American Geotechnical, Inc.
GEOTECHNICAL/CIVIL ENGINEERING, TESTING & INSPECTION

April 2, 2021 File No. 33348-08

The Cove at El Niguel
c/o Laguna Niguel Properties, Inc.
27422 Portola Parkway, Suite 300
Foothill Ranch, CA 92610

Attention: Ms. Deborah Hon
Mr. Brian Diaz / Recupero and Associates, Inc.

Subject: **RESPONSE TO CITY OF LAGUNA NIGUEL GEOTECHNICAL REVIEW SHEET DATED FEBRUARY 15, 2021 AND NOTICE OF INCOMPLETENESS DATED FEBRUARY 23, 2021**
Tentative Tract No. 17721
The Cove at El Niguel
30667 Crown Valley Parkway
Laguna Niguel, California

References: **NOTICE OF INCOMPLETENESS FOR SITE DEVELOPMENT PERMIT SP 16-04 AND TENTATIVE TRACT MAP 17721 (30667 CROWN VALLEY PARKWAY – THE COVE AT EL NIGUEL)**
By: Community Development Department, City of Laguna Niguel
Dated: February 23, 2021

GEOTECHNICAL REVIEW SHEET
By: GMU Geotechnical, Inc.
Dated: February 15, 2021

GEOTECHNICAL REVIEW OF TENTATIVE TRACT MAP
By: American Geotechnical, Inc. (File No. 33348-08)
Dated: January 8, 2021

Dear Ms. Hon:

We have reviewed the City of Laguna Niguel's Geotechnical Review Sheet dated February 15, 2021 as well as the City's Notice of Incompleteness dated February 23, 2021 regarding the geotechnical review of our January 8, 2021 report entitled, "Geotechnical Review of Tentative Tract Map, Tentative Tract No. 17721, The Cove at El Niguel, 30667 Crown Valley Parkway, Laguna Niguel, California." Our report was reviewed by the City's geotechnical reviewer, GMU Geotechnical, Inc. (GMU). A copy of the February 15, 2021, City of Laguna Niguel Geotechnical Review Sheet and City's Notice of Incompleteness dated February 23, 2021 are attached in **Appendix A**. We have prepared the corresponding response report presented herein to answer the City reviewer's comments. The comments listed in the City's February 15, 2021 Geotechnical Review Sheet are repeated herein in *italic* font for reference followed by our responses.

COMMENT NO. 1

Confirm that all of the recommendations of the geotechnical report conform to the current 2019 California Building Code, or provide revised or additional recommendations, as necessary.

RESPONSE TO COMMENT NO. 1

Acknowledged. It is confirmed that all of the recommendations of the geotechnical report conform to the current 2019 California Building Code.

COMMENT NO. 2

The report states that stability calculations were performed for the temporary backcut that will be required to create the toe-of-slope MSE wall; however, the calculations and a summary of the results were not provided. Please provide.

RESPONSE TO COMMENT NO. 2

Temporary cuts in compacted clayey fill like that at the site have demonstrated very good temporary stability provided cuts are not surcharged. We propose that these temporary slopes be excavated no steeper than 1:1 (horizontal:vertical). Any specific proposal by a contractor for a steeper excavation should be subject to specific evaluation. Nonetheless, a temporary backcut stability analysis was performed on Cross-Section J-J' to evaluate the temporary backcut condition for construction of the proposed MSE wall up to a maximum of 15.5 feet in height. A minimum 23-foot wide key and 1:1 (horizontal:vertical) backcut slope was analyzed. For short-term temporary back cut excavation stability analysis, a cohesion of 300 pounds per square (psf) and 30 degrees of friction angle were used for fill material. These values were selected for use in the temporary backcut stability analysis to account for partially saturated conditions during temporary backcut excavation. These values, based on experience, are viewed as greatly conservative. Commonly, friction values of about 45 to 70 degrees are applicable to the low confining pressure ranges applicable to back-cut analyses.

Results of our temporary backcut stability analysis on Cross-Section J-J' revealed the factors-of-safety being 1.611 which is greater than the minimum required factor-of-safety of 1.25. Results of our temporary backcut stability analysis is presented in **Appendix B**.

COMMENT NO. 3

Since the currently planned grading will now include the partial removal of the toe and keyway of the lower buttress, provide both static and seismic stability calculations for failure planes that extend from the new

toe of the slope, below the MSE wall and through the slope above. Both circular and block type failure planes should be searched for Sections DR-DR' and J-J'.

RESPONSE TO COMMENT NO. 3

We performed both static and seismic stability calculations for Section DR-DR' with a circular type failure plane search that extends from the new toe of the slope, below the MSE wall, and through the slope above. Results of our stability analyses were presented in our January 8, 2021 report. For static (long-term) and short-term (seismic) conditions, calculated factors-of-safety are 2.308 and 1.264, respectively.

Per the City's geotechnical review comments, we performed a supplemental stability analysis using block failure search extending from the new toe of the slope, below the MSE wall, and through the slope above. Results of our stability analysis using the block failure search for Section DR-DR' revealed that factors-of-safety under static (long-term) and pseudostatic/seismic (short-term) conditions are 1.823 and 1.267, respectively. Both values are exceeding the minimum required factors-of-safety of 1.5 and 1.1, respectively. Additionally, per the City's geotechnical review comments, we performed supplemental stability analyses for Section J-J' using both circular and block failure searches below the MSE wall and through the slope above. Results of our stability analyses revealed that the factors-of-safety under static (long-term) and pseudostatic/seismic (short-term) conditions are 2.203 and 1.601, respectively. Both values exceed the minimum required factors-of-safety of 1.5 and 1.1, respectively. Results of our supplemental stability analyses discussed above are included in **Appendix B**.

Summary of the results of supplemental long-term (gross), short-term (pseudo-static/seismic), and temporary backcut stability analyses discussed in the responses to Comments No. 2 and 3 are presented in the following table.

CROSS-SECTION	STATIC/ PSEUDO-STATIC	G.W.	SEARCH METHOD	STRENGTH PARAMETER	FACTOR-OF-SAFETY
DR-DR'	Long-term (Gross-Static)	Yes	Circular	Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 13º (Along Bedding) C = 0, Ø = 30º (Across Bedding) Bedrock: C = 0, Ø = 30°	2.308
DR-DR'	Short-term (Seismic)	Yes	Circular	Fill: Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 17.33º (Along Bedding)	1.264

				C = 0, Ø = 40º (Across Bedding) Bedrock: C = 0, Ø = 30°	
DR-DR’	Long-term (Gross-Static)	Yes	Block	Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 13º (Along Bedding) C = 0, Ø = 30º (Across Bedding) Bedrock: C = 0, Ø = 30°	1.823
DR-DR’	Short-term (Seismic)	Yes	Block	Fill: Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 17.33º (Along Bedding) C = 0, Ø = 40º (Across Bedding) Bedrock: C = 0, Ø = 30°	1.267
J-J’	Long-term (Gross-Static)	Yes	Circular	Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 13º (Along Bedding) C = 0, Ø = 30º (Across Bedding) Bedrock: C = 0, Ø = 30°	2.203
J-J’	Short-term (Seismic)	Yes	Circular	Fill: Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 17.33º (Along Bedding) C = 0, Ø = 40º (Across Bedding) Bedrock: C = 0, Ø = 30°	1.601
J-J’	Long-term (Gross-Static)	Yes	Block	Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 13º (Along Bedding) C = 0, Ø = 30º (Across Bedding) Bedrock: C = 0, Ø = 30°	1.951
J-J’	Short-term (Seismic)	Yes	Block	Fill: Fill: C = 0, Ø = 30° Landslide Debris: C = 0, Ø = 17.33º (Along Bedding) C = 0, Ø = 40º (Across Bedding) Bedrock: C = 0, Ø = 30°	1.482
J-J’	Temporary Backcut	Yes	Circular	Fill: C = 300 psf, Ø = 30º Bedrock: C = 0, Ø = 30º	1.611

It is our opinion that the shear strength parameters for fill material used in our slope stability analyses for global static loading conditions, the MSE wall calculations, the surficial slope stability calculations, and the short-term stability of the temporary excavations presented in our January 8, 2021 report and in this response report are either reasonable and/or significantly conservative from a geotechnical engineering standpoint as discussed herein. Soil strength, unlike concrete and steel, varies significantly with environmental and long-term loading conditions. For global static, long-term loading conditions, conservative values of zero cohesion and 30 degrees of friction angles were used for fill material in the stability analyses. For the MSE wall calculations, the same conservative values of shear strength parameters were used for fill material (i.e., zero cohesion and 30 degrees of friction angle). For surficial slope stability calculations, reasonable values of 250 psf cohesion and 28 degrees of friction angle were used for fill material to calculate fully saturated seepage conditions to a depth of up to 5 feet below the ground surface. Given the typical, very short-term transient loading of heavy rainfall, these values (i.e., 250 psf cohesion and 28 degrees of friction angle), in our opinion, are suitable and well representative values for typical fill soil material at the project and vicinity areas as well as in the southern Orange County areas such as Laguna Niguel. For a short-term temporary back cut excavation stability analysis, a 300 cohesion and 30 degrees of friction angle were used for fill material in the stability analyses to account for partially saturated conditions of fill soil.

In summary, results of all of stability analyses with conservative and reasonable shear strength parameters for fill material discussed above show that the calculated factors-of-safety for all conditions analyzed are all well above the minimum required factors of safety. As such, we believe that utilizing these shear strength parameters for fill material in our slope stability analyses are reasonable and/or conservative and have basis from geotechnical engineering standpoint.

COMMENT NO. 4

For the anticipated differential settlement amount provided on Page 33 of the report, please provide in the form of maximum anticipated settlement over a specific horizontal distance.

RESPONSE TO COMMENT NO. 4

As discussed on Page 33 of the referenced report dated January 8, 2021, no significant adverse settlement or subsidence is anticipated. The effect of differential settlement above the contact between bedrock and alluvium at the site is also considered negligible. Since most project fill will have been in place for more than a decade prior to building homes, and considering the fill is expansive, settlement will be of little concern compared to that of expansive soil influences and slope creep. As such, it is our opinion that the

maximum total settlement is anticipated to be less than 1-inch within a 40-foot span and a total maximum differential settlement is anticipated to be 1/2-inch (i.e., one-half of total settlement).

COMMENT NO. 5

The report provides inclinometer data for three installations within the property, with readings taken in December 2020. Based on the plots, it appears that on-going movement is occurring to some degree in all three installations. Please provide more discussion on the data, including:

a. *AG-27 shows movement in the upper 30 feet that appears to be continuing, and may be increasing in rate. It is not clear from the cross-sections provided what geologic materials exist at this inclinometer (the inclinometer is projected onto sections that show differing depths of fill). Please provide the log of the boring for this inclinometer. Please also discuss the causal mechanism for this creep, and how it may impact the proposed development, including the MSE wall and adjacent residential units. Will there be any future impact as a result of this on-going movement?*
b. *AG-31 shows on-going movement at about 57 feet that has not decreased in rate. The consultant's letter dated October 23, 2013 attributed this movement to the landslide mass "coming to equilibrium and corresponding, mobilization of capacity within the buttress mass." The current report attributes this movement to "casing anomaly", which does not appear to be correct. It appears that the landslide mass is continuing to move. Please discuss this on-going movement, and any potential impacts to the proposed development. Will there be any future impact to the proposed development as a result of this on-going movement?*

RESPONSE TO COMMENT NO. 5

We agree with the City's reviewer's comment that on-going movement is occurring to some degree in all three inclinometer locations; however, the rate of movement is relatively minor and consistent with slope creep behavior. All soil slopes can be expected to creep. Creep is not necessarily an indicator of instability. Clay fill slopes such as those at the site can be expected to creep more than slopes composed of non-plastic soil. The slopes at the project site are behaving like most clayey fill slopes throughout Southern California.

It should be noted that the Via Estroil Landslide (also known as Niguel Summit Landslide) was repaired between 1998 and early 2000. Right after the landslide repair was completed, supplemental borings were drilled to install inclinometers at various locations to monitor the slope movement and performance of the fill buttress. The inclinometers AGI-26 and AGI-27 were installed in March of 2000 for that purpose. As such, the borings for AGI-26 and AGI-27 were not logged, and no soil samples were collected during the

drilling and inclinometer installations. The initial base readings for inclinometers AGI-26 and AGI-27 were taken on March 27, 2000. Subsequent readings were taken on a regular basis, about 3- to 6-month intervals. However, due to expected settlement of deep fill buttress and casing seating anomalies created during installation combined with minor instrument drift, the inclinometer plots for AGI-26 and AGI-27 for readings taken prior to March 28, 2001 clearly show what is commonly known as depth position error (DPE) as a result of settlement and/or cable stretching errors. Accordingly, the readings taken on March 28, 2001 was chosen as a new base reading. Subsequent readings were taken periodically until the last reading taken on December 15, 2020 for about 20 years of the monitoring period. Inclinometer AGI-31 was installed a year later in 2002 and the base reading for inclinometer AGI-31 was taken on May 2, 2002. A brief boring log was prepared for inclinometer AGI-31 and is included in **Appendix C**. Subsequent inclinometer readings were taken periodically at inclinometer AGI-31 for about 19 years of the monitoring period. The slope inclinometer plots for AGI-26, AGI-27, and AGI-31 previously presented in our January 8, 2021 report are repeated herein and are presented in **Appendix D** for easy reference. More detailed discussions of the soil movement behavior shown in the inclinometer plots at AGI-26, AGI-27, and AGI-31 locations are presented below.

Inclinometer AGI-26

As discussed in our January 8, 2021 report, our inclinometer data analyses for inclinometer AGI-26 revealed that maximum apparent cumulative displacement at AGI-26 is about 0.81 inches at a depth of 4 feet for over a period of circa 20 years (19.7 years). There is no distinctive movement detected at depths in incremental displacement at the AGI-26 plot location. The behavior is completely consistent with well-integrated creep plus limited drying in the upper about 6 feet. The rate of movement over the past 20 years of the monitoring period at the AGI-26 location is about 0.041 inches per year at a depth of 4 feet. Such a low rate of movement, in our opinion, is attributed to insignificant creep over the monitoring period.

Inclinometer AGI-27

Our inclinometer data analyses for inclinometer AGI-27 revealed that maximum apparent cumulative displacement at the AGI-27 location is about 2.11 inches at a depth of 2 feet over circa 20 years of the monitoring period or at a rate of about 0.11 inches per year. The behavior of this inclinometer is also consistent with well-integrated, expected creep. Maximum cumulative displacement at the AGI-27 location occurred between the 2016 and 2020 readings, about 1.18 inch at a depth of 2 feet or at a rate of about 0.29 inches per year. The depth of movement is shown at a depth of about 30 feet below the ground surface (bgs) from incremental displacement plot. Although the rate of movement of 0.29 inches per year measured from the 2016 to 2020 readings increases when compared to the overall rate of movement of

0.11 inches per year for the entire almost 20 years of the monitoring period, these low rates of movement are consistent with the rate of creep movement typically seen for the southern California slopes. It appears that the rates of movement, either 0.11 inches or 0.29 inches per year, all reflect a typical creep movement of the highly expansive 1979 fill. The undersigned and American Geotechnical have conducted many projects associated with slope creep influence in southern California including Laguna Niguel. Our experience indicated that for a typical southern California slope, rate of movement in response to slope creep is generally on the order of about 0.1 to 0.3 inches per years. The rate of movement at the inclinometer AGI-27 location is within the typical range of creep movement in southern California.

Inclinometer AGI-31

Our inclinometer data analyses for inclinometer AGI-31 revealed that maximum apparent cumulative displacement at the AGI-31 location is about 0.85 inches over a depth of about 15 feet below ground surface (bgs) or at a rate of 0.045 inches per year in the direction of the positive A-axis with a trend of S48E. Maximum apparent cumulative displacement at depth of 57 feet bgs is about 0.59 inches over roughly 19 years or at a rate of about 0.03 inches per year. Minor movement at a depth of about 57 feet bgs is visible in both the positive A and B directions in the incremental displacement plot. Maximum incremental displacement is about 0.365 inches over roughly 19 years in the positive A direction and 0.1 inches in the positive B direction. Incremental displacement at a depth of 57 feet bgs has shown uniformly increase of rate of movement over roughly 19 years (18.6 years) since the baseline reading taken on May 2, 2002.

Our review of the boring log for inclinometer AGI-31 revealed that there is about 60 feet of fill soil consisting of olive green/olive brown, slightly moist to moist, firm Silty CLAY underlain by FORMATION consisting of light brown, very moist, soft to firm Silty CLAY. Water at a depth of 52 feet bgs was noted after 30 minutes of drilling and seepage was observed at a depth of 60 feet bgs.

A ”blinders-on-view” of the inclinometer AGI-31 behavior at depth of about 57 feet did catch our attention as well as the reviewer’s attention. Closer examination reveals circumstances/conditions that put that initial concern to rest for the following reasons:

1- The offset is in fill (at depth of about 57 feet), not in bedrock (bedrock contact is at depth of 60 feet).
2- The rate of movement is essentially linear but incredibly slow (i.e., 0.03 inches per year).
3- The observation is occurring where the inclinometer casing is buckling (see B-axis behavior in cumulative displacement plot).

4- No nearby inclinometers (i.e., AGI-26 and AGI-27) have similar behavior which indicated that passive resistance is locally still being mobilized in the fill downslope from AGI-31. Because the movement is so incredibly slow, about 0.03 inches per year, it can take decades to fully develop the available passive resistance. Calculations; however, clearly show adequate factors-of-safety.

As such, based on the small magnitude of cumulative and incremental displacements, the relatively uniformity of incremental displacement over the past 18.6 years of the monitoring period, the general shape of the displacement plots at the AGI-31 location, review of the boring log for AGI-31, as well as our inclinometer data analysis discussed above, it is our opinion that the movement at a depth of 57 feet bgs at AGI-31 location is primarily related to long-term creep movement associated with the soil mass coming to equilibrium and corresponding, mobilization of passive resistance capacity within the fill buttress mass. In addition, based on the nearly linear but incredibly slow rate of movement measured over the past roughly 19 years of the monitoring period, we estimate that another 1 inch of soil movement at a depth of 57 feet bgs can be expected to occur in a similar, incredibly slow rate of movement in the next 20 years as the fill buttress mass mobilizes its strength over time to reach full capacity of passive resistance within fill buttress mass. It should be noted that we don't rule out the possibility that the movement at a depth of 57 feet bgs could be real; however, the magnitude of the total movement is very small and consistent with very slow creep movement which can be expected in any hillside area consisting of clayey earth materials, particularly in southern California area as discussed earlier.

At a creep rate of only about 0.03 (at depth of 57 feet) to 0.045 (at near surface) inches per year at the AGI-31 location, no unusual behavior is indicated. Similar at-depth creep movement was not observed in any of the further downslope inclinometers (i.e., AGI-26 and AGI-27 locations) as discussed earlier. In other words, it is our opinion that the fill buttress constructed during the Via Estroil (Niguel Summit) Landslide is performing rather well.

Conclusion

In summary, based on our inclinometer data analyses discussed above, it is our opinion that no significant movement would be anticipated to occur during the construction life and only typical slope creep influence would continue over time. It is also our opinion that such a small and consistently slow rate of movement detected over the past roughly 20 years of the monitoring period at inclinometers AGI-26, AGI-27, and AGI-31 locations would continue with a similar, consistently slow rate of creep movement in the future until the passive resistance capacity of the fill buttress mass is fully mobilized. Thereafter only well integrated normal near-surface creep can be expected. This is the same, typical creep occurring in larger fill slopes

throughout South Orange County, California. Additionally, it is anticipated that such a slow rate of on-going creep movement would have no impact to the proposed redevelopment, including MSE walls, retaining walls, and other site improvements at the subject property as well as the nearby neighboring properties to the west, south and north. We recommend that the three inclinometers, AGI-26, AGI-27, and AGI-31, within the subject property be monitored annually or at least bi-annually during the construction and after the site redevelopment to evaluate the future performance of the fill buttress and rate of movement. Our recommendations with regard to the slope creep influence for the proposed site redevelopment have been presented in the referenced January 8, 2021 report.

We appreciate the opportunity to be of service. Should you have any questions regarding the information provided herein, please do not hesitate to contact this office. When additional plans become available, they should be forwarded to this office for review and comment.

Respectfully Submitted,

AMERICAN GEOTECHNICAL, INC.

Fei-chiu (Jerry) Huang, Ph.D.
Principal Engineer
G.E. 2601

Gregory W. Axten
President/CEO
G.E. 103

Douglas S. Santo
Chief Engineering Geologist
C.E.G. 1866

Enclosures: Appendix A – City of Laguna Niguel Geotechnical Review Sheet & Notice of Incompleteness
Appendix B – Supplemental Slope Stability Analyses
Appendix C – Boring Log (AGI-31)
Appendix D – Slope Inclinometer Plots (AGI-26, AGI-27, and AGI-31)

Distribution: 5 – Addressee (Regular Mail and Email: Deborah.hon@hondev.com)
Mr. Brian Diaz (Email: bdiaz@recupero.net)

APPENDIX A

CITY OF LAGUNA NIGUEL GEOTECHNICAL REVIEW SHEET DATED FEBRUARY 15, 2021 & CITY OF LAGUNA NIGUEL NOTICE OF INCOMPLETENESS DATED FEBRUARY 23, 2021

CITY OF LAGUNA NIGUEL

30111 Crown Valley Parkway
Laguna Niguel, California 92677
Phone (949) 362-4300 | Fax (949) 362-4340

GEOTECHNICAL REVIEW SHEET

Reviewed by:

GMU GEOTECHNICAL, INC.
23241 Arroyo Vista
Rancho Santa Margarita, CA 92688
(949) 888-6513 · Fax: (949) 888-1380 · email: info@gmugeo.com

REFERENCE NO.: SP16-04 DATE: February 15, 2021

PROJECT DESCRIPTION: The Cove at El Niguel (multi-family residential development)

LOCATION: 30667 Crown Valley Parkway

DEVELOPER/OWNER: Laguna Niguel Properties, Inc.

