Appendix G-2:

Geotechnical Report Addendum (2016)

October 17, 2016
IC 16010-I

Manny Valencia
3003 Runyon Canyon Road
Los Angeles, California 90046

Subject

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

References: Report 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

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

Geology and Soils Report Correction Letter, Log #92340, dated April 7, 2016

Dear Gentle Persons;

Irvine Geotechnical has prepared this addendum report to provide additional geotechnical recommendations to the Grading Division for the design and construction of the proposed project. This addendum report follows consultation with the design team and review of the grading and drainage plans prepared by Obando & Associates, Inc. Responses to the six items of the Grading Division review letter are provided below. A copy of the April 7, 2016 Department review letter is appended to this report for reference.

Item 1 - Non-conforming conditions on the site are limited to road cuts steeper than 1:1; existing, non-certified fill; and existing wood retaining devices used for landscaping and paths near the residence.

The limits of the existing fill are entirely within the footprint of the proposed residence and will be removed as a consequence of the proposed project. There is nothing to label on the map with respect to fill removal.

Existing, non-engineered and non-permitted retaining devices should be removed from the site. Labels have been added to the Geologic Map to show the areas of removal.

As previously recommended and shown on Section B, existing steep road cuts along Runyon canyon should be trimmed to 1:1. Labels have been added to the Geologic Map to identify areas to be trimmed.

Item 2 - Section C was extended to the toe of slope in the canyon toward the east as new Section X. Section X is oriented to pass through the steepest slopes as shown on the Local Topo Map.

The gross stability of the slope shown in Section X was calculated using a computerized version of the Simplified Bishop's method (SLIDE Version 6.039 developed by ROCSCIENCE, Inc.). It is assumed that the effluent path will follow a 1:1 plane projected outward from the caps of the seepage pits and a groundwater surface was included in the analysis.

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 0.288g.

The analysis shows that the subject property and existing slopes will be 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 earth materials encountered during exploration. The cross sections and geologic structure used are the most critical for the slopes analyzed.

Item 3 - It is our understanding that the existing OWTS, which services the existing residence and consists of three seepage pits and a septic tank, are performing well and are

to remain. The pits and tank are located in the motor court northwest of the existing residence as shown on the Geologic Map.

Item 4 - It is not planned to abandon the existing OWTS.

Item 5a - The conglomerate bedrock is generally massive and fractures are infrequent and randomly oriented. Two dominant joint sets are present in the granitic bedrock. One strikes northeast and dips 51 to 81 degrees toward the southeast. The other strikes northwest and dips 43 to 65 degrees toward the southwest. Faults were not encountered in this exploration. There is no evidence of wedge or toppling failures, pop outs, or roots growing along fractures in the subject slope.

Item 5b - A kinematic analysis was performed using stereographic methods and the software program Dips, v6.017 by RocScience Inc. The existing steep road cuts and recommended 1:1 trims will face southwest (azimuth 215 degrees) to west (azimuth 90 degrees). Using a slope face angle of 45 degrees, and an assumed residual phi angle of the granitic bedrock of 34 degrees, potential failures were checked between the azimuthal range of 90 to 215 degrees.

Planar, failures are not kinematically feasible for south and west-facing slopes. A planar failure is kinematically feasible in the direction of 205 degrees.

Wedge failures are not kinematically feasible for west-facing slopes. A wedge failures are kinematically feasible in the south and southwest directions (130 to 215 degrees).

Flexural toppling failures are not kinematically feasible.

Direct toppling failures are not kinematically feasible for south and west-facing slopes. Direct toppling failures are kinematically feasible in the southwest direction (190 to 215 degrees).

Item 5c - SWEDGE was used to compute the factor of safety and shape of potential wedge failures in the direction of 200 degrees. Using a residual phi angle of 34 degrees and no cohesion, the computed safety factor for the critical wedge is 1.14. However, as shown on the graphical output page, the failure wedges are narrow and shallow.

Shallow wedge-type failures are possible for the recommended southwest-facing 1:1 trims. However, the road has been abandoned for vehicle use and is not relied upon for ingress or ingress to the residence or adjoining properties. A debris fence is recommended along the toe of the southwest-facing trim.

Item 6 - The “tunnel” proposed to connect the existing house to the proposed house is really more of a walkway trenched into the hillside. The roof of this walkway will be close to existing and proposed grades. The walkway will be constructed using cut and cover construction techniques. The sides of the trench will be trimmed back to a 1:1 gradient above the safe excavation height of 8 feet in bedrock. Permanent conventional retaining walls will then be constructed to support the sides fo the trench. The tops of the retaining walls will be capped with a structural roof and then backfilled to finish grade to create the appearance of a tunnel. Tunneling is not proposed for this project.

ADDITIONAL PROJECT SCOPE

Because the site is located within Runyon Canyon park, and the access roads are used by the public for hiking, it is desired to limit the impact of trucking. A double row of retaining walls and 1.5:1 slopes are proposed to maintain earth onsite to reduce the volume of export.

The following recommendations pertain to changes on the proposed grading plans for the project. The Geologic Map and Sections A through C have been updated to reflect the latest Grading Plans prepared by Obando & Associates, Inc.

STABILITY

Gross Stability

Two 10-foot high retaining walls and 1.5:1 slopes are planned on the northern portion of the property. The grading is proposed as a means of reducing export and keeping soils onsite.

Section C was updated to show the retaining walls and proposed grading. The gross stability of the slope shown in Section C was calculated using a computerized version of the Simplified Bishop’s method (SLIDE Version 6.039 developed by ROCSCIENCE, Inc.).

Distributed forces were included to model the resisting force of retaining walls designed for and equivalent fluid pressure of 55 pcf. The walls are also required to extend 5 feet below grade (15 feet total retaining).

Using the screening procedure and for a maximum allowable displacement of 5 cm, the horizontal acceleration (Keq) is 0.288g.

The analysis shows that the subject property and existing slopes will be 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 earth materials encountered during exploration. The cross section is the most critical for the slopes analyzed.

Surficial Stability

Based upon the enclosed calculations, it is reasonable to assume that the compacted fill will be surficially stable.

1.5:1 FILL SLOPES

Fill slopes may be constructed at a 1.5:1 gradient per the enclosed calculations. Compacted fill should be keyed and benched into or supported laterally by retaining walls. Keyways should be a minimum of 15 feet wide and 3 feet into bedrock as measured on the downhill side. The base of all fills and the axis of drainage courses require subdrains.

For proposed fill slopes steeper than 2:1, the fills shall be overbuilt and trimmed back to expose the compacted inner core. Fill placed for slopes steeper than 2:1 should be compacted to at last 93 percent of the maximum density as determined by ASTM D 1557-12 or equivalent.

RETAINING WALLS

General Design - Static Loading

Cantilevered retaining walls up to 15 feet high that approved retaining wall backfill with a 1.5:1 backslope may be designed for an equivalent fluid pressure of 55 pcf. As described above, retaining walls on 1½:1 slopes should be designed to retain 5 feet below the toe of the wall (15 feet total).

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 2014 Building Code. The computed PGA_M for this site is 0.962g. The horizontal coefficient of seismic increment (K_E) was assumed to be ⅓(PGA_M) = 0.321g.

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 0.321g.

For 15-foot high cantilevered retaining walls, the static design force is equal to 6.187 kips (15ft^2 * 55 pcf /2). For a ground motion of 0.321g and a FS of 1.0, the enclosed calculations indicate an unbalanced force under seismic conditions from the Maximum Considered Earthquake is 7.614 kips.

The seismic increment on retaining walls supporting a 1½:1 backslope is 1.427 kips (7.614 kips - 6.187 kips). For a 15-foot high wall, this is an equivalent fluid pressure of 12.7 pcf. The recommended seismic surcharge on retaining walls higher than 6 feet supporting a 1½:1 backslope is an equivalent fluid pressure of 13 pcf. The seismic surcharge should be applied as a conventional fluid.

Surcharge Loading

Retaining walls that are surcharged by traffic and/or structural loads should be designed to withstand the surcharge. 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 93 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, 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, 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.

Foundation Design

Retaining wall footings may be sized per the **FOUNDATION DESIGN** section of the referenced report.

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 an approved location.

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
\\IGPAFC2\Fina\ICprojects\IC16010 Valencia\IC16010 Valencia Addendum.wpd

Enc: *Geology and Soils Report Correction Letter,* Log #92340, dated April 7, 2016
Calculation Sheets (28)
Kinematic Analysis (9)
Sections A through C & X
Local Topo Map
In pocket: Geologic Map

xc: (7) Addressee

CITY OF LOS ANGELES
CALIFORNIA

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

RAYMOND S. CHAN, C.E., S.E.
GENERAL MANAGER

FRANK BUSH
EXECUTIVE OFFICER

GEOLOGY AND SOILS REPORT CORRECTION LETTER

April 07, 2016

LOG # 92340
SOILS/GEOLOGY FILE - 2
LAN

Manny Valencia

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
Geology/Soils Report	IC 16010-C	03/11/2016	Irvine Geotechnical, Inc.
Oversized Doc(s).	``	``	``
Laboratory Test Report	SL16.2127	02/26/2016	Soil Labwork LLC

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
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. Retaining walls ranging up to 13 feet in height are proposed for the lower floor levels and an expansion of the driveway. 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 1:1 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 structure(s) on conventional and/or drilled-pile foundations bearing on competent bedrock.

The site is located in a designated seismically induced landslide hazard zone as shown on the "Seismic Hazard Zones" map issued by the State of California.

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. The consultant indicates that non-conforming slopes will be trimmed. Clearly identify/label on the geologic map all non-conforming slopes to be trimmed or supported by new retaining walls.

   Note: Please be aware that all existing cut slopes steeper than 2H:1V will be considered as non-conforming. The Department will allow cut slopes evaluated as stable with the required minimum factor of safety of 1.5 for gross and surficial stability and exposing hazard-free geology, up to a maximum horizontal to vertical slope gradient of 1.5H:1V (33 degrees) on private property and up to a maximum horizontal to vertical slope gradient of 1H:1V (45 degrees) for street cuts.

2. Provide static and seismic slope stability analyses along cross-section C based on the expected zone of saturation from the proposed seepage pits. Note: Multiple search analyses shall be utilized in the analyses, not only specified failure planes.

   Note: In the event the safety factor is less than 1.5 and piles are recommended to raise the safety factor, provide calculations to determine the required lateral force on the piles to bring the safety factor to 1.5. Passive resistance of the piles shall be considered below the lowest 1.5-safety factor plane determined without piles.

3. Clarify whether the existing OWTS will be utilized or abandoned and clearly show the location of the existing OWTS on the geologic map and cross-sections.

4. In the event the existing OWTS will be abandoned, provide recommendations for proper abandonment (P/BC 2014-027).

5. For rock slopes 1:1 (H:V) or steeper, provide additional geologic mapping and analysis that incorporates, but not limited to, the following:

   a. Detailed mapping and description of discontinuities along the existing cut slope; such as bedding planes, lithologic contacts, joints, fractures, and faults, with characteristics such as orientation, spacing, presence of infilling or openness, continuity, etc.

   b. Kinematic analysis of discontinuities relative to the slope face, using stereographic

methods to assess potential planar, wedge and topple type failures.

c. Slope stability analysis of the potential failures using appropriate methods for type of failure identified from the kinematic analysis.

6. Provide a detailed sequence of excavation and implementation of construction techniques for the areas to be tunneled. Provide details of temporary support/shoring for the tunneling such as the minimum reinforcement and spacing of support columns/beams and ribbing.

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
213-482-0480

cc: Chris Drugan, Applicant
Irvine Geotechnical, Inc., Project Consultant
Soil Labwork LLC, 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	16 feet
SHEAR DIAGRAM:	JBG 1	BACKSLOPE ANGLE:	34 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:	1 feet
CD (C/FS):	410.0 psf	FINAL TENSION CRACK:	15 feet

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

HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h) 0.321 %g

VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v) 0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	46	degrees
AREA OF TRIAL FAILURE WEDGE	199.4	square feet
TOTAL EXTERNAL SURCHARGE	0.0	pounds
WEIGHT OF TRIAL FAILURE WEDGE	26917.0	pounds
NUMBER OF TRIAL WEDGES ANALYZED	615	trials
LENGTH OF FAILURE PLANE	21.6	feet
DEPTH OF TENSION CRACK	10.6	feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	15.0	feet
CALCULATED HORIZONTAL THRUST ON WALL	**7613.7**	**pounds**

THE CALCULATION INDICATES THAT FOR THE DESIGN GROUND MOTION, THE UNBALANCED FORCE ON RETAINING WALLS SUPPORTING COMPACTEDF FILL WITH A 1.5:1 BACKSLOPE IS 7.614 KIPS.

