendum Report
Proposed Residence and Pool
Arb. 22, Portion of SW¼; NE ¼; SEC 4; T1S; R14W
3003 North Runyon Canyon Road
Los Angeles, California

References: Reports by Irvine Geotechnical, Inc.:

Geologic and Soils Engineering Exploration, Proposed Residence and Pool, Arb. 22, Portion of SW¼; NE ¼; SEC 4; T1S; R14W, 3003 North Runyon Canyon Road, Los Angeles, California, March 11, 2016 and

Addendum Geologic and Soils Engineering Exploration, Geologic and Soils Engineering Exploration, Proposed Residence and Pool, Arb. 22, Portion of SW¼; NE ¼; SEC 4; T1S; R14W, 3003 North Runyon Canyon Road, Los Angeles, California, dated October 17, 2016

City of Los Angeles Department of Building and Safety, Grading Division:

Geology and Soils Report Correction Letters, Log #92340, dated April 7, 2016 and Log #92340-01, dated November 16, 2016.

Dear Gentle Persons;

Irvine Geotechnical has prepared this geologic and soils engineering update and addendum report to provide additional recommendations to the Grading Division for the design and construction of the proposed project. This report follows consultation with the client and design team and meetings with the reviewing geotechnical engineer and engineering geologist for the Grading Division. This report intends to provide updated recommendations in conformance with the 2020 Building Code and to respond to the open correction letter dated November 16, 2016.

The project is generally similar to what was previously presented to the Department and follows evolution based on presentations to and responses from Mulholland Scenic Parkway. It is planned to redevelop the property with a new, single-family residence. The structure will be significantly tucked into and partially covered by the hillside to reduce the visual impact to Runyon Canyon. Retaining walls up to 40 feet high are planned to tuck the structure below grade. Two rows of parallel retaining walls up to 10 feet high each are planned on the northwestern slopes to support earth with a 2:1 backslope. Fill slopes are no longer planned at 1½:1 gradient and the grading plan has been revised to show Code-conforming, 2:1 fill slopes. A small 1½:1 cut into bedrock is planned on the northern side of the residence. The proposed project is shown on the updated Geologic Map, which is based on the latest Grading Plans prepared by Obando and Associates. Sections A through C have been updated to show the latest project.

The following response pertains to the one open Item of the Department's Correction Letter, dated November 16, 2016.

Item 1 - All fill slopes are planned at a 2:1 gradient as shown on the Geologic Map/Grading Plan and Section C.

The following recommendations are intended to update the geotechnical design recommendations to the 2020 Building Code.

CONCLUSIONS AND RECOMMENDATIONS

The proposed project remains feasible from a geologic and geotechnical engineering standpoint. The bedrock remains the recommended bearing material. Existing fill and soil are not considered suitable for support of foundations or slabs. Conventional foundations may be used to support portions of the proposed structures sufficiently tucked into the

slope to expose bedrock and satisfy foundation setback requirements. Deepened pile foundations are recommended to support structures on or near slopes.

Geotechnical recommendations for design of foundations, slabs, retaining walls, and temporary excavations contained in the referenced reports remain valid and applicable, unless where modified below. Graded compacted fill slopes should not be made steeper than 2:1. Cut slopes in bedrock may be created at a 1½:1 gradient.

2020 SEISMIC DESIGN VALUES

Building Code Seismic Coefficients

Seismic design parameters within the Building Code include amplification of the seismic forces on the structure depending on the soil type, distance to seismic source and intensity of shaking. The purpose of the code seismic design parameters is to prevent collapse of structures and loss of life during strong ground shaking. Cosmetic damage should be expected.

The following table lists the applicable seismic coefficients for the 2020 Los Angeles Building Code.

SEISMIC COEFFICIENTS (2020 Los Angeles Building Code)		
Latitude = 34.1133°N Longitude = 118.3504°W	Short Period (0.2s)	One-Second Period
Earth Materials and Site Class Chapter 20 - ASCE 7	Bedrock - C	
Seismic Design Category from Table 1613.2.5(1) and 1613.2.5(2)	E	
Spectral Accelerations from Figures 1613.2.1 (1) through 1613.2.1(8)	S_s = 2.108 (g)	S_1 = 0.757 (g)
Site Coefficients from Tables 1613.2.3 (1) and 1613.2.3 (2)	F_A = 1.2	F_V = 1.4
Spectral Response Accelerations from Equations 16-36 and 16-37	S_{MS} = 2.529 (g)	S_{M1} = 1.060 (g)
Design Accelerations from Equations 16-38 and 16-39	S_{DS} = 1.686 (g)	S_{D1} = 0.707 (g)

Ground Motion

Spectral accelerations and peak ground accelerations at the site were determined for the Risk-Targeted Maximum Considered Earthquake (MCE_R) and Geometric Mean Peak Ground Acceleration (MCE_G) following the procedures in ASCE 7-16 and the 2019 Building Code. The computed PGA_M for this site is 1.079g. According to the USGS deaggregation website (https://earthquake.usgs.gov/hazards/interactive/), and using a ground motion with a 10 percent probability of exceedance in 50 years, the mean de-aggregated earthquake PGA and moment magnitude are 0.522g and 6.76, respectively. For a ground motion with a 2 percent probability of exceedance in 50 years, the modal de-aggregated earthquake PGA and moment magnitude are 1.000g and 6.93, respectively. The modal distance to the ground motion source is 6.1 km.

SLOPE STABILITY

Gross Stability

The property is located along the crest of a ridge and slopes descend to the east, west, and south. The highest and steepest slopes are represented by Sections A, B, and X. The offsite topography is based on the Local Topo Map, which is based on NavigateLA GIS database. The gross stability of the slopes shown in Sections A, B, and X was calculated using a computerized version of Simplified Bishop's method (SLIDE Version 8.032 developed by ROCSCIENCE, Inc.).

The seismic stability of the site was calculated in conformance with Southern California Earthquake Center (SCEC), 2002, "*Recommended Procedures for Implementation of DMG Special Publication 117* and California Geological Survey (CGS), Special Publication 117A, 2008 "*Guidelines for Evaluating and Mitigating Seismic Hazards in California.*" Using the screening procedure and for a maximum allowable displacement of 5 cm, the horizontal acceleration (Keq) is 0.253g.

The analysis shows that the subject property and existing slopes are grossly stable with a factor of safety in excess of 1.5 under static conditions and in excess of 1.0 under seismic conditions. The calculations use the shear tests of samples believed to represent the weakest bedrock encountered during exploration. The cross sections and geologic structure used are the most critical for the slopes analyzed.

RETAINING WALLS

General Design - Static Loading

Cantilevered retaining walls up to 12 feet high that support bedrock and approved retaining wall backfill, may be designed for an equivalent fluid pressures shown in the following table. Restrained walls that are pinned at the top by a non-yielding floor should be designed for an at-rest earth pressure. The recommended design at-rest earth pressure on restrained basement walls is an equivalent fluid pressure of 60 pcf.

DESIGN EARTH PRESSURES - CANTILEVERED WALLS

Surface Slope Gradient	Design EFP
Level	35
3:1	38
2:1	43
1.5:1	55

Seismic Surcharge

In conformance with the Building Code, retaining walls higher than 6 feet were considered for seismic loading for the design ground motion resulting from the Maximum Considered Earthquake. The horizontal coefficient of seismic increment (K_E) and seismic increment (P_E) were estimated following procedures by Sitar, N. et. al.,2010, (*Seismic Earth Pressures on Deep Building Basements,* SEAOC 2010 Convention Proceedings). Spectral accelerations at the site were determined for the Maximum Considered Earthquake (MCE) following the procedures in ASCE 7-10 and the 2019 Building Code. The computed PGA_M for this site is 1.079g. The horizontal coefficient of seismic increment (K_E) was assumed to be ⅓(PGA_M) = 0.360g.

The force required in addition to the static design force to raise the safety factor to at least 1.0 (P_E) was checked using a computerized version of the Mononobe-Okabe method. Ground motion was assumed to be 0.360g.

The recommended static and seismic forces for cantilevered and restrained retaining walls are shown in the following table. Where the unbalanced seismic force is higher than the static design pressure, the seismic increment was converted to an equivalent fluid pressure.

DESIGN EARTH PRESSURES - WALLS > 6 FEET			
Surface Slope Gradient	Static Design Force	Seismic Force*	Seismic Surcharge
Level	12ft^2 * 35 pcf /2=2.520 kips	1.103 kips	0 pcf
2:1	10ft^2 * 43 pcf /2=2.150 kips	1.103 kips	0 pcf
1.5:1**	12ft^2 * 55 pcf /2=3.960 kips	0.118 kips	0 pcf
Restrained	40ft^2 * 60 pcf /2=48.000 kips	26.935 kips	0 pcf

* See Calculation sheets
** Bedrock only

Surcharge Loading

Retaining walls that are surcharged by traffic and/or structural loads should be designed to withstand the surcharge. The surcharge loads may be computed following the guidelines in City of Los Angeles P/BC 2020-83 (*Retaining Wall Design*) and P/BC 2017-141 (*Guidelines for Determining Live Loads Surcharge from Sidewalk Pedestrian Traffic and Street Traffic*) or equivalent Boussinesq methods. Irvine Geotechnical would be happy to assist the structural engineer in evaluating the surcharge pressure and the point of application from concentrated structural loads.

Subdrain

The recommended design earth pressures assume a free-draining backfill and no buildup of hydrostatic pressures. Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of ¾ inch crushed gravel. Not all subdrain systems and pipes are approved by all Building Departments. It is recommended that the Building Department be consulted when using non-conventional systems. The subdrain system should discharge to the atmosphere or to an engineered sump via gravity. Surface drains should not be connected to the subdrain system.

Backfill

Retaining wall backfill should be compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557-12. Where access between the retaining wall and the temporary excavation prevents the use of compaction equipment and the retained height is less than 10 feet, retaining walls should be backfilled with ¾-inch crushed gravel to within

2 feet of the ground surface. Where the area between the wall and the excavation exceeds 18 inches or the retained height is more than 10 feet, the gravel must be vibrated or wheel-rolled and tested for compaction. The upper 2 feet of backfill above the gravel should consist of a compacted fill blanket to the surface. Retaining wall backfill should be capped with a paved surface drain or a concrete slab.

Freeboard

Retaining walls surcharged by a sloping condition should be provided with a minimum of 12 inches of freeboard for slough protection. An open "V" drain should be placed behind the wall so that all upslope flows are directed around the structure to the street or approved location.

TEMPORARY EXCAVATIONS

Temporary excavations will be required to construct the proposed retaining walls. The excavations could be up to 40 feet in height and will expose scattered fill over bedrock. The fill should be trimmed to 1:1 for wall excavations. Where not surcharged by existing footings or structures, the bedrock is capable of maintaining vertical excavations up to 8 feet per the enclosed calculations. Where vertical excavations in the bedrock exceed 8 feet in height, the upper portion should be trimmed to 1:1 (45 degrees).

It should be noted that regardless of stability, excavations that remove lateral support from property lines or existing structures are not allowed by the Code. The following section from Chapter 33 of the Building Code governs temporary excavations:

3307.3 Temporary excavations and shoring.

3307.3.1 General. Excavations shall not remove the lateral support from a public way, from an adjacent property or from an existing structure. For the purpose of this section, the lateral support shall be considered to have been removed when any of the following conditions exist:

1. The excavation exposes any adverse geological formations, which would affect the lateral support of a public way or an adjacent structure.

2. The excavation extends below a plane extending downward at an angle of 45 degrees from the edge of the public way or an adjacent property.

Exception: Normal footing excavations not exceeding two feet in depth will not be construed as removing lateral support.

3. The excavation extends below a plane extending downward at an angle of 45 degrees from the bottom of an existing structure.

Vertical excavations removing lateral or vertical support from existing foundations or property lines, or where trimming is not feasible, will require the use of temporary shoring.

Shoring

Temporary shoring should be designed for an equivalent fluid pressure of 30 pounds per cubic foot per the enclosed calculations. Shoring that is integrated into the permanent retaining walls should be designed for earth pressures conforming to the RETAINING WALL section of this report.

Shoring may consist of cast-in-place concrete piles with wood lagging. Shoring piles should be a minimum of 12 inches in diameter and a minimum of 6 feet into bedrock below the base of the excavation. Piles may be assumed fixed 3 feet into bedrock below the base of the excavation. For the vertical forces, piles may be designed for a skin friction of 800 pounds per square foot for that portion of pile in contact with the bedrock. Soldier piles should be spaced a maximum of 10 feet on center.

The friction value is for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces. Resistance to lateral loading may be provided by passive earth pressure within the bedrock below the base of the excavation.

Passive earth pressure may be computed as an equivalent fluid having a density of 500 pounds per cubic foot. The maximum allowable earth pressure is 6,000 pounds per square foot. For design of isolated piles, the allowable passive and maximum earth pressures may be increased by 100 percent. Piles spaced more than 3 pile diameters on center may be considered isolated.

Surcharge Loading

Shoring that is surcharged by traffic and/or structural loads should be designed to withstand the surcharge. The surcharge loads may be computed following the guidelines in City of Los Angeles P/BC 2017-141 (*Guidelines for Determining Live Loads Surcharge from Sidewalk Pedestrian Traffic and Street Traffic*) or equivalent Boussinesq and site-specific methods.

Irvine Geotechnical would be happy to assist the shoring engineer in evaluating the surcharge pressure and the point of application from concentrated structural loads.

Lagging

Lagging is recommended between piles. Due to arching in the soils, the pressure on the lagging will be less than that on the shoring piles. It is recommended that the lagging be designed for the full design pressure but be limited to a maximum of 300 pounds per square foot. The void between the lagging and the back-cut should be slurry-filled and observed by a representative of the geotechnical engineer.

Earth Anchors

Tie-back earth anchors may be used to assist the shoring piles. Pressure grouted or post-grouted anchors are anticipated. For design purposes, it is assumed that the active wedge adjacent to shoring supporting bedrock is defined by a plane drawn at 30 degrees with the vertical through the bottom of the excavation. Anchors should extend at least 15 feet beyond the potential active wedge, or to a greater length if necessary to develop the desired capacities. For pressure grouted anchors in bedrock, an average ultimate bond stress within bedrock may be assumed to be 7,500 psf. The ultimate capacity should be verified in the field following testing procedures and protocols developed by the Shoring Engineer. All anchors should be tested in conformance with City of Los Angeles Guidelines and the PTI - *Recommendations for Prestressed Rock and Soil Anchors*.

Testing of a percentage of the initial and representative anchors to 200 percent of the design is recommended to verify the assumptions. The remaining anchors should be tested to at least 150 percent of design. The installation and testing should conform to the recommendations of the shoring engineer and City of Los Angeles Guidelines. The testing should also be observed by a representative of the geotechnical engineer. Failure or excessive movement of anchors may require longer bond length, additional post-grouting or additional anchors.

Raker Footings

A bearing value of 5,000 psf may be assumed for inclined raker footings. A coefficient of sliding friction of 0.50 may be assumed along the base of the footing. Passive pressure may be assumed to be 500 pcf.