GEOTECHNICAL FIRM: American Geotechnical, Inc.

THEIR JOB NO.: 33348-08

GEOTECHNICAL ENGINEER: Fei-chiu Huang (GE 2601) and Gregory Axten (GE 103)

ENGINEERING GEOLOGIST: Douglas Santo (CEG 1866)

DOCUMENTS REVIEWED: (1) Geotechnical Review of Tentative Tract Map, Tenatative Tract No. 17721, The Cove at El Niguel, 30667 Crown Valley Parkway, Laguna *Niguel, California,* prepared by American Geotechnical, Inc,. dated January 8, 2021; (2) Tentative Tract Map No. 17721, The Cove at El Niguel, 30667 Crown Valley Parkway, Laguna Niguel, prepared by Hunsaker & Associates Irvine, Inc., dated January 21, 2021.

REVIEW TYPE: **Planning Level Only**

ACTION:

- [ ] RECOMMENDED APPROVAL OF DOCUMENT(S) SUBMITTED
- [ ] CONDITIONAL APPROVAL OF DOCUMENT(S) SUBMITTED
- [x] REQUEST ADDITIONAL DATA FOR REVIEW – ***See COMMENTS.***

Please send responses directly to the City of Laguna Niguel, Building Department.
GMU Geotechnical can only accept responses forwarded from the City.

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REFERENCE NO.: SP16-04 DATE: February 15, 2021

COMMENTS

1. Confirm that all of the recommendations of the geotechnical report conform to the current 2019 California Building Code, or provide revised or additional recommendations, as necessary.

2. The report states that stability calculations were performed for the temporary backcut that will be required to create the toe-of-slope MSE wall; however, the calculations and a summary of the results were not provided. Please provide.

3. Since the currently planned grading will now include the partial removal of the toe and keyway of the lower buttress, provide both static and seismic stability calculations for failure planes that extend from the new toe of the slope, below the MSE wall and through the slope above. Both circular and block type failure planes should be searched for Sections DR-DR' and J-J'.

4. For the anticipated differential settlement amount provided on Page 33 of the report, please provide in the form of maximum anticipated settlement over a specific horizontal distance.

5. The report provides inclinometer data for three installations within the property, with readings taken in December 2020. Based on the plots, it appears that on-going movement is occurring to some degree in all three installations. Please provide more discussion on the data, including:
    a. AG-27 shows movement in the upper 30 feet that appears to be continuing, and may be increasing in rate. It is not clear from the cross-sections provided what geologic materials exist at this inclinometer (the inclinometer is projected onto sections that show differing depths of fill). Please provide the log of the boring for this inclinometer. Please also discuss the causal mechanism for this creep, and how it may impact the proposed development, including the MSE wall and adjacent residential units. Will there be any future impact as a result of this on-going movement?
    b. AG-31 shows on-going movement at about 57 feet that has not decreased in rate. The consultant's letter dated October 23, 2013 attributed this movement to the landslide mass "coming to equilibrium and corresponding, mobilization of capacity within the buttress mass." The current report attributes this movement to "casing anomaly", which does not appear to be correct. It appears that the landslide mass is continuing to move. Please discuss this on-going movement, and any potential impacts to the proposed development. Will there be any future impact to the proposed development as a result of this on-going movement?

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REFERENCE NO.: SP16-04 DATE: February 15, 2021

The following items will be Conditions of Approval for this Planning permit:

6. Prior to issuance of the grading/construction permit, the consultant should review the precise grading plans, retaining wall plans and calculations, and MSE wall plans and calculations, and prepare a grading plan review letter/report with additional or revised recommendations, as necessary. If any major changes are made to the proposed grading, provide revised or additional slope stability calculations, as necessary.

7. In Section 8.24, the tentative tract map report states that cut/fill transitions and lot capping are not expected, and the need for lot capping should be further evaluated during grading. However, all of the geotechnical sections show a 5-foot over-excavation across all of the building areas. Please clarify the need for over-excavation as part of the precise grading plan review letter/report.

8. Page 40 of the report recommends annual geotechnical/geologic monitoring of slopes, pavements, and common area improvements. This recommendation shall be added to the Homeowners' Association maintenance guidelines.

REVIEWED BY:

Lisa Bates, PG, CEG 2293
Associate Geologist

David Hansen, M.Sc., PE, GE 3056
Associate Geotechnical Engineer

DISTRIBUTION: Erica Roess, City of Laguna Niguel (email)

CITY of LAGUNA NIGUEL
Community Development Department
30111 Crown Valley Parkway / Laguna Niguel, California, 92677
Phone / 949-362-4300 Fax / 949-362-4369

February 23, 2021

Mr. Mike Recupero
Recupero and Associates, Inc.
31877 Del Obispo Street, Suite 204
San Juan Capistrano, CA 92675

Subject: **Notice of Incompleteness for Site Development Permit SP 16-04 and Tentative Tract Map 17721 (30667 Crown Valley Parkway – The Cove at El Niguel)**

Dear Mr. Recupero,

Thank you for the January 25, 2021 application re-submittal for a Site Development Permit to construct 22 dwelling units, and a Tentative Map application requesting to subdivide a parcel into two lots. After review of your re-submittal and in conformance with Government Code Section 65943, this is notification that your application is considered incomplete at this time. Staff has the following issues of concern and/or the following additional items or revisions are necessary to fully facilitate the analysis of the proposal.

Project Description Letter

1. Please provide an updated (from October 2020) Project Description letter. Please consider this letter to be your opportunity to talk directly to the public and decision-makers (as an attachment in a staff report); therefore, please provide a more descriptive letter stating why the project should be supported.

2. As indicated in your January 25, 2021 Response to Comments matrix, alternate development standards are being requested for:

   - Structure height,
   - Active recreation area, and
   - Wall height.

   Additionally, the project plans submitted in the January 25, 2021 resubmittal appear to indicate the following alternate development standards are also being requested:

   - Common open space area (LNMC 9-1-33.1 – Table 3.2),
   - Minimum perimeter setbacks (LNMC 9-1-33.1 – Table 3.2),
   - Parking (removal of proposed spaces #1 and #2 – Comment #42 below) (LNMC 9-1-63), and
   - Signage – aggregate 40 sf (LNMC 9-1-73 – Table 7-2).

   Please review the applicable code sections. If the intention is to not request an alternate development standard, please revise plans accordingly. If it is intended, please add an explanation similar to what you provided in the Response to Comments matrix.

Lastly, per the Community Design Guidelines, please provide an explanation of the proposal in the context of the following design guidelines:

- Circulation system to be user friendly (LNMC 9-1-93.2 (a.3)),
- Setbacks and streetscape variation (LNMC 9-1-93.2 (b.2)), and
- Sidewalk requirements (LNMC 9-1-93.2 (d.2)).

Geotechnical Report (*Attachment 1* - GMU Comment Letter)

3. Please confirm that all of the recommendations of the geotechnical report conform to the current 2019 California Building Code, or provide revised or additional recommendations, as necessary.

4. The report states that stability calculations were performed for the temporary backcut that will be required to create the toe-of-slope MSE wall; however, the calculations and a summary of the results were not provided. Please provide.

5. Since the currently planned grading will now include the partial removal of the toe and keyway of the lower buttress, provide both static and seismic stability calculations for failure planes that extend from the new toe of the slope, below the MSE wall and through the slope above. Both circular and block type failure planes should be searched for Sections DR-DR' and J-J'.

6. For the anticipated differential settlement amount provided on Page 33 of the report, please provide in the form of maximum anticipated settlement over a specific horizontal distance.

7. The report provides inclinometer data for three installations within the property, with readings taken in December 2020. Based on the plots, it appears that on-going movement is occurring to some degree in all three installations. Please provide more discussion on the data, including:

    a. AG-27 shows movement in the upper 30 feet that appears to be continuing and may be increasing in rate. It is not clear from the cross-sections provided what geologic materials exist at this inclinometer (the inclinometer is projected onto sections that show differing depths of fill). Please provide the log of the boring for this inclinometer. Please also discuss the causal mechanism for this creep, and how it may impact the proposed development, including the MSE wall and adjacent residential units. Will there be any future impact as a result of this on-going movement?

    b. AG-31 shows on-going movement at about 57 feet that has not decreased in rate. The consultant's letter dated October 23, 2013 attributed this movement to the landslide mass "coming to equilibrium and corresponding, mobilization of capacity within the buttress mass." The current report attributes this movement to "casing anomaly," which does not appear to be correct. It appears that the landslide mass is continuing to move. Please discuss this on-going movement, and any potential impacts to the proposed development. Will there be any future impact to the proposed development as a result of this on-going movement?

Hydrology (*Attachment 2* - GMU Comment Letter)

8. Please review Hydrology letter that accompanied submittal from October 2016 (*Attachment 3*). The majority of comments from the 2016 review were not addressed, specifically: 3a, 4a, 4b, 4e, 5a, 5b, 5c, 6c, 7b, 7d, and 8d. With the next submittal, include a response letter stating how each of the previous comments and new comments have been addressed or why you can prove (with supporting information) they do not need to be addressed.

9. Add project information, professional stamp and signature to title sheet.

10. In Section C:

    a. Provide information to support your statement, remove statement or provide information to demonstrate relevance.

    b. Can design flows from upstream area be verified using Orange County Hydrology?

11. In Section D, statements were made that 100-year discharges were determined using Orange Rational Method and then also using Los Angeles County Flood Control District guidelines. Orange County Hydrology Manual should be basis for all design flows.

12. In Section E, confirm / validate Q10 flows taken from 1986 and 1979 plans have not been affected by changes upstream since these plans were approved.

13. Key information in the calculations should be highlighted/underlined/boxed so that it clearly stands out for reviewing with information in the report.

14. Organizing output to summarize results will expedite review process.

15. Several pipelines have velocity beyond industry acceptable criteria. How are these high velocity pipelines being protected against the high velocities? Provide manufacturers specifications and cut sheets for pipelines with high velocities and include in report to verify velocities are within manufacturers specifications for pipes.

16. In Section 4, reference the use of LACFCD for flow conversion. Must use Orange County Hydrology Manual.

17. As identified in *Attachment 4*, please revise per redlined comments.

Water Quality Management Plan (WQMP) (*Attachment 2* - GMU Comment Letter)

18. With next submittal, include a response letter stating how each of the previous comments from the October 2016 review *(Attachment 3)* and new comments have been addressed or why you can prove (with supporting information) they do not need to be addressed. Report format has been revised (copy of previous report was not included with submittal).

19. Add project information, professional stamp and signature to title sheet.

20. Add permit/application number, sign and date, Engineer to sign, date and stamp Project Owners Certificate.

21. In Section 3, Table 3-1, address slight discrepancy with table in Section 2.1 for pervious area.

22. In the Conceptual WQMP Plan / Site Plan/Attachment D, it is not clear how drainage from the project entrance area is being treated before conveying drainage directly to Crown Valley Parkway; and how the drainage ditch behind homes conveys runoff to the wetlands systems.

23. In Section 6.1/Attachment F, summarize analysis. Attachment F is a collection of printouts with no apparent organization or discussion.

24. Geotechnical Report/Attachment G – no report is included. Add report if relevant or remove from report.

25. As identified in *Attachment 5*, please revise per redlined comments.

Traffic Assessment

26. Staff sent a request for proposals to three traffic consultants to do a peer review of the LLG traffic study. Staff selected a consultant on February 23, 2021; and is currently in the process of executing the contract. Once the contract is executed, staff will request that the consultant do the peer review and comments may be forthcoming.

27. The traffic assessment mentioned construction parking at City Hall on page 11. Please take out of study and consider alternative construction parking areas.

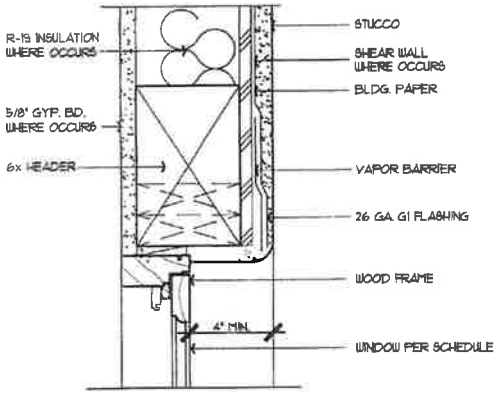
Building Elevations

28. Please replace the sand stucco finish with a smooth trowel stucco finish. Additionally, minimal expansion joints should be used focused more in the corners. If control joints are necessary, they should be filled with a paintable cocking to be blended in with the final coat of paint for the stucco areas.

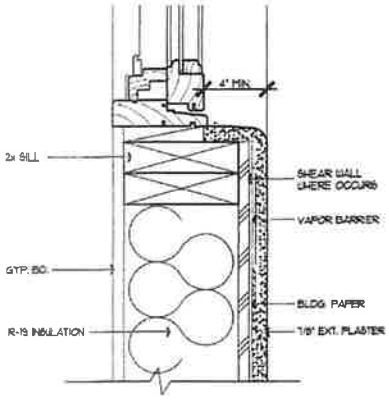
29. Please label the color of the vinyl windows and consider using a color other than white.

30. Please provide a detail in the plans identifying proposed insets for all doors and windows. For example, windows with a 4-inch recess and doors with 6-inch recess. A sample detail is provided below.

Window Head/Jamb



Windowsill



Landscape Concept Plan

31. According to 9-1-93.3(c) (Residential Landscaping – Use of Nonresidential Landscaping Guidelines), project frontage, entry, boundary/interior, and pedestrian area landscaping, and coordination of landscaping an utilities, shall follow the nonresidential landscaping guidelines contained in Section 9-1-92.3. Therefore, please identify that the minimum tree/shrub size, percentage, and placement are being met pursuant to LNMC 9-1-92.3(j) (Nonresidential Landscaping – Planting sizes and densities).

32. Pursuant to 9-1-93.3 (b.1), please add the following note to Landscape Concept Plan: "Trees planted within fifteen (15) feet of walls or pavement shall be installed with deep root barriers."

33. Please add note to plan stating that: "Any existing hardscape or landscaping damaged during construction to be replaced to the satisfaction of the City of Laguna Niguel."

34. Please add note to plan stating that "Owner shall be responsible for all landscape maintenance and debris maintenance of the R.O.W. This shall include trimming of trees and along in the R.O.W., trimming of shrubs in and along the R.O.W., control of irrigation run-off, erosion control, etc., throughout the life of the project."

Signage Plan

35. Per LNMC 9-1-71.3 (b) (Corner Cutoff Setback), in order to preserve sight lines for safety purposes, free-standing signs shall not be located within a corner cutoff area for fences as identified in Section 9-1-35.2. Please overlay this corner cutoff area in the two locations where the monument signs are proposed and move the signs if they fall within the area.

36. Are the signs proposed to be illuminated?

37. According to LNMC 9-1-71.7, all free-standing signs shall include landscaping and/or hardscaping around the base of the sign, at a minimum ratio of two (2) square feet for every square foot of sign area, so as to protect the sign from vehicles, improve the appearance of the installation, and screen light fixtures and other appurtenances.

    Please identify amount of landscaping being provided at base of signs.

Lighting Concept Plan

38. Pursuant to LNMC 9-1-35.15 (g), the lighting needs to be at least 1.0 footcandle in the guest parking areas. Please revise the plan to show a minimum of 1.0 footcandle in each one of the guest parking areas.

39. As identified in *Attachment 6* from Orange County Sherriff's Department (OCSD), the lighting in the common areas should be illuminated to at least 1 footcandle at ground level. Lighting for the active recreation areas should be illuminated to at least 0.6 footcandle, maintained along the length of the trail/walkways. The average-to-minimum uniformity ratio should not be greater than 4:1.

Tentative Tract Map

40. Tentative Tract Map 17721 Sheet TTM-1, please add note to plan stating that: "Owner shall be responsible for all landscape maintenance and debris maintenance of the R.O.W. This shall include trimming of trees and along in the R.O.W., trimming of shrubs in and along the R.O.W., control of irrigation run-off, erosion control, etc., throughout the life of the project."

Tentative Tract Map – Site Plan

41. Tentative Tract Map 17721 Site Plan Sheet SP-1, please add note to plan stating that: "Owner shall be responsible for all landscape maintenance and debris maintenance of the R.O.W. This shall include trimming of trees and along in the R.O.W., trimming of shrubs in and along the R.O.W., control of irrigation run-off, erosion control, etc., throughout the life of the project."

42. Please remove proposed parking spaces #1 and #2, update parking counts, and driveway width accordingly. For example, one of two cars which are parked adjacent to that egress potentially can be in conflict with someone else deeper in the development as they are both trying to get out. Additionally, drivers will inevitably make u-turns before the elbow into the main driveway to grab one of those two spots creating a bottleneck.

Tentative Tract Map - Open Space Exhibit

43. Please identify existing trees on site and label which will be maintained, and which will be removed.

44. Please add note to plan stating that: "Owner shall be responsible for all landscape maintenance and debris maintenance of the R.O.W. This shall include trimming of trees and along in the R.O.W., trimming of shrubs in and along the R.O.W., control of irrigation run-off, erosion control, etc., throughout the life of the project."

Tentative Tract Map – Grading Plan

45. Please add note to plan stating that: "Owner shall be responsible for all landscape maintenance and debris maintenance of the R.O.W. This shall include trimming of trees and along in the R.O.W., trimming of shrubs in and along the R.O.W., control of irrigation run-off, erosion control, etc., throughout the life of the project."

Architectural Site Plan

46. Please provide an architectural site plan. Per the "Discretionary Permit Filing Instructions," please include the following required components:

    - Footprint/layout of all building and structures.
    - Fully dimensioned property lines.
    - Walls and/or fences, including height and material.
    - Outdoor lighting fixtures.
    - Location, dimensions, and nature of easements.
    - Building setbacks to all property lines (setbacks to roof overhang/projection also to be identified).
    - Path of travel from public way and handicap parking stalls to primary entrance(s).
    - Freestanding signage.
    - On-site parking and circulation facilities, including dimensions for stalls, aisles, curb cuts, driveways.
    - Utility equipment and structures, including fire protection devices, and method of screening.
    - North arrow and scale.
    - Tabular legend with the following information:
        - Applicable development standards and the project's compliance / non-compliance (can label "Alternative Development Standard" request) with each requirement.
        - Property zoning designation.
        - Address, legal description, and lot area.
        - Square footage of proposed structures
        - Parking summary, number of spaces provided and required.

It is acknowledged that many of these details are included in the Landscape Plan, Signage Plan, Tentative Tract Map Site Plan, and Utility Plan; however, there should be one comprehensive Architectural Site Plan that can be considered by decision-makers.

Additional Comments

47. Please provide a Response to Comments and updated plan-set per OCFA's November 19, 2020 comment letter (provided to Applicant team November 30, 2020) *(Attachment 7)*. Planning staff will route to OCFA staff once received.

48. Please revise project plans per Planning staff's redlined comments (*Attachment 8*).

49. Please provide materials board when plan is approved by OCFA. In particular, staff would like to review / potentially comment on the proposed "slump stone veneer."

50. Please include overall page numbers to the plan-set so the pages can be more easily referenced during a public hearing.

51. Please provide "will serve" documentation from all necessary utility service providers that they can adequately provide services to the proposed parcel.

52. Please note that noticing materials will be required prior to being scheduled for a public hearing. Details of the requirement materials can be found in the Discretionary Permit Application.