IRVINE GEOTECHNICAL Inc

SURFICIAL STABILITY

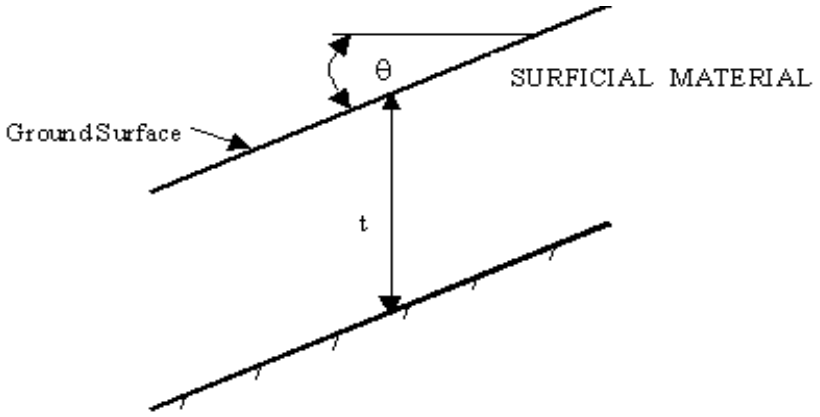
IC: **16010** CONSULT: **JAI**
CLIENT: **VALENCIA**

CALCULATION SHEET #

CALCULATE THE SURFICIAL STABILITY OF THE EARTH MATERIAL USING THE INFINITE SLOPE ANALYSIS WITH PARALLEL SEEPAGE. THIS METHOD WAS RECOMMENDED BY THE ASCE AND THE BUILDING AND SAFETY ADVISORY COMMITTEE (8/16/78). MODIFIED FROM SKEMPTON & DeLORY, 1957.

CALCULATION PARAMETERS

EARTH MATERIAL:	COMPACTED FILL		
COHESION:	410 psf	SHEAR DIAGRAM:	JBG 1
PHI ANGLE:	32 degrees	SLOPE ANGLE:	34 degrees
DENSITY:	135 pcf	SATURATION DEPTH (t):	3.0 feet

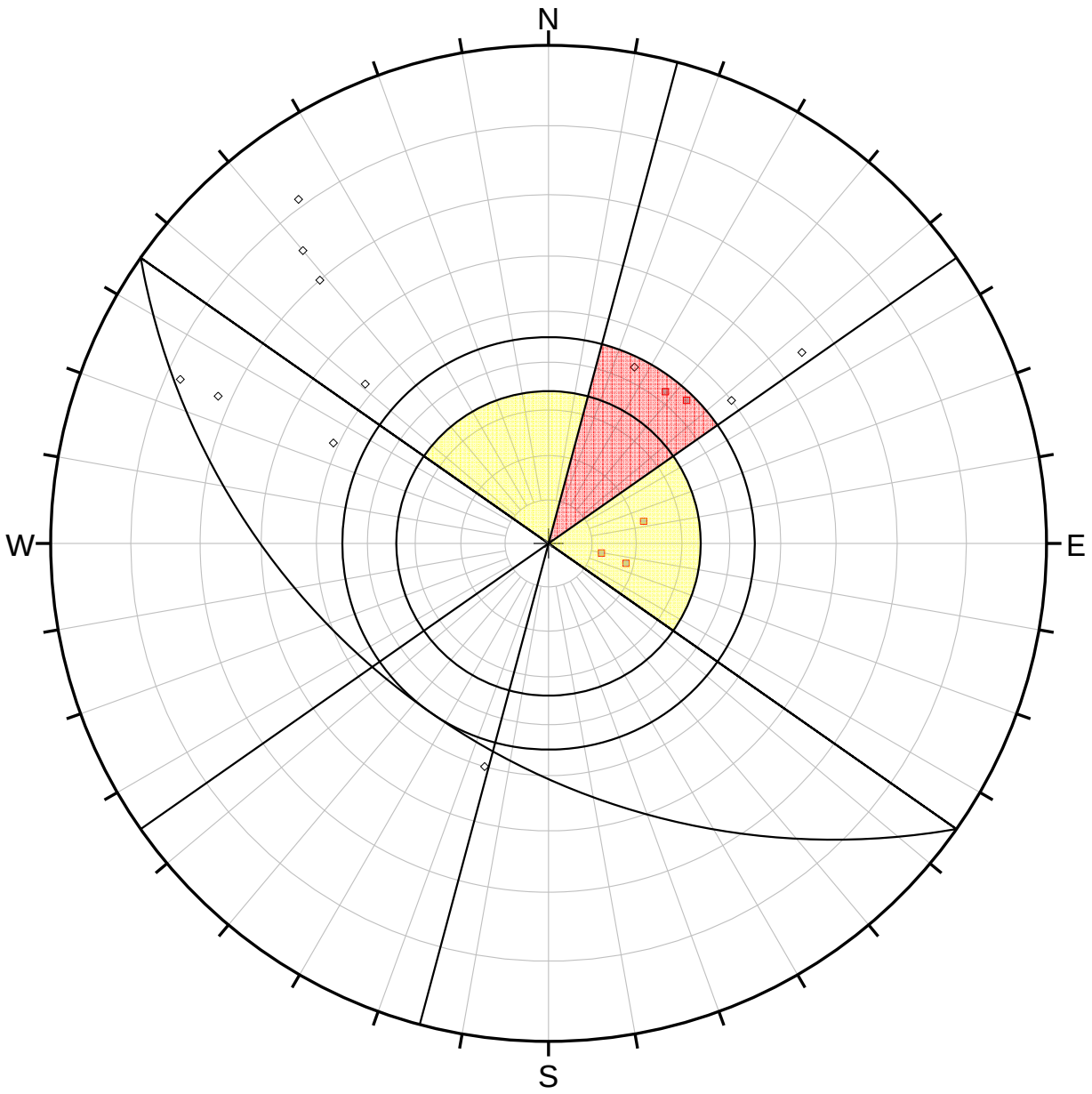


$$FS = \frac{C + (\gamma_{soil} - \gamma_{water}) \bullet t \bullet \cos^2\theta \tan\Phi}{\gamma_{soil} \bullet t \bullet \cos\Phi \sin\Phi}$$

SAFETY FACTOR = 2.68

CONCLUSIONS:

THE CALCULATION INDICATES THAT UNIFORM SLOPES IN COMPACTED FILL ARE SURFICIALLY STABLE.

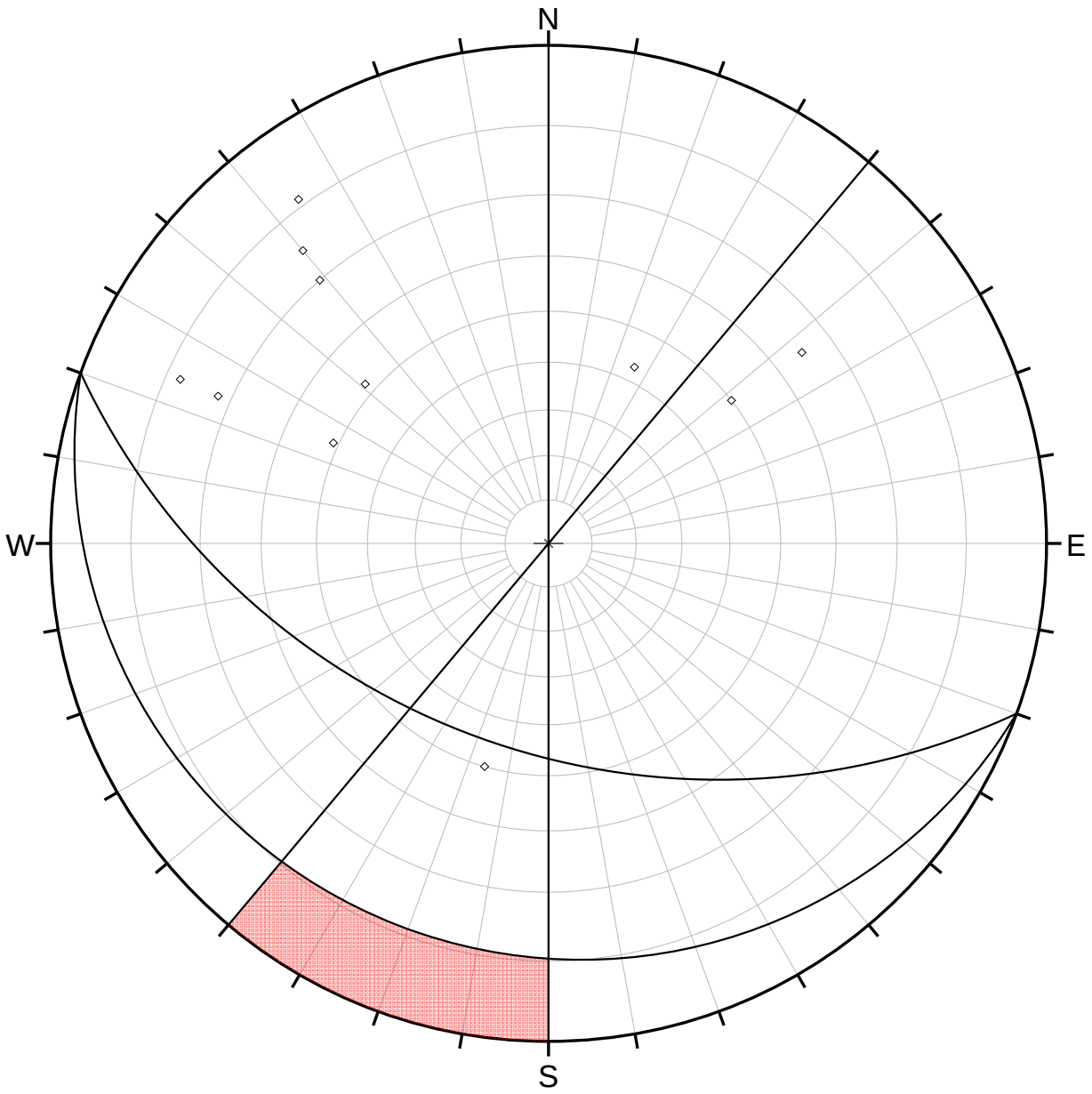


Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Kinematic Analysis	Direct Toppling
Slope Dip	45
Slope Dip Direction	215
Friction Angle	34°
Lateral Limits	20°

	Critical	Total	%
Direct Toppling (Intersection)	2	55	3.64%
Oblique Toppling (Intersection)	3	55	5.45%
Base Plane (All)	1	11	9.09%

Plot Mode	Pole Vectors
Vector Count	11 (11 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	55
Hemisphere	Lower
Projection	Equal Angle