Deflection Monitoring

Prior to construction and excavation for the project, it is recommended that the existing conditions along the property lines be documented and surveyed. Documentation should include photographs and descriptions of the offsite structures and conditions. Survey monuments should be affixed to representative structures and to points along the property line and offsite. The survey points should be measured prior to construction to form a

baseline for determining settlement and/or deformation. Upon installation of the shoring system, survey monuments should be affixed to the tops of representative piles so that deflection can be measured.

Some deflection is expected for a well designed and constructed cantilevered shoring system. It is recommended that deflection be limited to 1 inch or less.

The shored excavations and offsite structures should be visually inspected everyday. Survey monuments should be measured once a month during the construction process. Should the surveys reveal offsite deformation or excessive deflection of the shoring system, the shoring engineer and geotechnical engineer should be notified. Excessive deflection may require additional anchors and/or internal bracing to restrain the shoring system.

A representative of the geotechnical engineer or geologist should be present during grading to see temporary slopes. All excavations should be stabilized within 30 days of initial excavation. Water should not be allowed to pond on top of the excavations nor to flow toward them. No vehicular surcharge should be allowed within three feet of the top of the cut.

PLAN REVIEW

Formal plans ready for submittal to the Building Department should be reviewed by Irvine Geotechnical. Any change in scope of the project may require additional work.

SITE OBSERVATIONS DURING CONSTRUCTION

Please advise Irvine Geotechnical at least 24 hours prior to any required site visit. The agency approved plans and permits should be at the jobsite and available to our representative. The project consultant will perform the observation and post a notice at the jobsite of his visit and findings. This notice should be given to the agency inspector.

During construction, a number of reviews by this office are recommended to verify site geotechnical conditions and conformance with the intent of the recommendations for construction. Although not all possible geotechnical observation and testing services are required by the reviewing agency, the more site reviews requested, the lower the risk of future problems. It is recommended that all grading, foundation, and drainage excavations be seen by a representative of the geotechnical engineer PRIOR to placing fill, forms, pipe, concrete, or steel. Any fill which is placed should be approved, tested, and verified if used for engineering purposes. Temporary excavations should be observed by a representative of the Geotechnical Engineer.

The following site reviews are advised or required. Should the observations reveal any unforeseen hazards, the geologist/engineer will recommend treatment.

Pre-construction meeting	Advised
Temporary excavations	Required
Shoring pile and lagging installation	Required
Bottom excavation for removals	Required
Keyway excavations and benching	Required
Subdrains	Required
Compaction of fill	Required
Foundation excavations	Required
Slab subgrade moisture barrier membrane	Advised
Slab subgrade rock placement	Advised
Slab steel placement	Advised
Subdrain and rock placement behind retaining walls	Required
Compaction of retaining wall backfill	Required
Compaction of utility trench backfill	Advised

Irvine Geotechnical requires at least a 24 hour notice prior to any required site visits. The approved plans and building/grading permits should be on the job and available to the project consultant.

Irvine Geotechnical appreciates the opportunity to provide our service on this project. Any questions concerning the data or interpretation of this or the referenced report should be directed to the undersigned.

Respectfully submitted,
Irvine Geotechnical, Inc.

Jon A. Irvine
E.G. 1691/G.E. 2891
R:\ICprojects\2016 Projects\IC16010 Valencia\IC16010 Valencia Update Addendum.wpd

Enc: *Geology and Soils Report Correction Letter,* dated November 16, 2016
Calculation Sheets (49)
In pocket: Geologic Map and Sections A through C

xc: (3) Addressee

CITY OF LOS ANGELES
CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

FRANK BUSH
GENERAL MANAGER

OSAMA YOUNAN, P.E.
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT CORRECTION LETTER

November 16, 2016

LOG # 92340-01
SOILS/GEOLOGY FILE - 2
LAN

Manny Valencia
3003 N. Runyon Canyon Road
Los Angeles, CA 90046

TRACT: -- (MP SW ¼ NE ¼ SEC 4 T1S R14W)
LOT(S): PT SW ¼ NE ¼ SEC 4 T1S R14W (Arb. 22)
LOCATION: 3003 N. Runyon Canyon Road

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Addendum Report	IC 16010-I	10/17/2016	Irvine Geotechnical, Inc.
Oversized Docs.	``	``	``

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Dept. Correction Letter	92340	04/07/2016	LADBS
Geology/Soils Report	IC 16010-C	03/11/2016	Irvine Geotechnical, Inc.
Laboratory Test Report	SL16.2127	02/26/2016	Soil Labwork LLC
Dept. Approval Letter	26176	11/12/1998	LADBS
Addendum Report	17848-I	11/12/1998	J. Byer Group
Geology/Soils Report	17848-I	09/30/1998	J. Byer Group

The Grading Division of the Department of Building and Safety has reviewed the referenced report providing recommendations for the proposed three-story residence, swimming pool, patios, and tunnel. The lower floor levels will be partially subterranean. The current development has been revised to include the construction of new fill slopes to minimize the export of material. Retaining walls ranging up to 40 feet in height are proposed for the lower floor levels and an expansion of the driveway area. An onsite wastewater treatment system (OWTS) currently services the existing residence. New seepage pits are proposed along the driveway area to service the new residence. The new residence and existing residence will be connected by the proposed tunnel.

The subject property is developed with a multi-story residence and swimming pool. The building pad is situated along the north-south trending ridge with slopes descending to the south, west, and east. Slopes range as high as 340 feet with gradients of about 1½:1 (H:V) to ½:1 locally. Subsurface exploration performed by the consultant consisted of eight test pits supplemented with

field mapping of the bedrock outcrops. The earth materials at the subsurface exploration locations consist of up to 3 feet of uncertified fill underlain by soil and sedimentary and granitic bedrock. Geologic structure observed by the consultant within the sedimentary bedrock consisted of a northeasterly dip of 50 degrees. Geologic structure observed within the granitic bedrock consisted of varying orientations of joints. The consultants recommend to support the proposed structures on conventional and/or drilled-pile foundations bearing on competent bedrock.

The review of the subject report can not be completed at this time and will be continued upon submittal of an addendum to the report which shall include, but not be limited to, the following:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2014 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. All new graded fill slopes shall be no steeper than 2H:1V (7010.2 & 7011.2). Revise recommendations accordingly.

The geologist and soils engineer shall prepare a report containing the corrections indicated in this letter. The report shall be in the form of an itemized response. It is recommended that once all correction items have been addressed in a response report, to contact the report review engineer and/or geologist to schedule a verification appointment to demonstrate compliance with all the corrections. Do not schedule an appointment until all corrections have been addressed. Bring three copies of the response report, including one unbound wet-signed original for microfilming in the event that the report is found to be acceptable.

EDMOND LEE
Engineering Geologist Associate II

YING LIU
Geotechnical Engineer I

Log No. 92340-01
213-482-0480

cc: Applicant
Irvine Geotechnical, Inc., Project Consultant
LA District Office

IRVINE GEOTECHNICAL Inc

RETAINING WALL

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	COMPACTED FILL	WALL HEIGHT	12 feet
SHEAR DIAGRAM:	JBG-1	BACKSLOPE ANGLE:	0 degrees
COHESION:	410 psf	SURCHARGE:	0 pounds
PHI ANGLE:	32 degrees	SURCHARGE TYPE:	U Uniform
DENSITY	135 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION	0 degrees	INITIAL TENSION CRACK:	2 feet
CD (C/FS):	410.0 psf	FINAL TENSION CRACK:	20 feet

PHID = ATAN(TAN(PHI)/FS) = 32.0 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0.36 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	49 degrees
AREA OF TRIAL FAILURE WEDGE	45.6 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	6158.8 pounds
NUMBER OF TRIAL WEDGES ANALYZED	779 trials
LENGTH OF FAILURE PLANE	7.6 feet
DEPTH OF TENSION CRACK	6.2 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	5.0 feet
CALCULATED HORIZONTAL THRUST ON WALL	**1329.1 pounds**

THE CALCULATION INDICATES THAT FOR THE DESIGN GROUND MOTION, THE UNBALANCED FORCE ON RETAINING WALLS SUPPORTING COMPACTED FILL WITH A 2:1 BAKSLOPE IS 1.330 KIPS.

IRVINE GEOTECHNICAL Inc

RETAINING WALL

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	WALL HEIGHT	40 feet
SHEAR DIAGRAM:	B-3	BACKSLOPE ANGLE:	0 degrees
COHESION:	690 psf	SURCHARGE:	0 pounds
PHI ANGLE:	41 degrees	SURCHARGE TYPE:	U Uniform
DENSITY	145 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION	0 degrees	INITIAL TENSION CRACK:	2 feet
CD (C/FS):	690.0 psf	FINAL TENSION CRACK:	40 feet

PHID = ATAN(TAN(PHI)/FS) = 41.0 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0.36 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	53 degrees
AREA OF TRIAL FAILURE WEDGE	558.9 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	81034.0 pounds
NUMBER OF TRIAL WEDGES ANALYZED	1599 trials
LENGTH OF FAILURE PLANE	36.6 feet
DEPTH OF TENSION CRACK	10.8 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	22.0 feet
CALCULATED HORIZONTAL THRUST ON WALL	**26934.7 pounds**

THE CALCULATION INDICATES THAT FOR THE DESIGN GROUND MOTION, THE UNBALANCED FORCE ON RETAINING WALLS SUPPORTING BEDROCK WITH A LEVEL BAKSLOPE IS 26.935 KIPS.

IRVINE GEOTECHNICAL Inc

RETAINING WALL

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	COMPACTED FILL	WALL HEIGHT	10 feet
SHEAR DIAGRAM:	JBG-1	BACKSLOPE ANGLE:	27 degrees
COHESION:	410 psf	SURCHARGE:	0 pounds
PHI ANGLE:	32 degrees	SURCHARGE TYPE:	U Uniform
DENSITY	135 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION	0 degrees	INITIAL TENSION CRACK:	2 feet
CD (C/FS):	410.0 psf	FINAL TENSION CRACK:	20 feet

PHID = ATAN(TAN(PHI)/FS) = 32.0 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0.36 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	44 degrees
AREA OF TRIAL FAILURE WEDGE	65.4 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	8829.4 pounds
NUMBER OF TRIAL WEDGES ANALYZED	779 trials
LENGTH OF FAILURE PLANE	11.1 feet
DEPTH OF TENSION CRACK	6.4 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	8.0 feet
CALCULATED HORIZONTAL THRUST ON WALL	**1102.1 pounds**

THE CALCULATION INDICATES THAT FOR THE DESIGN GROUND MOTION, THE UNBALANCED FORCE ON RETAINING WALLS SUPPORTING COMPACTED FILL WITH A 2:1 BAKSLOPE IS 1.103 KIPS.

IRVINE GEOTECHNICAL Inc

RETAINING WALL

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	WALL HEIGHT	12 feet
SHEAR DIAGRAM:	B-3	BACKSLOPE ANGLE:	34 degrees
COHESION:	690 psf	SURCHARGE:	0 pounds
PHI ANGLE:	41 degrees	SURCHARGE TYPE:	U Uniform
DENSITY	145 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION	0 degrees	INITIAL TENSION CRACK:	2 feet
CD (C/FS):	690.0 psf	FINAL TENSION CRACK:	20 feet

PHID = ATAN(TAN(PHI)/FS) = 41.0 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0.36 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	54 degrees
AREA OF TRIAL FAILURE WEDGE	22.6 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	3276.5 pounds
NUMBER OF TRIAL WEDGES ANALYZED	779 trials
LENGTH OF FAILURE PLANE	3.4 feet
DEPTH OF TENSION CRACK	10.6 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	2.0 feet
CALCULATED HORIZONTAL THRUST ON WALL	**117.4 pounds**

THE CALCULATION INDICATES THAT FOR THE DESIGN GROUND MOTION, THE UNBALANCED FORCE ON RETAINING WALLS SUPPORTING BEDROCK WITH A 1.5:1 BAKSLOPE IS 0.118 KIPS.

IRVINE GEOTECHNICAL Inc

SHORING PILE

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	RETAINED LENGTH	40 feet
SHEAR DIAGRAM:	B-3	BACKSLOPE ANGLE:	0 degrees
COHESION:	690 psf	SURCHARGE:	0 pounds
PHI ANGLE:	41 degrees	SURCHARGE TYPE:	U Uniform
DENSITY	145 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.25	FINAL FAILURE ANGLE:	70 degrees
PILE FRICTION	0 degrees	INITIAL TENSION CRACK:	2 feet
CD (C/FS):	552.0 psf	FINAL TENSION CRACK:	40 feet

PHID = ATAN(TAN(PHI)/FS) = 34.8 degrees

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	63 degrees
AREA OF TRIAL FAILURE WEDGE	354.2 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	51353.1 pounds
NUMBER OF TRIAL WEDGES ANALYZED	1599 trials
LENGTH OF FAILURE PLANE	28.6 feet
DEPTH OF TENSION CRACK	14.5 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	13.0 feet
CALCULATED THRUST ON PILE	**12794.4 pounds**
CALCULATED EQUIVALENT FLUID PRESSURE	**16.0 pcf**
DESIGN EQUIVALENT FLUID PRESSURE	**30.0 pcf**

THE CALCULATION INDICATES THAT THE PROPOSED SHORING PILES MAY MAY BE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 30 POUNDS PER CUBIC FOOT. THE FLUID PRESSURE SHOULD BE MULTIPLIED BY THE PILE SPACING.

IRVINE GEOTECHNICAL Inc

TEMPORARY EXCAVATION HEIGHT

IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE HEIGHT TO WHICH TEMPORARY EXCAVATIONS ARE STABLE (NEGATIVE THRUST). THE EXCAVATION HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE EARTH MATERIAL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE.

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	WALL HEIGHT:	8 feet
SHEAR DIAGRAM:	B-3	BACKSLOPE ANGLE:	45 degrees
COHESION:	690 psf	SURCHARGE:	0 pounds
PHI ANGLE:	41 degrees	SURCHARGE TYPE:	P Point
DENSITY:	145 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.25	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	0 degrees	INITIAL TENSION CRACK:	1 feet
CD (C/FS):	552.0 psf	FINAL TENSION CRACK:	30 feet
PHID = ATAN(TAN(PHI)/FS) =	34.8 degrees		

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	52	degrees
AREA OF TRIAL FAILURE WEDGE	7.9	square feet
TOTAL EXTERNAL SURCHARGE	0.0	pounds
WEIGHT OF TRIAL FAILURE WEDGE	1139.7	pounds
NUMBER OF TRIAL WEDGES ANALYZED	1230	trials
LENGTH OF FAILURE PLANE	1.6	feet
DEPTH OF TENSION CRACK	7.7	feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	1.0	feet
CALCULATED HORIZONTAL THRUST	**-418.0**	**pounds**
CALCULATED EQUIVALENT FLUID PRESSURE	**-13.1**	**pcf**
MAXIMUM HEIGHT OF TEMPORARY EXCAVATION	**8.0**	**feet**

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE TEMPORARY EXCAVATIONS IN BEDROCK UP TO 8 FEET WITH A 45 DEGREE BACKSLOPE HIGH HAVE A NEGATIVE THRUST AND ARE TEMPORARILY STABLE.