As a part of your resubmittal, please provide the following: 1) one electronic copy of the project plans (email PDF, USB, or upload on Trakit), 2) items requested above, and 3) a written response following the same numeric format of this notice stating how the issues have or will be addressed. After receiving your resubmittal, the application will be reevaluated for completeness and you will be notified of your application's status. Should you have any questions, please contact me by phone at (949) 362-4067 or by email at eroess@cityoflagunaniguel.org

Sincerely,

COMMUNITY DEVELOPMENT DEPARTMENT

Erica Roess

Erica Roess
Senior Planner

Enclosures
cc: file
John Morgan, Development Services Manager

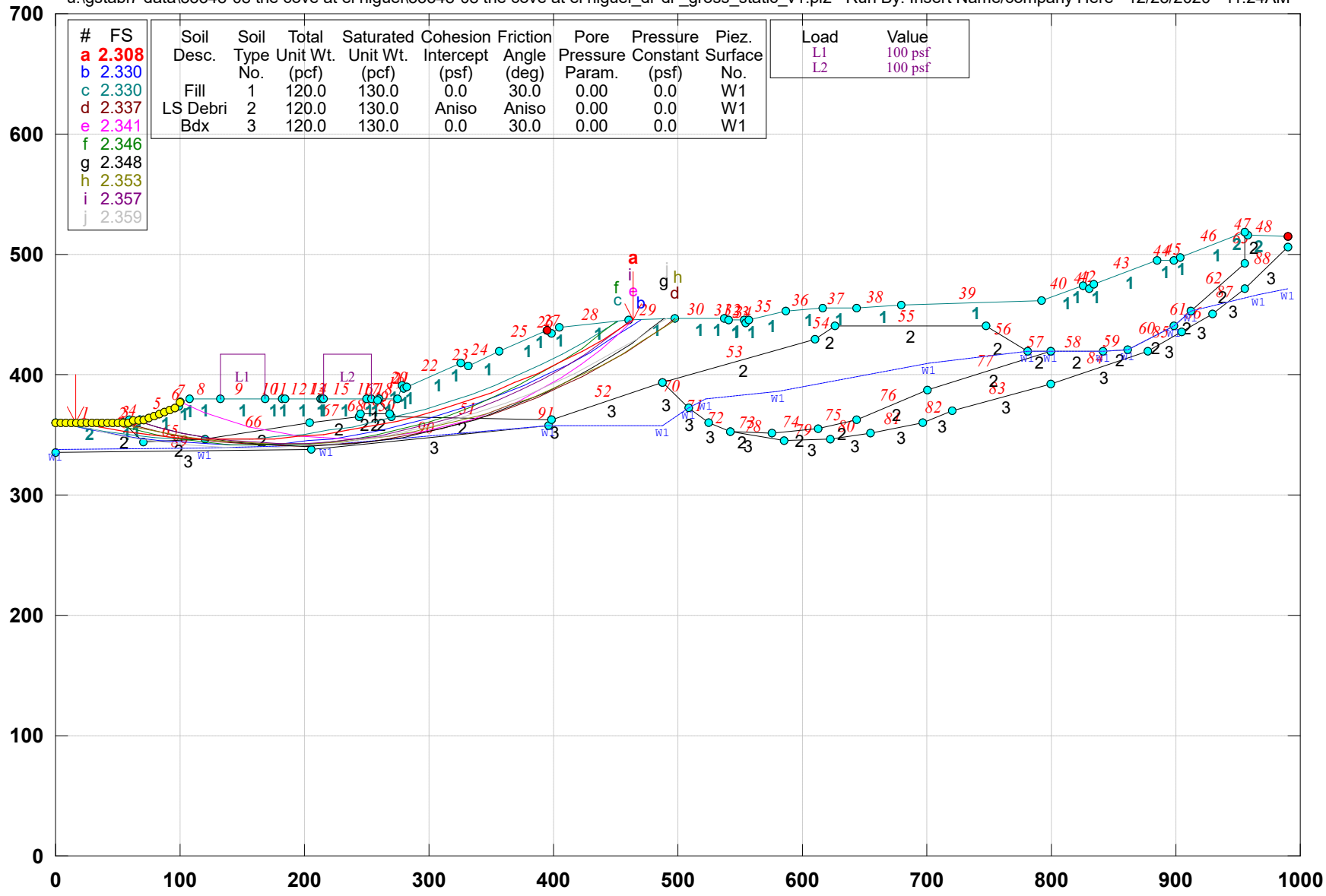
Attachment 1: GMU Consulting Geotechnical Comments dated February 15, 2021
Attachment 2: GMU Consulting Hydrology/WQMP Comments dated February 15, 2021
Attachment 3: JT Yean Hydrology Comments dated October 10, 2016
Attachment 4: Redlines - GMU Consulting Hydrology Comments dated February 15, 2021
Attachment 5: Redlines - GMU Consulting WQMP Comments dated February 15, 2021
Attachment 6: OCSD comments dated February 2, 2021
Attachment 7: OCFA comments dated November 19, 2020
Attachment 8: Redlines – Planning staff February 22, 2021

APPENDIX B

SUPPLEMENTAL SLOPE STABILITY ANALYSES

33348-08 The Cove at El Niguel Section DR-DR'_Gross_Static

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_v1.pl2 Run By: Insert Name/company Here 12/23/2020 11:24AM



GSTABL7 v.2 FSmin=2.308

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 12/23/2020
Time of Run: 11:24AM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_v1.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_v1.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_v1.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section DR-DR'_Gross_Static

BOUNDARY COORDINATES

48 Top Boundaries
91 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	360.00	55.00	360.00	2
2	55.00	360.00	59.00	360.00	1
3	59.00	360.00	59.01	362.00	1
4	59.01	362.00	70.00	362.00	1
5	70.00	362.00	99.00	373.50	1
6	99.00	373.50	100.00	377.00	1
7	100.00	377.00	108.00	379.95	1
8	108.00	379.95	132.00	379.95	1
9	132.00	379.95	168.00	379.95	1
10	168.00	379.95	182.00	379.95	1
11	182.00	379.95	184.00	379.50	1
12	184.00	379.50	213.00	379.50	1
13	213.00	379.50	214.00	380.19	1
14	214.00	380.19	215.00	380.19	1
15	215.00	380.19	250.00	380.19	1
16	250.00	380.19	254.00	380.19	1
17	254.00	380.19	260.00	380.19	1
18	260.00	380.19	275.00	380.19	1
19	275.00	380.19	278.00	390.44	1
20	278.00	390.44	280.00	389.00	1
21	280.00	389.00	282.00	390.00	1

22	282.00	390.00	326.00	410.00	1
23	326.00	410.00	332.00	407.00	1
24	332.00	407.00	357.00	420.00	1
25	357.00	420.00	395.00	437.00	1
26	395.00	437.00	399.00	434.00	1
27	399.00	434.00	405.00	439.00	1
28	405.00	439.00	460.00	445.00	1
29	460.00	445.00	498.00	447.00	1
30	498.00	447.00	537.00	447.00	1
31	537.00	447.00	541.00	445.00	1
32	541.00	445.00	553.00	446.00	1
33	553.00	446.00	555.00	443.00	1
34	555.00	443.00	557.00	446.00	1
35	557.00	446.00	586.00	453.00	1
36	586.00	453.00	616.00	456.00	1
37	616.00	456.00	644.00	456.00	1
38	644.00	456.00	680.00	458.00	1
39	680.00	458.00	792.00	462.00	1
40	792.00	462.00	825.00	474.00	1
41	825.00	474.00	830.00	471.00	1
42	830.00	471.00	834.00	475.00	1
43	834.00	475.00	885.00	495.00	1
44	885.00	495.00	899.00	495.00	1
45	899.00	495.00	903.00	498.00	1
46	903.00	498.00	955.00	519.00	1
47	955.00	519.00	958.00	516.00	2
48	958.00	516.00	990.00	515.00	2
49	259.00	379.00	268.00	368.00	1
50	268.00	368.00	270.00	365.00	2
51	270.00	365.00	398.00	363.00	2
52	398.00	363.00	488.00	394.00	3
53	488.00	394.00	610.00	430.00	2
54	610.00	430.00	626.00	440.00	2
55	626.00	440.00	748.00	440.00	2
56	748.00	440.00	781.00	420.00	2
57	781.00	420.00	800.00	420.00	2
58	800.00	420.00	841.00	419.00	2
59	841.00	419.00	861.00	421.00	2
60	861.00	421.00	898.00	440.00	2
61	898.00	440.00	912.00	453.00	2
62	912.00	453.00	954.99	493.00	2
63	954.99	493.00	955.00	519.00	2
64	55.00	360.00	70.00	344.00	2
65	70.00	344.00	120.00	346.00	2
66	120.00	346.00	204.00	360.00	2
67	204.00	360.00	244.00	365.00	2
68	244.00	365.00	245.00	368.00	2
69	245.00	368.00	268.00	368.00	2
70	488.00	394.00	508.00	372.00	3
71	508.00	372.00	525.00	360.00	3
72	525.00	360.00	542.00	353.00	3
73	542.00	353.00	576.00	352.00	2
74	576.00	352.00	613.00	355.00	2
75	613.00	355.00	644.00	362.00	2
76	644.00	362.00	700.00	387.00	2
77	700.00	387.00	800.00	420.00	2
78	542.00	353.00	585.00	345.00	3
79	585.00	345.00	622.00	347.00	3
80	622.00	347.00	655.00	351.00	3
81	655.00	351.00	697.00	360.00	3
82	697.00	360.00	720.00	370.00	3
83	720.00	370.00	800.00	392.00	3
84	800.00	392.00	877.00	420.00	3
85	877.00	420.00	905.00	435.00	3
86	905.00	435.00	929.00	450.00	3
87	929.00	450.00	955.00	471.00	3
88	955.00	471.00	990.00	506.00	3
89	0.00	335.00	205.00	338.00	3
90	205.00	338.00	396.00	358.00	3
91	396.00	358.00	398.00	363.00	3

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	30.0	0.00	0.0	1
2	120.0	130.0	0.0	13.0	0.00	0.0	1
3	120.0	130.0	0.0	30.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	0.0	0.00	30.00
2	30.0	0.00	13.00
3	90.0	0.00	30.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 17 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	338.00
2	120.00	339.00
3	218.00	342.00
4	396.00	358.00

5	488.00	358.00
6	508.00	372.00
7	522.00	380.00
8	580.00	386.00
9	702.00	409.00
10	781.00	420.00
11	800.00	420.00
12	841.00	419.00
13	861.00	421.00
14	898.00	440.00
15	912.00	453.00
16	966.00	466.00
17	990.00	471.00

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	132.00	168.00	100.0	0.0
2	215.00	254.00	100.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

1

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

2000 Trial Surfaces Have Been Generated.

80 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 100.00(ft)

Each Surface Terminates Between X = 395.00(ft)
and X = 990.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)

20.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 2000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 275

Number of Trial Surfaces with Misleading FS = 105

Number of Trial Surfaces With Valid FS = 1620

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 19.0 %

Statistical Data On All Valid FS Values:
FS Max = 6.521 FS Min = 2.308 FS Ave = 3.459
Standard Deviation = 0.418 Coefficient of Variation = 12.10 %

((Modified Bishop FS for Critical Surface = 2.275))

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.667	360.000
2	36.250	355.941
3	55.965	352.571
4	75.784	349.894
5	95.686	347.912
6	115.645	346.630
7	135.636	346.047
8	155.636	346.165
9	175.619	346.984
10	195.562	348.502
11	215.438	350.718
12	235.225	353.629
13	254.898	357.232
14	274.433	361.521
15	293.805	366.493
16	312.991	372.140
17	331.968	378.456
18	350.711	385.433
19	369.199	393.062
20	387.408	401.335
21	405.316	410.240
22	422.901	419.767
23	440.142	429.905
24	457.016	440.640
25	463.646	445.192

Circle Center At X = 142.268 ; Y = 916.756 ; and Radius = 570.748

*** FOS = 2.308 Theta (ki=1.0) = 10.05 ***
Lambda = 0.177

Individual data on the 61 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	19.6	4769.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	18.7	12737.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	1.0	850.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.0	2780.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.0	10.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	3.8	4634.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.2	9321.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.8	8928.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	19.9	46180.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	3.3	9956.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	1.0	3309.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.0	29853.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	7.6	30342.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	6.9	27760.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	9.4	38102.0	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.6	14771.2	0.0	0.0	0.	0.	0.0	0.0	363.6
17	20.0	81224.5	0.0	0.0	0.	0.	0.0	0.0	2000.0
18	12.4	49750.2	0.0	0.0	0.	0.	0.0	0.0	1236.4
19	7.6	30284.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	6.4	25055.8	0.0	0.0	0.	0.	0.0	0.0	0.0
21	2.0	7723.1	0.0	0.0	0.	0.	0.0	0.0	0.0
22	11.6	43617.1	0.0	0.0	0.	0.	0.0	0.0	0.0
23	8.4	30912.6	0.0	0.0	0.	0.	0.0	0.0	0.0
24	9.0	31920.0	0.0	0.0	0.	0.	0.0	0.0	0.0
25	1.0	3521.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	1.0	3549.2	0.0	0.0	0.	0.	0.0	0.0	0.0
27	0.4	1551.9	0.0	0.0	0.	0.	0.0	0.0	43.8
28	19.8	66523.2	0.0	0.0	0.	0.	0.0	0.0	1978.7
29	8.8	27121.2	0.0	0.0	0.	0.	0.0	0.0	877.5
30	1.0	2983.5	0.0	0.0	0.	0.	0.0	0.0	100.0
31	5.0	14587.8	0.0	0.0	0.	0.	0.0	0.0	500.0
32	4.0	11274.7	0.0	0.0	0.	0.	0.0	0.0	400.0
33	0.9	2483.6	0.0	0.0	0.	0.	0.0	0.0	0.0
34	4.1	11078.5	0.0	0.0	0.	0.	0.0	0.0	0.0
35	1.0	2633.7	0.0	0.0	0.	0.	0.0	0.0	0.0
36	8.0	20121.1	0.0	0.0	0.	0.	0.0	0.0	0.0
37	2.0	4766.8	0.0	0.0	0.	0.	0.0	0.0	0.0
38	4.4	10189.4	0.0	0.0	0.	0.	0.0	0.0	0.0
39	0.6	1265.6	0.0	0.0	0.	0.	0.0	0.0	0.0
40	3.0	8374.7	0.0	0.0	0.	0.	0.0	0.0	0.0
41	2.0	6486.4	0.0	0.0	0.	0.	0.0	0.0	0.0
42	2.0	6310.4	0.0	0.0	0.	0.	0.0	0.0	0.0
43	5.0	16070.9	0.0	0.0	0.	0.	0.0	0.0	0.0
44	6.8	23176.0	0.0	0.0	0.	0.	0.0	0.0	0.0
45	19.2	70014.0	0.0	0.0	0.	0.	0.0	0.0	0.0
46	13.0	51106.4	0.0	0.0	0.	0.	0.0	0.0	0.0
47	6.0	22232.7	0.0	0.0	0.	0.	0.0	0.0	0.0
48	0.0	110.2	0.0	0.0	0.	0.	0.0	0.0	0.0
49	18.7	67169.4	0.0	0.0	0.	0.	0.0	0.0	0.0
50	6.3	23872.2	0.0	0.0	0.	0.	0.0	0.0	0.0
51	12.2	47113.5	0.0	0.0	0.	0.	0.0	0.0	0.0
52	18.2	70648.5	0.0	0.0	0.	0.	0.0	0.0	0.0
53	7.6	29225.3	0.0	0.0	0.	0.	0.0	0.0	0.0
54	4.0	14109.9	0.0	0.0	0.	0.	0.0	0.0	0.0
55	6.0	20094.6	0.0	0.0	0.	0.	0.0	0.0	0.0
56	0.3	1094.7	0.0	0.0	0.	0.	0.0	0.0	0.0
57	17.6	52734.4	0.0	0.0	0.	0.	0.0	0.0	0.0
58	17.2	35289.1	0.0	0.0	0.	0.	0.0	0.0	0.0
59	16.9	17175.4	0.0	0.0	0.	0.	0.0	0.0	0.0
60	3.0	1136.2	0.0	0.0	0.	0.	0.0	0.0	0.0
61	3.6	505.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	4.167	360.000
2	23.604	355.289
3	43.197	351.276
4	62.921	347.964
5	82.751	345.359
6	102.661	343.463
7	122.626	342.280
8	142.620	341.810
9	162.619	342.054
10	182.596	343.012
11	202.526	344.683
12	222.383	347.064
13	242.144	350.152
14	261.781	353.944
15	281.270	358.435
16	300.587	363.619
17	319.706	369.489
18	338.603	376.037
19	357.255	383.257
20	375.637	391.137
21	393.726	399.669
22	411.498	408.842
23	428.932	418.643
24	446.005	429.060
25	462.695	440.080
26	470.363	445.545

Circle Center At X = 145.764 ; Y = 901.425 ; and Radius = 559.634

*** FOS = 2.330 Theta (ki=1.0) = 9.63 ***
Lambda = 0.170

1

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.000	360.000
2	19.601	356.027
3	39.326	352.722
4	59.152	350.089
5	79.056	348.132
6	99.015	346.853
7	119.006	346.253
8	139.006	346.332
9	158.992	347.092
10	178.940	348.530
11	198.828	350.645
12	218.632	353.435
13	238.330	356.897
14	257.900	361.026
15	277.317	365.818
16	296.560	371.267
17	315.607	377.368
18	334.436	384.112
19	353.025	391.492
20	371.352	399.499
21	389.396	408.125

22	407.136	417.359
23	424.553	427.191
24	441.625	437.610
25	451.439	444.066

Circle Center At X = 126.665 ; Y = 934.534 ; and Radius = 588.331

*** FOS = 2.330 Theta (ki=1.0) = 10.04 ***
Lambda = 0.177

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	54.167	360.000
2	73.503	354.889
3	93.028	350.560
4	112.712	347.018
5	132.523	344.271
6	152.428	342.321
7	172.395	341.173
8	192.392	340.828
9	212.386	341.287
10	232.346	342.549
11	252.240	344.613
12	272.034	347.473
13	291.698	351.127
14	311.198	355.568
15	330.505	360.789
16	349.586	366.781
17	368.411	373.536
18	386.949	381.041
19	405.171	389.285
20	423.047	398.255
21	440.548	407.935
22	457.646	418.311
23	474.313	429.366
24	490.522	441.082
25	498.054	447.000

Circle Center At X = 190.971 ; Y = 838.467 ; and Radius = 497.641

*** FOS = 2.337 Theta (ki=1.0) = 9.19 ***
Lambda = 0.162

1

Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.000	377.000
2	118.376	369.105
3	137.212	362.381
4	156.433	356.856
5	175.964	352.551
6	195.728	349.483
7	215.645	347.664
8	235.637	347.102
9	255.625	347.799

10	275.529	349.752
11	295.271	352.953
12	314.773	357.390
13	333.957	363.044
14	352.747	369.895
15	371.069	377.914
16	388.850	387.070
17	406.020	397.326
18	422.511	408.642
19	438.258	420.973
20	453.197	434.270
21	464.033	445.212

Circle Center At X = 234.566 ; Y = 664.861 ; and Radius = 317.761

*** FOS = 2.341 Theta (ki=1.0) = 8.82 ***
Lambda = 0.155

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	41.667	360.000
2	60.921	354.589
3	80.403	350.068
4	100.072	346.447
5	119.888	343.733
6	139.806	341.932
7	159.787	341.049
8	179.787	341.084
9	199.764	342.038
10	219.676	343.909
11	239.482	346.693
12	259.138	350.384
13	278.604	354.973
14	297.839	360.453
15	316.802	366.810
16	335.453	374.031
17	353.752	382.102
18	371.661	391.005
19	389.142	400.721
20	406.159	411.231
21	422.674	422.510
22	438.654	434.537
23	449.981	443.907

Circle Center At X = 169.018 ; Y = 776.177 ; and Radius = 435.226

*** FOS = 2.346 Theta (ki=1.0) = 9.96 ***
Lambda = 0.176

1

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.500	362.000
2	81.687	356.355
3	101.106	351.569

4	120.718	347.652
5	140.486	344.611
6	160.369	342.454
7	180.329	341.183
8	200.325	340.802
9	220.319	341.310
10	240.270	342.709
11	260.139	344.993
12	279.887	348.160
13	299.474	352.202
14	318.862	357.112
15	338.012	362.880
16	356.887	369.494
17	375.448	376.941
18	393.660	385.208
19	411.486	394.276
20	428.891	404.129
21	445.840	414.747
22	462.299	426.108
23	478.237	438.190
24	488.223	446.485

Circle Center At X = 198.865 ; Y = 789.711 ; and Radius = 448.923

*** FOS = 2.348 Theta (ki=1.0) = 9.19 ***
Lambda = 0.162

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	50.000	360.000
2	69.436	355.284
3	89.036	351.306
4	108.773	348.072
5	128.618	345.588
6	148.543	343.856
7	168.519	342.880
8	188.518	342.659
9	208.511	343.196
10	228.469	344.488
11	248.364	346.535
12	268.168	349.333
13	287.851	352.878
14	307.386	357.165
15	326.745	362.189
16	345.900	367.941
17	364.824	374.413
18	383.489	381.597
19	401.869	389.482
20	419.938	398.057
21	437.669	407.309
22	455.037	417.225
23	472.018	427.791
24	488.587	438.992
25	499.517	447.000

Circle Center At X = 184.339 ; Y = 871.190 ; and Radius = 528.547

*** FOS = 2.353 Theta (ki=1.0) = 9.31 ***
Lambda = 0.164

1

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.500	362.000
2	81.732	356.510
3	101.204	351.944
4	120.871	348.311
5	140.689	345.620
6	160.613	343.877
7	180.597	343.086
8	200.597	343.248
9	220.565	344.364
10	240.458	346.431
11	260.230	349.443
12	279.836	353.395
13	299.231	358.278
14	318.371	364.079
15	337.212	370.787
16	355.713	378.385
17	373.830	386.856
18	391.523	396.182
19	408.751	406.341
20	425.475	417.310
21	441.657	429.063
22	457.260	441.575
23	461.209	445.064

Circle Center At X = 187.190 ; Y = 762.392 ; and Radius = 419.358

*** FOS = 2.357 Theta (ki=1.0) = 9.69 ***
Lambda = 0.171

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	8.333	360.000
2	27.690	354.970
3	47.214	350.629
4	66.878	346.983
5	86.660	344.036
6	106.534	341.792
7	126.475	340.254
8	146.457	339.423
9	166.457	339.302
10	186.448	339.889
11	206.406	341.185
12	226.306	343.187
13	246.122	345.893
14	265.830	349.300
15	285.404	353.403
16	304.821	358.198
17	324.056	363.677
18	343.084	369.835
19	361.882	376.664
20	380.427	384.155
21	398.694	392.298
22	416.661	401.083
23	434.305	410.500
24	451.605	420.536