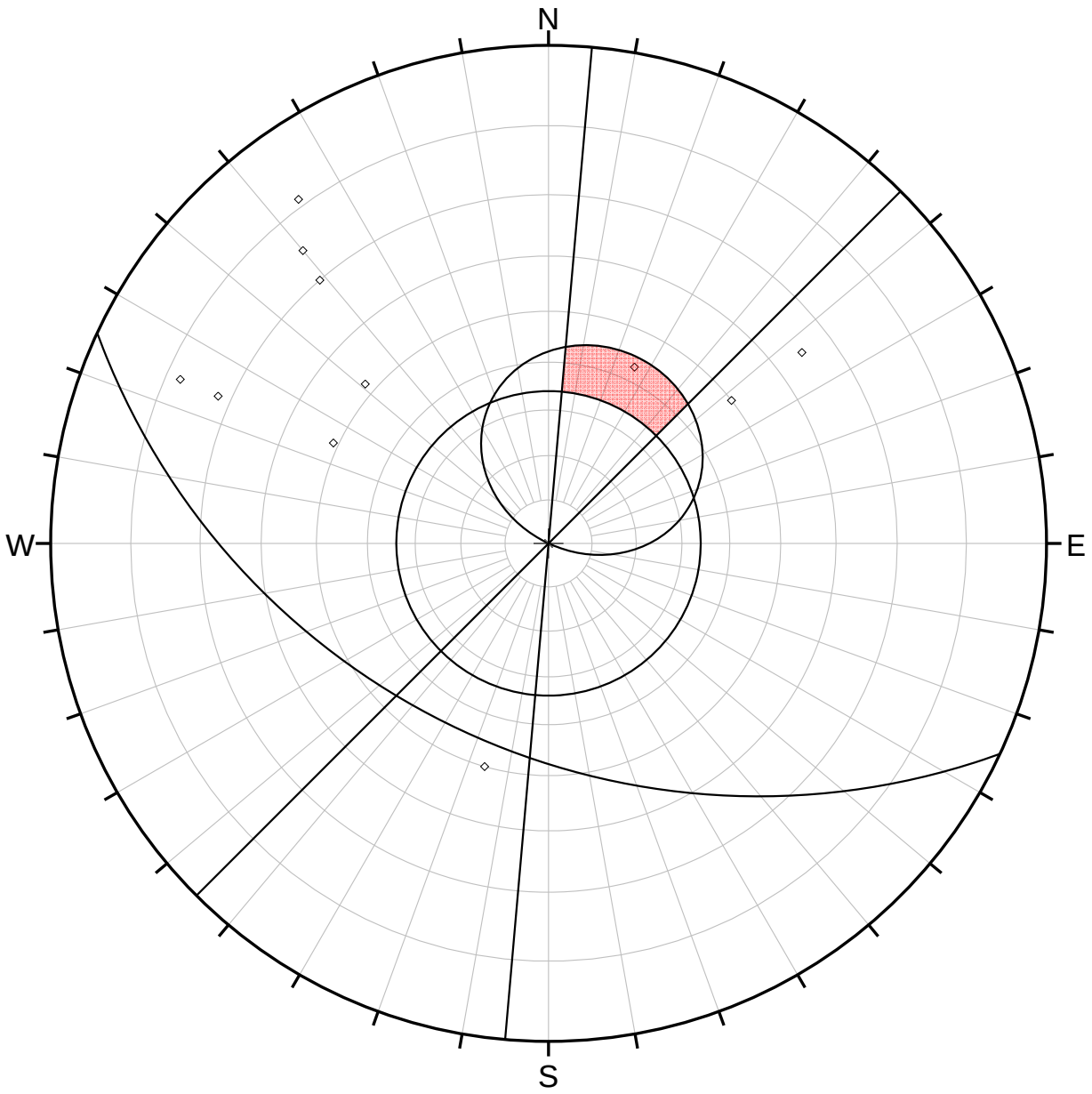


Symbol	Feature
◇	Pole Vectors

Kinematic Analysis	Flexural Toppling
Slope Dip	45
Slope Dip Direction	200
Friction Angle	34°
Lateral Limits	20°

	Critical	Total	%
Flexural Toppling (All)	0	11	0.00%

Plot Mode	Pole Vectors
Vector Count	11 (11 Entries)
Hemisphere	Lower
Projection	Equal Angle

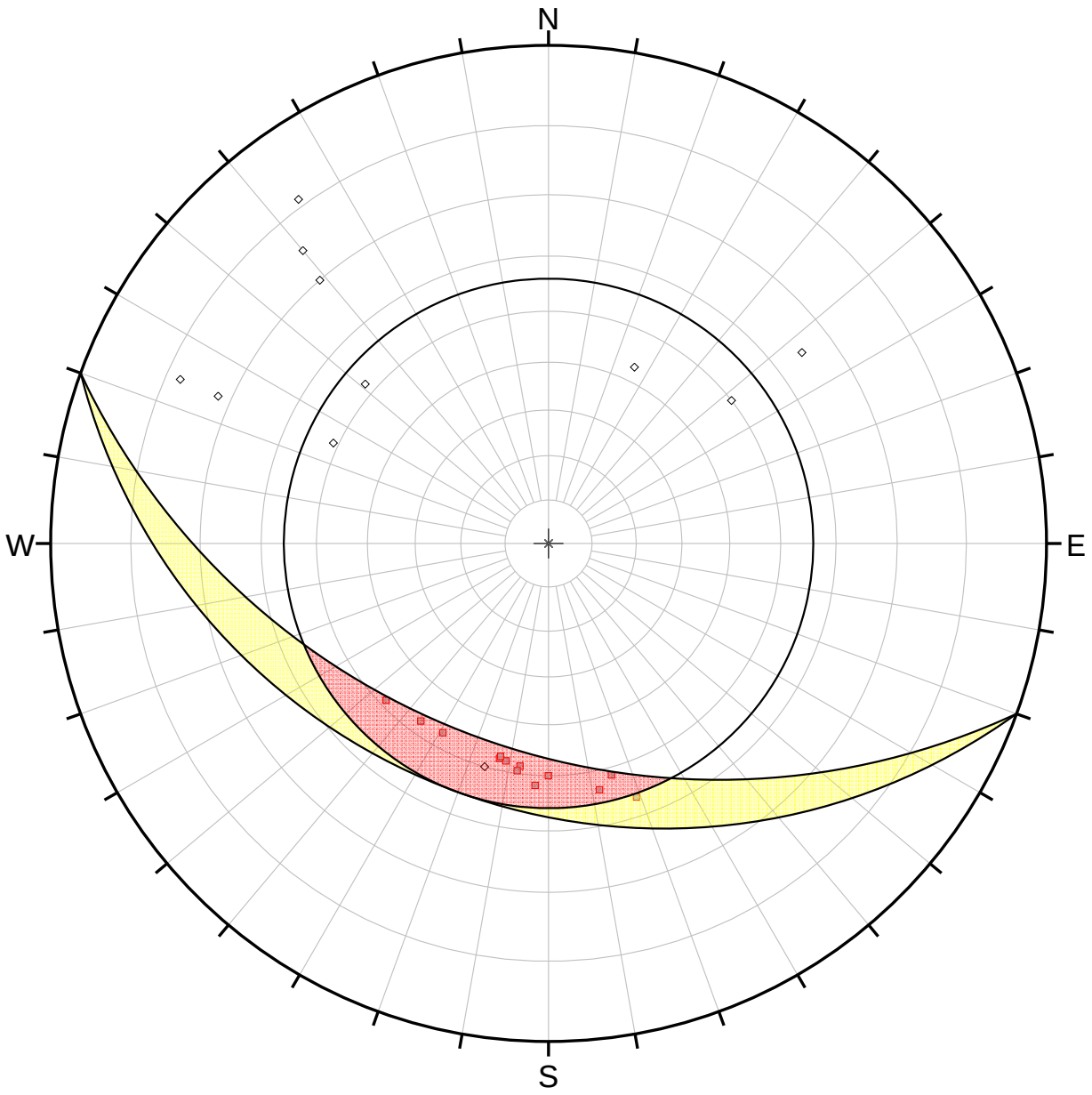


Symbol	Feature
◇	Pole Vectors

Kinematic Analysis	Planar Sliding
Slope Dip	45
Slope Dip Direction	205
Friction Angle	34°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	1	11	9.09%

Plot Mode	Pole Vectors
Vector Count	11 (11 Entries)
Hemisphere	Lower
Projection	Equal Angle



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Kinematic Analysis	Wedge Sliding
Slope Dip	45
Slope Dip Direction	200
Friction Angle	34°

	Critical	Total	%
Wedge Sliding	13	55	23.64%

Plot Mode	Pole Vectors
Vector Count	11 (11 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	55
Hemisphere	Lower
Projection	Equal Angle

Dips Analysis Information

Project Summary

File Name: Valencia Dips
Last saved with Dips version: 6.017
Date Created: 10/17/2016, 8:45:17 AM

General Settings:

Data Format: Dip / Dip Direction
Magnetic Declination (E pos): 0°
Multiple Data Flag (Quantity): OFF
Extra Data Columns: 0
Poles: 11
Entries: 11

Traverses:

No traverse information available.

Global Mean

	Trend	Plunge
Unweighted	324.02	40.06
Weighted	324.02	40.06

Global Best Fit

Unweighted			
	Trend	Plunge	Eigenvalue
S1	313.99	25.65	0.607270
S2	57.70	26.27	0.270883
S3	186.46	51.75	0.121846

Woodcock S1 / S3 = 2.242
Woodcock K = 1.010
Woodcock C = 0.807

Weighted			
	Trend	Plunge	Eigenvalue
S1	313.99	25.65	0.607270
S2	57.70	26.27	0.270883
S3	186.46	51.75	0.121846

Woodcock S1 / S3 = 2.242
Woodcock K = 1.010
Woodcock C = 0.807

Intersections:

Intersection Type	Number
Grid Data Planes	55
User and Mean Set (Unweighted) Planes	0
User and Mean Set (Weighted) Planes	0
User Planes	0
Mean Set (Unweighted) Planes	0
Mean Set (Weighted) Planes	0

Kinematic Analysis:

Slope Dip: 45

Slope Dip Direction: 215
Friction Angle: 34°
Lateral Limit Angle: 20°

Planar Sliding

Planar Sliding	Critical	%	Total
All Vectors	1	9.09%	11

Planar Sliding (No Limits)

Planar Sliding	Critical	%	Total
All Vectors	1	9.09%	11

Wedge Sliding

Critical 1 = Wedge Sliding (Both Planes)
Critical 2 = Wedge Sliding (One Planes)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	6	10.91%	3	5.45%	55
User and Mean Set (Unweighted) Plane Intersections	No results				
User and Mean Set (Weighted) Plane Intersections	No results				
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	No results				
Mean Set Plane (Weighted) Intersections	No results				

Flexural Toppling

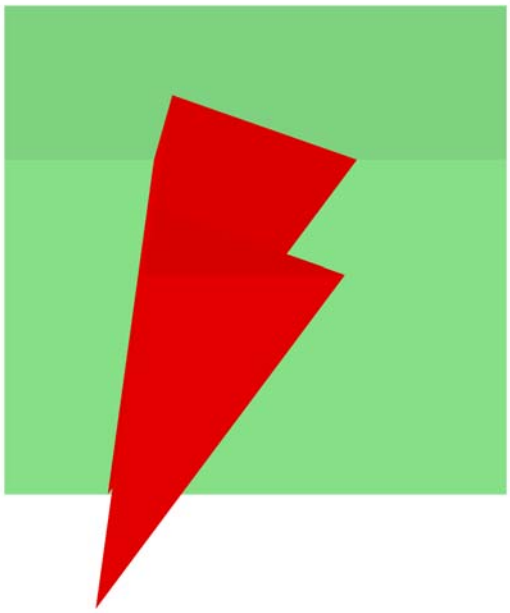
Flexural Toppling	Critical	%	Total
All Vectors	0	0.00%	11

Direct Toppling

Base Plane	Critical	%	Total
All Vectors	1	9.09%	11

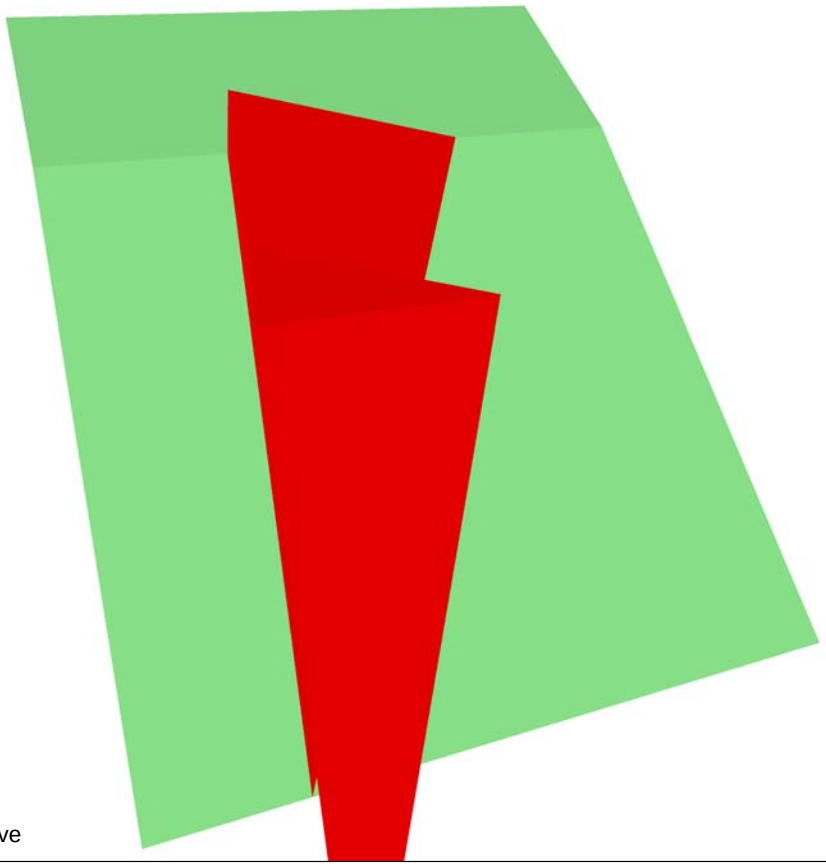
Critical 1 = Direct Toppling (Intersection)
Critical 2 = Oblique Toppling (Intersection)