IRVINE GEOTECHNICAL Inc

SCREENING ACCELERATION

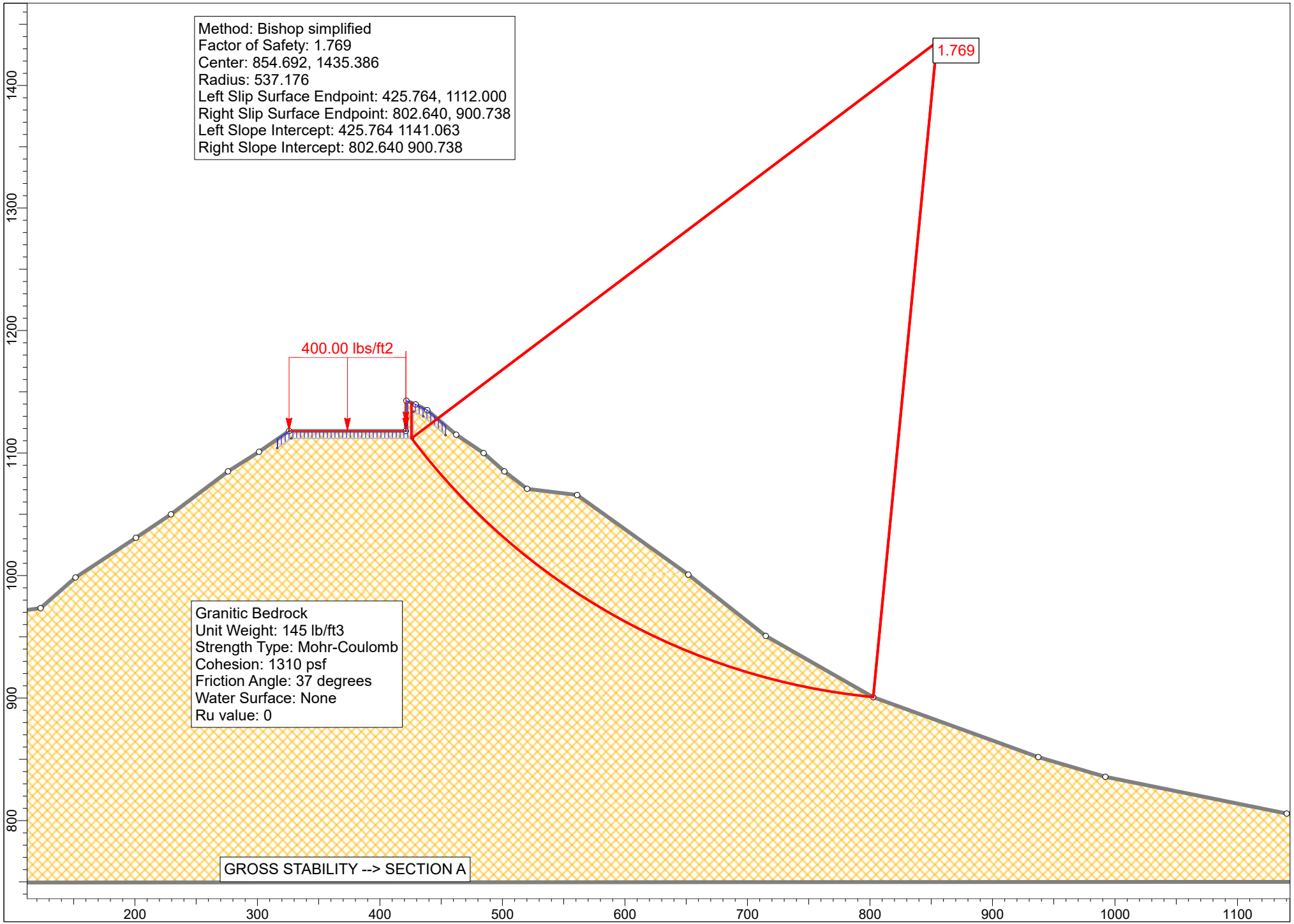
IC: **16** CONSULT **JAI**
CLIENT **VALENCIA - RUNYON CANYON**

REFERENCES

CGS, SP117A, 2008 (Guidelines for Evaluating and Mitigating Seismic Hazards in California) & SCEC, 2002 (Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landsliding in California)

Longitude	118.383	W
Latitude	34.108	N
Mean Return Time	475	years
Meanl EQ Magnitude (M)	6.76	
Mean Source Distance (r)	9.89	km
Max. Horizontal Acceleration (MHA)	0.719	g
Significant Duration of Shaking (D_{5-95})	11.57	secs
Modal Mean Period (T_m)	0.495	
Nonlinear Response Factor (NRF)	0.805	
Design Allowable Displacement	15	cm
Seismic Factor (f_{eq})	0.352	
Screening Acceleration (Keq)	**0.253**	**g**

CONCLUSIONS: The screening acceleration for determining the seismic slope stability is 0.253g.


Method: Bishop simplified
Factor of Safety: 1.769
Center: 854.692, 1435.386
Radius: 537.176
Left Slip Surface Endpoint: 425.764, 1112.000
Right Slip Surface Endpoint: 802.640, 900.738
Left Slope Intercept: 425.764 1141.063
Right Slope Intercept: 802.640 900.738
1.769
400.00 lbs/ft2
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: None
Ru value: 0
GROSS STABILITY --> SECTION A
1400
1300
1200
1100
1000
900
800
200
300
400
500
600
700
800
900
1000
1100

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

Slide Modeler Version:	8.032
Compute Time:	00h:00m:00.468s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified

Number of slices:	25
Tolerance:	0.005
Maximum number of iterations:	50
Check malpha < 0.2:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10

Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

1 Distributed Load present

Distributed Load 1	
Distribution:	Constant
Magnitude [psf]:	400
Orientation:	Vertical

Tension Crack

Water level: filled with water

Materials

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [°]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS	1.768600
Center:	854.692, 1435.386
Radius:	537.176
Left Slip Surface Endpoint:	425.764, 1112.000
Right Slip Surface Endpoint:	802.640, 900.738
Left Slope Intercept:	425.764 1141.063
Right Slope Intercept:	802.640 900.738
Resisting Moment:	1.28716e+09 lb-ft
Driving Moment:	7.27785e+08 lb-ft
Total Slice Area:	18664.8 ft2
Surface Horizontal Width:	376.876 ft
Surface Average Height:	49.5251 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 3202
Number of Invalid Surfaces: 0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.7686

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	15.075	76695.8	-51.6889	Granitic Bedrock	1310	37	1889.44	3341.67	2696.12	0	2696.12	5087.63	5087.63
2	15.075	93065.2	-49.1624	Granitic Bedrock	1310	37	2257.98	3993.46	3561.07	0	3561.07	6173.49	6173.49
3	15.075	102702	-46.7592	Granitic Bedrock	1310	37	2507.4	4434.59	4146.47	0	4146.47	6812.78	6812.78
4	15.075	113773	-44.4591	Granitic Bedrock	1310	37	2789.87	4934.17	4809.45	0	4809.45	7547.15	7547.15
5	15.075	118615	-42.2466	Granitic Bedrock	1310	37	2951.16	5219.43	5187.98	0	5187.98	7868.31	7868.31
6	15.075	120109	-40.1092	Granitic Bedrock	1310	37	3043.2	5382.21	5403.99	0	5403.99	7967.44	7967.44
7	15.075	127417	-38.0372	Granitic Bedrock	1310	37	3256.48	5759.41	5904.59	0	5904.59	8452.23	8452.23
8	15.075	147519	-36.0223	Granitic Bedrock	1310	37	3748.72	6629.99	7059.86	0	7059.86	9785.69	9785.69
9	15.075	166590	-34.0577	Granitic Bedrock	1310	37	4230.63	7482.3	8190.9	0	8190.9	11050.7	11050.7
10	15.075	173665	-32.1378	Granitic Bedrock	1310	37	4456.29	7881.39	8720.51	0	8720.51	11520	11520
11	15.075	170038	-30.2575	Granitic Bedrock	1310	37	4442.4	7856.83	8687.92	0	8687.92	11279.4	11279.4
12	15.075	164973	-28.4126	Granitic Bedrock	1310	37	4391.26	7766.38	8567.93	0	8567.93	10943.5	10943.5
13	15.075	158548	-26.5993	Granitic Bedrock	1310	37	4303.62	7611.39	8362.25	0	8362.25	10517.3	10517.3
14	15.075	150827	-24.8144	Granitic Bedrock	1310	37	4180.11	7392.95	8072.33	0	8072.33	10005.1	10005.1
15	15.075	141868	-23.0548	Granitic Bedrock	1310	37	4021.2	7111.89	7699.35	0	7699.35	9410.79	9410.79
16	15.075	130440	-21.318	Granitic Bedrock	1310	37	3796.19	6713.95	7171.3	0	7171.3	8652.75	8652.75
17	15.075	116626	-19.6015	Granitic Bedrock	1310	37	3505.13	6199.18	6488.15	0	6488.15	7736.38	7736.38
18	15.075	101705	-17.9032	Granitic Bedrock	1310	37	3177.84	5620.32	5719.98	0	5719.98	6746.59	6746.59
19	15.075	85709.7	-16.2209	Granitic Bedrock	1310	37	2814.32	4977.4	4866.8	0	4866.8	5685.55	5685.55
20	15.075	71144.8	-14.553	Granitic Bedrock	1310	37	2477.47	4381.65	4076.23	0	4076.23	4719.39	4719.39
21	15.075	60292.2	-12.8975	Granitic Bedrock	1310	37	2227.45	3939.47	3489.42	0	3489.42	3999.48	3999.48
22	15.075	48556.3	-11.253	Granitic Bedrock	1310	37	1947.94	3445.12	2833.4	0	2833.4	3220.97	3220.97
23	15.075	35839.6	-9.6178	Granitic Bedrock	1310	37	1635.56	2892.66	2100.25	0	2100.25	2377.41	2377.41

24	15.075	22157.4	-7.99048	Granitic Bedrock	1310	37	1289.8	2281.15	1288.76	0	1288.76	1469.81	1469.81
25	15.075	7522.6	-6.36963	Granitic Bedrock	1310	37	910.031	1609.48	397.423	0	397.423	499.011	499.011

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.7686

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	425.764	1112	26354.5	0	0
2	440.839	1092.92	49315.4	0	0
3	455.914	1075.48	77387	0	0
4	470.989	1059.45	106058	0	0
5	486.064	1044.65	135147	0	0
6	501.139	1030.96	161691	0	0
7	516.214	1018.26	184438	0	0
8	531.289	1006.47	204983	0	0
9	546.364	995.509	225859	0	0
10	561.439	985.318	245551	0	0
11	576.514	975.848	260960	0	0
12	591.589	967.054	270395	0	0
13	606.664	958.899	274071	0	0
14	621.739	951.35	272319	0	0
15	636.814	944.38	265571	0	0
16	651.889	937.963	254351	0	0
17	666.964	932.081	239312	0	0
18	682.04	926.712	221304	0	0
19	697.115	921.842	201255	0	0
20	712.19	917.456	180174	0	0
21	727.265	913.543	158779	0	0
22	742.34	910.091	137246	0	0
23	757.415	907.091	116380	0	0
24	772.49	904.537	97088.9	0	0
25	787.565	902.421	80372.4	0	0
26	802.64	900.738	0	0	0

Entity Information

Distributed Load

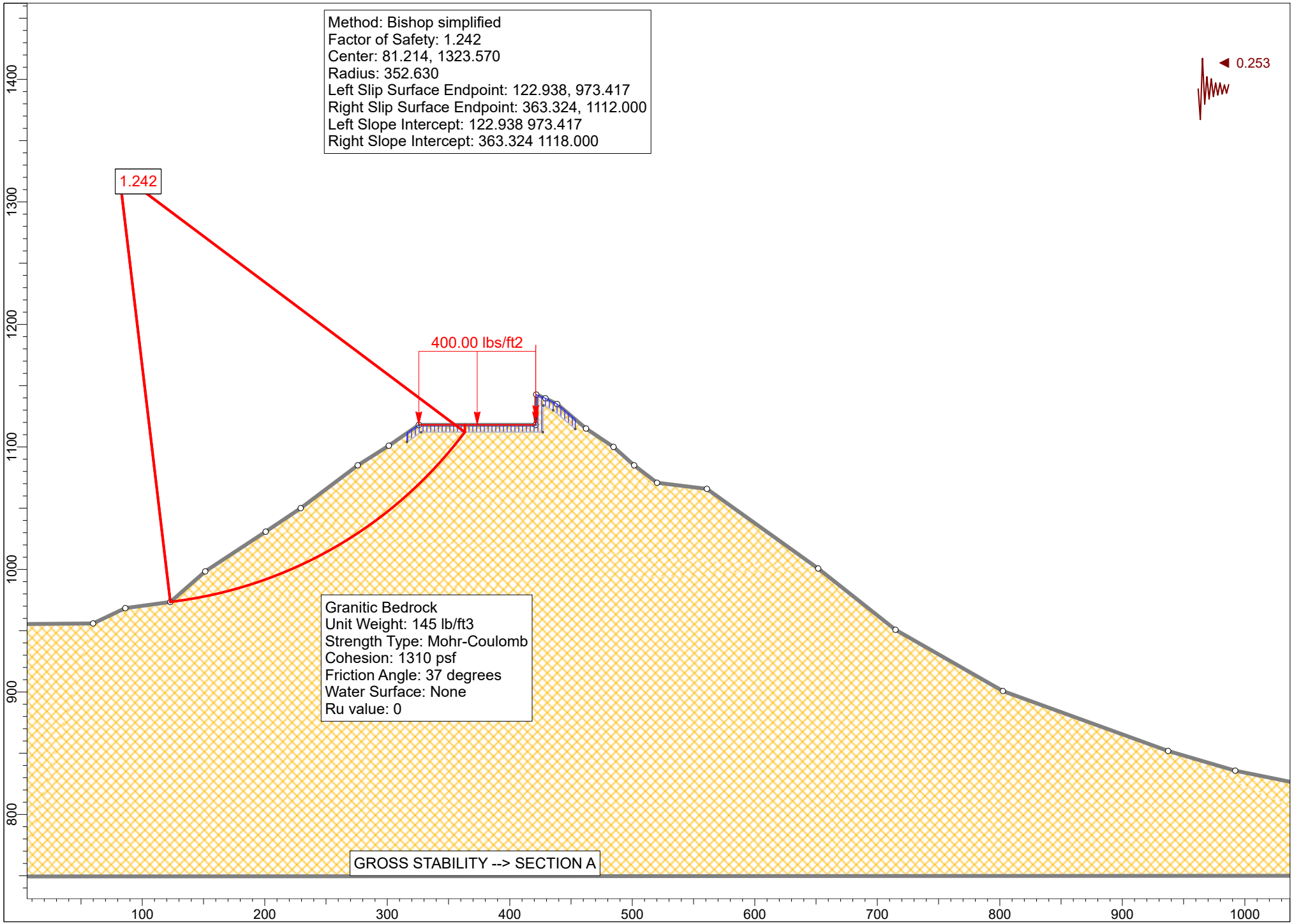
X	Y
325.79	1118
421.143	1118
421.238	1123.06