25	468.537	431.180
26	485.082	442.416
27	490.827	446.622

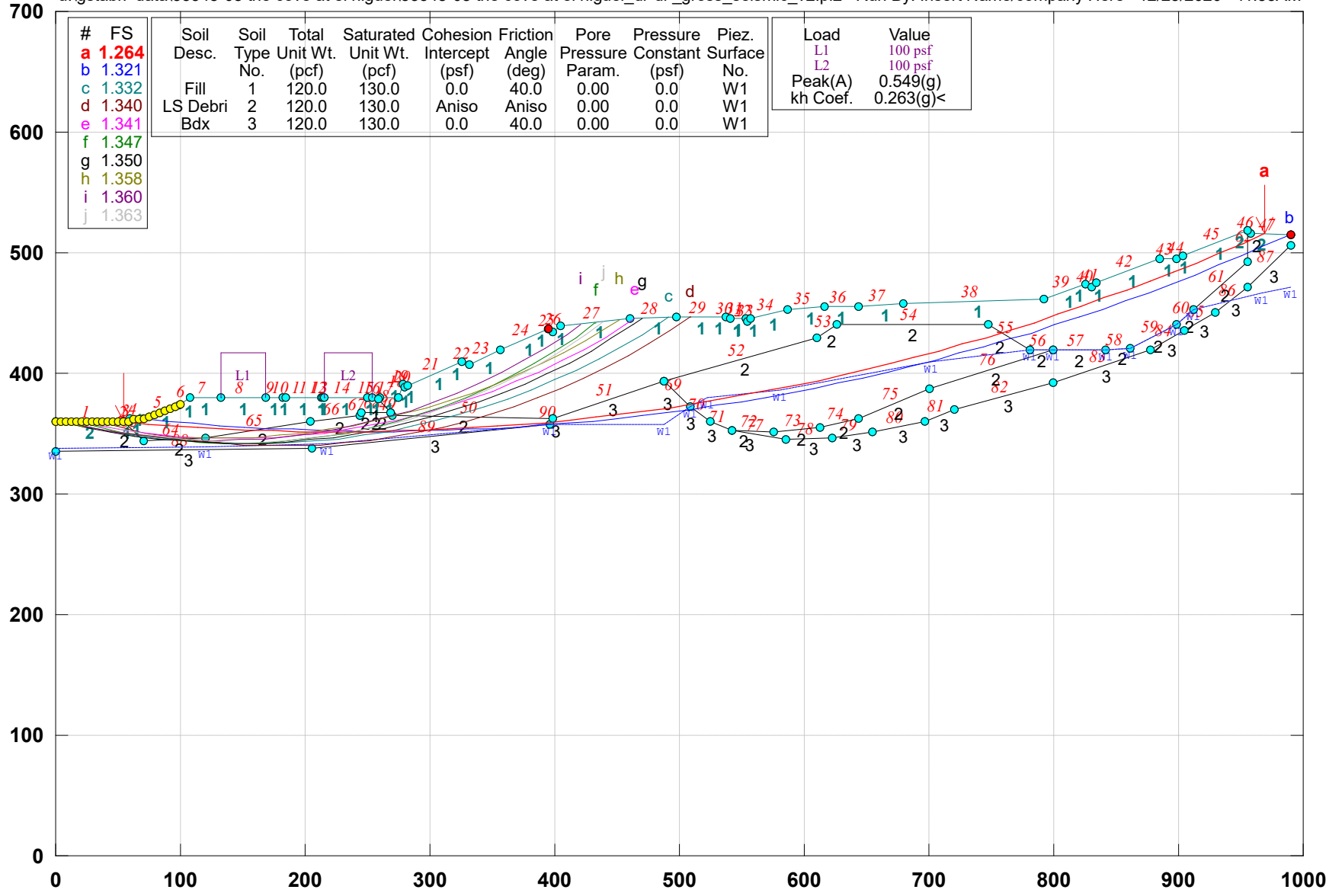
Circle Center At X = 159.886 ; Y = 903.440 ; and Radius = 564.177

*** FOS = 2.359 Theta (ki=1.0) = 9.36 ***
Lambda = 0.165

**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section DR-DR'_Gross_Seismic

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_v2.pl2 Run By: Insert Name/company Here 12/23/2020 11:53AM



GSTABL7 v.2 FSmin=1.264

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 12/23/2020
Time of Run: 11:53AM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_v2.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_v2.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_v2.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section DR-DR'_Gross_Seismic

BOUNDARY COORDINATES

47 Top Boundaries
90 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	360.00	55.00	360.00	2
2	55.00	360.00	59.00	360.00	1
3	59.00	360.00	59.01	362.00	1
4	59.01	362.00	70.00	362.00	1
5	70.00	362.00	99.00	373.50	1
6	99.00	373.50	108.00	379.95	1
7	108.00	379.95	132.00	379.95	1
8	132.00	379.95	168.00	379.95	1
9	168.00	379.95	182.00	379.95	1
10	182.00	379.95	184.00	379.50	1
11	184.00	379.50	213.00	379.50	1
12	213.00	379.50	214.00	380.19	1
13	214.00	380.19	215.00	380.19	1
14	215.00	380.19	250.00	380.19	1
15	250.00	380.19	254.00	380.19	1
16	254.00	380.19	260.00	380.19	1
17	260.00	380.19	275.00	380.19	1
18	275.00	380.19	278.00	390.44	1
19	278.00	390.44	280.00	389.00	1
20	280.00	389.00	282.00	390.00	1
21	282.00	390.00	326.00	410.00	1

22	326.00	410.00	332.00	407.00	1
23	332.00	407.00	357.00	420.00	1
24	357.00	420.00	395.00	437.00	1
25	395.00	437.00	399.00	434.00	1
26	399.00	434.00	405.00	439.00	1
27	405.00	439.00	460.00	445.00	1
28	460.00	445.00	498.00	447.00	1
29	498.00	447.00	537.00	447.00	1
30	537.00	447.00	541.00	445.00	1
31	541.00	445.00	553.00	446.00	1
32	553.00	446.00	555.00	443.00	1
33	555.00	443.00	557.00	446.00	1
34	557.00	446.00	586.00	453.00	1
35	586.00	453.00	616.00	456.00	1
36	616.00	456.00	644.00	456.00	1
37	644.00	456.00	680.00	458.00	1
38	680.00	458.00	792.00	462.00	1
39	792.00	462.00	825.00	474.00	1
40	825.00	474.00	830.00	471.00	1
41	830.00	471.00	834.00	475.00	1
42	834.00	475.00	885.00	495.00	1
43	885.00	495.00	899.00	495.00	1
44	899.00	495.00	903.00	498.00	1
45	903.00	498.00	955.00	519.00	1
46	955.00	519.00	958.00	516.00	2
47	958.00	516.00	990.00	515.00	2
48	259.00	379.00	268.00	368.00	1
49	268.00	368.00	270.00	365.00	2
50	270.00	365.00	398.00	363.00	2
51	398.00	363.00	488.00	394.00	3
52	488.00	394.00	610.00	430.00	2
53	610.00	430.00	626.00	440.00	2
54	626.00	440.00	748.00	440.00	2
55	748.00	440.00	781.00	420.00	2
56	781.00	420.00	800.00	420.00	2
57	800.00	420.00	841.00	419.00	2
58	841.00	419.00	861.00	421.00	2
59	861.00	421.00	898.00	440.00	2
60	898.00	440.00	912.00	453.00	2
61	912.00	453.00	954.99	493.00	2
62	954.99	493.00	955.00	519.00	2
63	55.00	360.00	70.00	344.00	2
64	70.00	344.00	120.00	346.00	2
65	120.00	346.00	204.00	360.00	2
66	204.00	360.00	244.00	365.00	2
67	244.00	365.00	245.00	368.00	2
68	245.00	368.00	268.00	368.00	2
69	488.00	394.00	508.00	372.00	3
70	508.00	372.00	525.00	360.00	3
71	525.00	360.00	542.00	353.00	3
72	542.00	353.00	576.00	352.00	2
73	576.00	352.00	613.00	355.00	2
74	613.00	355.00	644.00	362.00	2
75	644.00	362.00	700.00	387.00	2
76	700.00	387.00	800.00	420.00	2
77	542.00	353.00	585.00	345.00	3
78	585.00	345.00	622.00	347.00	3
79	622.00	347.00	655.00	351.00	3
80	655.00	351.00	697.00	360.00	3
81	697.00	360.00	720.00	370.00	3
82	720.00	370.00	800.00	392.00	3
83	800.00	392.00	877.00	420.00	3
84	877.00	420.00	905.00	435.00	3
85	905.00	435.00	929.00	450.00	3
86	929.00	450.00	955.00	471.00	3
87	955.00	471.00	990.00	506.00	3
88	0.00	335.00	205.00	338.00	3
89	205.00	338.00	396.00	358.00	3
90	396.00	358.00	398.00	363.00	3

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	40.0	0.00	0.0	1
2	120.0	130.0	0.0	17.3	0.00	0.0	1
3	120.0	130.0	0.0	40.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	0.0	0.00	40.00
2	30.0	0.00	17.33
3	90.0	0.00	40.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 17 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	338.00
2	120.00	339.00
3	218.00	342.00
4	396.00	358.00
5	488.00	358.00

6	508.00	372.00
7	522.00	380.00
8	580.00	386.00
9	702.00	409.00
10	781.00	420.00
11	800.00	420.00
12	841.00	419.00
13	861.00	421.00
14	898.00	440.00
15	912.00	453.00
16	966.00	466.00
17	990.00	471.00

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	132.00	168.00	100.0	0.0
2	215.00	254.00	100.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.

Specified Peak Ground Acceleration Coefficient (A) = 0.549(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.263(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

2000 Trial Surfaces Have Been Generated.

80 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 100.00(ft)

Each Surface Terminates Between X = 395.00(ft)
and X = 990.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)

20.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 2000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 746

Number of Trial Surfaces with Misleading FS = 434

Number of Trial Surfaces With Valid FS = 820

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 59.0 %

Statistical Data On All Valid FS Values:
FS Max = 21.090 FS Min = 1.264 FS Ave = 1.831
Standard Deviation = 0.712 Coefficient of Variation = 38.88 %

((Modified Bishop FS for Critical Surface = 1.213))

Failure Surface Specified By 48 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	54.167	360.000
2	74.081	358.154
3	94.016	356.534
4	113.967	355.140
5	133.933	353.974
6	153.911	353.035
7	173.898	352.323
8	193.892	351.838
9	213.891	351.580
10	233.891	351.550
11	253.890	351.747
12	273.885	352.172
13	293.875	352.823
14	313.855	353.702
15	333.825	354.809
16	353.780	356.142
17	373.719	357.701
18	393.639	359.488
19	413.538	361.500
20	433.412	363.739
21	453.260	366.204
22	473.078	368.894
23	492.864	371.809
24	512.616	374.949
25	532.331	378.313
26	552.007	381.901
27	571.640	385.713
28	591.229	389.747

29	610.771	394.004
30	630.263	398.483
31	649.703	403.183
32	669.088	408.104
33	688.416	413.245
34	707.684	418.605
35	726.890	424.184
36	746.032	429.981
37	765.106	435.995
38	784.111	442.226
39	803.044	448.672
40	821.902	455.333
41	840.683	462.208
42	859.385	469.296
43	878.005	476.597
44	896.541	484.108
45	914.990	491.830
46	933.350	499.760
47	951.619	507.900
48	968.542	515.671

Circle Center At X = 226.549 ; Y = 2110.720 ; and Radius = 1759.186

*** FOS = 1.264 Theta (ki=1.0) = 7.04 ***
Lambda = 0.123

Individual data on the 113 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.8	3.9	0.0	0.0	0.	0.	1.0	0.0	0.0
2	0.1	0.8	0.0	0.0	0.	0.	0.2	0.0	0.0
3	3.9	125.3	0.0	0.0	0.	0.	33.0	0.0	0.0
4	0.0	1.7	0.0	0.0	0.	0.	0.5	0.0	0.0
5	11.0	3901.7	0.0	0.0	0.	0.	1026.2	0.0	0.0
6	4.1	2187.5	0.0	0.0	0.	0.	575.3	0.0	0.0
7	19.9	24465.1	0.0	0.0	0.	0.	6434.3	0.0	0.0
8	5.0	9661.2	0.0	0.0	0.	0.	2540.9	0.0	0.0
9	9.0	22522.0	0.0	0.0	0.	0.	5923.3	0.0	0.0
10	6.0	17615.4	0.0	0.0	0.	0.	4632.9	0.0	0.0
11	18.0	54827.0	0.0	0.0	0.	0.	14419.5	0.0	0.0
12	1.9	6012.1	0.0	0.0	0.	0.	1581.2	0.0	193.3
13	20.0	63399.5	0.0	0.0	0.	0.	16674.1	0.0	1997.8
14	6.8	22178.5	0.0	0.0	0.	0.	5832.9	0.0	683.6
15	7.3	23751.5	0.0	0.0	0.	0.	6246.6	0.0	725.3
16	5.9	19479.8	0.0	0.0	0.	0.	5123.2	0.0	0.0
17	8.1	26955.4	0.0	0.0	0.	0.	7089.3	0.0	0.0
18	2.0	6629.6	0.0	0.0	0.	0.	1743.6	0.0	0.0
19	9.9	32694.9	0.0	0.0	0.	0.	8598.8	0.0	0.0
20	10.1	33631.2	0.0	0.0	0.	0.	8845.0	0.0	0.0
21	9.0	30078.5	0.0	0.0	0.	0.	7910.6	0.0	0.0
22	0.9	3016.2	0.0	0.0	0.	0.	793.3	0.0	0.0
23	0.1	375.0	0.0	0.0	0.	0.	98.6	0.0	0.0
24	1.0	3433.3	0.0	0.0	0.	0.	903.0	0.0	0.0
25	18.9	64891.1	0.0	0.0	0.	0.	17066.4	0.0	1889.1
26	10.1	34683.5	0.0	0.0	0.	0.	9121.8	0.0	1010.9
27	1.0	3424.3	0.0	0.0	0.	0.	900.6	0.0	100.0
28	5.0	17103.5	0.0	0.0	0.	0.	4498.2	0.0	500.0
29	3.9	13284.9	0.0	0.0	0.	0.	3493.9	0.0	389.0
30	0.1	376.6	0.0	0.0	0.	0.	99.1	0.0	11.0
31	5.0	17032.5	0.0	0.0	0.	0.	4479.5	0.0	0.0
32	1.0	3398.9	0.0	0.0	0.	0.	893.9	0.0	0.0
33	8.0	27099.1	0.0	0.0	0.	0.	7127.1	0.0	0.0

34	2.0	6749.3	0.0	0.0	0.	0.	1775.1	0.0	0.0
35	3.9	13081.8	0.0	0.0	0.	0.	3440.5	0.0	0.0
36	1.1	3746.0	0.0	0.0	0.	0.	985.2	0.0	0.0
37	3.0	11900.9	0.0	0.0	0.	0.	3129.9	0.0	0.0
38	2.0	8971.6	0.0	0.0	0.	0.	2359.5	0.0	0.0
39	2.0	8903.1	0.0	0.0	0.	0.	2341.5	0.0	0.0
40	11.9	57095.8	0.0	0.0	0.	0.	15016.2	0.0	0.0
41	20.0	111913.2	0.0	0.0	0.	0.	29433.2	0.0	0.0
42	12.1	77534.0	0.0	0.0	0.	0.	20391.4	0.0	0.0
43	6.0	38850.3	0.0	0.0	0.	0.	10217.6	0.0	0.0
44	1.8	11542.3	0.0	0.0	0.	0.	3035.6	0.0	0.0
45	20.0	138081.5	0.0	0.0	0.	0.	36315.4	0.0	0.0
46	3.2	24301.8	0.0	0.0	0.	0.	6391.4	0.0	0.0
47	16.7	133805.4	0.0	0.0	0.	0.	35190.8	0.0	0.0
48	19.9	175314.8	0.0	0.0	0.	0.	46107.8	0.0	0.0
49	1.4	12595.7	0.0	0.0	0.	0.	3312.7	0.0	0.0
50	1.7	15816.6	0.0	0.0	0.	0.	4159.8	0.0	0.0
51	1.3	11578.7	0.0	0.0	0.	0.	3045.2	0.0	0.0
52	1.0	8927.5	0.0	0.0	0.	0.	2347.9	0.0	0.0
53	6.0	54839.9	0.0	0.0	0.	0.	14422.9	0.0	0.0
54	8.5	80320.1	0.0	0.0	0.	0.	21124.2	0.0	0.0
55	19.9	186967.0	0.0	0.0	0.	0.	49172.3	0.0	0.0
56	19.8	186274.9	0.0	0.0	0.	0.	48990.3	0.0	0.0
57	6.7	63066.7	0.0	0.0	0.	0.	16586.5	0.0	0.0
58	13.1	121369.9	0.0	0.0	0.	0.	31920.3	0.0	0.0
59	14.9	136247.2	0.0	0.0	0.	0.	35833.0	0.0	0.0
60	4.9	43866.8	0.0	0.0	0.	0.	11537.0	0.0	0.0
61	5.1	46004.3	0.0	0.0	0.	0.	12099.1	0.0	0.0
62	8.2	72899.3	0.0	0.0	0.	0.	19172.5	0.0	0.0
63	6.4	55512.6	0.0	0.0	0.	0.	14599.8	0.0	0.0
64	0.8	6702.7	0.0	0.0	0.	0.	1762.8	0.0	0.0
65	8.6	73658.9	0.0	824.2	0.	0.	19372.3	0.0	0.0
66	10.3	86566.7	0.0	2018.4	0.	0.	22767.0	0.0	0.0
67	4.7	38362.4	0.0	757.5	0.	0.	10089.3	0.0	0.0
68	4.0	31994.7	0.0	562.6	0.	0.	8414.6	0.0	0.0
69	11.0	85452.3	0.0	1137.0	0.	0.	22474.0	0.0	0.0
70	1.0	7634.8	0.0	72.7	0.	0.	2007.9	0.0	0.0
71	2.0	14951.2	0.0	129.3	0.	0.	3932.2	0.0	0.0
72	2.0	14854.4	0.0	106.3	0.	0.	3906.7	0.0	0.0
73	8.3	62882.9	0.0	196.1	0.	0.	16538.2	0.0	0.0
74	6.4	48662.8	0.0	0.0	0.	0.	12798.3	0.0	0.0
75	14.4	110413.1	0.0	0.0	0.	0.	29038.6	0.0	0.0
76	5.2	40192.2	0.0	0.0	0.	0.	10570.6	0.0	0.0
77	18.8	141164.0	0.0	0.0	0.	0.	37126.1	0.0	0.0
78	0.8	5689.8	0.0	0.0	0.	0.	1496.4	0.0	0.0
79	5.2	38361.8	0.0	0.0	0.	0.	10089.2	0.0	0.0
80	10.0	71574.3	0.0	0.0	0.	0.	18824.0	0.0	0.0
81	4.3	29672.6	0.0	0.0	0.	0.	7803.9	0.0	0.0
82	13.7	92076.8	0.0	0.0	0.	0.	24216.2	0.0	0.0
83	5.7	36723.9	0.0	0.0	0.	0.	9658.4	0.0	0.0
84	19.4	119129.7	0.0	0.0	0.	0.	31331.1	0.0	0.0
85	10.9	63039.2	0.0	0.0	0.	0.	16579.3	0.0	0.0
86	8.4	46480.5	0.0	0.0	0.	0.	12224.4	0.0	0.0
87	19.3	98776.2	0.0	0.0	0.	0.	25978.1	0.0	0.0
88	19.2	87434.8	0.0	0.0	0.	0.	22995.3	0.0	0.0
89	19.1	75648.4	0.0	0.0	0.	0.	19895.5	0.0	0.0
90	2.0	7109.6	0.0	0.0	0.	0.	1869.8	0.0	0.0
91	10.2	34764.5	0.0	0.0	0.	0.	9143.1	0.0	0.0
92	6.9	21553.6	0.0	0.0	0.	0.	5668.6	0.0	0.0
93	19.0	50784.3	0.0	0.0	0.	0.	13356.3	0.0	0.0
94	7.9	17315.3	0.0	0.0	0.	0.	4553.9	0.0	0.0
95	11.0	22814.8	0.0	0.0	0.	0.	6000.3	0.0	0.0
96	18.9	39470.7	0.0	0.0	0.	0.	10380.8	0.0	0.0
97	3.1	6520.0	0.0	0.0	0.	0.	1714.8	0.0	0.0
98	5.0	9070.5	0.0	0.0	0.	0.	2385.5	0.0	0.0
99	4.0	6705.7	0.0	0.0	0.	0.	1763.6	0.0	0.0
100	6.7	12290.0	0.0	0.0	0.	0.	3232.3	0.0	0.0
101	18.7	34865.1	0.0	0.0	0.	0.	9169.5	0.0	0.0
102	18.6	34989.4	0.0	0.0	0.	0.	9202.2	0.0	0.0
103	7.0	13107.3	0.0	0.0	0.	0.	3447.2	0.0	0.0
104	11.5	18322.5	0.0	0.0	0.	0.	4818.8	0.0	0.0

105	2.5	3062.6	0.0	0.0	0.	0.	805.5	0.0	0.0
106	4.0	5052.3	0.0	0.0	0.	0.	1328.8	0.0	0.0
107	12.0	15971.4	0.0	0.0	0.	0.	4200.5	0.0	0.0
108	18.4	23694.5	0.0	0.0	0.	0.	6231.7	0.0	0.0
109	18.3	22176.5	0.0	0.0	0.	0.	5832.4	0.0	0.0
110	3.4	3907.3	0.0	0.0	0.	0.	1027.6	0.0	0.0
111	0.0	4.2	0.0	0.0	0.	0.	1.1	0.0	0.0
112	3.0	2649.3	0.0	0.0	0.	0.	696.8	0.0	0.0
113	10.5	3270.1	0.0	0.0	0.	0.	860.0	0.0	0.0

Failure Surface Specified By 49 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.833	362.330
2	90.725	360.252
3	110.640	358.406
4	130.574	356.793
5	150.527	355.412
6	170.494	354.264
7	190.473	353.349
8	210.461	352.667
9	230.456	352.219
10	250.455	352.003
11	270.455	352.021
12	290.453	352.273
13	310.448	352.758
14	330.435	353.476
15	350.412	354.427
16	370.377	355.611
17	390.327	357.028
18	410.259	358.677
19	430.170	360.559
20	450.058	362.673
21	469.920	365.020
22	489.753	367.597
23	509.555	370.406
24	529.322	373.446
25	549.053	376.716
26	568.744	380.216
27	588.394	383.946
28	607.998	387.904
29	627.555	392.091
30	647.061	396.506
31	666.515	401.148
32	685.914	406.017
33	705.254	411.112
34	724.533	416.432
35	743.749	421.977
36	762.899	427.745
37	781.981	433.737
38	800.991	439.951
39	819.927	446.386
40	838.787	453.041
41	857.569	459.916
42	876.268	467.010
43	894.884	474.322
44	913.413	481.850
45	931.853	489.594
46	950.201	497.552
47	968.456	505.724
48	986.613	514.109
49	988.579	515.044