Intersection Type	Critical 1	%	Critical 2	%	Total
Grid Data Plane Intersections	2	3.64%	3	5.45%	55
User and Mean Set (Unweighted) Plane Intersections	No results				
User and Mean Set (Weighted) Plane Intersections	No results				
User Plane Intersections	No results				
Mean Set Plane (Unweighted) Intersections	No results				
Mean Set Plane (Weighted) Intersections	No results				

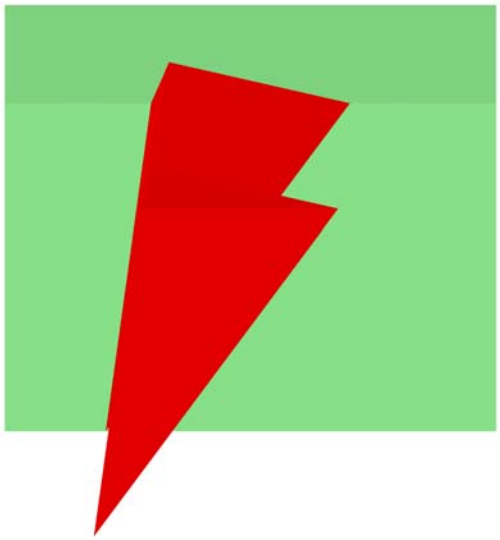


Top

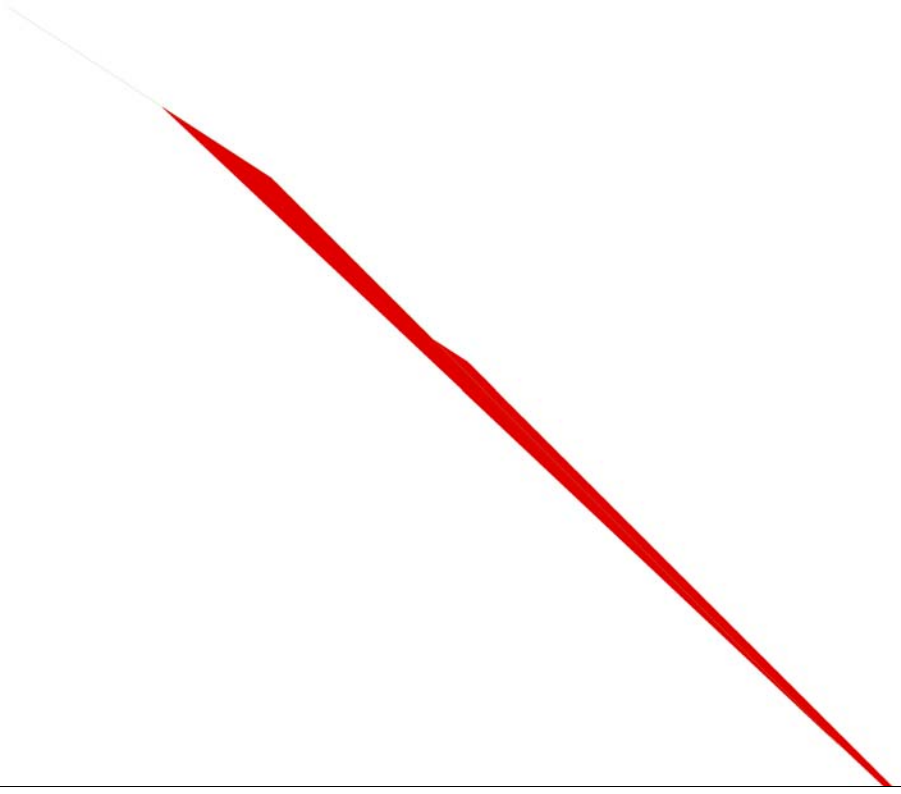
Factor of Safety: 1.1412



Perspective



Front



Side

Swedge Analysis Information

SWEDGE - Surface Wedge Stability Analysis

Project Summary

File Name	Swedge2
Project Title	SWEDGE - Surface Wedge Stability Analysis
Date Created	10/17/2016, 8:59:29 AM

Analysis Results

Analysis type - Combinations

Number of Combinations	4950
Number of Valid Wedges	14
Number of Invalid Wedges	4936
Number of Failed Wedges	0
Number of Stable Wedges	14

Current Wedge Data - Min FS Wedge

Safety Factor	1.14119
Wedge height (on slope) [ft]	40
Bench width (on upper face) [ft]	7.73679
Wedge volume [ft3]	438.754
Wedge weight [lbs]	63619.3
Wedge area (joint1) [ft2]	760.984
Wedge area (joint2) [ft2]	66.0068
Wedge area (slope) [ft2]	686.268
Wedge area (upper face) [ft2]	111.915

Effective Normal and Strength Properties

	Joint 1	Joint 2
Effective Normal force [lbs]	46528.191	0.000
Effective Normal stress [psf]	61.142	0.000
Shear Strength [psf]	42.812	0.000
Strength due to Waviness [psf]	22.254	0.000

Driving force [lbs]	43388.2
Resisting force [lbs]	49514.3

Failure Mode

Sliding on joint1

Joint Sets 1&2 line of Intersection

Plunge [deg]	Trend [deg]	Length [ft]
42.956	209.191	66.073

Trace Lengths

	Slope Face [ft]	Upper Face [ft]
Joint 1	63.933	23.916
Joint 2	56.838	9.483

Persistence

Joint 1 [ft]	66.0731
Joint 2 [ft]	66.0731

Intersection Angles

	Slope Face	Upper Face
Joint 1 & Joint 2	22.192	80.711
Joint 1 & Crest	62.228	22.689
Joint 2 & Crest	95.580	76.600

Dip and Dip Direction

	Dip [deg]	Dip Direction [deg]
Joint Set 1	43.000	206.000
Joint Set 2	70.000	139.000
Slope	45.000	200.000
Upper Face	33.000	200.000

Joint Set 1 Data

Cohesion [psf]	0
Friction Angle [deg]	35
Waviness Angle [deg]	20

Joint Set 2 Data

Cohesion [psf]	0
Friction Angle [deg]	35
Waviness Angle [deg]	20

Slope Data

Slope height [ft]	40
Rock unit weight [lbs/ft3]:	145
Water pressures in the slope	NO
Overhanging slope face	NO
Externally applied force	YES
Tension crack	NO

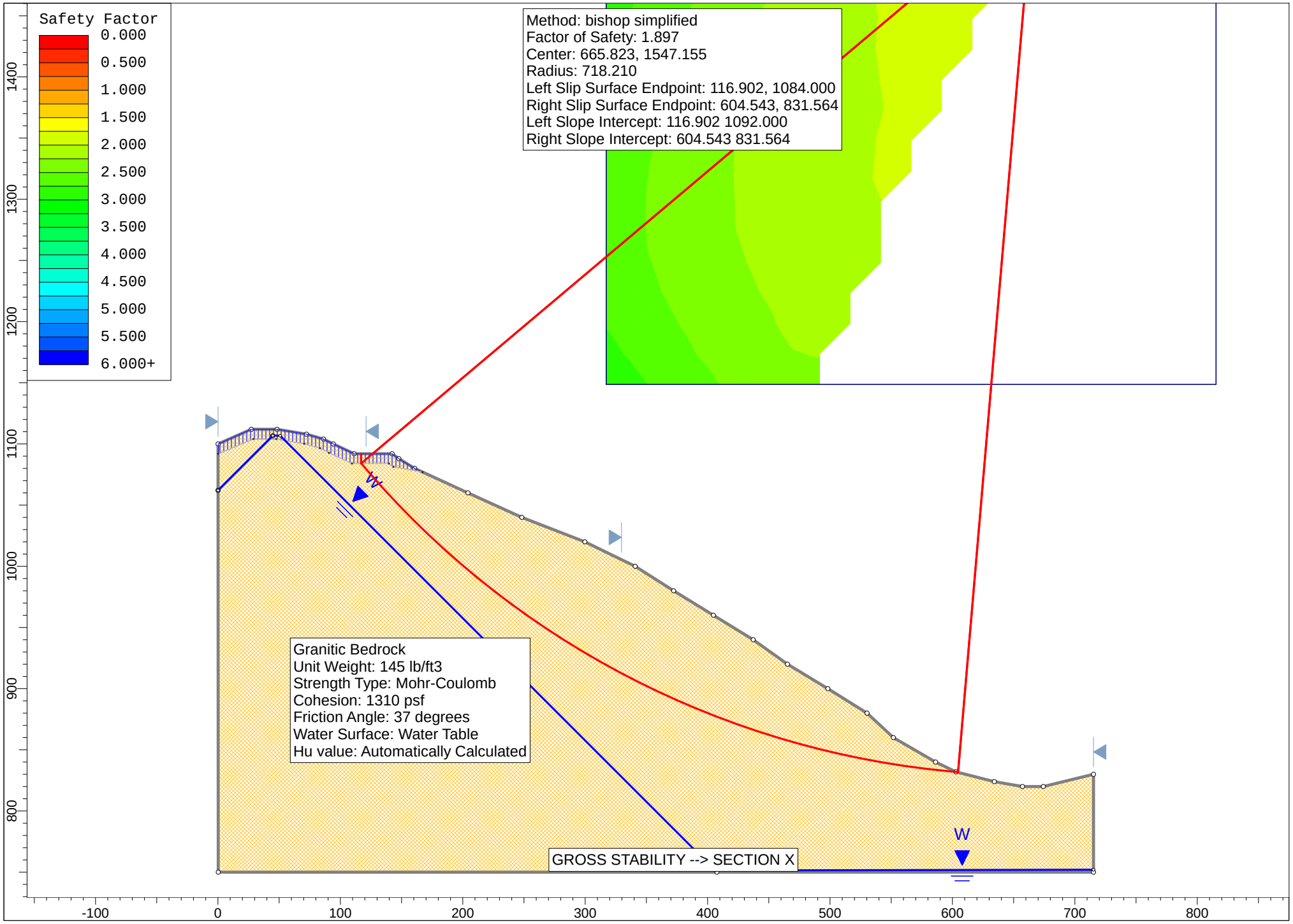
Wedge Vertices - Min FS Wedge

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

Point	East	North	Up
124	0.000	0.000	0.000
134	41.674	27.399	40.000
234	18.874	35.698	40.000
123	23.585	42.216	45.024

Spill Width Parameters

Swelling Factor	1.5
Angle of repose of failed material	38 deg


Safety Factor
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
5.500
6.000+
Method: bishop simplified
Factor of Safety: 1.897
Center: 665.823, 1547.155
Radius: 718.210
Left Slip Surface Endpoint: 116.902, 1084.000
Right Slip Surface Endpoint: 604.543, 831.564
Left Slope Intercept: 116.902 1092.000
Right Slope Intercept: 604.543 831.564
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

File Name: SectionXcalc
Slide Modeler Version: 6.039
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION A
Date Created: 3/11/2016, 8:36:14 AM

General Settings

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

Analysis Options

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: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

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

Surface Options

Surface Type: Circular

Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Tension Crack

Tension crack Water level: filled with water

Material Properties

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

Global Minimums

Method: bishop simplified

FS: 1.897400
Center: 665.823, 1547.155
Radius: 718.210
Left Slip Surface Endpoint: 116.902, 1084.000
Right Slip Surface Endpoint: 604.543, 831.564
Left Slope Intercept: 116.902 1092.000
Right Slope Intercept: 604.543 831.564
Resisting Moment=2.63178e+009 lb-ft
Driving Moment=1.38705e+009 lb-ft
Total Slice Area=29451.5 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2377
Number of Invalid Surfaces: 2474

Error Codes:

Error Code -101 reported for 156 surfaces
Error Code -103 reported for 6 surfaces
Error Code -104 reported for 1 surface
Error Code -113 reported for 298 surfaces
Error Code -1000 reported for 2013 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
-104 = Same as -102. Surface / nonslope intersections also exist, but these points lie outside the arc defined by the two surface / slope intersections.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.8974