Tension Crack

X	Y
316.146	1104
327.669	1112
427.033	1112
427.44	1133.82
435.359	1129.94
453.53	1114.54

External Boundary

X	Y
0.000317657	749.393
1160.87	750
1160.87	806.763
1140.17	805.763
992.17	835.763
937.44	851.791
802.57	900.763
714.87	950.763
651.77	1000.76
560.97	1065.76
520.17	1070.76
501.57	1085
484.67	1100
462.27	1115
438.67	1135
429.131	1139.68
421.606	1142.78
421.143	1118
325.79	1118
301.308	1101
275.97	1085
229.37	1050
200.812	1030.86
151.47	998.421
122.97	973.421
86.1699	968.421
59.8699	955.921
-0.107439	955.411


Method: Bishop simplified
Factor of Safety: 1.242
Center: 81.214, 1323.570
Radius: 352.630
Left Slip Surface Endpoint: 122.938, 973.417
Right Slip Surface Endpoint: 363.324, 1112.000
Left Slope Intercept: 122.938 973.417
Right Slope Intercept: 363.324 1118.000
0.253
1.242
400.00 lbs/ft2
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: None
Ru value: 0
GROSS STABILITY --> SECTION A
1400
1300
1200
1100
1000
900
800
100
200
300
400
500
600
700
800
900
1000

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

Slide Modeler Version: 8.032

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified

Number of slices:	25
Tolerance:	0.005
Maximum number of iterations:	50
Check malpha < 0.2:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10
Number of iterations:	10

Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Seismic Load Coefficient (Horizontal): 0.253

Loading

1 Distributed Load present

Distributed Load 1	
Distribution:	Constant
Magnitude [psf]:	400
Orientation:	Vertical

Tension Crack

Water level: filled with water

Materials

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [°]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS	1.242230
Center:	81.214, 1323.570
Radius:	352.630
Left Slip Surface Endpoint:	122.938, 973.417
Right Slip Surface Endpoint:	363.324, 1112.000
Left Slope Intercept:	122.938 973.417
Right Slope Intercept:	363.324 1118.000
Resisting Moment:	4.07279e+08 lb-ft
Driving Moment:	3.27862e+08 lb-ft
Total Slice Area:	9115.45 ft2
Surface Horizontal Width:	240.386 ft
Surface Average Height:	37.9201 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2531
Number of Invalid Surfaces: 0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.24223

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	9.61543	4955.11	7.5835	Granitic Bedrock	1310	37	1265.25	1571.74	347.334	0	347.334	515.783	515.783
2	9.61543	14741.2	9.16286	Granitic Bedrock	1310	37	1808.1	2246.08	1242.22	0	1242.22	1533.87	1533.87
3	9.61543	24145.7	10.7493	Granitic Bedrock	1310	37	2312.29	2872.39	2073.36	0	2073.36	2512.33	2512.33
4	9.61543	31598.7	12.3441	Granitic Bedrock	1310	37	2691.68	3343.68	2698.78	0	2698.78	3287.84	3287.84
5	9.61543	37281.7	13.9487	Granitic Bedrock	1310	37	2961.55	3678.93	3143.68	0	3143.68	3879.26	3879.26
6	9.61543	42564.5	15.5646	Granitic Bedrock	1310	37	3200.53	3975.79	3537.62	0	3537.62	4429.09	4429.09
7	9.61543	47438.1	17.1932	Granitic Bedrock	1310	37	3409.14	4234.94	3881.52	0	3881.52	4936.38	4936.38
8	9.61543	51892.1	18.8363	Granitic Bedrock	1310	37	3587.85	4456.93	4176.12	0	4176.12	5400.06	5400.06
9	9.61543	55983	20.4957	Granitic Bedrock	1310	37	3740.51	4646.57	4427.77	0	4427.77	5825.97	5825.97
10	9.61543	59727.8	22.1733	Granitic Bedrock	1310	37	3868.76	4805.89	4639.21	0	4639.21	6215.91	6215.91
11	9.61543	63012.6	23.8711	Granitic Bedrock	1310	37	3967.64	4928.72	4802.2	0	4802.2	6558.02	6558.02
12	9.61543	66289.8	25.5916	Granitic Bedrock	1310	37	4060.19	5043.69	4954.78	0	4954.78	6899.36	6899.36
13	9.61543	69680.7	27.3371	Granitic Bedrock	1310	37	4152	5157.74	5106.13	0	5106.13	7252.54	7252.54
14	9.61543	72551.9	29.1107	Granitic Bedrock	1310	37	4212.58	5232.99	5205.97	0	5205.97	7551.69	7551.69
15	9.61543	74874.3	30.9154	Granitic Bedrock	1310	37	4241.52	5268.94	5253.7	0	5253.7	7793.74	7793.74
16	9.61543	76611	32.7548	Granitic Bedrock	1310	37	4238.22	5264.84	5248.25	0	5248.25	7974.86	7974.86
17	9.61543	76805.4	34.6332	Granitic Bedrock	1310	37	4161.2	5169.17	5121.3	0	5121.3	7995.47	7995.47
18	9.61543	75670.3	36.5551	Granitic Bedrock	1310	37	4023.59	4998.22	4894.44	0	4894.44	7877.73	7877.73
19	9.61543	73913.6	38.5262	Granitic Bedrock	1310	37	3858.87	4793.61	4622.91	0	4622.91	7695.27	7695.27
20	9.61543	72022.9	40.5529	Granitic Bedrock	1310	37	3688.76	4582.29	4342.47	0	4342.47	7498.87	7498.87
21	9.61543	69423.9	42.6431	Granitic Bedrock	1310	37	3489.93	4335.3	4014.72	0	4014.72	7228.72	7228.72
22	9.61543	62102.4	44.8062	Granitic Bedrock	1310	37	3242.98	4028.53	3607.61	0	3607.61	6828.73	6828.73
23	9.61543	48286.1	47.0539	Granitic Bedrock	1310	37	2632.42	3270.07	2601.11	0	2601.11	5429.36	5429.36
24	9.61543	33263.4	49.401	Granitic	1310	37	1990.61	2472.79	1543.08	0	1543.08	3865.64	3865.64

25	9.61543	16904	51.8666	Bedrock Granitic Bedrock	1310	37	1334.91	1658.26	462.16	0	462.16	2162.59	2162.59

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.24223

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	122.938	973.417	0	0	0
2	132.554	974.697	10434.8	0	0
3	142.169	976.248	22117.5	0	0
4	151.785	978.073	34397.4	0	0
5	161.4	980.177	46535.8	0	0
6	171.016	982.566	57995.5	0	0
7	180.631	985.244	68443.3	0	0
8	190.246	988.219	77585	0	0
9	199.862	991.499	85163.6	0	0
10	209.477	995.094	90954.9	0	0
11	219.093	999.012	94763.3	0	0
12	228.708	1003.27	96434.5	0	0
13	238.324	1007.87	95780.6	0	0
14	247.939	1012.84	92585.5	0	0
15	257.554	1018.2	86752.3	0	0
16	267.17	1023.96	78231.2	0	0
17	276.785	1030.14	67025.3	0	0
18	286.401	1036.78	53484.5	0	0
19	296.016	1043.91	38029.8	0	0
20	305.632	1051.57	20943	0	0
21	315.247	1059.8	2365.92	0	0
22	324.863	1068.65	-17282.7	0	0
23	334.478	1078.2	-36350.9	0	0
24	344.093	1088.53	-50195.1	0	0
25	353.709	1099.75	-56833.5	0	0
26	363.324	1112	1123.2	0	0

Entity Information

Distributed Load

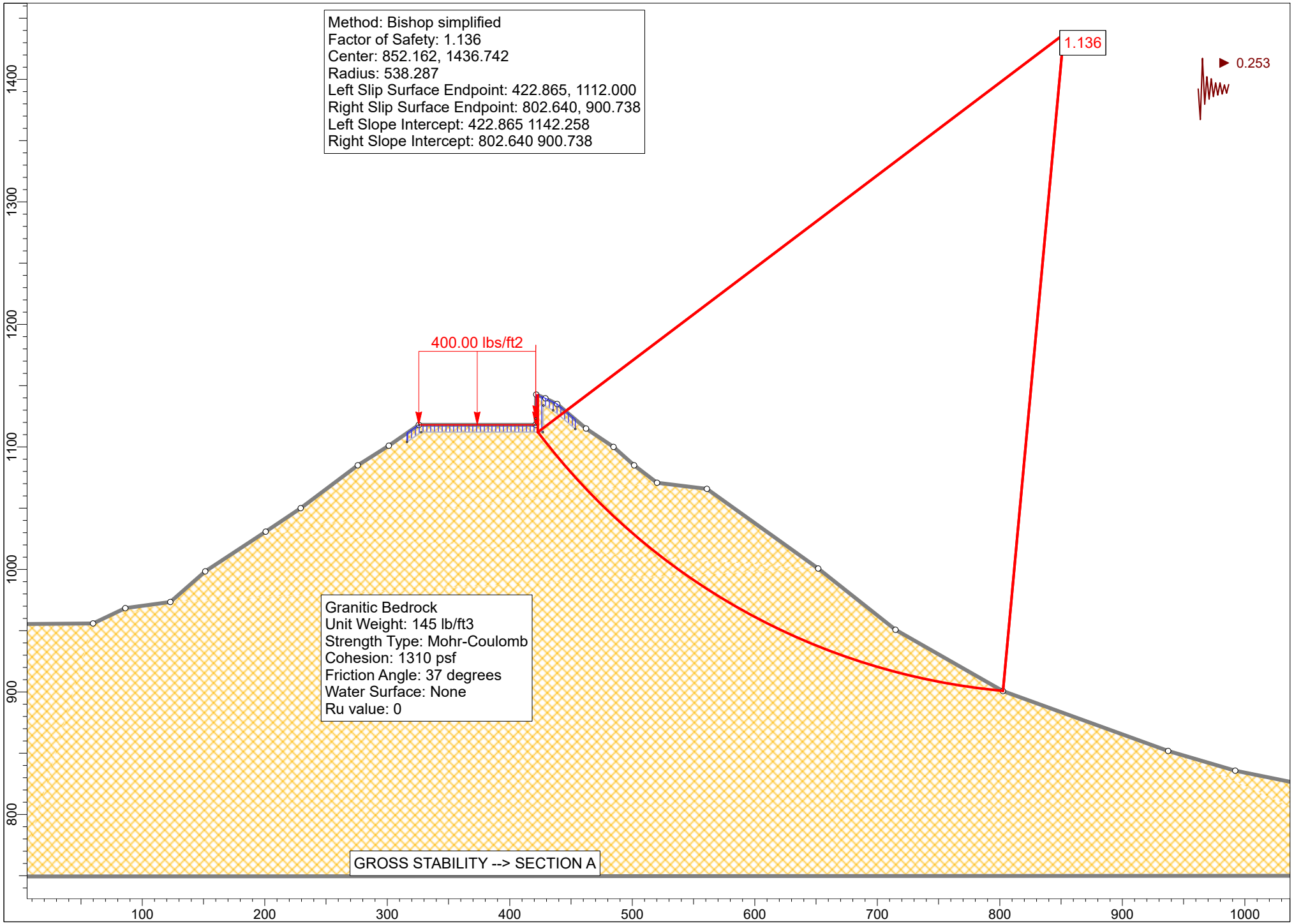
X	Y
325.79	1118
421.143	1118
421.238	1123.06

Tension Crack

X	Y
316.146	1104
327.669	1112
427.033	1112
427.44	1133.82
435.359	1129.94
453.53	1114.54

External Boundary

X	Y
0.000317657	749.393
1160.87	750
1160.87	806.763
1140.17	805.763
992.17	835.763
937.44	851.791
802.57	900.763
714.87	950.763
651.77	1000.76
560.97	1065.76
520.17	1070.76
501.57	1085
484.67	1100
462.27	1115
438.67	1135
429.131	1139.68
421.606	1142.78
421.143	1118
325.79	1118
301.308	1101
275.97	1085
229.37	1050
200.812	1030.86
151.47	998.421
122.97	973.421
86.1699	968.421
59.8699	955.921
-0.107439	955.411


Method: Bishop simplified
Factor of Safety: 1.136
Center: 852.162, 1436.742
Radius: 538.287
Left Slip Surface Endpoint: 422.865, 1112.000
Right Slip Surface Endpoint: 802.640, 900.738
Left Slope Intercept: 422.865 1142.258
Right Slope Intercept: 802.640 900.738
1.136
0.253
400.00 lbs/ft2
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: None
Ru value: 0
GROSS STABILITY --> SECTION A
1400
1300
1200
1100
1000
900
800
100
200
300
400
500
600
700
800
900
1000

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

Slide Modeler Version:	8.032
Compute Time:	00h:00m:00.487s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified

Number of slices:	25
Tolerance:	0.005
Maximum number of iterations:	50
Check malpha < 0.2:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10

Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Seismic Load Coefficient (Horizontal): 0.253

Loading

1 Distributed Load present

Distributed Load 1	
Distribution:	Constant
Magnitude [psf]:	400
Orientation:	Vertical

Tension Crack

Water level: filled with water

Materials

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [°]	37
Water Surface	None
Ru Value	0

Global Minimums

Method: bishop simplified

FS	1.135540
Center:	852.162, 1436.742
Radius:	538.287
Left Slip Surface Endpoint:	422.865, 1112.000
Right Slip Surface Endpoint:	802.640, 900.738
Left Slope Intercept:	422.865 1142.258
Right Slope Intercept:	802.640 900.738
Resisting Moment:	1.1952e+09 lb-ft
Driving Moment:	1.05254e+09 lb-ft
Total Slice Area:	19267.4 ft2

Surface Horizontal Width: 379.775 ft
Surface Average Height: 50.7339 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 3331
Number of Invalid Surfaces: 0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.13554