Circle Center At X = 258.904 ; Y = 2066.219 ; and Radius = 1714.237

*** FOS = 1.321 Theta (ki=1.0) = 7.31 ***
Lambda = 0.128

1

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	8.333	360.000
2	27.789	355.366
3	47.390	351.392
4	67.115	348.083
5	86.939	345.442
6	106.842	343.473
7	126.800	342.177
8	146.791	341.557
9	166.791	341.613
10	186.777	342.344
11	206.728	343.751
12	226.619	345.831
13	246.429	348.582
14	266.135	352.001
15	285.714	356.084
16	305.143	360.826
17	324.401	366.222
18	343.466	372.266
19	362.316	378.951
20	380.929	386.269
21	399.284	394.212
22	417.360	402.771
23	435.137	411.936
24	452.594	421.696
25	469.711	432.040
26	486.468	442.958
27	491.769	446.672

Circle Center At X = 155.144 ; Y = 933.210 ; and Radius = 591.712

*** FOS = 1.332 Theta (ki=1.0) = 7.07 ***
Lambda = 0.124

Failure Surface Specified By 27 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.333	360.000
2	52.710	355.045
3	72.252	350.789
4	91.934	347.237
5	111.731	344.395
6	131.617	342.266
7	151.567	340.852
8	171.555	340.156
9	191.555	340.179
10	211.541	340.919
11	231.488	342.378
12	251.370	344.551
13	271.160	347.438
14	290.834	351.033
15	310.367	355.333
16	329.732	360.331
17	348.905	366.022

18	367.862	372.398
19	386.577	379.451
20	405.027	387.171
21	423.187	395.549
22	441.035	404.574
23	458.548	414.234
24	475.702	424.518
25	492.475	435.410
26	508.847	446.898
27	508.981	447.000

Circle Center At X = 180.933 ; Y = 896.796 ; and Radius = 556.719

*** FOS = 1.340 Theta (ki=1.0) = 6.82 ***
Lambda = 0.120

1

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.667	360.000
2	36.250	355.941
3	55.965	352.571
4	75.784	349.894
5	95.686	347.912
6	115.645	346.630
7	135.636	346.047
8	155.636	346.165
9	175.619	346.984
10	195.562	348.502
11	215.438	350.718
12	235.225	353.629
13	254.898	357.232
14	274.433	361.521
15	293.805	366.493
16	312.991	372.140
17	331.968	378.456
18	350.711	385.433
19	369.199	393.062
20	387.408	401.335
21	405.316	410.240
22	422.901	419.767
23	440.142	429.905
24	457.016	440.640
25	463.646	445.192

Circle Center At X = 142.268 ; Y = 916.756 ; and Radius = 570.748

*** FOS = 1.341 Theta (ki=1.0) = 7.87 ***
Lambda = 0.138

Failure Surface Specified By 24 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.667	360.000
2	36.006	354.901
3	55.546	350.639

4	75.252	347.222
5	95.087	344.657
6	115.014	342.948
7	134.996	342.098
8	154.996	342.109
9	174.977	342.982
10	194.902	344.713
11	214.734	347.301
12	234.436	350.740
13	253.972	355.024
14	273.305	360.145
15	292.400	366.094
16	311.221	372.859
17	329.733	380.428
18	347.903	388.787
19	365.695	397.920
20	383.079	407.811
21	400.020	418.441
22	416.488	429.790
23	432.452	441.838
24	432.671	442.019

Circle Center At X = 144.732 ; Y = 806.455 ; and Radius = 464.460

*** FOS = 1.347 Theta (ki=1.0) = 7.59 ***
Lambda = 0.133

1

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	4.167	360.000
2	23.604	355.289
3	43.197	351.276
4	62.921	347.964
5	82.751	345.359
6	102.661	343.463
7	122.626	342.280
8	142.620	341.810
9	162.619	342.054
10	182.596	343.012
11	202.526	344.683
12	222.383	347.064
13	242.144	350.152
14	261.781	353.944
15	281.270	358.435
16	300.587	363.619
17	319.706	369.489
18	338.603	376.037
19	357.255	383.257
20	375.637	391.137
21	393.726	399.669
22	411.498	408.842
23	428.932	418.643
24	446.005	429.060
25	462.695	440.080
26	470.363	445.545

Circle Center At X = 145.764 ; Y = 901.425 ; and Radius = 559.634

*** FOS = 1.350 Theta (ki=1.0) = 7.46 ***
Lambda = 0.131

Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.000	360.000
2	19.601	356.027
3	39.326	352.722
4	59.152	350.089
5	79.056	348.132
6	99.015	346.853
7	119.006	346.253
8	139.006	346.332
9	158.992	347.092
10	178.940	348.530
11	198.828	350.645
12	218.632	353.435
13	238.330	356.897
14	257.900	361.026
15	277.317	365.818
16	296.560	371.267
17	315.607	377.368
18	334.436	384.112
19	353.025	391.492
20	371.352	399.499
21	389.396	408.125
22	407.136	417.359
23	424.553	427.191
24	441.625	437.610
25	451.439	444.066

Circle Center At X = 126.665 ; Y = 934.534 ; and Radius = 588.331

*** FOS = 1.358 Theta (ki=1.0) = 15.45 ***
Lambda = 0.276

1

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	8.333	360.000
2	27.792	355.378
3	47.424	351.559
4	67.196	348.549
5	87.075	346.355
6	107.028	344.979
7	127.020	344.424
8	147.019	344.691
9	166.989	345.779
10	186.898	347.686
11	206.711	350.410
12	226.396	353.945
13	245.920	358.287
14	265.248	363.426
15	284.349	369.355
16	303.190	376.064
17	321.740	383.542
18	339.967	391.775
19	357.840	400.749
20	375.329	410.451

21	392.405	420.863
22	409.039	431.967
23	421.100	440.756

Circle Center At X = 130.531 ; Y = 831.145 ; and Radius = 486.734

*** FOS = 1.360 Theta (ki=1.0) = 7.51 ***
Lambda = 0.132

Failure Surface Specified By 23 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.000	360.000
2	44.379	355.056
3	63.952	350.945
4	83.683	347.673
5	103.535	345.248
6	123.473	343.672
7	143.460	342.950
8	163.460	343.082
9	183.435	344.068
10	203.351	345.907
11	223.169	348.595
12	242.855	352.126
13	262.372	356.496
14	281.684	361.695
15	300.757	367.714
16	319.555	374.543
17	338.044	382.168
18	356.191	390.576
19	373.962	399.752
20	391.325	409.678
21	408.248	420.337
22	424.700	431.709
23	439.285	442.740

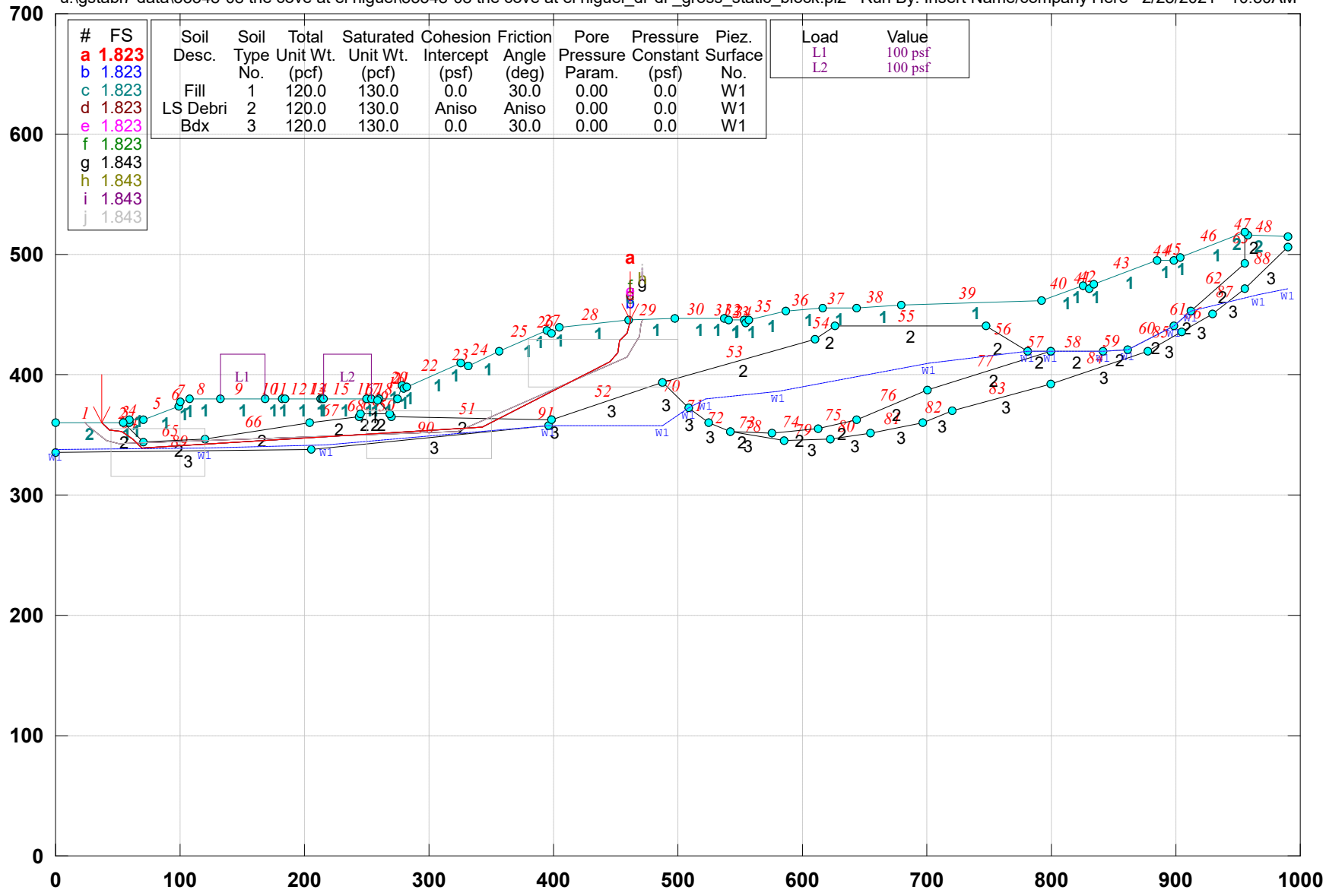
Circle Center At X = 150.370 ; Y = 811.000 ; and Radius = 468.101

*** FOS = 1.363 Theta (ki=1.0) = 7.89 ***
Lambda = 0.139

**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section DR-DR'_Gross_Static

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_block.pl2 Run By: Insert Name/company Here 2/25/2021 10:50AM



GSTABL7 v.2 FSmin=1.823

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 2/25/2021
Time of Run: 10:50AM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_block.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_block.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_static_block.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section DR-DR'_Gross_Static

BOUNDARY COORDINATES

48 Top Boundaries
91 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	360.00	55.00	360.00	2
2	55.00	360.00	59.00	360.00	1
3	59.00	360.00	59.01	362.00	1
4	59.01	362.00	70.00	362.00	1
5	70.00	362.00	99.00	373.50	1
6	99.00	373.50	100.00	377.00	1
7	100.00	377.00	108.00	379.95	1
8	108.00	379.95	132.00	379.95	1
9	132.00	379.95	168.00	379.95	1
10	168.00	379.95	182.00	379.95	1
11	182.00	379.95	184.00	379.50	1
12	184.00	379.50	213.00	379.50	1
13	213.00	379.50	214.00	380.19	1
14	214.00	380.19	215.00	380.19	1
15	215.00	380.19	250.00	380.19	1
16	250.00	380.19	254.00	380.19	1
17	254.00	380.19	260.00	380.19	1
18	260.00	380.19	275.00	380.19	1
19	275.00	380.19	278.00	390.44	1
20	278.00	390.44	280.00	389.00	1
21	280.00	389.00	282.00	390.00	1

22	282.00	390.00	326.00	410.00	1
23	326.00	410.00	332.00	407.00	1
24	332.00	407.00	357.00	420.00	1
25	357.00	420.00	395.00	437.00	1
26	395.00	437.00	399.00	434.00	1
27	399.00	434.00	405.00	439.00	1
28	405.00	439.00	460.00	445.00	1
29	460.00	445.00	498.00	447.00	1
30	498.00	447.00	537.00	447.00	1
31	537.00	447.00	541.00	445.00	1
32	541.00	445.00	553.00	446.00	1
33	553.00	446.00	555.00	443.00	1
34	555.00	443.00	557.00	446.00	1
35	557.00	446.00	586.00	453.00	1
36	586.00	453.00	616.00	456.00	1
37	616.00	456.00	644.00	456.00	1
38	644.00	456.00	680.00	458.00	1
39	680.00	458.00	792.00	462.00	1
40	792.00	462.00	825.00	474.00	1
41	825.00	474.00	830.00	471.00	1
42	830.00	471.00	834.00	475.00	1
43	834.00	475.00	885.00	495.00	1
44	885.00	495.00	899.00	495.00	1
45	899.00	495.00	903.00	498.00	1
46	903.00	498.00	955.00	519.00	1
47	955.00	519.00	958.00	516.00	2
48	958.00	516.00	990.00	515.00	2
49	259.00	379.00	268.00	368.00	1
50	268.00	368.00	270.00	365.00	2
51	270.00	365.00	398.00	363.00	2
52	398.00	363.00	488.00	394.00	3
53	488.00	394.00	610.00	430.00	2
54	610.00	430.00	626.00	440.00	2
55	626.00	440.00	748.00	440.00	2
56	748.00	440.00	781.00	420.00	2
57	781.00	420.00	800.00	420.00	2
58	800.00	420.00	841.00	419.00	2
59	841.00	419.00	861.00	421.00	2
60	861.00	421.00	898.00	440.00	2
61	898.00	440.00	912.00	453.00	2
62	912.00	453.00	954.99	493.00	2
63	954.99	493.00	955.00	519.00	2
64	55.00	360.00	70.00	344.00	2
65	70.00	344.00	120.00	346.00	2
66	120.00	346.00	204.00	360.00	2
67	204.00	360.00	244.00	365.00	2
68	244.00	365.00	245.00	368.00	2
69	245.00	368.00	268.00	368.00	2
70	488.00	394.00	508.00	372.00	3
71	508.00	372.00	525.00	360.00	3
72	525.00	360.00	542.00	353.00	3
73	542.00	353.00	576.00	352.00	2
74	576.00	352.00	613.00	355.00	2
75	613.00	355.00	644.00	362.00	2
76	644.00	362.00	700.00	387.00	2
77	700.00	387.00	800.00	420.00	2
78	542.00	353.00	585.00	345.00	3
79	585.00	345.00	622.00	347.00	3
80	622.00	347.00	655.00	351.00	3
81	655.00	351.00	697.00	360.00	3
82	697.00	360.00	720.00	370.00	3
83	720.00	370.00	800.00	392.00	3
84	800.00	392.00	877.00	420.00	3
85	877.00	420.00	905.00	435.00	3
86	905.00	435.00	929.00	450.00	3
87	929.00	450.00	955.00	471.00	3
88	955.00	471.00	990.00	506.00	3
89	0.00	335.00	205.00	338.00	3
90	205.00	338.00	396.00	358.00	3
91	396.00	358.00	398.00	363.00	3

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	30.0	0.00	0.0	1
2	120.0	130.0	0.0	13.0	0.00	0.0	1
3	120.0	130.0	0.0	30.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	0.0	0.00	30.00
2	30.0	0.00	13.00
3	90.0	0.00	30.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 17 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	338.00
2	120.00	339.00
3	218.00	342.00
4	396.00	358.00

5	488.00	358.00
6	508.00	372.00
7	522.00	380.00
8	580.00	386.00
9	702.00	409.00
10	781.00	420.00
11	800.00	420.00
12	841.00	419.00
13	861.00	421.00
14	898.00	440.00
15	912.00	453.00
16	966.00	466.00
17	990.00	471.00

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	132.00	168.00	100.0	0.0
2	215.00	254.00	100.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

3 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	45.00	335.00	120.00	335.00	40.00
2	250.00	350.00	350.00	350.00	40.00
3	380.00	410.00	500.00	410.00	40.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 181

Number of Trial Surfaces with Misleading FS = 90

Number of Trial Surfaces With Valid FS = 729

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 27.1 %

Statistical Data On All Valid FS Values:
FS Max = 4.138 FS Min = 1.823 FS Ave = 2.908
Standard Deviation = 0.464 Coefficient of Variation = 15.94 %

((Simplified Janbu FS for Critical Surface = 1.694))

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.582	360.000
2	43.538	354.214
3	53.375	352.416
4	61.371	346.411
5	68.763	339.675
6	343.158	356.218
7	445.090	410.730
8	452.153	417.809
9	452.318	427.808
10	459.360	434.908
11	461.695	444.631
12	462.175	445.114

*** FOS = 1.823 Theta (ki=1.0) = 8.42 ***
Lambda = 0.148

Individual data on the 47 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.0	2414.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.8	7890.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	1.6	1597.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.0	4947.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.0	15.4	0.0	0.0	0.	0.	0.0	0.0	0.0

6	2.4	4165.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.4	16814.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	1.2	3309.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	29.0	94398.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	1.0	4046.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.0	35208.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	12.0	54068.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	12.0	53026.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	36.0	152828.6	0.0	0.0	0.	0.	0.0	0.0	3600.0
15	14.0	56901.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	2.0	7959.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	20.0	77458.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.0	33912.1	0.0	0.0	0.	0.	0.0	0.0	0.0
19	1.0	3773.2	0.0	0.0	0.	0.	0.0	0.0	0.0
20	1.0	3807.4	0.0	0.0	0.	0.	0.0	0.0	0.0
21	29.0	107267.6	0.0	0.0	0.	0.	0.0	0.0	2900.0
22	1.0	3590.4	0.0	0.0	0.	0.	0.0	0.0	100.0
23	5.0	17843.3	0.0	0.0	0.	0.	0.0	0.0	500.0
24	4.0	14144.4	0.0	0.0	0.	0.	0.0	0.0	400.0
25	5.0	17517.8	0.0	0.0	0.	0.	0.0	0.0	0.0
26	1.0	3481.8	0.0	0.0	0.	0.	0.0	0.0	0.0
27	8.0	27594.3	0.0	0.0	0.	0.	0.0	0.0	0.0
28	2.0	6826.2	0.0	0.0	0.	0.	0.0	0.0	0.0
29	5.0	16939.0	0.0	0.0	0.	0.	0.0	0.0	0.0
30	3.0	11921.6	0.0	0.0	0.	0.	0.0	0.0	0.0
31	2.0	8968.7	0.0	0.0	0.	0.	0.0	0.0	0.0
32	2.0	8887.0	0.0	0.0	0.	0.	0.0	0.0	0.0
33	44.0	243632.5	0.0	0.0	0.	0.	0.0	0.0	0.0
34	6.0	38257.4	0.0	0.0	0.	0.	0.0	0.0	0.0
35	11.2	72329.2	0.0	0.0	0.	0.	0.0	0.0	0.0
36	13.8	93818.4	0.0	0.0	0.	0.	0.0	0.0	0.0
37	0.0	244.2	0.0	0.0	0.	0.	0.0	0.0	0.0
38	38.0	249271.5	0.0	0.0	0.	0.	0.0	0.0	0.0
39	4.0	24234.2	0.0	0.0	0.	0.	0.0	0.0	0.0
40	6.0	35146.1	0.0	0.0	0.	0.	0.0	0.0	0.0
41	40.1	198093.9	0.0	0.0	0.	0.	0.0	0.0	0.0
42	7.1	24992.4	0.0	0.0	0.	0.	0.0	0.0	0.0
43	0.2	422.6	0.0	0.0	0.	0.	0.0	0.0	0.0
44	7.0	11145.2	0.0	0.0	0.	0.	0.0	0.0	0.0
45	0.6	669.7	0.0	0.0	0.	0.	0.0	0.0	0.0
46	1.7	802.3	0.0	0.0	0.	0.	0.0	0.0	0.0
47	0.5	13.2	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.582	360.000
2	43.538	354.214
3	53.375	352.416
4	61.371	346.411
5	68.763	339.675
6	343.158	356.218
7	445.090	410.730
8	452.153	417.809
9	452.318	427.808
10	459.360	434.908
11	461.695	444.631
12	462.175	445.114

*** FOS = 1.823 Theta (ki=1.0) = 8.42 ***
Lambda = 0.148

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.582	360.000
2	43.538	354.214
3	53.375	352.416
4	61.371	346.411
5	68.763	339.675
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1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.070	360.000
2	26.247	358.220
3	33.327	351.158
4	41.298	345.120
5	51.093	343.103
6	322.528	352.380
7	459.475	414.001
8	463.683	423.073
9	469.168	431.435
10	469.707	441.420
11	471.350	445.597