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	19.5056	53986.8	Granitic Bedrock	1310	37	1232.94	2339.38	1366.04	0	1366.04
2	19.5056	104944	Granitic Bedrock	1310	37	1995.93	3787.07	3287.19	0	3287.19
3	19.5056	129877	Granitic Bedrock	1310	37	2406.93	4566.91	4322.06	0	4322.06
4	19.5056	155878	Granitic Bedrock	1310	37	2845.95	5399.9	5427.47	0	5427.47
5	19.5056	178512	Granitic Bedrock	1310	37	3245.34	6157.7	6433.14	0	6433.14
6	19.5056	198026	Granitic Bedrock	1310	37	3605.55	6841.17	7340.11	0	7340.11
7	19.5056	214638	Granitic Bedrock	1310	37	3927.27	7451.6	8150.19	0	8150.19
8	19.5056	230954	Granitic Bedrock	1310	37	4249.96	8063.88	8962.72	0	8962.72
9	19.5056	245606	Granitic Bedrock	1310	37	4551.08	8635.21	9720.89	0	9720.89
10	19.5056	256713	Granitic Bedrock	1310	37	4798.35	9104.39	10343.5	0	10343.5
11	19.5056	261500	Granitic Bedrock	1310	37	4943.04	9378.93	10707.8	0	10707.8
12	19.5056	262571	Granitic Bedrock	1310	37	5025.26	9534.93	10914.9	0	10914.9
13	19.5056	255312	Granitic Bedrock	1310	37	4963.63	9418	10759.7	0	10759.7
14	19.5056	245567	Granitic Bedrock	1310	37	4854.69	9211.29	10485.4	0	10485.4
15	19.5056	234573	Granitic Bedrock	1310	37	4718.9	8953.65	10143.5	0	10143.5
16	19.5056	221712	Granitic Bedrock	1310	37	4544.79	8623.28	9705.04	0	9705.04
17	19.5056	206130	Granitic Bedrock	1310	37	4316.09	8189.34	9129.18	0	9129.18
18	19.5056	184794	Granitic Bedrock	1310	37	3976.19	7544.43	8273.35	0	8273.35
19	19.5056	164975	Granitic Bedrock	1310	37	3655.52	6935.98	7465.95	0	7465.95
20	19.5056	145580	Granitic Bedrock	1310	37	3334.76	6327.37	6658.26	0	6658.26
21	19.5056	123771	Granitic Bedrock	1310	37	2960.99	5618.18	5717.15	0	5717.15
22	19.5056	94681.4	Granitic Bedrock	1310	37	2440.46	4630.52	4406.47	0	4406.47
23	19.5056	57843.8	Granitic Bedrock	1310	37	1759.79	3339.03	2692.62	0	2692.62
24	19.5056	32818.3	Granitic Bedrock	1310	37	1293.35	2454	1518.14	0	1518.14
25	19.5056	9509.9	Granitic Bedrock	1310	37	850.475	1613.69	403.011	0	403.011

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.8974

	X	Y	Interslice	Interslice	Interslice

Number	coordinate [ft]	coordinate - Bottom [ft]	Normal Force [lbs]	Shear Force [lbs]	Force Angle [degrees]
1	116.902	1084	1996.8	0	0
2	136.408	1061.82	8240.99	0	0
3	155.914	1041.37	36546.9	0	0
4	175.419	1022.44	71433.4	0	0
5	194.925	1004.86	111300	0	0
6	214.43	988.522	153120	0	0
7	233.936	973.308	194460	0	0
8	253.442	959.135	233376	0	0
9	272.947	945.927	268853	0	0
10	292.453	933.623	299686	0	0
11	311.958	922.17	324560	0	0
12	331.464	911.521	342170	0	0
13	350.97	901.637	352036	0	0
14	370.475	892.483	353716	0	0
15	389.981	884.028	347672	0	0
16	409.486	876.247	334557	0	0
17	428.992	869.116	315117	0	0
18	448.498	862.614	290281	0	0
19	468.003	856.725	261449	0	0
20	487.509	851.432	229662	0	0
21	507.015	846.722	195976	0	0
22	526.52	842.584	161882	0	0
23	546.026	839.006	130044	0	0
24	565.531	835.982	103863	0	0
25	585.037	833.503	82399	0	0
26	604.543	831.564	0	0	0

List Of Coordinates

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

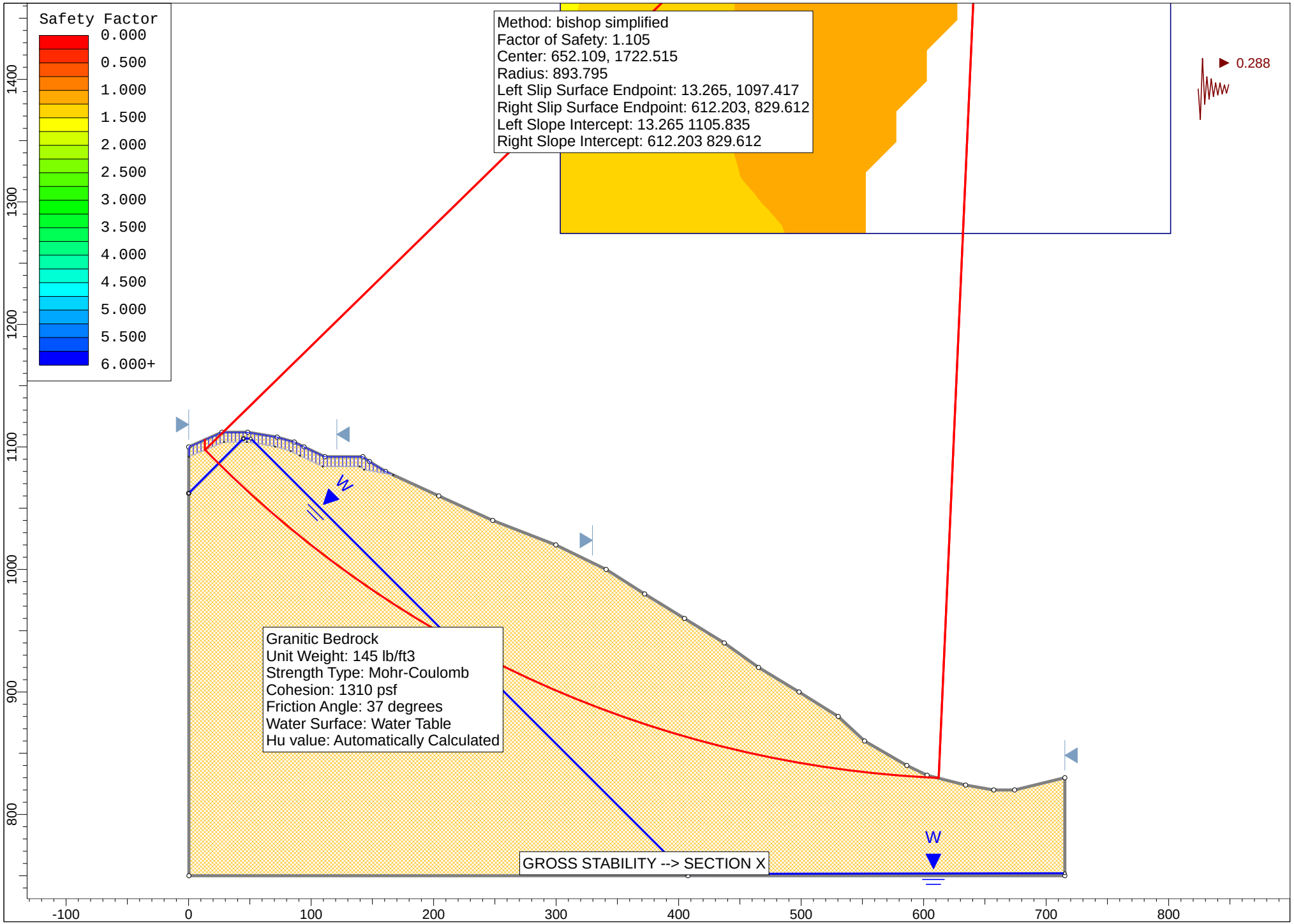
90.7376	1092.8
109.442	1084
139.629	1084
143.274	1081.35
167.118	1077.06

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


Safety Factor
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
5.500
6.000+
Method: bishop simplified
Factor of Safety: 1.105
Center: 652.109, 1722.515
Radius: 893.795
Left Slip Surface Endpoint: 13.265, 1097.417
Right Slip Surface Endpoint: 612.203, 829.612
Left Slope Intercept: 13.265 1105.835
Right Slope Intercept: 612.203 829.612
0.288
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

File Name: SectionXcalc seis
Slide Modeler Version: 6.039
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION X

General Settings

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

Analysis Options

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: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

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

Surface Options

Surface Type: Circular
Search Method: Grid Search

Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.288

Tension Crack

Tension crack Water level: filled with water

Material Properties

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

Global Minimums

Method: bishop simplified

FS: 1.105220
Center: 652.109, 1722.515
Radius: 893.795
Left Slip Surface Endpoint: 13.265, 1097.417
Right Slip Surface Endpoint: 612.203, 829.612
Left Slope Intercept: 13.265 1105.835
Right Slope Intercept: 612.203 829.612
Resisting Moment=4.46622e+009 lb-ft
Driving Moment=4.04103e+009 lb-ft
Total Slice Area=47727.3 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2801
Number of Invalid Surfaces: 2050

Error Codes:

Error Code -101 reported for 169 surfaces
Error Code -104 reported for 1 surface
Error Code -113 reported for 362 surfaces
Error Code -1000 reported for 1518 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-104 = Same as -102. Surface / nonslope intersections also exist, but these points lie outside the arc defined by the two surface / slope intersections.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.10522

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	23.9575	85373.6	Granitic Bedrock	1310	37	2142.73	2368.19	1455.41	51.1475	1404.27
2	23.9575	168580	Granitic Bedrock	1310	37	2535.36	2802.13	4720.26	2740.14	1980.12
3	23.9575	228159	Granitic Bedrock	1310	37	4286.44	4737.46	5879.61	1331.23	4548.38
4	23.9575	266143	Granitic Bedrock	1310	37	5157.71	5700.4	7023.99	1197.72	5826.27
5	23.9575	306783	Granitic Bedrock	1310	37	6131.62	6776.79	8277.17	1022.49	7254.68
6	23.9575	355225	Granitic Bedrock	1310	37	7310.3	8079.49	9792.09	808.667	8983.42
7	23.9575	366737	Granitic Bedrock	1310	37	7817.64	8640.21	10286.4	558.881	9727.53
8	23.9575	379977	Granitic Bedrock	1310	37	8387.88	9270.45	10839.3	275.386	10563.9
9	23.9575	390064	Granitic Bedrock	1310	37	8903.13	9839.92	11319.6	0	11319.6
10	23.9575	397105	Granitic Bedrock	1310	37	9227.21	10198.1	11794.9	0	11794.9
11	23.9575	404566	Granitic Bedrock	1310	37	9564.49	10570.9	12289.6	0	12289.6
12	23.9575	410765	Granitic Bedrock	1310	37	9879.27	10918.8	12751.3	0	12751.3
13	23.9575	409611	Granitic Bedrock	1310	37	10035.1	11091	12979.8	0	12979.8
14	23.9575	401220	Granitic Bedrock	1310	37	10026.2	11081.2	12966.8	0	12966.8
15	23.9575	381094	Granitic Bedrock	1310	37	9740.72	10765.6	12548.1	0	12548.1
16	23.9575	356421	Granitic Bedrock	1310	37	9333.35	10315.4	11950.6	0	11950.6
17	23.9575	330045	Granitic Bedrock	1310	37	8866.62	9799.57	11266	0	11266
18	23.9575	300785	Granitic Bedrock	1310	37	8309.87	9184.24	10449.5	0	10449.5
19	23.9575	263300	Granitic Bedrock	1310	37	7527.69	8319.75	9302.25	0	9302.25
20	23.9575	226969	Granitic Bedrock	1310	37	6744.9	7454.6	8154.14	0	8154.14
21	23.9575	191197	Granitic Bedrock	1310	37	5947.32	6573.1	6984.38	0	6984.38
22	23.9575	149762	Granitic Bedrock	1310	37	4973.46	5496.77	5556.05	0	5556.05
23	23.9575	91094.9	Granitic Bedrock	1310	37	3509.04	3878.26	3408.2	0	3408.2
24	23.9575	47795.3	Granitic Bedrock	1310	37	2405.86	2659	1790.19	0	1790.19
25	23.9575	11684.8	Granitic Bedrock	1310	37	1459.96	1613.58	402.866	0	402.866

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.10522

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	13.2653	1097.42	2210.81	0	0
2	37.2228	1073.84	9804.75	0	0
3	61.1803	1051.94	101002	0	0
4	85.1378	1031.57	183857	0	0
5	109.095	1012.58	270326	0	0
6	133.053	994.883	358346	0	0
7	157.01	978.374	447240	0	0
8	180.968	962.979	524003	0	0
9	204.925	948.632	588085	0	0
10	228.883	935.274	638418	0	0
11	252.841	922.857	678276	0	0
12	276.798	911.337	707323	0	0
13	300.756	900.676	724977	0	0
14	324.713	890.842	730277	0	0
15	348.671	881.805	722906	0	0
16	372.628	873.54	703105	0	0
17	396.586	866.025	672058	0	0
18	420.543	859.239	631224	0	0
19	444.501	853.166	582304	0	0
20	468.458	847.792	527861	0	0
21	492.416	843.103	469942	0	0
22	516.373	839.088	410625	0	0
23	540.331	835.738	353266	0	0
24	564.288	833.046	304644	0	0
25	588.246	831.005	264448	0	0
26	612.203	829.612	0	0	0