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	15.191	80406.7	-51.5927	Granitic Bedrock	1310	37	2541.09	2885.51	2090.78	0	2090.78	5296	5296
2	15.191	99110.8	-49.0574	Granitic Bedrock	1310	37	3107.98	3529.24	2945.04	0	2945.04	6527.61	6527.61
3	15.191	108260	-46.6458	Granitic Bedrock	1310	37	3456	3924.43	3469.47	0	3469.47	7129.96	7129.96
4	15.191	118872	-44.3377	Granitic Bedrock	1310	37	3851.38	4373.4	4065.28	0	4065.28	7828.63	7828.63
5	15.191	124776	-42.1173	Granitic Bedrock	1310	37	4129.22	4688.9	4483.95	0	4483.95	8217.25	8217.25
6	15.191	125616	-39.9723	Granitic Bedrock	1310	37	4268.67	4847.25	4694.09	0	4694.09	8272.41	8272.41
7	15.191	130786	-37.8927	Granitic Bedrock	1310	37	4529.66	5143.61	5087.37	0	5087.37	8612.69	8612.69
8	15.191	150036	-35.8705	Granitic Bedrock	1310	37	5210.1	5916.28	6112.71	0	6112.71	9880.1	9880.1
9	15.191	169275	-33.8986	Granitic Bedrock	1310	37	5913.78	6715.33	7173.11	0	7173.11	11146.8	11146.8
10	15.191	178661	-31.9715	Granitic Bedrock	1310	37	6336.23	7195.04	7809.71	0	7809.71	11764.6	11764.6
11	15.191	174925	-30.084	Granitic Bedrock	1310	37	6354.51	7215.8	7837.24	0	7837.24	11518.5	11518.5
12	15.191	169647	-28.232	Granitic Bedrock	1310	37	6316.18	7172.27	7779.5	0	7779.5	11170.7	11170.7
13	15.191	162986	-26.4116	Granitic Bedrock	1310	37	6224.09	7067.7	7640.71	0	7640.71	10731.9	10731.9
14	15.191	155008	-24.6195	Granitic Bedrock	1310	37	6078.37	6902.23	7421.12	0	7421.12	10206.5	10206.5
15	15.191	145773	-22.8528	Granitic Bedrock	1310	37	5878.95	6675.78	7120.61	0	7120.61	9598.27	9598.27
16	15.191	134218	-21.1088	Granitic Bedrock	1310	37	5586.91	6344.16	6680.57	0	6680.57	8837.36	8837.36
17	15.191	120055	-19.385	Granitic Bedrock	1310	37	5187.91	5891.08	6079.31	0	6079.31	7904.73	7904.73
18	15.191	104760	-17.6793	Granitic Bedrock	1310	37	4730.37	5371.53	5389.83	0	5389.83	6897.61	6897.61
19	15.191	88373	-15.9897	Granitic Bedrock	1310	37	4213.63	4784.75	4611.15	0	4611.15	5818.58	5818.58
20	15.191	73171.3	-14.3143	Granitic Bedrock	1310	37	3720.65	4224.95	3868.26	0	3868.26	4817.63	4817.63
21	15.191	61935.1	-12.6513	Granitic Bedrock	1310	37	3359.3	3814.62	3323.74	0	3323.74	4077.79	4077.79
22	15.191	49865.3	-10.999	Granitic Bedrock	1310	37	2951.62	3351.68	2709.4	0	2709.4	3283.09	3283.09

23	15.191	36796.6	-9.35598	Granitic Bedrock	1310	37	2489.17	2826.55	2012.53	0	2012.53	2422.65	2422.65
24	15.191	22744.3	-7.72069	Granitic Bedrock	1310	37	1970.12	2237.15	1230.38	0	1230.38	1497.47	1497.47
25	15.191	7721.12	-6.09171	Granitic Bedrock	1310	37	1392.41	1581.13	359.806	0	359.806	508.407	508.407

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.13554

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	422.865	1112	28565.5	0	0
2	438.056	1092.84	50404.2	0	0
3	453.247	1075.33	79878.8	0	0
4	468.438	1059.24	110640	0	0
5	483.629	1044.39	142606	0	0
6	498.82	1030.66	173089	0	0
7	514.011	1017.93	199860	0	0
8	529.202	1006.1	224349	0	0
9	544.393	995.118	250380	0	0
10	559.584	984.911	276672	0	0
11	574.775	975.429	299759	0	0
12	589.966	966.629	316543	0	0
13	605.157	958.473	327055	0	0
14	620.348	950.928	331474	0	0
15	635.539	943.967	330100	0	0
16	650.73	937.565	323343	0	0
17	665.921	931.7	311685	0	0
18	681.112	926.355	295817	0	0
19	696.303	921.513	276626	0	0
20	711.494	917.16	255106	0	0
21	726.685	913.284	232144	0	0
22	741.876	909.874	208163	0	0
23	757.067	906.921	183982	0	0
24	772.258	904.419	160551	0	0
25	787.449	902.359	138939	0	0
26	802.64	900.738	0	0	0

Entity Information

Distributed Load

X	Y
325.79	1118
421.143	1118
421.238	1123.06

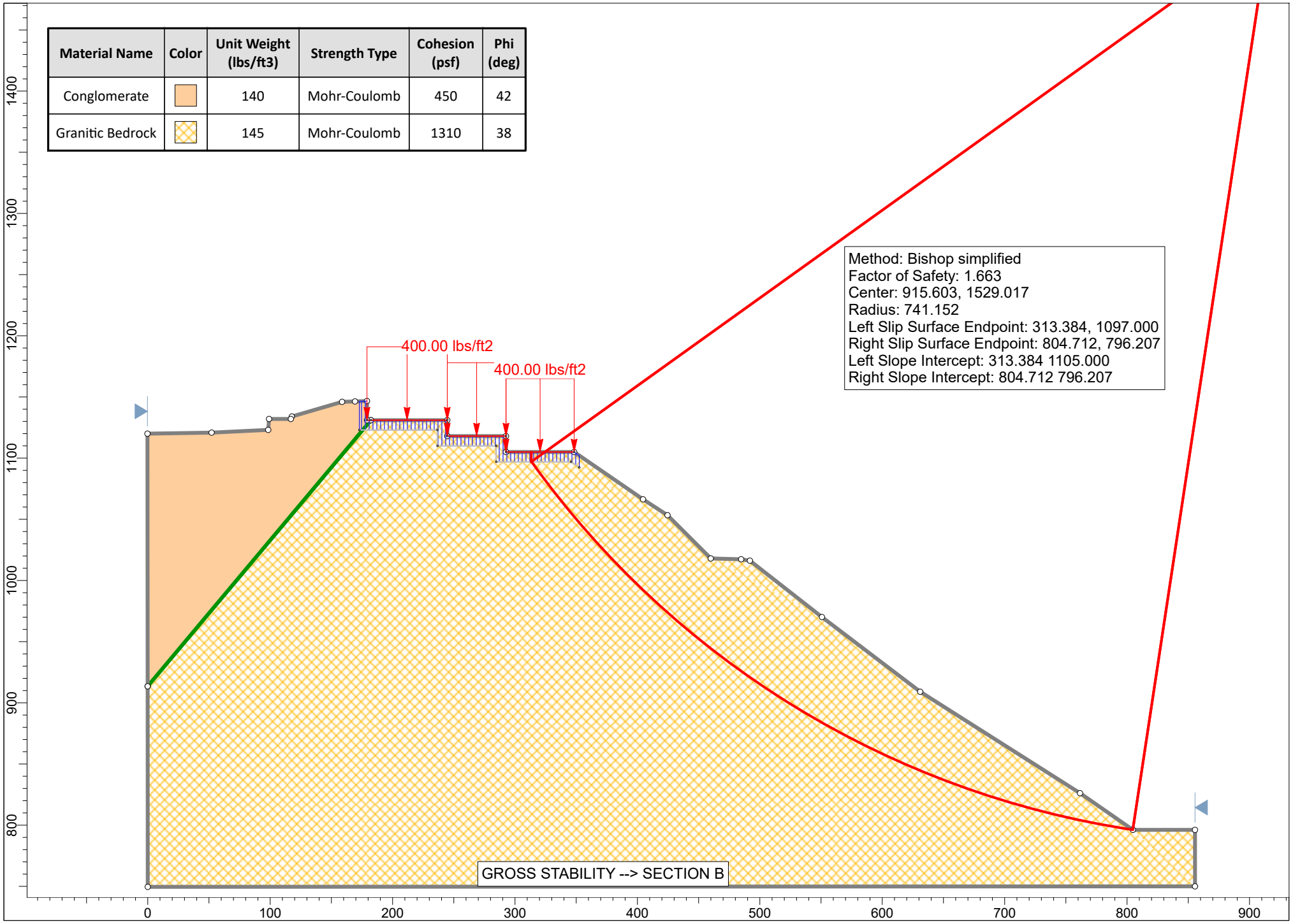
Tension Crack

X	Y
316.146	1104
327.669	1112
427.033	1112
427.44	1133.82
435.359	1129.94
453.53	1114.54

External Boundary

X	Y
0.000317657	749.393
1160.87	750
1160.87	806.763
1140.17	805.763
992.17	835.763
937.44	851.791
802.57	900.763
714.87	950.763
651.77	1000.76
560.97	1065.76
520.17	1070.76
501.57	1085
484.67	1100
462.27	1115
438.67	1135
429.131	1139.68
421.606	1142.78
421.143	1118
325.79	1118
301.308	1101
275.97	1085
229.37	1050
200.812	1030.86
151.47	998.421
122.97	973.421
86.1699	968.421
59.8699	955.921
-0.107439	955.411

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Conglomerate		140	Mohr-Coulomb	450	42
Granitic Bedrock		145	Mohr-Coulomb	1310	38



Slide Analysis Information

VALENCIA - RUNYON

Project Summary

Slide Modeler Version:	8.032
Compute Time:	00h:00m:00.446s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified

Number of slices:	25
Tolerance:	0.005
Maximum number of iterations:	50
Check malpha < 0.2:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10

Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

1 Distributed Load present

Distributed Load 1	
Distribution:	Constant
Magnitude [psf]:	400
Orientation:	Vertical

Tension Crack

Water level: filled with water

Materials

Property	Conglomerate	Granitic Bedrock
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	140	145
Cohesion [psf]	450	1310
Friction Angle [°]	42	38
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS	1.662500
Center:	915.603, 1529.017
Radius:	741.152
Left Slip Surface Endpoint:	313.384, 1097.000
Right Slip Surface Endpoint:	804.712, 796.207
Left Slope Intercept:	313.384 1105.000
Right Slope Intercept:	804.712 796.207
Resisting Moment:	2.75549e+09 lb-ft
Driving Moment:	1.65744e+09 lb-ft
Total Slice Area:	29569.4 ft2
Surface Horizontal Width:	491.329 ft
Surface Average Height:	60.1824 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2762
Number of Invalid Surfaces: 0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.6625

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	19.6532	60067.7	-53.0806	Granitic Bedrock	1310	38	1484.07	2467.26	1481.22	0	1481.22	3456.42	3456.42
2	19.6532	130513	-50.6185	Granitic Bedrock	1310	38	2578.88	4287.39	3810.9	0	3810.9	6952.54	6952.54
3	19.6532	169227	-48.2795	Granitic Bedrock	1310	38	3165.88	5263.28	5059.98	0	5059.98	8610.73	8610.73
4	19.6532	191184	-46.0435	Granitic Bedrock	1310	38	3603.37	5990.61	5990.91	0	5990.91	9727.98	9727.98
5	19.6532	208806	-43.8947	Granitic Bedrock	1310	38	3980.95	6618.33	6794.36	0	6794.36	10624.6	10624.6
6	19.6532	222761	-41.8211	Granitic Bedrock	1310	38	4304.6	7156.4	7483.04	0	7483.04	11334.6	11334.6
7	19.6532	219369	-39.8127	Granitic Bedrock	1310	38	4335.32	7207.47	7548.43	0	7548.43	11162.1	11162.1
8	19.6532	216562	-37.8614	Granitic Bedrock	1310	38	4369.94	7265.03	7622.07	0	7622.07	11019.3	11019.3
9	19.6532	251177	-35.9606	Granitic Bedrock	1310	38	5066.68	8423.36	9104.67	0	9104.67	12780.5	12780.5
10	19.6532	268675	-34.1046	Granitic Bedrock	1310	38	5471.39	9096.18	9965.86	0	9965.86	13670.9	13670.9
11	19.6532	261594	-32.2884	Granitic Bedrock	1310	38	5430.59	9028.35	9879.04	0	9879.04	13310.6	13310.6
12	19.6532	251930	-30.508	Granitic Bedrock	1310	38	5334.87	8869.22	9675.35	0	9675.35	12818.8	12818.8
13	19.6532	240486	-28.7597	Granitic Bedrock	1310	38	5197.84	8641.41	9383.78	0	9383.78	12236.6	12236.6
14	19.6532	227567	-27.0402	Granitic Bedrock	1310	38	5024.4	8353.07	9014.72	0	9014.72	11579.2	11579.2
15	19.6532	212548	-25.3467	Granitic Bedrock	1310	38	4801.56	7982.6	8540.55	0	8540.55	10815	10815
16	19.6532	195515	-23.6766	Granitic Bedrock	1310	38	4529.74	7530.69	7962.13	0	7962.13	9948.34	9948.34
17	19.6532	179018	-22.0276	Granitic Bedrock	1310	38	4258.9	7080.42	7385.78	0	7385.78	9108.87	9108.87
18	19.6532	165116	-20.3975	Granitic Bedrock	1310	38	4031.71	6702.71	6902.36	0	6902.36	8401.54	8401.54
19	19.6532	149501	-18.7846	Granitic Bedrock	1310	38	3761.58	6253.63	6327.56	0	6327.56	7606.98	7606.98
20	19.6532	132134	-17.187	Granitic Bedrock	1310	38	3446.58	5729.94	5657.27	0	5657.27	6723.3	6723.3
21	19.6532	113062	-15.6031	Granitic Bedrock	1310	38	3086.47	5131.25	4890.97	0	4890.97	5752.9	5752.9
22	19.6532	92327.9	-14.0313	Granitic Bedrock	1310	38	2680.87	4456.95	4027.91	0	4027.91	4697.88	4697.88
23	19.6532	69903.4	-12.4702	Granitic Bedrock	1310	38	2227.96	3703.98	3064.15	0	3064.15	3556.86	3556.86
24	19.6532	43691	-10.9185	Granitic Bedrock	1310	38	1680.38	2793.63	1898.96	0	1898.96	2223.11	2223.11

25	19.6532	14823.2	-9.37483	Granitic Bedrock	1310	38	1060.17	1762.53	579.215	0	579.215	754.247	754.247

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.6625

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	313.384	1097	1996.8	0	0
2	333.037	1070.84	11575.2	0	0
3	352.69	1046.9	52132.5	0	0
4	372.343	1024.86	101447	0	0
5	391.996	1004.48	152740	0	0
6	411.649	985.567	202978	0	0
7	431.303	967.982	249970	0	0
8	450.956	951.6	288425	0	0
9	470.609	936.322	318995	0	0
10	490.262	922.064	349237	0	0
11	509.915	908.755	374339	0	0
12	529.568	896.337	390297	0	0
13	549.221	884.756	397495	0	0
14	568.875	873.97	396560	0	0
15	588.528	863.939	388244	0	0
16	608.181	854.629	373389	0	0
17	627.834	846.012	352981	0	0
18	647.487	838.06	328008	0	0
19	667.14	830.752	299216	0	0
20	686.793	824.068	267587	0	0
21	706.447	817.989	234242	0	0
22	726.1	812.501	200427	0	0
23	745.753	807.589	167524	0	0
24	765.406	803.243	137056	0	0
25	785.059	799.452	111231	0	0
26	804.712	796.207	0	0	0