*** FOS = 1.843 Theta (ki=1.0) = 8.35 ***
Lambda = 0.147

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.070	360.000
2	26.247	358.220
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4	41.298	345.120
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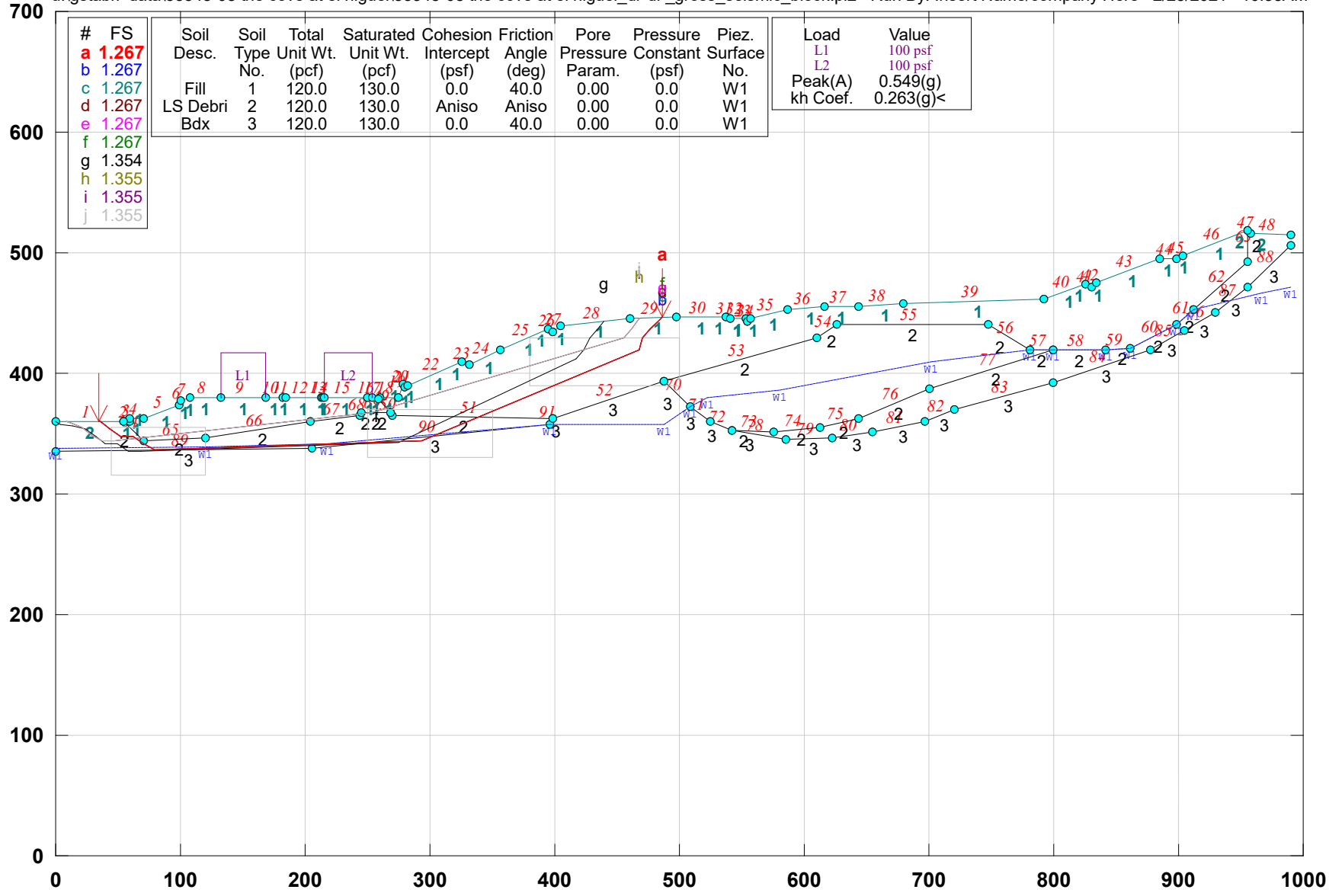
**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section DR-DR'_Gross_Seismic

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_block.pl2 Run By: Insert Name/company Here 2/25/2021 10:53AM



GSTABL7 v.2 FSmin=1.267

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 2/25/2021
Time of Run: 10:53AM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_block.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_block.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_dr-dr'_gross_seismic_block.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section DR-DR'_Gross_Seismic

BOUNDARY COORDINATES

48 Top Boundaries
91 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	360.00	55.00	360.00	2
2	55.00	360.00	59.00	360.00	1
3	59.00	360.00	59.01	362.00	1
4	59.01	362.00	70.00	362.00	1
5	70.00	362.00	99.00	373.50	1
6	99.00	373.50	100.00	377.00	1
7	100.00	377.00	108.00	379.95	1
8	108.00	379.95	132.00	379.95	1
9	132.00	379.95	168.00	379.95	1
10	168.00	379.95	182.00	379.95	1
11	182.00	379.95	184.00	379.50	1
12	184.00	379.50	213.00	379.50	1
13	213.00	379.50	214.00	380.19	1
14	214.00	380.19	215.00	380.19	1
15	215.00	380.19	250.00	380.19	1
16	250.00	380.19	254.00	380.19	1
17	254.00	380.19	260.00	380.19	1
18	260.00	380.19	275.00	380.19	1
19	275.00	380.19	278.00	390.44	1
20	278.00	390.44	280.00	389.00	1
21	280.00	389.00	282.00	390.00	1

22	282.00	390.00	326.00	410.00	1
23	326.00	410.00	332.00	407.00	1
24	332.00	407.00	357.00	420.00	1
25	357.00	420.00	395.00	437.00	1
26	395.00	437.00	399.00	434.00	1
27	399.00	434.00	405.00	439.00	1
28	405.00	439.00	460.00	445.00	1
29	460.00	445.00	498.00	447.00	1
30	498.00	447.00	537.00	447.00	1
31	537.00	447.00	541.00	445.00	1
32	541.00	445.00	553.00	446.00	1
33	553.00	446.00	555.00	443.00	1
34	555.00	443.00	557.00	446.00	1
35	557.00	446.00	586.00	453.00	1
36	586.00	453.00	616.00	456.00	1
37	616.00	456.00	644.00	456.00	1
38	644.00	456.00	680.00	458.00	1
39	680.00	458.00	792.00	462.00	1
40	792.00	462.00	825.00	474.00	1
41	825.00	474.00	830.00	471.00	1
42	830.00	471.00	834.00	475.00	1
43	834.00	475.00	885.00	495.00	1
44	885.00	495.00	899.00	495.00	1
45	899.00	495.00	903.00	498.00	1
46	903.00	498.00	955.00	519.00	1
47	955.00	519.00	958.00	516.00	2
48	958.00	516.00	990.00	515.00	2
49	259.00	379.00	268.00	368.00	1
50	268.00	368.00	270.00	365.00	2
51	270.00	365.00	398.00	363.00	2
52	398.00	363.00	488.00	394.00	3
53	488.00	394.00	610.00	430.00	2
54	610.00	430.00	626.00	440.00	2
55	626.00	440.00	748.00	440.00	2
56	748.00	440.00	781.00	420.00	2
57	781.00	420.00	800.00	420.00	2
58	800.00	420.00	841.00	419.00	2
59	841.00	419.00	861.00	421.00	2
60	861.00	421.00	898.00	440.00	2
61	898.00	440.00	912.00	453.00	2
62	912.00	453.00	954.99	493.00	2
63	954.99	493.00	955.00	519.00	2
64	55.00	360.00	70.00	344.00	2
65	70.00	344.00	120.00	346.00	2
66	120.00	346.00	204.00	360.00	2
67	204.00	360.00	244.00	365.00	2
68	244.00	365.00	245.00	368.00	2
69	245.00	368.00	268.00	368.00	2
70	488.00	394.00	508.00	372.00	3
71	508.00	372.00	525.00	360.00	3
72	525.00	360.00	542.00	353.00	3
73	542.00	353.00	576.00	352.00	2
74	576.00	352.00	613.00	355.00	2
75	613.00	355.00	644.00	362.00	2
76	644.00	362.00	700.00	387.00	2
77	700.00	387.00	800.00	420.00	2
78	542.00	353.00	585.00	345.00	3
79	585.00	345.00	622.00	347.00	3
80	622.00	347.00	655.00	351.00	3
81	655.00	351.00	697.00	360.00	3
82	697.00	360.00	720.00	370.00	3
83	720.00	370.00	800.00	392.00	3
84	800.00	392.00	877.00	420.00	3
85	877.00	420.00	905.00	435.00	3
86	905.00	435.00	929.00	450.00	3
87	929.00	450.00	955.00	471.00	3
88	955.00	471.00	990.00	506.00	3
89	0.00	335.00	205.00	338.00	3
90	205.00	338.00	396.00	358.00	3
91	396.00	358.00	398.00	363.00	3

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	40.0	0.00	0.0	1
2	120.0	130.0	0.0	13.0	0.00	0.0	1
3	120.0	130.0	0.0	40.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	0.0	0.00	30.00
2	30.0	0.00	17.33
3	90.0	0.00	30.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 17 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	338.00
2	120.00	339.00
3	218.00	342.00
4	396.00	358.00

5	488.00	358.00
6	508.00	372.00
7	522.00	380.00
8	580.00	386.00
9	702.00	409.00
10	781.00	420.00
11	800.00	420.00
12	841.00	419.00
13	861.00	421.00
14	898.00	440.00
15	912.00	453.00
16	966.00	466.00
17	990.00	471.00

1

BOUNDARY LOAD(S)

2 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	132.00	168.00	100.0	0.0
2	215.00	254.00	100.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.

Specified Peak Ground Acceleration Coefficient (A) = 0.549(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.263(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

3 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	45.00	335.00	120.00	335.00	40.00
2	250.00	350.00	350.00	350.00	40.00
3	380.00	410.00	500.00	410.00	40.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 297

Number of Trial Surfaces with Misleading FS = 457

Number of Trial Surfaces With Valid FS = 246

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 75.4 %

Statistical Data On All Valid FS Values:
FS Max = 2.082 FS Min = 1.267 FS Ave = 1.685
Standard Deviation = 0.182 Coefficient of Variation = 10.80 %

((Simplified Janbu FS for Critical Surface = 0.972))

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	35.150	360.000
2	35.519	359.809
3	43.890	354.339
4	51.815	348.241
5	61.755	347.145
6	70.323	341.989
7	78.961	336.951
8	292.889	343.884
9	467.502	419.412
10	470.322	429.006
11	476.834	436.595
12	483.905	443.666
13	486.250	446.382

*** FOS = 1.267 Theta (ki=1.0) = 15.04 ***
Lambda = 0.269

Individual data on the 53 slices

Slice	Width	Weight	Water Force Top	Water Force Bot	Tie Force Norm	Tie Force Tan	Earthquake Force Hor	Earthquake Force Ver	Surcharge Load

No.	(ft)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
1	0.4	4.2	0.0	0.0	0.	0.	1.1	0.0	0.0
2	8.4	2939.1	0.0	0.0	0.	0.	773.0	0.0	0.0
3	7.9	8283.7	0.0	0.0	0.	0.	2178.6	0.0	0.0
4	3.2	4561.1	0.0	0.0	0.	0.	1199.6	0.0	0.0
5	4.0	5918.8	0.0	0.0	0.	0.	1556.7	0.0	0.0
6	0.0	16.3	0.0	0.0	0.	0.	4.3	0.0	0.0
7	2.7	4843.4	0.0	0.0	0.	0.	1273.8	0.0	0.0
8	8.2	17152.2	0.0	0.0	0.	0.	4511.0	0.0	0.0
9	0.3	775.4	0.0	0.0	0.	0.	203.9	0.0	0.0
10	5.8	15846.3	0.0	0.0	0.	0.	4167.6	0.0	0.0
11	2.9	9440.6	0.0	178.0	0.	0.	2482.9	0.0	0.0
12	20.0	77846.3	0.0	1834.1	0.	0.	20473.6	0.0	0.0
13	1.0	4528.2	0.0	75.7	0.	0.	1190.9	0.0	0.0
14	8.0	39172.6	0.0	551.6	0.	0.	10302.4	0.0	0.0
15	12.0	60387.3	0.0	647.1	0.	0.	15881.9	0.0	0.0
16	12.0	59808.6	0.0	530.5	0.	0.	15729.7	0.0	0.0
17	36.0	176049.9	0.0	1494.5	0.	0.	46301.1	0.0	3600.0
18	14.0	67096.3	0.0	541.9	0.	0.	17646.3	0.0	0.0
19	2.0	9468.7	0.0	75.6	0.	0.	2490.3	0.0	0.0
20	20.0	93287.2	0.0	731.6	0.	0.	24534.5	0.0	0.0
21	9.0	41469.3	0.0	314.5	0.	0.	10906.4	0.0	0.0
22	1.0	4629.6	0.0	34.4	0.	0.	1217.6	0.0	0.0
23	1.0	4667.1	0.0	34.3	0.	0.	1227.4	0.0	0.0
24	3.0	13977.7	0.0	102.2	0.	0.	3676.1	0.0	300.0
25	26.0	119866.3	0.0	2085.8	0.	0.	31524.8	0.0	2600.0
26	1.0	4565.5	0.0	128.5	0.	0.	1200.7	0.0	100.0
27	2.0	9061.5	0.0	265.9	0.	0.	2383.2	0.0	198.7
28	3.0	13716.1	0.0	430.1	0.	0.	3607.3	0.0	301.3
29	4.0	18162.4	0.0	621.1	0.	0.	4776.7	0.0	400.0
30	5.0	22628.3	0.0	856.8	0.	0.	5951.2	0.0	0.0
31	1.0	4515.7	0.0	182.1	0.	0.	1187.6	0.0	0.0
32	8.0	36006.3	0.0	1585.4	0.	0.	9469.7	0.0	0.0
33	2.0	8968.4	0.0	432.1	0.	0.	2358.7	0.0	0.0
34	5.0	22363.0	0.0	1142.7	0.	0.	5881.5	0.0	0.0
35	3.0	15223.0	0.0	728.5	0.	0.	4003.6	0.0	0.0
36	2.0	11189.3	0.0	503.6	0.	0.	2942.8	0.0	0.0
37	2.0	11123.2	0.0	517.9	0.	0.	2925.4	0.0	0.0
38	10.9	64217.1	0.0	3070.4	0.	0.	16889.1	0.0	0.0
39	10.1	62484.9	0.0	2133.9	0.	0.	16433.5	0.0	0.0
40	4.0	24808.6	0.0	187.8	0.	0.	6524.7	0.0	0.0
41	19.0	117392.3	0.0	0.0	0.	0.	30874.2	0.0	0.0
42	6.0	35277.4	0.0	0.0	0.	0.	9278.0	0.0	0.0
43	7.2	40228.3	0.0	0.0	0.	0.	10580.0	0.0	0.0
44	17.8	101647.7	0.0	0.0	0.	0.	26733.3	0.0	0.0
45	38.0	221921.3	0.0	0.0	0.	0.	58365.3	0.0	0.0
46	4.0	22360.1	0.0	0.0	0.	0.	5880.7	0.0	0.0
47	6.0	32703.0	0.0	0.0	0.	0.	8600.9	0.0	0.0
48	55.0	249007.4	0.0	0.0	0.	0.	65488.9	0.0	0.0
49	7.5	24675.6	0.0	0.0	0.	0.	6489.7	0.0	0.0
50	2.8	7193.1	0.0	0.0	0.	0.	1891.8	0.0	0.0
51	6.5	10092.3	0.0	0.0	0.	0.	2654.3	0.0	0.0
52	7.1	5041.8	0.0	0.0	0.	0.	1326.0	0.0	0.0
53	2.3	364.8	0.0	0.0	0.	0.	95.9	0.0	0.0

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	35.150	360.000
2	35.519	359.809
3	43.890	354.339
4	51.815	348.241
5	61.755	347.145
6	70.323	341.989
7	78.961	336.951
8	292.889	343.884
9	467.502	419.412

10	470.322	429.006
11	476.834	436.595
12	483.905	443.666
13	486.250	446.382

*** FOS = 1.267 Theta (ki=1.0) = 15.04 ***
Lambda = 0.269

1

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1	35.150	360.000
2	35.519	359.809
3	43.890	354.339
4	51.815	348.241
5	61.755	347.145
6	70.323	341.989
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12	483.905	443.666
13	486.250	446.382

*** FOS = 1.267 Theta (ki=1.0) = 15.04 ***
Lambda = 0.269

1

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.293	360.000
2	4.193	357.432
3	14.139	356.388
4	23.693	353.435
5	32.110	348.037
6	39.556	341.361
7	49.554	341.155
8	57.743	335.416
9	67.737	335.066
10	274.603	342.234
11	417.200	412.371
12	423.741	419.935
13	428.135	428.917

14	433.788	437.166
15	439.077	442.717

*** FOS = 1.354 Theta (ki=1.0) = 7.90 ***
Lambda = 0.139

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	9.029	360.000
2	11.858	358.992
3	21.162	355.327
4	28.332	348.357
5	37.614	344.635
6	47.614	344.607
7	254.218	367.791
8	454.846	429.568
9	461.209	437.282
10	467.701	444.889
11	467.931	445.417

*** FOS = 1.355 Theta (ki=1.0) = 22.48 ***
Lambda = 0.414

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	9.029	360.000
2	11.858	358.992
3	21.162	355.327
4	28.332	348.357
5	37.614	344.635
6	47.614	344.607
7	254.218	367.791
8	454.846	429.568
9	461.209	437.282
10	467.701	444.889
11	467.931	445.417

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Point No.	X-Surf (ft)	Y-Surf (ft)
1	9.029	360.000
2	11.858	358.992
3	21.162	355.327
4	28.332	348.357

5	37.614	344.635
6	47.614	344.607
7	254.218	367.791
8	454.846	429.568
9	461.209	437.282
10	467.701	444.889
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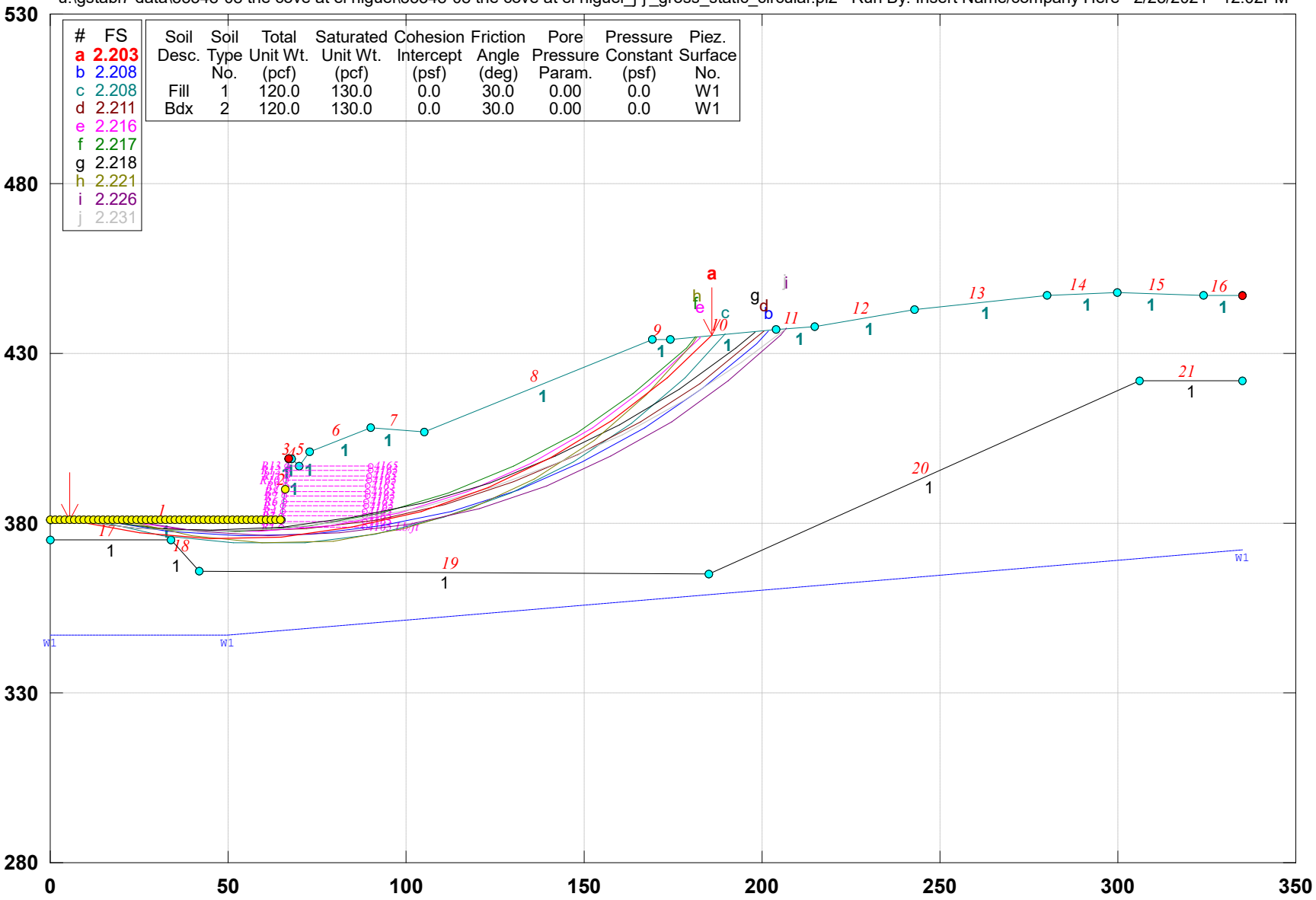
Lambda = 0.414

**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section J-J' 15.5' High MSE Wall_Static

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_j-j'_gross_static_circular.pl2 Run By: Insert Name/company Here 2/25/2021 12:02PM



GSTABL7 v.2 FSmin=2.203

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 2/25/2021
Time of Run: 12:02PM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_static_circular.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_static_circular.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_static_circular.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section J-J' 15.5' High MSE Wall_Static

BOUNDARY COORDINATES

16 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	381.00	65.00	381.00	1
2	65.00	381.00	67.00	399.00	1
3	67.00	399.00	68.00	399.00	1
4	68.00	399.00	70.00	397.00	1
5	70.00	397.00	73.00	401.00	1
6	73.00	401.00	90.00	408.00	1
7	90.00	408.00	105.00	407.00	1
8	105.00	407.00	169.00	434.00	1
9	169.00	434.00	174.00	434.00	1
10	174.00	434.00	204.00	437.00	1
11	204.00	437.00	215.00	438.00	1
12	215.00	438.00	243.00	443.00	1
13	243.00	443.00	280.00	447.00	1
14	280.00	447.00	300.00	448.00	1
15	300.00	448.00	324.00	447.00	1
16	324.00	447.00	335.00	447.00	1
17	0.00	375.00	34.00	375.00	1
18	34.00	375.00	42.00	366.00	1
19	42.00	366.00	185.00	365.00	1
20	185.00	365.00	306.00	422.00	1
21	306.00	422.00	335.00	422.00	1