List Of Coordinates

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

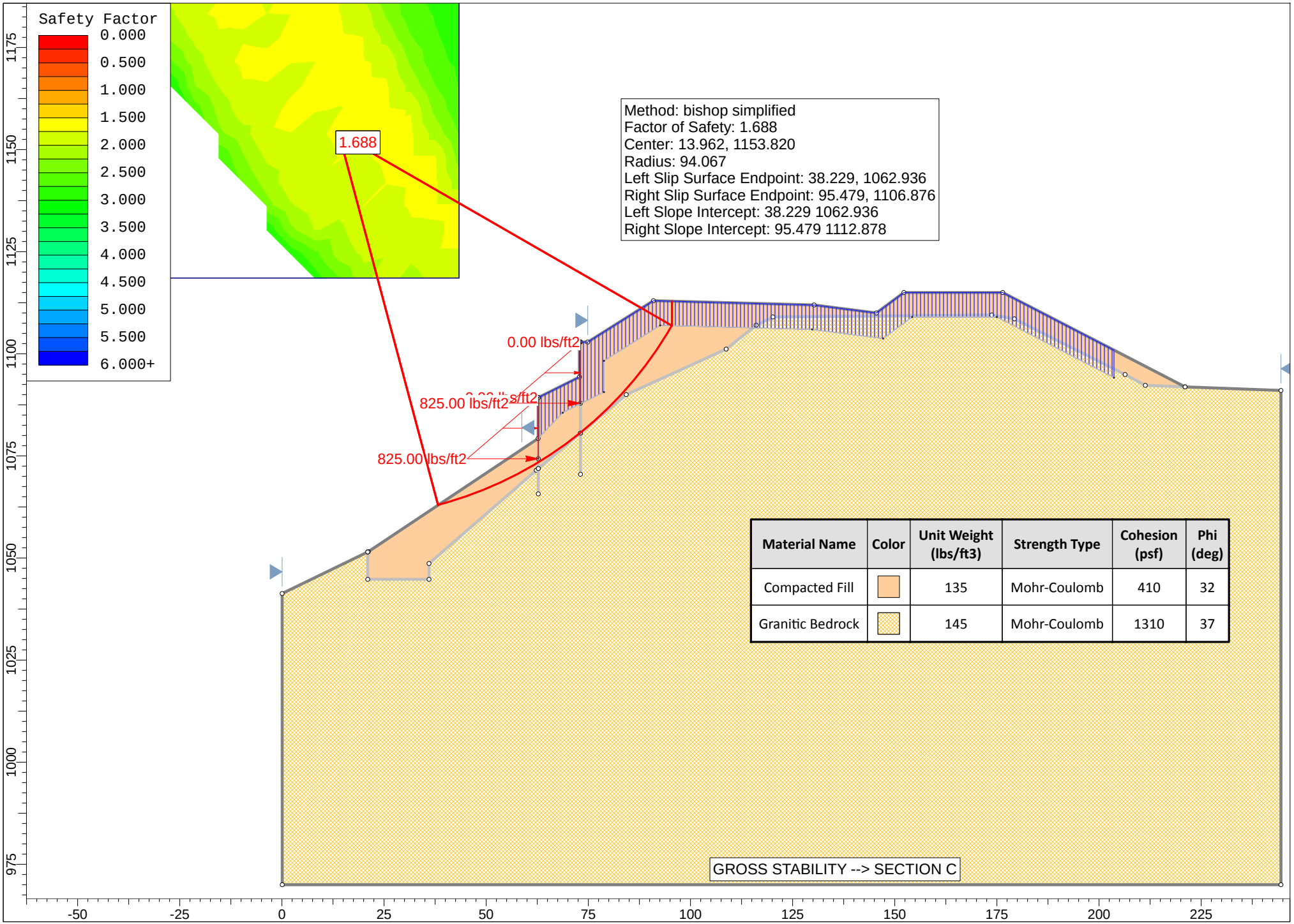
83.3175	1096.51
90.7376	1092.8
109.442	1084
139.629	1084
143.274	1081.35
167.118	1077.06

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


Safety Factor
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
5.500
6.000+
1.688
Method: bishop simplified
Factor of Safety: 1.688
Center: 13.962, 1153.820
Radius: 94.067
Left Slip Surface Endpoint: 38.229, 1062.936
Right Slip Surface Endpoint: 95.479, 1106.876
Left Slope Intercept: 38.229 1062.936
Right Slope Intercept: 95.479 1112.878
0.00 lbs/ft2
825.00 lbs/ft2
825.00 lbs/ft2
Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg)
Compacted Fill | 135 | Mohr-Coulomb | 410 | 32
Granitic Bedrock | 145 | Mohr-Coulomb | 1310 | 37
GROSS STABILITY --> SECTION C
1175
1150
1125
1100
1075
1050
1025
1000
975
-50
-25
0
25
50
75
100
125
150
175
200
225

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

File Name: SectionCcalc
Slide Modeler Version: 6.039
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION C

General Settings

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

Analysis Options

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: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

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

Surface Options

Surface Type: Circular
Search Method: Grid Search

Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

2 Distributed Loads present

Distributed Load 1

Distribution: Triangular
Magnitude 1 [psf]: 0
Magnitude 2 [psf]: 825
Orientation: Normal to boundary

Distributed Load 2

Distribution: Triangular
Magnitude 1 [psf]: 0
Magnitude 2 [psf]: 825
Orientation: Normal to boundary

Tension Crack

Tension crack Water level: filled with water

Material Properties

Property	Compacted Fill	Granitic Bedrock
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	135	145
Cohesion [psf]	410	1310
Friction Angle [deg]	32	37
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 1.688070
Center: 13.962, 1153.820
Radius: 94.067
Left Slip Surface Endpoint: 38.229, 1062.936
Right Slip Surface Endpoint: 95.479, 1106.876
Left Slope Intercept: 38.229 1062.936
Right Slope Intercept: 95.479 1112.878

Resisting Moment=7.17983e+006 lb-ft
Driving Moment=4.25329e+006 lb-ft
Total Slice Area=614.226 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2925
Number of Invalid Surfaces: 1926

Error Codes:

Error Code -101 reported for 256 surfaces
Error Code -113 reported for 174 surfaces
Error Code -1000 reported for 1496 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.68807

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.28999	136.895	Compacted Fill	410	32	240.074	405.261	-7.58365	0	-7.58365
2	2.28999	400.922	Compacted Fill	410	32	276.183	466.216	89.9636	0	89.9636
3	2.28999	645.19	Compacted Fill	410	32	308.728	521.154	177.884	0	177.884
4	2.28999	869.205	Compacted Fill	410	32	337.708	570.074	256.172	0	256.172
5	2.28999	1072.41	Compacted Fill	410	32	363.111	612.957	324.798	0	324.798
6	2.28999	1254.17	Compacted Fill	410	32	384.919	649.77	383.713	0	383.713
7	2.28999	1413.78	Compacted Fill	410	32	403.105	680.469	432.842	0	432.842
8	2.28999	1550.44	Compacted Fill	410	32	417.631	704.991	472.086	0	472.086
9	2.28999	1663.26	Compacted Fill	410	32	428.454	723.26	501.318	0	501.318
10	2.28999	1751.22	Compacted Fill	410	32	435.515	735.18	520.396	0	520.396
11	2.28999	2733.96	Compacted Fill	410	32	560.592	946.319	858.289	0	858.289
12	2.28999	4844.55	Compacted Fill	410	32	829.923	1400.97	1585.88	0	1585.88
13	2.28999	4731.9	Compacted Fill	410	32	805.109	1359.08	1518.85	0	1518.85
14	2.28999	4588.71	Compacted Fill	410	32	776.418	1310.65	1441.34	0	1441.34
15	2.28999	4413.01	Compacted Fill	410	32	743.727	1255.46	1353.02	0	1353.02
16	2.28999	6414.73	Compacted Fill	410	32	981.008	1656.01	1994.03	0	1994.03
17	2.28999	6328.29	Compacted Fill	410	32	955.369	1612.73	1924.76	0	1924.76
18	2.28999	6131.27	Compacted Fill	410	32	915.981	1546.24	1818.36	0	1818.36
19	2.28999	5889.69	Compacted Fill	410	32	871.214	1470.67	1697.43	0	1697.43
20	2.28999	5598.89	Compacted Fill	410	32	820.74	1385.47	1561.07	0	1561.07

21	2.28999	5253.12	Compacted Fill	410	32	764.163	1289.96	1408.23	0	1408.23
22	2.28999	4845.13	Compacted Fill	410	32	701.022	1183.37	1237.66	0	1237.66
23	2.28999	4365.64	Compacted Fill	410	32	630.768	1064.78	1047.87	0	1047.87
24	2.28999	3576.51	Compacted Fill	410	32	529.214	893.35	773.521	0	773.521
25	2.28999	2447.68	Compacted Fill	410	32	396.786	669.802	415.77	0	415.77

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.68807

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	38.2293	1062.94	0	0	0
2	40.5193	1063.58	554.624	0	0
3	42.8093	1064.28	1123.57	0	0
4	45.0993	1065.06	1693.49	0	0
5	47.3893	1065.89	2252.46	0	0
6	49.6793	1066.8	2790	0	0
7	51.9693	1067.77	3297.13	0	0
8	54.2592	1068.82	3766.45	0	0
9	56.5492	1069.94	4192.2	0	0
10	58.8392	1071.15	4570.44	0	0
11	61.1292	1072.43	4899.15	0	0
12	63.4192	1073.8	11186.9	0	0
13	65.7092	1075.26	10769.6	0	0
14	67.9992	1076.82	10247.9	0	0
15	70.2891	1078.48	9634.65	0	0
16	72.5791	1080.25	8946.08	0	0
17	74.8691	1082.13	13590.2	0	0
18	77.1591	1084.14	11908.4	0	0
19	79.4491	1086.29	10100.5	0	0
20	81.7391	1088.59	8193.69	0	0
21	84.0291	1091.06	6223.21	0	0
22	86.3191	1093.71	4235.18	0	0
23	88.609	1096.58	2290.09	0	0
24	90.899	1099.7	468.319	0	0
25	93.189	1103.11	-958.392	0	0
26	95.479	1106.88	1124.01	0	0

List Of Coordinates

Distributed Load

X	Y
62.7542	1089.28
62.7542	1074.3

Distributed Load

X	Y
73.0753	1102.82
73.0753	1087.9

Tension Crack

X	Y
62.7332	1079.29
68.7332	1085.58
78.8316	1090.63
78.8316	1098.29
92.5892	1106.95
129.787	1105.96
147.153	1103.74
154.218	1109
174.97	1109
203.647	1094.16

External Boundary

X	Y
0.065712	970
244.517	969.999
244.517	1091.02
221.049	1091.91
176.43	1115
152.23	1115
145.512	1110
130.248	1111.95
90.9316	1113
74.8467	1102.87
73.0753	1102.9
72.8316	1102.91
72.8316	1094.34
62.7542	1089.3
62.7332	1089.29
62.7332	1079.29
21.161	1051.55
21.011	1051.47
0.0477208	1041.32