Entity Information

Distributed Load

X	Y
348.35	1105
292.67	1105
292.67	1118
244.67	1118
244.67	1131
182.389	1131
179.07	1131

Tension Crack

X	Y
172.872	1123
236.67	1123
236.67	1110
284.67	1110
284.67	1097
345.866	1097
352.539	1092.41

External Boundary

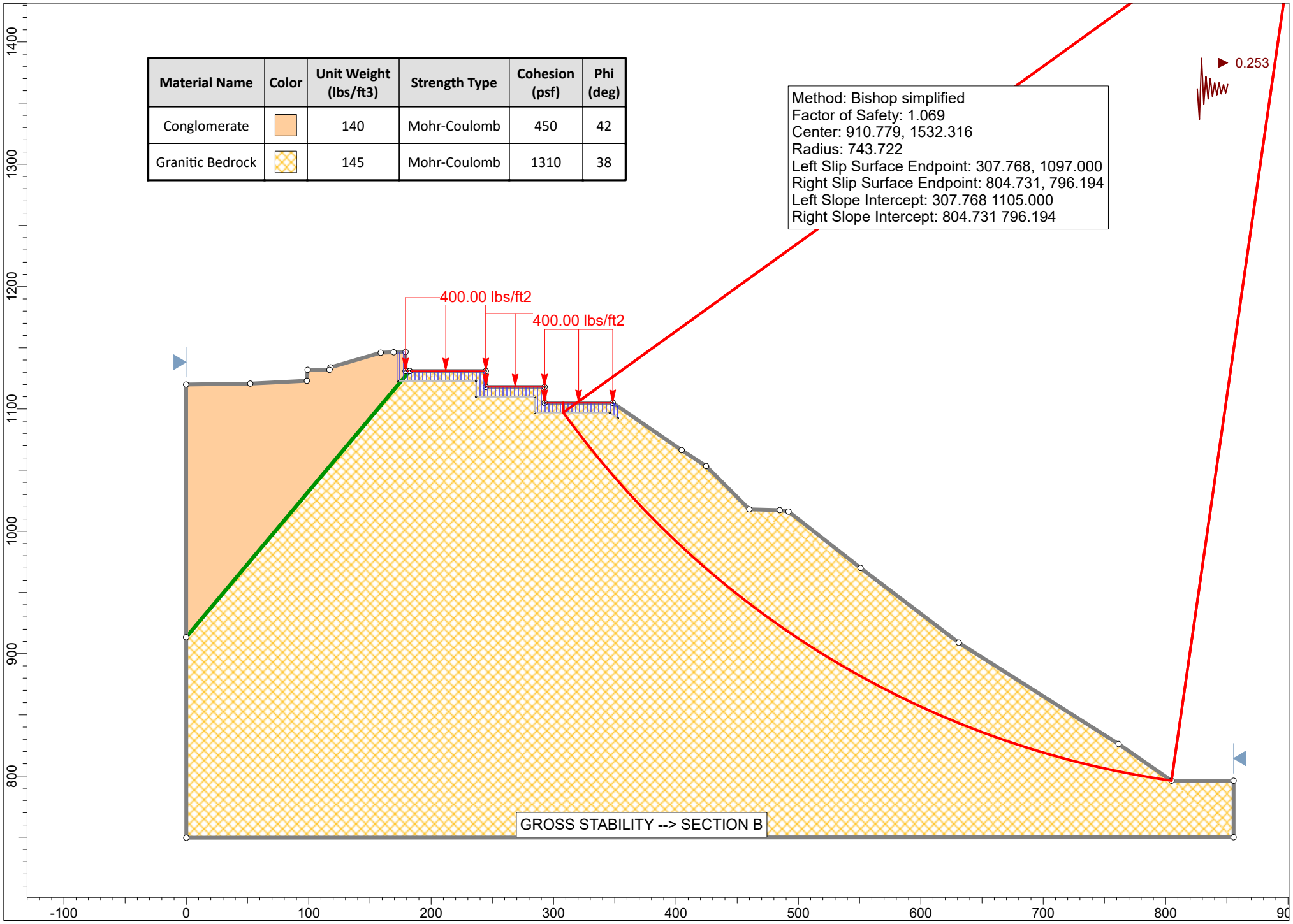
X	Y
0.000234115	749.552
855.499	750
855.499	796.146
804.8	796.146
761.6	826.146
631.002	909.051
550.744	970.064
491.9	1016.15
484.738	1017.32
459.9	1018
424.567	1053.33
404.627	1066.32
348.35	1105
292.67	1105
292.67	1118
244.67	1118
244.67	1131
182.389	1131
179.07	1131
179.07	1146.68
169.363	1146.35
158.8	1146
117.7	1134
116.9	1132
99.0651	1132
98.4699	1123.1
52.2	1120.8
-0.224083	1120
-0.0990391	913.497

Material Boundary

X	Y
-0.0990391	913.497
182.389	1131

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Conglomerate		140	Mohr-Coulomb	450	42
Granitic Bedrock		145	Mohr-Coulomb	1310	38

Method: Bishop simplified
Factor of Safety: 1.069
Center: 910.779, 1532.316
Radius: 743.722
Left Slip Surface Endpoint: 307.768, 1097.000
Right Slip Surface Endpoint: 804.731, 796.194
Left Slope Intercept: 307.768 1105.000
Right Slope Intercept: 804.731 796.194



Slide Analysis Information

VALENCIA - RUNYON

Project Summary

Slide Modeler Version:	8.032
Compute Time:	00h:00m:00.461s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified

Number of slices:	25
Tolerance:	0.005
Maximum number of iterations:	50
Check malpha < 0.2:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10

Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Seismic Load Coefficient (Horizontal): 0.253

Loading

1 Distributed Load present

Distributed Load 1	
Distribution:	Constant
Magnitude [psf]:	400
Orientation:	Vertical

Tension Crack

Water level: filled with water

Materials

Property	Conglomerate	Granitic Bedrock
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	140	145
Cohesion [psf]	450	1310
Friction Angle [°]	42	38
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS	1.069220
Center:	910.779, 1532.316
Radius:	743.722
Left Slip Surface Endpoint:	307.768, 1097.000
Right Slip Surface Endpoint:	804.731, 796.194
Left Slope Intercept:	307.768 1105.000
Right Slope Intercept:	804.731 796.194
Resisting Moment:	2.56282e+09 lb-ft
Driving Moment:	2.3969e+09 lb-ft
Total Slice Area:	30961.1 ft2
Surface Horizontal Width:	496.963 ft

Surface Average Height: 62.3005 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 3143
Number of Invalid Surfaces: 0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.06922

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	19.8785	60946.1	-52.9047	Granitic Bedrock	1310	38	1911.33	2043.63	939.009	0	939.009	3466.67	3466.67
2	19.8785	133504	-50.4328	Granitic Bedrock	1310	38	3410.16	3646.21	2990.22	0	2990.22	7117.2	7117.2
3	19.8785	181998	-48.0844	Granitic Bedrock	1310	38	4370.79	4673.34	4304.88	0	4304.88	9173.53	9173.53
4	19.8785	204065	-45.8389	Granitic Bedrock	1310	38	4980.21	5324.94	5138.87	0	5138.87	10267.1	10267.1
5	19.8785	221562	-43.6809	Granitic Bedrock	1310	38	5519.23	5901.27	5876.56	0	5876.56	11147.3	11147.3
6	19.8785	236094	-41.5981	Granitic Bedrock	1310	38	6007.62	6423.47	6544.93	0	6544.93	11878.4	11878.4
7	19.8785	235571	-39.5805	Granitic Bedrock	1310	38	6162.76	6589.35	6757.25	0	6757.25	11852	11852
8	19.8785	227390	-37.6202	Granitic Bedrock	1310	38	6131.76	6556.2	6714.84	0	6714.84	11440.4	11440.4
9	19.8785	256579	-35.7104	Granitic Bedrock	1310	38	6987.46	7471.13	7885.87	0	7885.87	12908.8	12908.8
10	19.8785	280534	-33.8453	Granitic Bedrock	1310	38	7743.84	8279.87	8921.02	0	8921.02	14114	14114
11	19.8785	274016	-32.0202	Granitic Bedrock	1310	38	7754.98	8291.78	8936.29	0	8936.29	13785.9	13785.9
12	19.8785	263756	-30.2308	Granitic Bedrock	1310	38	7659.82	8190.03	8806.06	0	8806.06	13269.7	13269.7
13	19.8785	251513	-28.4734	Granitic Bedrock	1310	38	7499.33	8018.43	8586.42	0	8586.42	12653.7	12653.7
14	19.8785	237897	-26.7448	Granitic Bedrock	1310	38	7287.34	7791.77	8296.3	0	8296.3	11968.6	11968.6
15	19.8785	222159	-25.0421	Granitic Bedrock	1310	38	7001.81	7486.48	7905.54	0	7905.54	11176.8	11176.8
16	19.8785	204361	-23.3628	Granitic Bedrock	1310	38	6641.49	7101.21	7412.43	0	7412.43	10281.3	10281.3
17	19.8785	186546	-21.7045	Granitic Bedrock	1310	38	6261.68	6695.11	6892.65	0	6892.65	9385.05	9385.05
18	19.8785	171797	-20.0651	Granitic Bedrock	1310	38	5952.08	6364.08	6468.91	0	6468.91	8642.96	8642.96
19	19.8785	155442	-18.4427	Granitic Bedrock	1310	38	5579.75	5965.98	5959.36	0	5959.36	7820.12	7820.12
20	19.8785	137292	-16.8355	Granitic Bedrock	1310	38	5136.47	5492.02	5352.72	0	5352.72	6906.99	6906.99
21	19.8785	117394	-15.2418	Granitic Bedrock	1310	38	4620.71	4940.56	4646.9	0	4646.9	5905.94	5905.94
22	19.8785	95790	-13.6601	Granitic Bedrock	1310	38	4030.7	4309.7	3839.45	0	3839.45	4819.05	4819.05
23	19.8785	72466.5	-12.089	Granitic Bedrock	1310	38	3362.82	3595.59	2925.43	0	2925.43	3645.68	3645.68

24	19.8785	45314	-10.527	Granitic Bedrock	1310	38	2545.35	2721.54	1806.69	0	1806.69	2279.68	2279.68
25	19.8785	15371.3	-8.97298	Granitic Bedrock	1310	38	1605.08	1716.19	519.895	0	519.895	773.339	773.339

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.06922

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	307.768	1097	1996.8	0	0
2	327.646	1070.71	4118.11	0	0
3	347.525	1046.65	42061.5	0	0
4	367.404	1024.51	96569.8	0	0
5	387.282	1004.04	154418	0	0
6	407.161	985.058	212350	0	0
7	427.039	967.411	268198	0	0
8	446.918	950.977	316373	0	0
9	466.796	935.657	354917	0	0
10	486.675	921.368	393659	0	0
11	506.553	908.037	429663	0	0
12	526.432	895.606	455966	0	0
13	546.31	884.022	472483	0	0
14	566.189	873.241	479656	0	0
15	586.067	863.224	478132	0	0
16	605.946	853.936	468615	0	0
17	625.825	845.349	451984	0	0
18	645.703	837.437	429281	0	0
19	665.582	830.176	401432	0	0
20	685.46	823.547	369380	0	0
21	705.339	817.532	334237	0	0
22	725.217	812.115	297281	0	0
23	745.096	807.284	259965	0	0
24	764.974	803.027	223926	0	0
25	784.853	799.333	191481	0	0
26	804.731	796.194	0	0	0

Entity Information

Distributed Load

X	Y
348.35	1105
292.67	1105
292.67	1118
244.67	1118
244.67	1131
182.389	1131
179.07	1131

Tension Crack

X	Y
172.872	1123
236.67	1123
236.67	1110
284.67	1110
284.67	1097

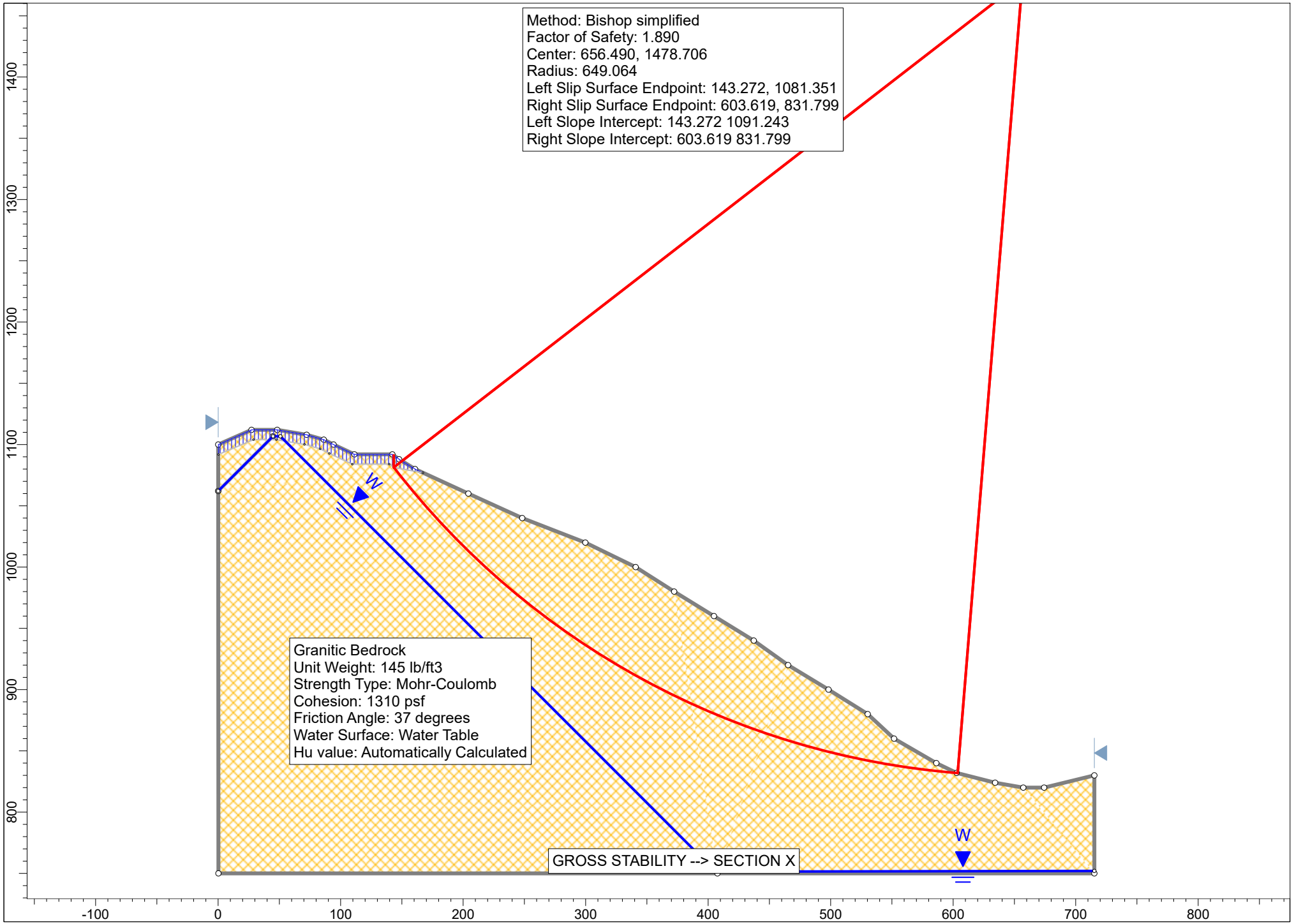
345.866	1097
352.539	1092.41

External Boundary

X	Y
0.000234115	749.552
855.499	750
855.499	796.146
804.8	796.146
761.6	826.146
631.002	909.051
550.744	970.064
491.9	1016.15
484.738	1017.32
459.9	1018
424.567	1053.33
404.627	1066.32
348.35	1105
292.67	1105
292.67	1118
244.67	1118
244.67	1131
182.389	1131
179.07	1131
179.07	1146.68
169.363	1146.35
158.8	1146
117.7	1134
116.9	1132
99.0651	1132
98.4699	1123.1
52.2	1120.8
-0.224083	1120
-0.0990391	913.497