User Specified Y-Origin = 280.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	30.0	0.00	0.0	1
2	120.0	130.0	0.0	30.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	347.00
2	50.00	347.00
3	335.00	372.00

1

REINFORCING LAYER(S)

13 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO. 1

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	379.00	4165.00	1.000
2	88.25	379.00	4165.00	1.000

REINFORCING LAYER NO. 2

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	380.50	4165.00	1.000

2	88.25	380.50	4165.00	1.000

REINFORCING LAYER NO. 3

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.11	382.00	4165.00	1.000
2	88.36	382.00	4165.00	1.000

REINFORCING LAYER NO. 4

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.28	383.50	4165.00	1.000
2	88.53	383.50	4165.00	1.000

REINFORCING LAYER NO. 5

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.44	385.00	4165.00	1.000
2	88.69	385.00	4165.00	1.000

REINFORCING LAYER NO. 6

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.61	386.50	4165.00	1.000
2	88.86	386.50	4165.00	1.000

REINFORCING LAYER NO. 7

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.78	388.00	4165.00	1.000
2	89.03	388.00	4165.00	1.000

REINFORCING LAYER NO. 8

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR

1	65.94	389.50	4165.00	1.000
2	89.19	389.50	4165.00	1.000

REINFORCING LAYER NO. 9

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.11	391.00	4165.00	1.000
2	89.36	391.00	4165.00	1.000

REINFORCING LAYER NO. 10

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.28	392.50	4165.00	1.000
2	89.53	392.50	4165.00	1.000

REINFORCING LAYER NO. 11

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.44	394.00	4165.00	1.000
2	89.69	394.00	4165.00	1.000

REINFORCING LAYER NO. 12

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.61	395.50	4165.00	1.000
2	89.86	395.50	4165.00	1.000

REINFORCING LAYER NO. 13

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.78	397.00	4165.00	1.000
2	90.03	397.00	4165.00	1.000

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

20 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 66.00(ft)

Each Surface Terminates Between X = 67.00(ft)
and X = 335.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 280.00(ft)

20.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 17

Number of Trial Surfaces with Misleading FS = 1

Number of Failed Attempts to Generate Trial Surface = 199

Number of Trial Surfaces With Valid FS = 783

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 21.7 %

Statistical Data On All Valid FS Values:
FS Max = 24.664 FS Min = 2.203 FS Ave = 3.272
Standard Deviation = 0.966 Coefficient of Variation = 29.51 %

((Modified Bishop FS for Critical Surface = 1.670))

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	5.388	381.000
2	25.015	377.156
3	44.944	375.471
4	64.938	375.966
5	84.759	378.635
6	104.171	383.446
7	122.945	390.342
8	140.856	399.241
9	157.692	410.037
10	173.252	422.602
11	185.750	435.175

Circle Center At X = 50.407 ; Y = 558.816 ; and Radius = 183.426

*** FOS = 2.203 Theta (ki=1.0) = 19.64 ***
Lambda = 0.357

Individual data on the 19 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	19.6	4527.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	19.9	11208.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	20.0	12671.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.1	37.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.0	3333.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	1.0	2722.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	2.0	5156.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.0	7974.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	11.8	36091.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	5.2	17382.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	14.2	43938.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.8	2329.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	17.9	51119.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	17.9	50632.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	16.8	42504.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	11.3	23084.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	4.3	6691.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	0.7	989.1	0.0	0.0	0.	0.	0.0	0.0	0.0
19	11.8	7505.3	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.469	381.000
2	33.174	377.573
3	53.120	376.111
4	73.113	376.628
5	92.958	379.119
6	112.458	383.560
7	131.424	389.907
8	149.670	398.099
9	167.016	408.054
10	183.293	419.675
11	198.342	432.849
12	202.047	436.805

Circle Center At X = 57.920 ; Y = 577.318 ; and Radius = 201.287

*** FOS = 2.208 Theta (ki=1.0) = 18.37 ***
Lambda = 0.332

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.122	381.000
2	31.577	376.360
3	51.447	374.085
4	71.447	374.208
5	91.287	376.727
6	110.683	381.606
7	129.354	388.775
8	147.032	398.129
9	163.461	409.535
10	178.404	422.828
11	189.659	435.566

Circle Center At X = 60.424 ; Y = 540.413 ; and Radius = 166.570

*** FOS = 2.208 Theta (ki=1.0) = 18.79 ***
Lambda = 0.340

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.122	381.000
2	31.935	378.271
3	51.915	377.378
4	71.893	378.329
5	91.698	381.116
6	111.162	385.714
7	130.120	392.086
8	148.410	400.177
9	165.878	409.918
10	182.374	421.226
11	197.758	434.005
12	200.392	436.639

Circle Center At X = 51.631 ; Y = 593.662 ; and Radius = 216.301

*** FOS = 2.211 Theta (ki=1.0) = 18.48 ***
Lambda = 0.334

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	18.857	381.000
2	38.645	378.096

3	58.636	377.494
4	78.563	379.202
5	98.160	383.198
6	117.165	389.428
7	135.324	397.809
8	152.395	408.230
9	168.150	420.550
10	182.378	434.605
11	182.581	434.858

Circle Center At X = 53.841 ; Y = 550.494 ; and Radius = 173.067

*** FOS = 2.216 Theta (ki=1.0) = 19.80 ***
Lambda = 0.360

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.469	381.000
2	33.270	378.186
3	53.261	377.560
4	73.199	379.127
5	92.846	382.870
6	111.964	388.744
7	130.323	396.678
8	147.702	406.575
9	163.892	418.318
10	178.698	431.764
11	181.320	434.732

Circle Center At X = 48.968 ; Y = 559.736 ; and Radius = 182.227

*** FOS = 2.217 Theta (ki=1.0) = 20.56 ***
Lambda = 0.375

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	5.388	381.000
2	25.240	378.572
3	45.227	377.853
4	65.202	378.847
5	85.019	381.547
6	104.532	385.934
7	123.598	391.975
8	142.077	399.626
9	159.833	408.831
10	176.735	419.522
11	192.661	431.620
12	197.938	436.394

Circle Center At X = 43.672 ; Y = 610.273 ; and Radius = 232.447

*** FOS = 2.218 Theta (ki=1.0) = 18.85 ***
Lambda = 0.341

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	20.204	381.000
2	39.613	376.172
3	59.504	374.087
4	79.492	374.785
5	99.189	378.251
6	118.214	384.419
7	136.198	393.170
8	152.792	404.334
9	167.675	417.694
10	180.559	432.992
11	181.674	434.767

Circle Center At X = 64.501 ; Y = 517.661 ; and Radius = 143.661

*** FOS = 2.221 Theta (ki=1.0) = 19.37 ***
Lambda = 0.352

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	21.551	381.000
2	41.269	377.655
3	61.225	376.322
4	81.213	377.015
5	101.028	379.727
6	120.467	384.430
7	139.331	391.076
8	157.425	399.597
9	174.564	409.904
10	190.573	421.893
11	205.286	435.440
12	206.903	437.264

Circle Center At X = 64.400 ; Y = 573.278 ; and Radius = 196.994

*** FOS = 2.226 Theta (ki=1.0) = 17.36 ***
Lambda = 0.313

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	5.388	381.000
2	25.236	378.539
3	45.218	377.691
4	65.203	378.461
5	85.061	380.844

6	104.660	384.824
7	123.875	390.375
8	142.577	397.462
9	160.645	406.037
10	177.962	416.045
11	194.412	427.419
12	206.383	437.217

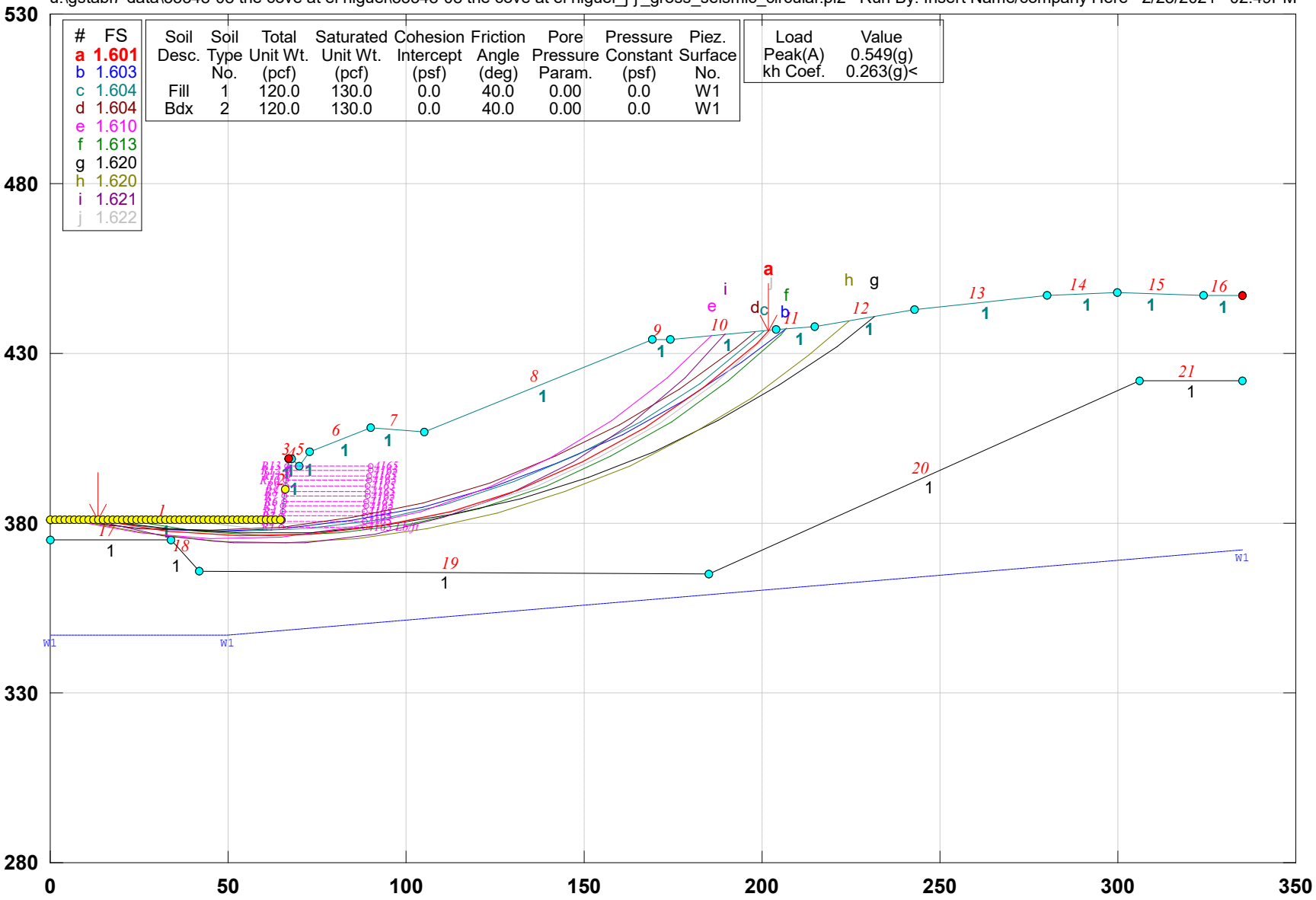
Circle Center At X = 45.731 ; Y = 624.182 ; and Radius = 246.506

*** FOS = 2.231 Theta (ki=1.0) = 18.04 ***
Lambda = 0.326

**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section J-J' 15.5' High MSE Wall_Seismic

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_circular.pl2 Run By: Insert Name/company Here 2/25/2021 02:49PM



GSTABL7 v.2 FSmin=1.601

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 2/25/2021
Time of Run: 02:49PM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_circular.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_circular.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_circular.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section J-J' 15.5' High MSE Wall_Seismic

BOUNDARY COORDINATES

16 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	381.00	65.00	381.00	1
2	65.00	381.00	67.00	399.00	1
3	67.00	399.00	68.00	399.00	1
4	68.00	399.00	70.00	397.00	1
5	70.00	397.00	73.00	401.00	1
6	73.00	401.00	90.00	408.00	1
7	90.00	408.00	105.00	407.00	1
8	105.00	407.00	169.00	434.00	1
9	169.00	434.00	174.00	434.00	1
10	174.00	434.00	204.00	437.00	1
11	204.00	437.00	215.00	438.00	1
12	215.00	438.00	243.00	443.00	1
13	243.00	443.00	280.00	447.00	1
14	280.00	447.00	300.00	448.00	1
15	300.00	448.00	324.00	447.00	1
16	324.00	447.00	335.00	447.00	1
17	0.00	375.00	34.00	375.00	1
18	34.00	375.00	42.00	366.00	1
19	42.00	366.00	185.00	365.00	1
20	185.00	365.00	306.00	422.00	1
21	306.00	422.00	335.00	422.00	1

User Specified Y-Origin = 280.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)
1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	40.0	0.00	0.0	1
2	120.0	130.0	0.0	40.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	347.00
2	50.00	347.00
3	335.00	372.00

Specified Peak Ground Acceleration Coefficient (A) = 0.549(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.263(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000
1

REINFORCING LAYER(S)

13 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO. 1

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	379.00	4165.00	1.000
2	88.25	379.00	4165.00	1.000

REINFORCING LAYER NO. 2

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	380.50	4165.00	1.000
2	88.25	380.50	4165.00	1.000

REINFORCING LAYER NO. 3

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.11	382.00	4165.00	1.000
2	88.36	382.00	4165.00	1.000

REINFORCING LAYER NO. 4

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.28	383.50	4165.00	1.000
2	88.53	383.50	4165.00	1.000

REINFORCING LAYER NO. 5

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.44	385.00	4165.00	1.000
2	88.69	385.00	4165.00	1.000

REINFORCING LAYER NO. 6

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.61	386.50	4165.00	1.000
2	88.86	386.50	4165.00	1.000

REINFORCING LAYER NO. 7

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.78	388.00	4165.00	1.000
2	89.03	388.00	4165.00	1.000

REINFORCING LAYER NO. 8

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.94	389.50	4165.00	1.000
2	89.19	389.50	4165.00	1.000

REINFORCING LAYER NO. 9

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.11	391.00	4165.00	1.000
2	89.36	391.00	4165.00	1.000

REINFORCING LAYER NO. 10

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.28	392.50	4165.00	1.000
2	89.53	392.50	4165.00	1.000

REINFORCING LAYER NO. 11

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.44	394.00	4165.00	1.000
2	89.69	394.00	4165.00	1.000

REINFORCING LAYER NO. 12

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.61	395.50	4165.00	1.000
2	89.86	395.50	4165.00	1.000

REINFORCING LAYER NO. 13

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.78	397.00	4165.00	1.000
2	90.03	397.00	4165.00	1.000

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

20 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 66.00(ft)

Each Surface Terminates Between X = 67.00(ft)
and X = 335.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 280.00(ft)

20.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 1000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 34

Number of Trial Surfaces with Misleading FS = 7

Number of Failed Attempts to Generate Trial Surface = 199

Number of Trial Surfaces With Valid FS = 760

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 24.0 %

Statistical Data On All Valid FS Values:
FS Max = 2.980 FS Min = 1.601 FS Ave = 2.071
Standard Deviation = 0.201 Coefficient of Variation = 9.71 %

((Modified Bishop FS for Critical Surface = 1.340))

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.469	381.000
2	33.174	377.573
3	53.120	376.111
4	73.113	376.628
5	92.958	379.119
6	112.458	383.560
7	131.424	389.907
8	149.670	398.099
9	167.016	408.054
10	183.293	419.675
11	198.342	432.849
12	202.047	436.805

Circle Center At X = 57.920 ; Y = 577.318 ; and Radius = 201.287

*** FOS = 1.601 Theta (ki=1.0) = 18.04 ***
Lambda = 0.326

Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	19.7	4051.7	0.0	0.0	0.	0.	1065.6	0.0	0.0
2	19.9	9953.0	0.0	0.0	0.	0.	2617.6	0.0	0.0
3	11.9	6751.1	0.0	0.0	0.	0.	1775.5	0.0	0.0
4	2.0	3253.5	0.0	0.0	0.	0.	855.7	0.0	0.0
5	1.0	2702.1	0.0	0.0	0.	0.	710.6	0.0	0.0
6	2.0	5154.9	0.0	0.0	0.	0.	1355.7	0.0	0.0
7	3.0	8069.0	0.0	0.0	0.	0.	2122.1	0.0	0.0
8	0.1	331.9	0.0	0.0	0.	0.	87.3	0.0	0.0
9	16.9	54379.4	0.0	0.0	0.	0.	14301.8	0.0	0.0
10	3.0	10281.1	0.0	0.0	0.	0.	2703.9	0.0	0.0
11	12.0	38888.9	0.0	0.0	0.	0.	10227.8	0.0	0.0
12	7.5	23146.7	0.0	0.0	0.	0.	6087.6	0.0	0.0
13	19.0	62390.8	0.0	0.0	0.	0.	16408.8	0.0	0.0
14	18.2	61290.7	0.0	0.0	0.	0.	16119.4	0.0	0.0
15	17.3	55010.9	0.0	0.0	0.	0.	14467.9	0.0	0.0
16	2.0	5908.2	0.0	0.0	0.	0.	1553.9	0.0	0.0
17	5.0	13646.9	0.0	0.0	0.	0.	3589.1	0.0	0.0
18	9.3	20192.8	0.0	0.0	0.	0.	5310.7	0.0	0.0
19	15.0	17009.8	0.0	0.0	0.	0.	4473.6	0.0	0.0
20	3.7	796.9	0.0	0.0	0.	0.	209.6	0.0	0.0

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	5.388	381.000
2	25.236	378.539
3	45.218	377.691
4	65.203	378.461
5	85.061	380.844
6	104.660	384.824
7	123.875	390.375
8	142.577	397.462

9	160.645	406.037
10	177.962	416.045
11	194.412	427.419
12	206.383	437.217

Circle Center At X = 45.731 ; Y = 624.182 ; and Radius = 246.506

*** FOS = 1.603 Theta (ki=1.0) = 17.79 ***
Lambda = 0.321

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.122	381.000
2	31.935	378.271
3	51.915	377.378
4	71.893	378.329
5	91.698	381.116
6	111.162	385.714
7	130.120	392.086
8	148.410	400.177
9	165.878	409.918
10	182.374	421.226
11	197.758	434.005
12	200.392	436.639

Circle Center At X = 51.631 ; Y = 593.662 ; and Radius = 216.301

*** FOS = 1.604 Theta (ki=1.0) = 18.18 ***
Lambda = 0.328

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	5.388	381.000
2	25.240	378.572
3	45.227	377.853
4	65.202	378.847
5	85.019	381.547
6	104.532	385.934
7	123.598	391.975
8	142.077	399.626
9	159.833	408.831
10	176.735	419.522
11	192.661	431.620
12	197.938	436.394

Circle Center At X = 43.672 ; Y = 610.273 ; and Radius = 232.447

*** FOS = 1.604 Theta (ki=1.0) = 18.67 ***
Lambda = 0.338

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	5.388	381.000
2	25.015	377.156
3	44.944	375.471
4	64.938	375.966
5	84.759	378.635
6	104.171	383.446
7	122.945	390.342
8	140.856	399.241
9	157.692	410.037
10	173.252	422.602
11	185.750	435.175

Circle Center At X = 50.407 ; Y = 558.816 ; and Radius = 183.426

*** FOS = 1.610 Theta (ki=1.0) = 19.36 ***
Lambda = 0.351

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	21.551	381.000
2	41.269	377.655
3	61.225	376.322
4	81.213	377.015
5	101.028	379.727
6	120.467	384.430
7	139.331	391.076
8	157.425	399.597
9	174.564	409.904
10	190.573	421.893
11	205.286	435.440
12	206.903	437.264

Circle Center At X = 64.400 ; Y = 573.278 ; and Radius = 196.994

*** FOS = 1.613 Theta (ki=1.0) = 16.82 ***
Lambda = 0.302

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	13.469	381.000
2	33.281	378.264
3	53.244	377.036
4	73.242	377.323
5	93.160	379.124
6	112.886	382.427
7	132.304	387.214
8	151.305	393.457

9	169.778	401.121
10	187.618	410.162
11	204.722	420.528
12	220.993	432.158
13	231.504	440.947

Circle Center At X = 59.458 ; Y = 640.937 ; and Radius = 263.974

*** FOS = 1.620 Theta (ki=1.0) = 16.07 ***
Lambda = 0.288

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	6.735	381.000
2	26.343	377.063
3	46.217	374.819
4	66.210	374.283
5	86.175	375.459
6	105.967	378.339
7	125.439	382.902
8	144.450	389.114
9	162.860	396.929
10	180.534	406.291
11	197.341	417.131
12	213.160	429.369
13	224.349	439.669

Circle Center At X = 62.468 ; Y = 607.813 ; and Radius = 233.561

*** FOS = 1.620 Theta (ki=1.0) = 15.70 ***
Lambda = 0.281

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	12.122	381.000
2	31.577	376.360
3	51.447	374.085
4	71.447	374.208
5	91.287	376.727
6	110.683	381.606
7	129.354	388.775
8	147.032	398.129
9	163.461	409.535
10	178.404	422.828
11	189.659	435.566

Circle Center At X = 60.424 ; Y = 540.413 ; and Radius = 166.570

*** FOS = 1.621 Theta (ki=1.0) = 18.29 ***
Lambda = 0.330

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.714	381.000
2	57.562	378.533
3	77.560	378.285
4	97.462	380.259
5	117.022	384.431
6	135.998	390.749
7	154.155	399.136
8	171.268	409.486
9	187.126	421.674
10	201.533	435.546
11	202.626	436.863