Material Boundary

X	Y
21.011	1051.47
21.011	1044.79
36.011	1044.79

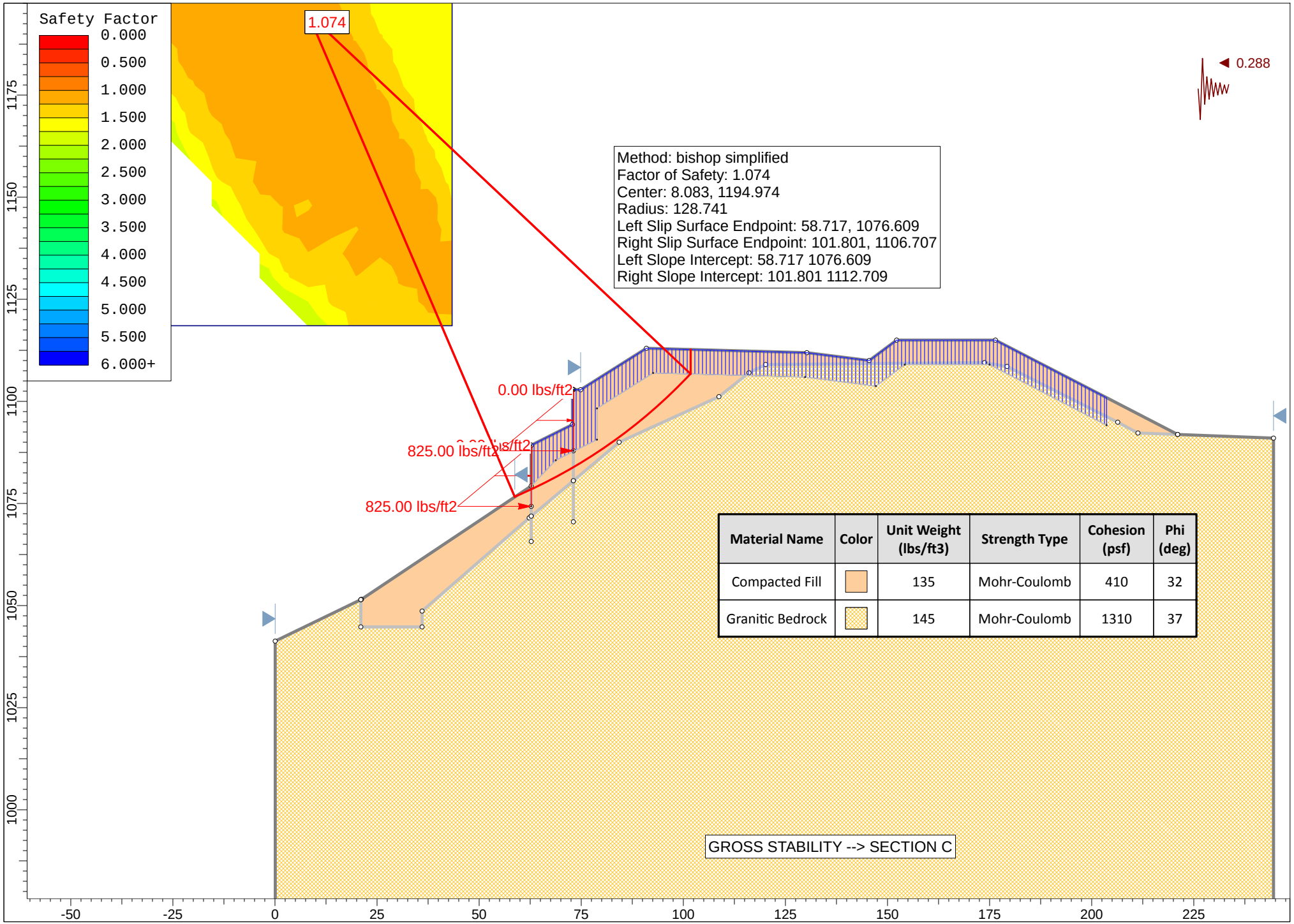
36.011	1048.67
62.2499	1071.48
62.7542	1071.9
73.0753	1080.59
84.2709	1090.01
108.724	1101.16
116.076	1107
120.141	1109.03
173.764	1109.51
179.28	1108.55
206.366	1094.92
211.33	1092.27
221.049	1091.91

Material Boundary

X	Y
62.7542	1065.71
62.7542	1071.9
62.7542	1074.3
62.7542	1089.3

Material Boundary

X	Y
73.0753	1070.51
73.0753	1080.59
73.0753	1087.9
73.0753	1102.9


Safety Factor
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
4.500
5.000
5.500
6.000+
1.074
0.288
Method: bishop simplified
Factor of Safety: 1.074
Center: 8.083, 1194.974
Radius: 128.741
Left Slip Surface Endpoint: 58.717, 1076.609
Right Slip Surface Endpoint: 101.801, 1106.707
Left Slope Intercept: 58.717 1076.609
Right Slope Intercept: 101.801 1112.709
0.00 lbs/ft2
825.00 lbs/ft2
825.00 lbs/ft2
Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg)
Compacted Fill | 135 | Mohr-Coulomb | 410 | 32
Granitic Bedrock | 145 | Mohr-Coulomb | 1310 | 37
GROSS STABILITY --> SECTION C
1175
1150
1125
1100
1075
1050
1025
1000
-50
-25
0
25
50
75
100
125
150
175
200
225

Slide Analysis Information

VALENCIA - RUNYON

Project Summary

File Name: SectionCcalc seis
Slide Modeler Version: 6.039
Project Title: VALENCIA - RUNYON
Analysis: GROSS STABILITY - SECTION C

General Settings

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

Analysis Options

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: 62.4 lbs/ft3
Advanced Groundwater Method: None

Random Numbers

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

Surface Options

Surface Type: Circular
Search Method: Grid Search

Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Create Tension Crack
Minimum Elevation: Not Defined
Minimum Depth: Not Defined

Loading

Seismic Load Coefficient (Horizontal): 0.288
2 Distributed Loads present

Distributed Load 1

Distribution: Triangular
Magnitude 1 [psf]: 0
Magnitude 2 [psf]: 825
Orientation: Normal to boundary

Distributed Load 2

Distribution: Triangular
Magnitude 1 [psf]: 0
Magnitude 2 [psf]: 825
Orientation: Normal to boundary

Tension Crack

Tension crack Water level: filled with water

Material Properties

Property	Compacted Fill	Granitic Bedrock
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	135	145
Cohesion [psf]	410	1310
Friction Angle [deg]	32	37
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS: 1.073670
Center: 8.083, 1194.974
Radius: 128.741
Left Slip Surface Endpoint: 58.717, 1076.609
Right Slip Surface Endpoint: 101.801, 1106.707
Left Slope Intercept: 58.717 1076.609

Right Slope Intercept: 101.801 1112.709
Resisting Moment=7.25323e+006 lb-ft
Driving Moment=6.75554e+006 lb-ft
Total Slice Area=556.401 ft2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 2925
Number of Invalid Surfaces: 1926

Error Codes:

Error Code -101 reported for 256 surfaces
Error Code -113 reported for 174 surfaces
Error Code -1000 reported for 1496 surfaces

Error Codes

The following errors were encountered during the computation:

-101 = Only one (or zero) surface / slope intersections.
-113 = Surface intersects outside slope limits.
-1000 = No valid slip surfaces are generated at a grid center. Unable to draw a surface.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.07367

Slice Number	Width [ft]	Weight [lbs]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.72337	46.2897	Compacted Fill	410	32	317.005	340.359	-111.449	0	-111.449
2	1.72337	135.349	Compacted Fill	410	32	338.235	363.153	-74.9708	0	-74.9708
3	1.72337	1759.92	Compacted Fill	410	32	765.917	822.342	659.883	0	659.883
4	1.72337	2540.06	Compacted Fill	410	32	964.567	1035.63	1001.21	0	1001.21
5	1.72337	2540.24	Compacted Fill	410	32	956.517	1026.98	987.38	0	987.38
6	1.72337	2532.84	Compacted Fill	410	32	946.459	1016.18	970.101	0	970.101
7	1.72337	2517.67	Compacted Fill	410	32	934.39	1003.23	949.363	0	949.363
8	1.72337	2494.54	Compacted Fill	410	32	920.308	988.107	925.165	0	925.165
9	1.72337	4009.78	Compacted Fill	410	32	1293.29	1388.57	1566.04	0	1566.04
10	1.72337	4198.9	Compacted Fill	410	32	1328.67	1426.55	1626.82	0	1626.82
11	1.72337	4185.81	Compacted Fill	410	32	1313.09	1409.83	1600.06	0	1600.06
12	1.72337	4180.59	Compacted Fill	410	32	1299.37	1395.1	1576.49	0	1576.49
13	1.72337	4166.21	Compacted Fill	410	32	1283.31	1377.85	1548.88	0	1548.88
14	1.72337	4142.37	Compacted Fill	410	32	1264.87	1358.06	1517.21	0	1517.21
15	1.72337	4108.75	Compacted Fill	410	32	1244.05	1335.7	1481.44	0	1481.44
16	1.72337	4065.01	Compacted Fill	410	32	1220.82	1310.76	1441.51	0	1441.51
17	1.72337	4010.74	Compacted Fill	410	32	1195.14	1283.19	1397.4	0	1397.4
18	1.72337	3945.55	Compacted Fill	410	32	1167	1252.97	1349.04	0	1349.04
19	1.72337	3856.57	Compacted Fill	410	32	1133.54	1217.04	1291.54	0	1291.54

20	1.72337	3568.12	Compacted Fill	410	32	1055.46	1133.22	1157.39	0	1157.39
21	1.72337	3204.06	Compacted Fill	410	32	961.891	1032.75	996.614	0	996.614
22	1.72337	2826.98	Compacted Fill	410	32	867.189	931.075	833.894	0	833.894
23	1.72337	2436.22	Compacted Fill	410	32	771.372	828.199	669.26	0	669.26
24	1.72337	2031.02	Compacted Fill	410	32	674.461	724.149	502.742	0	502.742
25	1.72337	1610.57	Compacted Fill	410	32	576.484	618.954	334.396	0	334.396

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.07367

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	58.7169	1076.61	0	0	0
2	60.4403	1077.36	616.634	0	0
3	62.1636	1078.14	1219.03	0	0
4	63.887	1078.96	4742.91	0	0
5	65.6104	1079.8	4827.32	0	0
6	67.3337	1080.68	4877.67	0	0
7	69.0571	1081.59	4895.99	0	0
8	70.7805	1082.53	4884.7	0	0
9	72.5038	1083.51	4846.6	0	0
10	74.2272	1084.52	10487	0	0
11	75.9506	1085.57	9857.77	0	0
12	77.6739	1086.66	9173.44	0	0
13	79.3973	1087.79	8431.55	0	0
14	81.1207	1088.96	7635.3	0	0
15	82.844	1090.16	6788.43	0	0
16	84.5674	1091.42	5895.23	0	0
17	86.2908	1092.71	4960.63	0	0
18	88.0141	1094.05	3990.24	0	0
19	89.7375	1095.44	2990.37	0	0
20	91.4609	1096.88	1973.85	0	0
21	93.1842	1098.37	1038.58	0	0
22	94.9076	1099.92	232.273	0	0
23	96.631	1101.52	-424.844	0	0
24	98.3543	1103.18	-910.923	0	0
25	100.078	1104.91	-1202.27	0	0
26	101.801	1106.71	1124.01	0	0

List Of Coordinates

Distributed Load

X	Y
62.7542	1089.28
62.7542	1074.3

Distributed Load

X	Y
73.0753	1102.82
73.0753	1087.9

Tension Crack

X	Y
62.7332	1079.29
68.7332	1085.58
78.8316	1090.63
78.8316	1098.29
92.5892	1106.95
129.787	1105.96
147.153	1103.74
154.218	1109
174.97	1109
203.647	1094.16

External Boundary

X	Y
0.065712	970
244.517	969.999
244.517	1091.02
221.049	1091.91
176.43	1115
152.23	1115
145.512	1110
130.248	1111.95
90.9316	1113
74.8467	1102.87
73.0753	1102.9
72.8316	1102.91
72.8316	1094.34
62.7542	1089.3
62.7332	1089.29
62.7332	1079.29
21.161	1051.55
21.011	1051.47
0.0477208	1041.32

Material Boundary

X	Y
21.011	1051.47
21.011	1044.79
36.011	1044.79

36.011	1048.67
62.2499	1071.48
62.7542	1071.9
73.0753	1080.59
84.2709	1090.01
108.724	1101.16
116.076	1107
120.141	1109.03
173.764	1109.51
179.28	1108.55
206.366	1094.92
211.33	1092.27
221.049	1091.91

Material Boundary

X	Y
62.7542	1065.71
62.7542	1071.9
62.7542	1074.3
62.7542	1089.3

Material Boundary

X	Y
73.0753	1070.51
73.0753	1080.59
73.0753	1087.9
73.0753	1102.9

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 / 78 --- STRIKE & DIP OF BEDDING
- --- STRIKE & DIP OF JOINT
- --- GEOLOGIC CONTACT

CONGLOMERATE EXPOSED

THIN FILL AND SOIL OVER CONGLOMERATE

PROPOSED LOCATION OF SEEPAGE PITS (OPTION 2)

PROPOSED LOCATION OF SEEPAGE PITS (OPTION 1)