Material Boundary

X	Y
-0.0990391	913.497
182.389	1131


Method: Bishop simplified
Factor of Safety: 1.890
Center: 656.490, 1478.706
Radius: 649.064
Left Slip Surface Endpoint: 143.272, 1081.351
Right Slip Surface Endpoint: 603.619, 831.799
Left Slope Intercept: 143.272 1091.243
Right Slope Intercept: 603.619 831.799
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Hu value: Automatically Calculated
W
W
GROSS STABILITY --> SECTION X
1400
1300
1200
1100
1000
900
800
-100
0
100
200
300
400
500
600
700
800

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

Slide Modeler Version:	8.032
Compute Time:	00h:00m:00.439s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified

Number of slices:	25
Tolerance:	0.005
Maximum number of iterations:	50
Check malpha < 0.2:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10

Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Tension Crack

Water level: filled with water

Materials

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [°]	37
Water Surface	Water Table
Hu Value	Automatically Calculated

Global Minimums

Method: bishop simplified

FS	1.890180
Center:	656.490, 1478.706
Radius:	649.064
Left Slip Surface Endpoint:	143.272, 1081.351
Right Slip Surface Endpoint:	603.619, 831.799
Left Slope Intercept:	143.272 1091.243
Right Slope Intercept:	603.619 831.799
Resisting Moment:	2.12038e+09 lb-ft
Driving Moment:	1.12179e+09 lb-ft
Total Slice Area:	25881.8 ft2
Surface Horizontal Width:	460.347 ft
Surface Average Height:	56.2224 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces:	3466
Number of Invalid Surfaces:	0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.89018

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	18.4139	40438.3	-50.9609	Granitic Bedrock	1310	37	1051.58	1987.68	899.309	0	899.309	2196.09	2196.09
2	18.4139	72280.4	-48.4451	Granitic Bedrock	1310	37	1557.49	2943.94	2168.31	0	2168.31	3925.34	3925.34
3	18.4139	102907	-46.0487	Granitic Bedrock	1310	37	2066.48	3906.02	3445.04	0	3445.04	5588.59	5588.59
4	18.4139	129398	-43.7524	Granitic Bedrock	1310	37	2529.24	4780.71	4605.81	0	4605.81	7027.22	7027.22
5	18.4139	152353	-41.5412	Granitic Bedrock	1310	37	2949.67	5575.41	5660.41	0	5660.41	8273.84	8273.84
6	18.4139	172127	-39.4034	Granitic Bedrock	1310	37	3329.3	6292.98	6612.64	0	6612.64	9347.69	9347.69
7	18.4139	191178	-37.3294	Granitic Bedrock	1310	37	3705.56	7004.17	7556.42	0	7556.42	10382.3	10382.3
8	18.4139	208244	-35.3112	Granitic Bedrock	1310	37	4056.21	7666.96	8435.98	0	8435.98	11309.1	11309.1
9	18.4139	222126	-33.3423	Granitic Bedrock	1310	37	4358.86	8239.03	9195.15	0	9195.15	12063	12063
10	18.4139	229986	-31.417	Granitic Bedrock	1310	37	4561.57	8622.19	9703.58	0	9703.58	12489.8	12489.8
11	18.4139	234730	-29.5304	Granitic Bedrock	1310	37	4711.13	8904.89	10078.8	0	10078.8	12747.5	12747.5
12	18.4139	232197	-27.6785	Granitic Bedrock	1310	37	4730.93	8942.3	10128.4	0	10128.4	12609.9	12609.9
13	18.4139	225860	-25.8575	Granitic Bedrock	1310	37	4678.97	8844.1	9998.1	0	9998.1	12265.8	12265.8
14	18.4139	218397	-24.0642	Granitic Bedrock	1310	37	4602.11	8698.82	9805.28	0	9805.28	11860.5	11860.5
15	18.4139	209199	-22.2956	Granitic Bedrock	1310	37	4488.56	8484.19	9520.46	0	9520.46	11361	11361
16	18.4139	198236	-20.5492	Granitic Bedrock	1310	37	4336.82	8197.37	9139.87	0	9139.87	10765.6	10765.6
17	18.4139	182971	-18.8225	Granitic Bedrock	1310	37	4097.63	7745.25	8539.88	0	8539.88	9936.62	9936.62
18	18.4139	164508	-17.1134	Granitic Bedrock	1310	37	3789.57	7162.96	7767.14	0	7767.14	8933.93	8933.93
19	18.4139	148436	-15.4198	Granitic Bedrock	1310	37	3519.72	6652.91	7090.29	0	7090.29	8061.09	8061.09
20	18.4139	131186	-13.74	Granitic Bedrock	1310	37	3219.46	6085.35	6337.08	0	6337.08	7124.28	7124.28
21	18.4139	111762	-12.0722	Granitic Bedrock	1310	37	2868.19	5421.39	5455.99	0	5455.99	6069.42	6069.42
22	18.4139	83521.6	-10.4146	Granitic Bedrock	1310	37	2330.56	4405.18	4107.45	0	4107.45	4535.8	4535.8
23	18.4139	51861.4	-8.76588	Granitic Bedrock	1310	37	1710.71	3233.55	2552.64	0	2552.64	2816.43	2816.43
24	18.4139	29937.2	-7.12442	Granitic Bedrock	1310	37	1277.55	2414.8	1466.12	0	1466.12	1625.8	1625.8
25	18.4139	9024.16	-5.48882	Granitic Bedrock	1310	37	855.653	1617.34	407.853	0	407.853	490.074	490.074

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.89018

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

1	143.272	1081.35	3052.96	0	0
2	161.686	1058.64	4110.58	0	0
3	180.099	1037.87	20473.7	0	0
4	198.513	1018.77	48224.6	0	0
5	216.927	1001.14	82847.2	0	0
6	235.341	984.826	120882	0	0
7	253.755	969.698	159607	0	0
8	272.169	955.656	197486	0	0
9	290.583	942.613	232828	0	0
10	308.997	930.498	263966	0	0
11	327.411	919.25	289111	0	0
12	345.824	908.819	307493	0	0
13	364.238	899.161	318206	0	0
14	382.652	890.236	321277	0	0
15	401.066	882.013	317165	0	0
16	419.48	874.462	306398	0	0
17	437.894	867.56	289631	0	0
18	456.308	861.283	267780	0	0
19	474.722	855.614	242037	0	0
20	493.136	850.535	213237	0	0
21	511.549	846.032	182487	0	0
22	529.963	842.094	151160	0	0
23	548.377	838.71	122147	0	0
24	566.791	835.87	97894.8	0	0
25	585.205	833.569	77744.7	0	0
26	603.619	831.799	0	0	0

Entity Information

Water Table

X	Y
0.0669028	1062.09
44.7782	1106.8
50.7782	1106.8
406.148	751.431
715.23	752

Tension Crack

X	Y
0.230139	1091.93
28.9148	1104
47.568	1104
70.468	1100.18
83.3175	1096.51
90.7376	1092.8
109.442	1084
139.629	1084
143.274	1081.35
167.118	1077.06

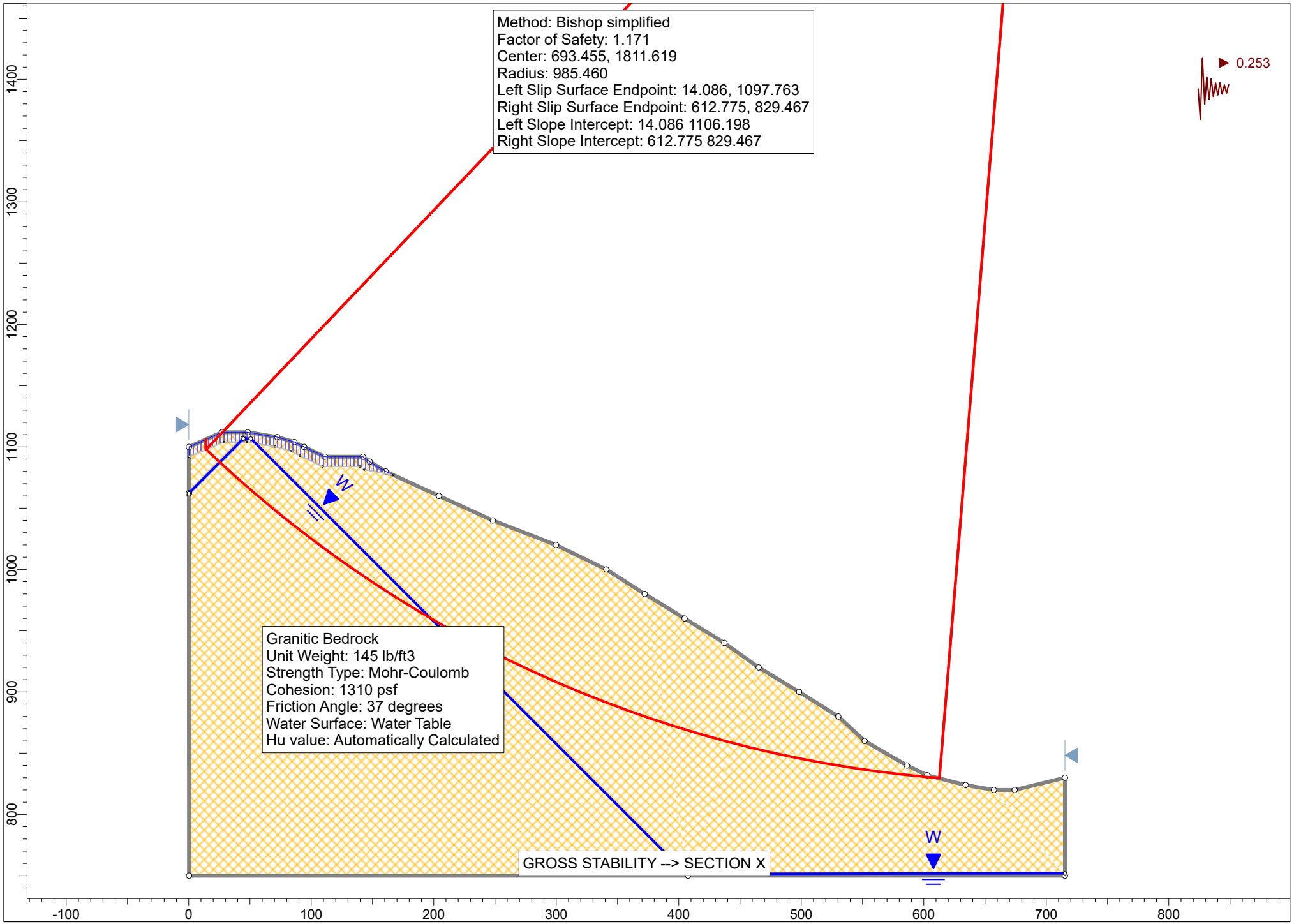
External Boundary

X	Y
0.230139	750
407.579	750
715.23	750
715.23	830
674.23	820

657.23	820
634.23	824
602.83	832
586.23	840
551.73	860
530.23	880
498.23	900
465.23	920
437.23	940
404.73	960
372.23	980
340.83	1000
299.73	1020
248.23	1040
204.23	1060
160.73	1080
147.73	1088
142.23	1092
111.23	1092
94.2301	1100
86.2301	1104
72.2301	1108
48.2301	1112
27.2301	1112
0.0470739	1100
0.0669028	1062.09

Material Boundary

X	Y
0.0669028	1062.09
44.7782	1106.8


Method: Bishop simplified
Factor of Safety: 1.171
Center: 693.455, 1811.619
Radius: 985.460
Left Slip Surface Endpoint: 14.086, 1097.763
Right Slip Surface Endpoint: 612.775, 829.467
Left Slope Intercept: 14.086 1106.198
Right Slope Intercept: 612.775 829.467
0.253
Granitic Bedrock
Unit Weight: 145 lb/ft3
Strength Type: Mohr-Coulomb
Cohesion: 1310 psf
Friction Angle: 37 degrees
Water Surface: Water Table
Hu value: Automatically Calculated
W
W
GROSS STABILITY --> SECTION X
1400
1300
1200
1100
1000
900
800
-100
0
100
200
300
400
500
600
700
800

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

Slide Modeler Version:	8.032
Compute Time:	00h:00m:00.456s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified

Number of slices:	25
Tolerance:	0.005
Maximum number of iterations:	50
Check malpha < 0.2:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

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

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	10
Circles per division:	10

Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis: No
Staged pseudostatic analysis: No

Seismic Load Coefficient (Horizontal): 0.253

Tension Crack

Water level: filled with water

Materials

Property	Granitic Bedrock
Color	
Strength Type	Mohr-Coulomb
Unit Weight [lbs/ft3]	145
Cohesion [psf]	1310
Friction Angle [°]	37
Water Surface	Water Table
Hu Value	Automatically Calculated

Global Minimums

Method: bishop simplified

FS	1.171070
Center:	693.455, 1811.619
Radius:	985.460
Left Slip Surface Endpoint:	14.086, 1097.763
Right Slip Surface Endpoint:	612.775, 829.467
Left Slope Intercept:	14.086 1106.198
Right Slope Intercept:	612.775 829.467
Resisting Moment:	4.71287e+09 lb-ft
Driving Moment:	4.02441e+09 lb-ft
Total Slice Area:	44723.2 ft2
Surface Horizontal Width:	598.688 ft
Surface Average Height:	74.702 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces:	3492
Number of Invalid Surfaces:	0

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.17107

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	23.9475	82188.8	-42.6357	Granitic Bedrock	1310	37	2073.16	2427.81	1525.31	41.9244	1483.39	3434.06	3392.14
2	23.9475	159565	-40.7701	Granitic Bedrock	1310	37	2408.49	2820.51	4588.54	2584.03	2004.51	6665.3	4081.27
3	23.9475	214809	-38.9555	Granitic Bedrock	1310	37	4029.02	4718.26	5715.99	1193.07	4522.92	8973.45	7780.38
4	23.9475	248951	-37.1864	Granitic Bedrock	1310	37	4802.39	5623.93	6756.16	1031.37	5724.79	10399.6	9368.19
5	23.9475	288244	-35.4578	Granitic Bedrock	1310	37	5712.34	6689.55	7972.6	833.686	7138.91	12040.8	11207.1
6	23.9475	333673	-33.7656	Granitic Bedrock	1310	37	6782.22	7942.45	9403.92	602.348	8801.57	13938.3	13336
7	23.9475	343513	-32.1063	Granitic Bedrock	1310	37	7218.98	8453.93	9819.66	339.356	9480.31	14349.2	14009.9
8	23.9475	355739	-30.4766	Granitic Bedrock	1310	37	7725.23	9046.79	10313.5	46.4474	10267.1	14859.8	14813.3
9	23.9475	365145	-28.8738	Granitic Bedrock	1310	37	8069.77	9450.27	10802.5	0	10802.5	15252.4	15252.4
10	23.9475	371866	-27.2953	Granitic Bedrock	1310	37	8343.27	9770.55	11227.5	0	11227.5	15532.9	15532.9
11	23.9475	379410	-25.739	Granitic Bedrock	1310	37	8636.93	10114.5	11683.9	0	11683.9	15847.8	15847.8
12	23.9475	385829	-24.2029	Granitic Bedrock	1310	37	8911.28	10435.7	12110.2	0	12110.2	16115.7	16115.7
13	23.9475	384949	-22.685	Granitic Bedrock	1310	37	9034.77	10580.4	12302.2	0	12302.2	16078.7	16078.7
14	23.9475	377186	-21.1838	Granitic Bedrock	1310	37	9009.35	10550.6	12262.6	0	12262.6	15754.2	15754.2
15	23.9475	357815	-19.6977	Granitic Bedrock	1310	37	8725.29	10217.9	11821.2	0	11821.2	14944.9	14944.9
16	23.9475	334400	-18.2253	Granitic Bedrock	1310	37	8339.03	9765.59	11220.9	0	11220.9	13966.7	13966.7
17	23.9475	309443	-16.7653	Granitic Bedrock	1310	37	7903.05	9255.02	10543.4	0	10543.4	12924.2	12924.2
18	23.9475	281734	-15.3163	Granitic Bedrock	1310	37	7388.23	8652.13	9743.36	0	9743.36	11766.8	11766.8
19	23.9475	245957	-13.8774	Granitic Bedrock	1310	37	6668.55	7809.34	8624.93	0	8624.93	10272.4	10272.4
20	23.9475	211843	-12.4473	Granitic Bedrock	1310	37	5964.63	6985	7530.99	0	7530.99	8847.57	8847.57
21	23.9475	178242	-11.0251	Granitic Bedrock	1310	37	5250.46	6148.66	6421.1	0	6421.1	7444.08	7444.08
22	23.9475	138913	-9.60974	Granitic Bedrock	1310	37	4375.09	5123.54	5060.74	0	5060.74	5801.49	5801.49
23	23.9475	82866.6	-8.20026	Granitic Bedrock	1310	37	3061.67	3585.43	3019.6	0	3019.6	3460.81	3460.81
24	23.9475	42691.7	-6.79577	Granitic Bedrock	1310	37	2104.56	2464.59	1532.19	0	1532.19	1782.98	1782.98
25	23.9475	9895.4	-5.39538	Granitic Bedrock	1310	37	1305.28	1528.58	290.064	0	290.064	413.343	413.343

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.17107

Slice	X	Y	Interslice	Interslice	Interslice

Number	coordinate [ft]	coordinate - Bottom [ft]	Normal Force [lbs]	Shear Force [lbs]	Force Angle [degrees]
1	14.0861	1097.76	2219.8	0	0
2	38.0337	1075.71	7050.11	0	0
3	61.9812	1055.07	84553.5	0	0
4	85.9287	1035.7	153188	0	0
5	109.876	1017.54	224037	0	0
6	133.824	1000.48	296284	0	0
7	157.771	984.47	369022	0	0
8	181.719	969.444	430787	0	0
9	205.666	955.351	481334	0	0
10	229.614	942.145	523322	0	0
11	253.562	929.788	556563	0	0
12	277.509	918.242	580835	0	0
13	301.457	907.478	595627	0	0
14	325.404	897.468	600035	0	0
15	349.352	888.187	593749	0	0
16	373.299	879.614	576897	0	0
17	397.247	871.729	550493	0	0
18	421.194	864.514	515789	0	0
19	445.142	857.956	474229	0	0
20	469.089	852.039	427959	0	0
21	493.037	846.753	378678	0	0
22	516.984	842.088	328131	0	0
23	540.932	838.033	279134	0	0
24	564.88	834.582	237278	0	0
25	588.827	831.728	202106	0	0
26	612.775	829.467	0	0	0

Entity Information

Water Table

X	Y
0.0669028	1062.09
44.7782	1106.8
50.7782	1106.8
406.148	751.431
715.23	752

Tension Crack

X	Y
0.230139	1091.93
28.9148	1104
47.568	1104
70.468	1100.18
83.3175	1096.51
90.7376	1092.8
109.442	1084
139.629	1084
143.274	1081.35
167.118	1077.06

External Boundary

X	Y
0.230139	750
407.579	750
715.23	750

715.23	830
674.23	820
657.23	820
634.23	824
602.83	832
586.23	840
551.73	860
530.23	880
498.23	900
465.23	920
437.23	940
404.73	960
372.23	980
340.83	1000
299.73	1020
248.23	1040
204.23	1060
160.73	1080
147.73	1088
142.23	1092
111.23	1092
94.2301	1100
86.2301	1104
72.2301	1108
48.2301	1112
27.2301	1112
0.0470739	1100
0.0669028	1062.09

Material Boundary

X	Y
0.0669028	1062.09
44.7782	1106.8

IRVINE GEOTECHNICAL Inc

GEOLOGIC MAP

PROJECT: IC16010 - VALENCIA

CONSULTANT: CLC | SCALE: 1" = 20'

LEGEND

TP1	---	NUMBER & LOCATION OF TEST PIT - IRVINE
JB1	---	NUMBER & LOCATION OF TEST PIT - BYER
PS1	---	NUMBER & LOCATION OF TEST PIT - PARMELEE
50	---	STRIKE & DIP OF BEDDING
78	---	STRIKE & DIP OF JOINT
	---	GEOLOGIC CONTACT

CONGLOMERATE EXPOSED

THIN FILL AND SOIL OVER CONGLOMERATE

QUARTZ DIORITE

QUARTZ DIORITE

THIN FILL AND SOIL OVER QUARTZ DIORITE

QUARTZ DIORITE

RUNNON CANYON ROAD

PARCEL MAP P.M. 44-61 (NOT A PART)

PARCEL MAP 44-61 A PART)

POR. SW. 1/4, NE. 1/4 SEC. 4

MULTI-LEVEL RESIDENTIAL HOME

GROUND FLOOR FOOTPRINT 1131.00FS

GROUND FLOOR FOOTPRINT 1118.00FS

BASEMENT FOOTPRINT 1105.00FS

8' BENCH

6' HIGH CHAINLINK FENCE

AREA INACCESSIBLE (APPROX. CONTOURS)

FD SPK 2.0' O/S FROM PL (NO REF)

FD SPK/W 2.21' S53°54'26"W FROM PC (NO-REF)

FD 2" IP 2.38' S52°23'17"W FROM PC (NO REF)

FD NAIL 2.41' S51°41'33"W FROM PC (NO REF)

L=66.61' R=230.00' Δ=16°35'27"

L=40.17' R=135.00' Δ=17°02'56"

L=21.76' R=100.00' Δ=12°28'04"

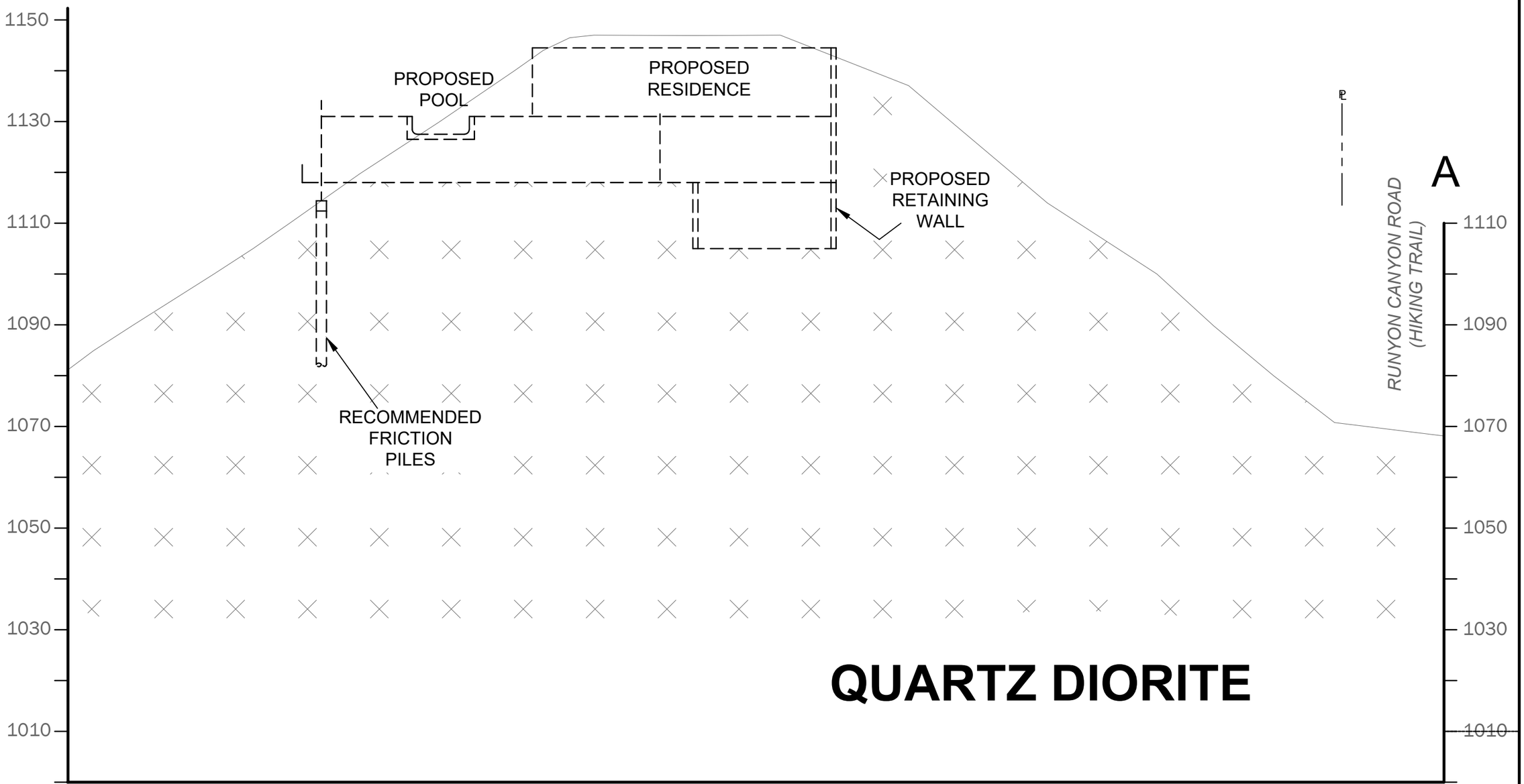
L=75.25' R=100.00' Δ=43°07'01"

IRVINE GEOTECHNICAL Inc

SECTION A - A

PROJECT: IC16010 - VALENCIA

CONSULTANT: CLC | SCALE: 1" = 20'

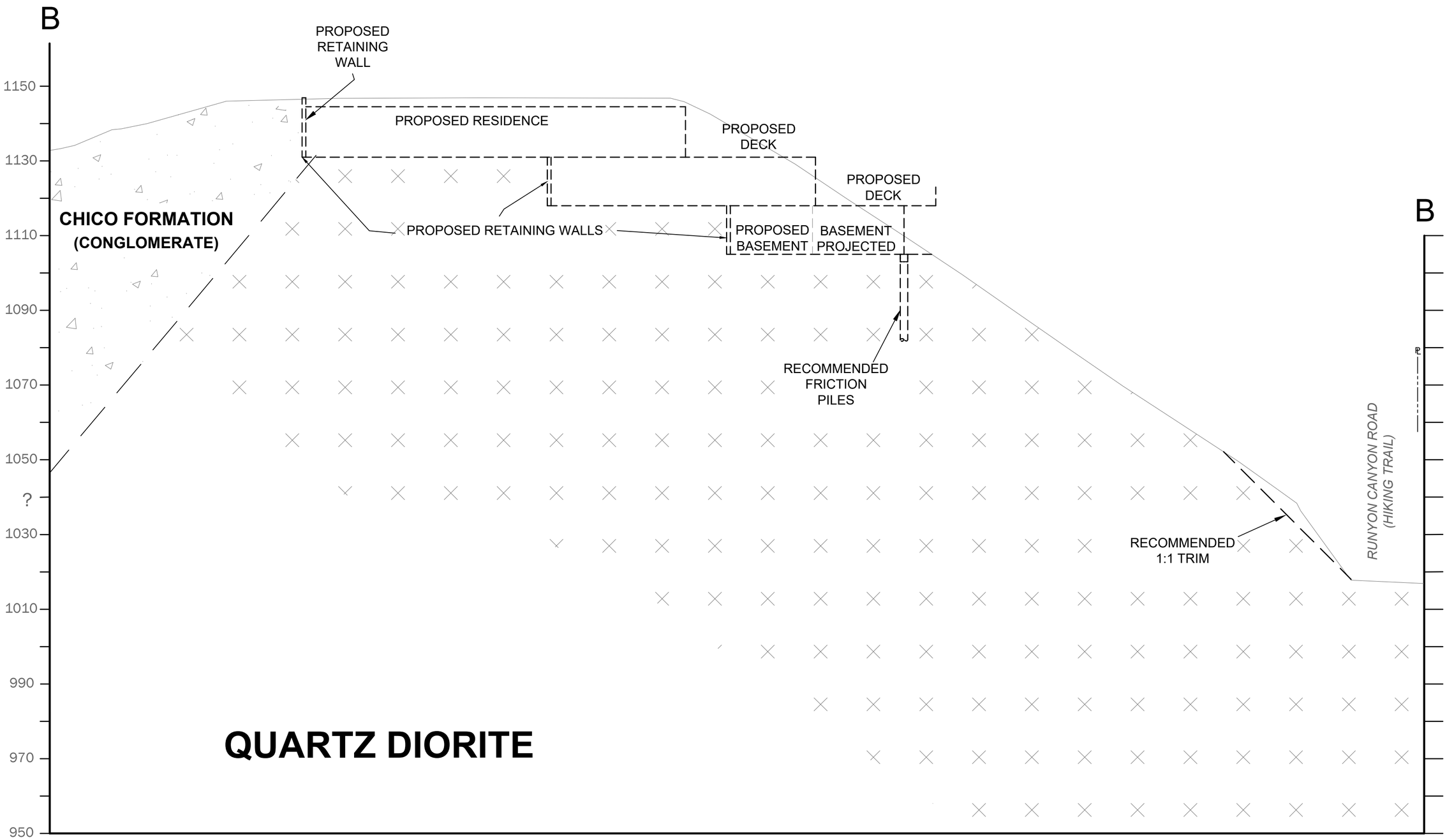


IRVINE GEOTECHNICAL Inc

SECTION B - B

PROJECT: IC16010 - VALENCIA

CONSULTANT: CLC | SCALE: 1" = 20'



IRVINE GEOTECHNICAL Inc

SECTION C - C

PROJECT: IC16010 - VALENCIA

CONSULTANT: CLC | SCALE: 1" = 20'