EXISTING SEEPAGE PITS & TANK

REMOVE WOOD RETAINING DEVICES

MULTI-LEVEL RESIDENTIAL HOME

RUNYON CANYON ROAD

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

QUARTZ DIORITE

THIN FILL AND SOIL OVER QUARTZ DIORITE

RECOMMENDED 1:1 TRIM

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

A A' B B' C C' D D' E E' F F' G G' H

SEE C-4

TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8

JB1 JB2 JB3 JB4 JB5

PS1 PS2 PS3 PS4 PS5 PS6 PS7 PS8

1107.00 BOTTOM OF SLOPE

1115.00 TOP OF SLOPE

1130.45FS GROUND FLOOR FOOTPRINT

1128.50FS GROUND FLOOR FOOTPRINT

1118.00FS BASEMENT FOOTPRINT

1106.50FS BASEMENT FOOTPRINT

1131.80 FF

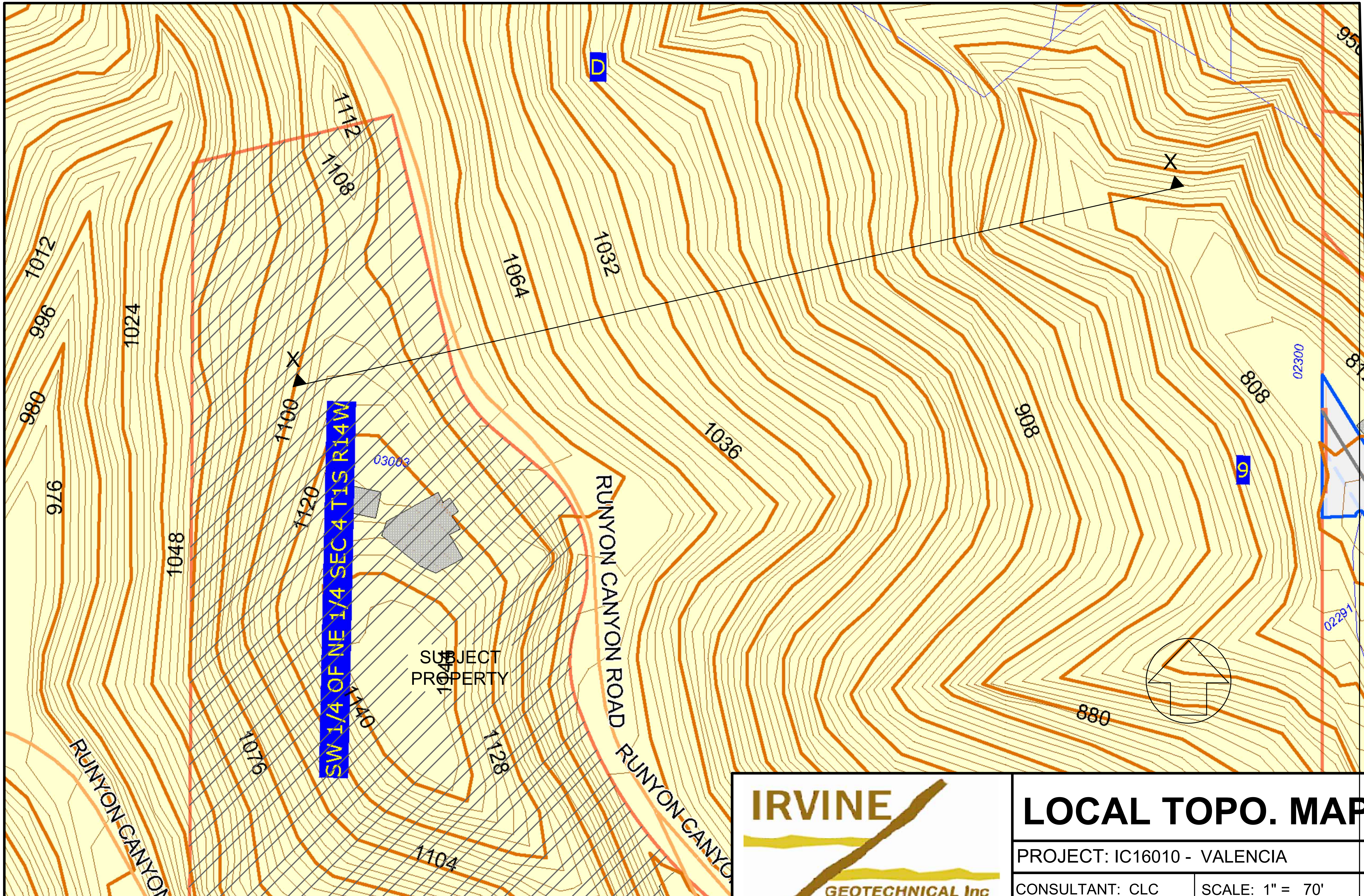
1123.29 FF

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)



IRVINE GEOTECHNICAL Inc

LOCAL TOPO. MAP

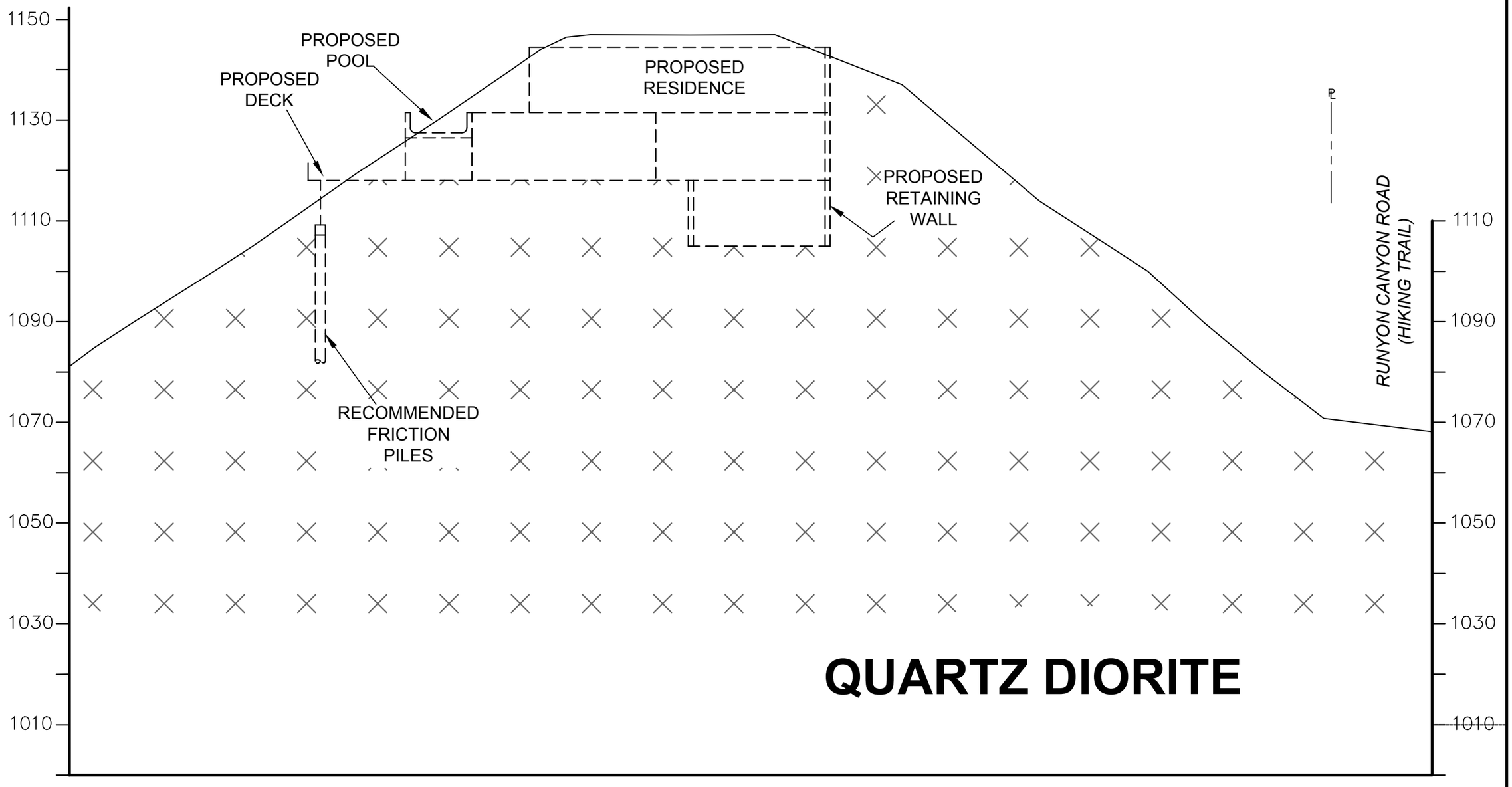
PROJECT: IC16010 - VALENCIA	
CONSULTANT: CLC	SCALE: 1" = 70'

IRVINE GEOTECHNICAL Inc

SECTION A - A

PROJECT: IC16010 - VALENCIA

CONSULTANT: CLC | SCALE: 1" = 20'

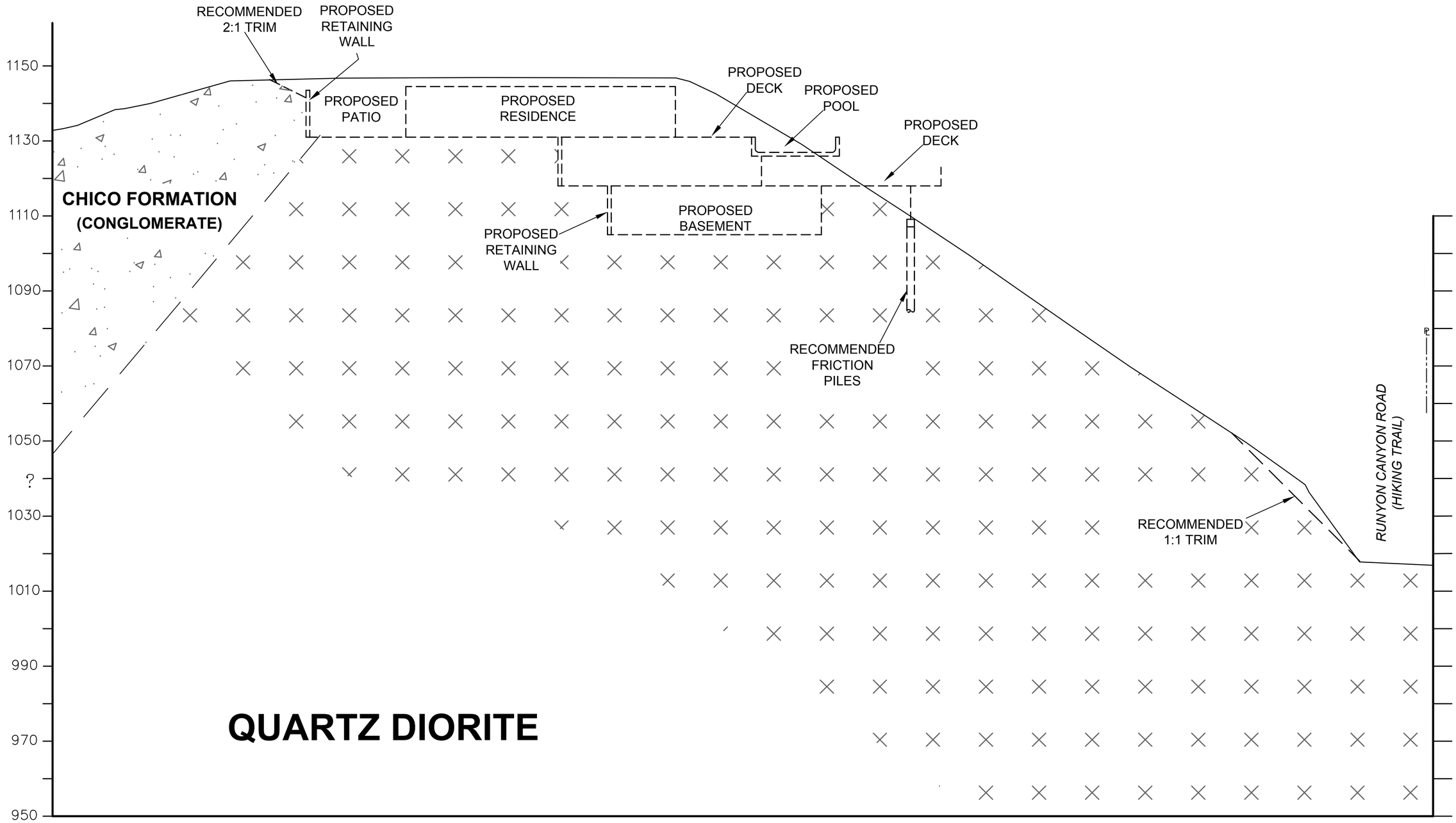


IRVINE GEOTECHNICAL Inc

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'