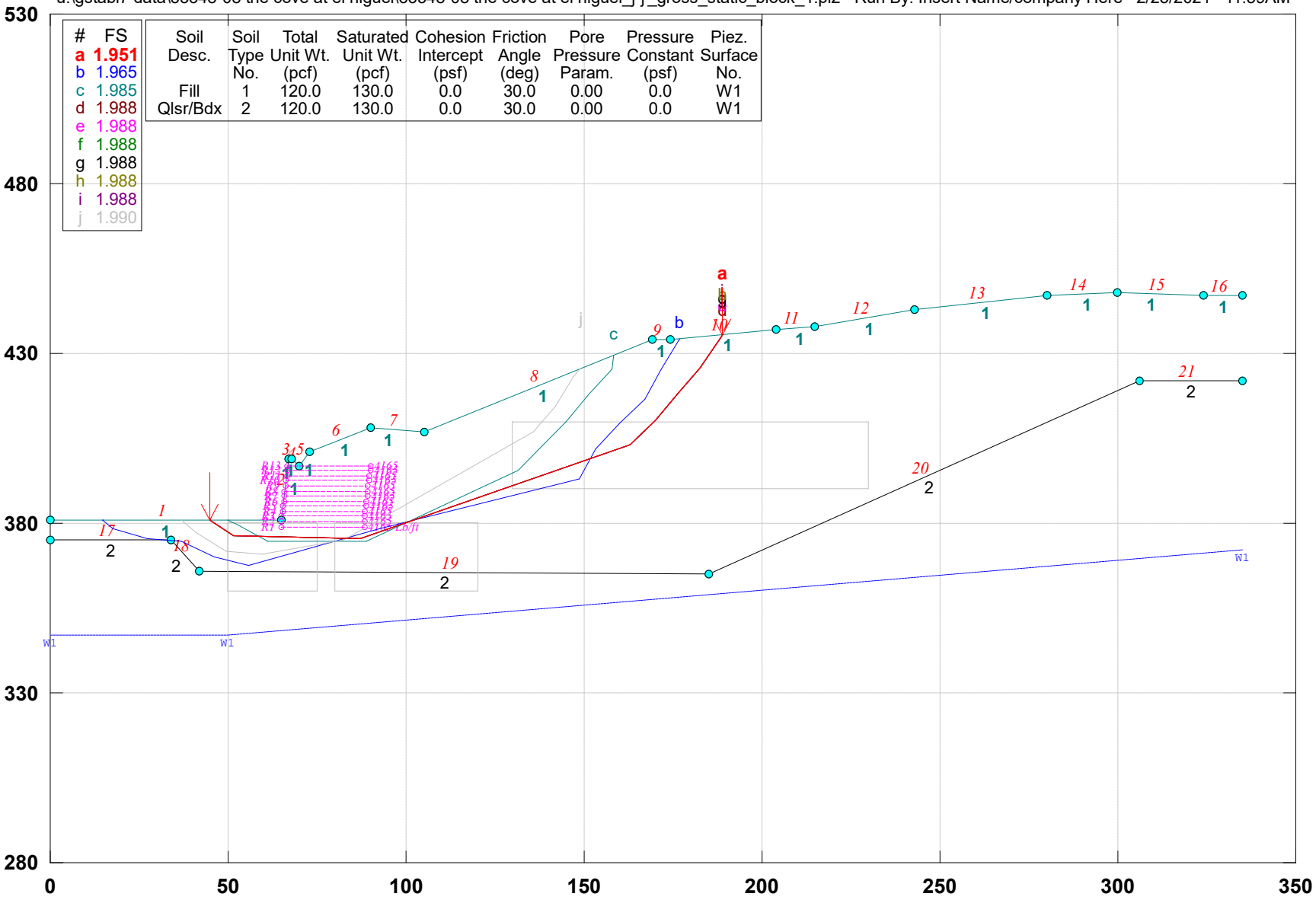
Circle Center At X = 69.788 ; Y = 557.944 ; and Radius = 179.827

*** FOS = 1.622 Theta (ki=1.0) = 18.02 ***
Lambda = 0.325

**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section J-J' 15.5' High MSE Wall_Static

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_j-j'_gross_static_block_1.pl2 Run By: Insert Name/company Here 2/25/2021 11:59AM



GSTABL7 v.2 FSmin=1.951

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 2/25/2021
Time of Run: 11:59AM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_static_block_1.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_static_block_1.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_static_block_1.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section J-J' 15.5' High MSE Wall_Static

BOUNDARY COORDINATES

16 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	381.00	65.00	381.00	1
2	65.00	381.00	67.00	399.00	1
3	67.00	399.00	68.00	399.00	1
4	68.00	399.00	70.00	397.00	1
5	70.00	397.00	73.00	401.00	1
6	73.00	401.00	90.00	408.00	1
7	90.00	408.00	105.00	407.00	1
8	105.00	407.00	169.00	434.00	1
9	169.00	434.00	174.00	434.00	1
10	174.00	434.00	204.00	437.00	1
11	204.00	437.00	215.00	438.00	1
12	215.00	438.00	243.00	443.00	1
13	243.00	443.00	280.00	447.00	1
14	280.00	447.00	300.00	448.00	1
15	300.00	448.00	324.00	447.00	1
16	324.00	447.00	335.00	447.00	1
17	0.00	375.00	34.00	375.00	2
18	34.00	375.00	42.00	366.00	2
19	42.00	366.00	185.00	365.00	2
20	185.00	365.00	306.00	422.00	2
21	306.00	422.00	335.00	422.00	2

User Specified Y-Origin = 280.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	30.0	0.00	0.0	1
2	120.0	130.0	0.0	30.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	347.00
2	50.00	347.00
3	335.00	372.00

1

REINFORCING LAYER(S)

13 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO. 1

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	379.00	4165.00	1.000
2	88.25	379.00	4165.00	1.000

REINFORCING LAYER NO. 2

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	380.50	4165.00	1.000

2	88.25	380.50	4165.00	1.000

REINFORCING LAYER NO. 3

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.11	382.00	4165.00	1.000
2	88.36	382.00	4165.00	1.000

REINFORCING LAYER NO. 4

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.28	383.50	4165.00	1.000
2	88.53	383.50	4165.00	1.000

REINFORCING LAYER NO. 5

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.44	385.00	4165.00	1.000
2	88.69	385.00	4165.00	1.000

REINFORCING LAYER NO. 6

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.61	386.50	4165.00	1.000
2	88.86	386.50	4165.00	1.000

REINFORCING LAYER NO. 7

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.78	388.00	4165.00	1.000
2	89.03	388.00	4165.00	1.000

REINFORCING LAYER NO. 8

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR

1	65.94	389.50	4165.00	1.000
2	89.19	389.50	4165.00	1.000

REINFORCING LAYER NO. 9

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.11	391.00	4165.00	1.000
2	89.36	391.00	4165.00	1.000

REINFORCING LAYER NO. 10

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.28	392.50	4165.00	1.000
2	89.53	392.50	4165.00	1.000

REINFORCING LAYER NO. 11

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.44	394.00	4165.00	1.000
2	89.69	394.00	4165.00	1.000

REINFORCING LAYER NO. 12

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.61	395.50	4165.00	1.000
2	89.86	395.50	4165.00	1.000

REINFORCING LAYER NO. 13

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.78	397.00	4165.00	1.000
2	90.03	397.00	4165.00	1.000

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

2000 Trial Surfaces Have Been Generated.

3 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	50.00	370.00	75.00	370.00	20.00
2	80.00	370.00	120.00	370.00	20.00
3	130.00	400.00	230.00	400.00	20.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 2000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 26

Number of Trial Surfaces With Valid FS = 1974

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 1.3 %

Statistical Data On All Valid FS Values:
FS Max = 8.444 FS Min = 1.951 FS Ave = 2.769
Standard Deviation = 0.580 Coefficient of Variation = 20.94 %

((Simplified Janbu FS for Critical Surface = 1.484))

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
4	163.026	403.173

5	170.070	410.271
6	176.220	418.156
7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.951 Theta (ki=1.0) = 19.08 ***
Lambda = 0.346

Individual data on the 17 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.7	1832.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	13.5	7612.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	2.0	3343.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.0	2756.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.0	5283.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	3.0	8309.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	14.0	47302.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.0	11358.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	15.0	50729.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	58.0	185427.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	6.0	19037.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	1.1	3115.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	3.9	10003.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	2.2	4629.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	6.3	9534.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.6	3435.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.7	54.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	14.856	381.000
2	17.519	378.337
3	27.074	375.386
4	37.031	374.454
5	46.065	370.165
6	55.742	367.645
7	92.449	378.534
8	148.573	393.094
9	153.153	401.984
10	159.902	409.364
11	166.968	416.439
12	171.710	425.243
13	176.689	433.916
14	176.777	434.278

*** FOS = 1.965 Theta (ki=1.0) = 17.39 ***
Lambda = 0.313

1

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	49.976	381.000
2	52.528	379.857
3	61.003	374.550
4	88.835	374.735
5	131.337	395.468
6	138.027	402.900
7	145.082	409.987
8	151.218	417.883
9	157.976	425.254
10	158.463	429.555

*** FOS = 1.985 Theta (ki=1.0) = 21.00 ***
Lambda = 0.384

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
4	163.026	403.173
5	170.070	410.271
6	176.220	418.156
7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.988 Theta (ki=1.0) = 18.91 ***
Lambda = 0.343

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
4	163.026	403.173
5	170.070	410.271
6	176.220	418.156
7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.988 Theta (ki=1.0) = 18.91 ***
Lambda = 0.343

Failure Surface Specified By 9 Coordinate Points

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1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
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5	170.070	410.271
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7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.988 Theta (ki=1.0) = 18.91 ***
Lambda = 0.343

1

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1	44.794	381.000
2	51.543	376.473
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Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
4	163.026	403.173
5	170.070	410.271
6	176.220	418.156
7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.988 Theta (ki=1.0) = 18.91 ***
Lambda = 0.343

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
4	163.026	403.173
5	170.070	410.271
6	176.220	418.156
7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.988 Theta (ki=1.0) = 18.91 ***
Lambda = 0.343

Failure Surface Specified By 9 Coordinate Points

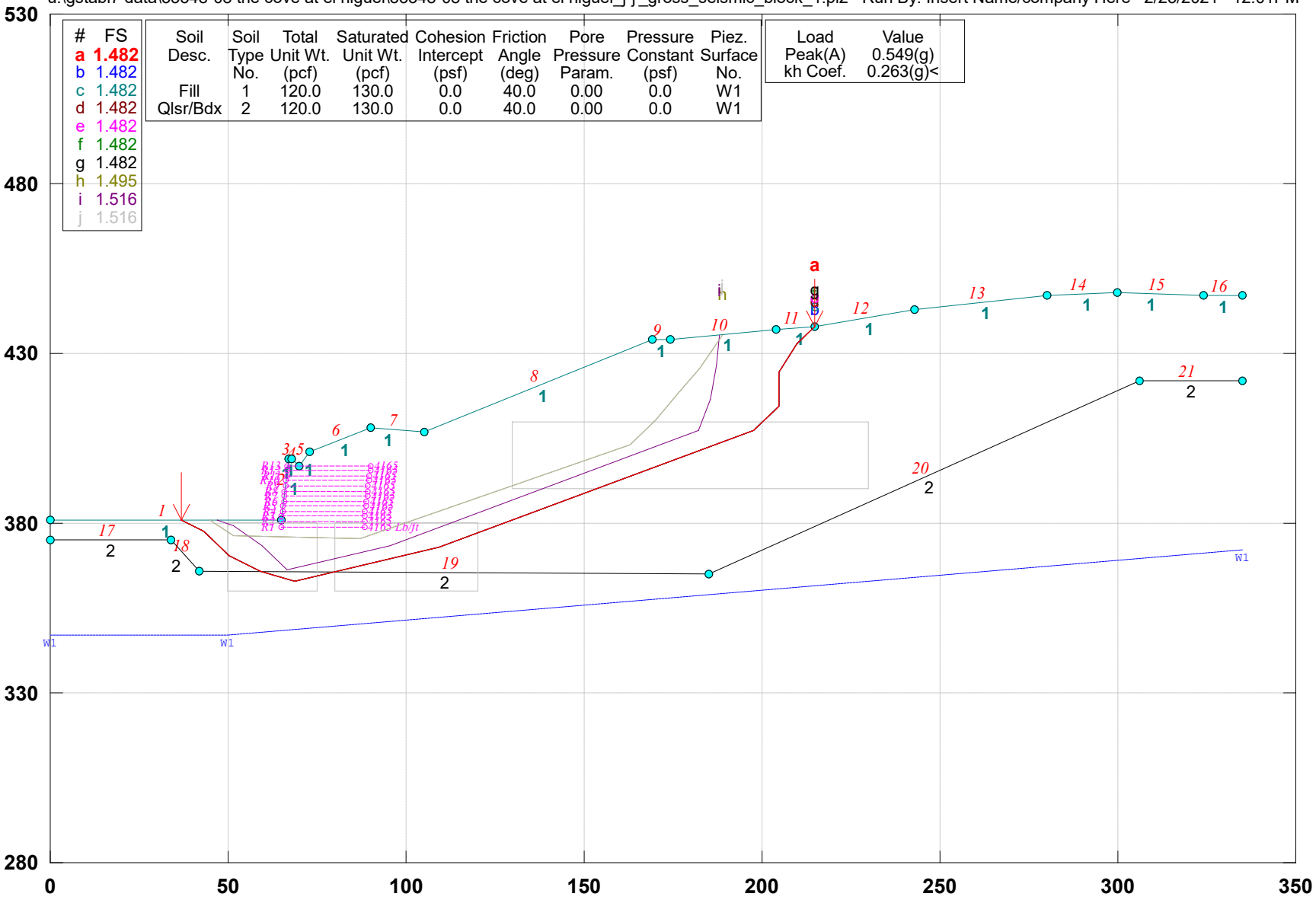
Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.938	381.000
2	40.972	377.021
3	49.438	371.699
4	59.410	370.951
5	82.458	375.004
6	135.511	406.791
7	142.053	414.354
8	147.071	423.004
9	149.215	425.653

*** FOS = 1.990 Theta (ki=1.0) = 19.23 ***
Lambda = 0.349

**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section J-J' 15.5' High MSE Wall_Static

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_block_1.pl2 Run By: Insert Name/company Here 2/25/2021 12:01PM



GSTABL7 v.2 FSmin=1.482

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 2/25/2021
Time of Run: 12:01PM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_block_1.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_block_1.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_gross_seismic_block_1.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section J-J' 15.5' High MSE Wall_Static

BOUNDARY COORDINATES

16 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	381.00	65.00	381.00	1
2	65.00	381.00	67.00	399.00	1
3	67.00	399.00	68.00	399.00	1
4	68.00	399.00	70.00	397.00	1
5	70.00	397.00	73.00	401.00	1
6	73.00	401.00	90.00	408.00	1
7	90.00	408.00	105.00	407.00	1
8	105.00	407.00	169.00	434.00	1
9	169.00	434.00	174.00	434.00	1
10	174.00	434.00	204.00	437.00	1
11	204.00	437.00	215.00	438.00	1
12	215.00	438.00	243.00	443.00	1
13	243.00	443.00	280.00	447.00	1
14	280.00	447.00	300.00	448.00	1
15	300.00	448.00	324.00	447.00	1
16	324.00	447.00	335.00	447.00	1
17	0.00	375.00	34.00	375.00	2
18	34.00	375.00	42.00	366.00	2
19	42.00	366.00	185.00	365.00	2
20	185.00	365.00	306.00	422.00	2
21	306.00	422.00	335.00	422.00	2

User Specified Y-Origin = 280.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)
1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	0.0	40.0	0.00	0.0	1
2	120.0	130.0	0.0	40.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	347.00
2	50.00	347.00
3	335.00	372.00

Specified Peak Ground Acceleration Coefficient (A) = 0.549(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.263(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000
1

REINFORCING LAYER(S)

13 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO. 1

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	379.00	4165.00	1.000
2	88.25	379.00	4165.00	1.000

REINFORCING LAYER NO. 2

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.00	380.50	4165.00	1.000
2	88.25	380.50	4165.00	1.000

REINFORCING LAYER NO. 3

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.11	382.00	4165.00	1.000
2	88.36	382.00	4165.00	1.000

REINFORCING LAYER NO. 4

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.28	383.50	4165.00	1.000
2	88.53	383.50	4165.00	1.000

REINFORCING LAYER NO. 5

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.44	385.00	4165.00	1.000
2	88.69	385.00	4165.00	1.000

REINFORCING LAYER NO. 6

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.61	386.50	4165.00	1.000
2	88.86	386.50	4165.00	1.000

REINFORCING LAYER NO. 7

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.78	388.00	4165.00	1.000
2	89.03	388.00	4165.00	1.000

REINFORCING LAYER NO. 8

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	65.94	389.50	4165.00	1.000
2	89.19	389.50	4165.00	1.000

REINFORCING LAYER NO. 9

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.11	391.00	4165.00	1.000
2	89.36	391.00	4165.00	1.000

REINFORCING LAYER NO. 10

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.28	392.50	4165.00	1.000
2	89.53	392.50	4165.00	1.000

REINFORCING LAYER NO. 11

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.44	394.00	4165.00	1.000
2	89.69	394.00	4165.00	1.000

REINFORCING LAYER NO. 12

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.61	395.50	4165.00	1.000
2	89.86	395.50	4165.00	1.000

REINFORCING LAYER NO. 13

2 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	66.78	397.00	4165.00	1.000
2	90.03	397.00	4165.00	1.000

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

2000 Trial Surfaces Have Been Generated.

3 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	50.00	370.00	75.00	370.00	20.00
2	80.00	370.00	120.00	370.00	20.00
3	130.00	400.00	230.00	400.00	20.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces (if applicable) have been applied to the slice base(s) on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 2000

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 72

Number of Trial Surfaces with Misleading FS = 528

Number of Trial Surfaces With Valid FS = 1400

Percentage of Trial Surfaces With Non-Valid FS Solutions of the Total Attempted = 30.0 %

Statistical Data On All Valid FS Values:
FS Max = 4.358 FS Min = 1.482 FS Ave = 2.044
Standard Deviation = 0.369 Coefficient of Variation = 18.05 %

((Simplified Janbu FS for Critical Surface = 1.240))

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.997	381.000
2	43.038	377.418
3	50.114	370.352
4	59.045	365.854
5	68.596	362.889
6	109.421	372.919
7	197.645	407.245
8	204.619	414.412
9	204.810	424.410
10	209.964	432.980
11	214.983	437.998

*** FOS = 1.482 Theta (ki=1.0) = 15.00 ***
Lambda = 0.268

Individual data on the 22 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.0	1298.3	0.0	0.0	0.	0.	341.5	0.0	0.0
2	7.1	6041.7	0.0	0.0	0.	0.	1589.0	0.0	0.0
3	8.9	13724.5	0.0	0.0	0.	0.	3609.6	0.0	0.0
4	0.1	97.5	0.0	0.0	0.	0.	25.7	0.0	0.0
5	6.0	11482.8	0.0	0.0	0.	0.	3020.0	0.0	0.0
6	2.0	6313.1	0.0	0.0	0.	0.	1660.4	0.0	0.0
7	1.0	4292.5	0.0	0.0	0.	0.	1128.9	0.0	0.0
8	0.6	2554.2	0.0	0.0	0.	0.	671.8	0.0	0.0
9	1.4	5836.7	0.0	0.0	0.	0.	1535.0	0.0	0.0
10	3.0	12743.0	0.0	0.0	0.	0.	3351.4	0.0	0.0
11	7.2	32378.1	0.0	0.0	0.	0.	8515.4	0.0	0.0
12	9.8	46040.6	0.0	0.0	0.	0.	12108.7	0.0	0.0
13	15.0	67517.9	0.0	0.0	0.	0.	17757.2	0.0	0.0
14	4.4	18865.4	0.0	0.0	0.	0.	4961.6	0.0	0.0
15	59.6	263982.3	0.0	0.0	0.	0.	69427.3	0.0	0.0
16	5.0	22156.6	0.0	0.0	0.	0.	5827.2	0.0	0.0
17	23.6	92322.4	0.0	0.0	0.	0.	24280.8	0.0	0.0
18	6.4	19957.8	0.0	0.0	0.	0.	5248.9	0.0	0.0
19	0.6	1703.2	0.0	0.0	0.	0.	447.9	0.0	0.0
20	0.2	405.7	0.0	0.0	0.	0.	106.7	0.0	0.0
21	5.2	5326.7	0.0	0.0	0.	0.	1400.9	0.0	0.0
22	5.0	1373.8	0.0	0.0	0.	0.	361.3	0.0	0.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.997	381.000
2	43.038	377.418
3	50.114	370.352
4	59.045	365.854
5	68.596	362.889
6	109.421	372.919
7	197.645	407.245
8	204.619	414.412
9	204.810	424.410
10	209.964	432.980
11	214.983	437.998

*** FOS = 1.482 Theta (ki=1.0) = 15.00 ***
Lambda = 0.268

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.997	381.000
2	43.038	377.418
3	50.114	370.352
4	59.045	365.854
5	68.596	362.889
6	109.421	372.919
7	197.645	407.245
8	204.619	414.412
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*** FOS = 1.482 Theta (ki=1.0) = 15.00 ***
Lambda = 0.268

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.997	381.000
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1

Failure Surface Specified By 11 Coordinate Points

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9	204.810	424.410
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11	214.983	437.998

*** FOS = 1.482 Theta (ki=1.0) = 15.00 ***
Lambda = 0.268

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.997	381.000
2	43.038	377.418
3	50.114	370.352
4	59.045	365.854
5	68.596	362.889
6	109.421	372.919
7	197.645	407.245
8	204.619	414.412
9	204.810	424.410
10	209.964	432.980
11	214.983	437.998

*** FOS = 1.482 Theta (ki=1.0) = 15.00 ***
Lambda = 0.268

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.997	381.000
2	43.038	377.418
3	50.114	370.352
4	59.045	365.854
5	68.596	362.889
6	109.421	372.919
7	197.645	407.245
8	204.619	414.412
9	204.810	424.410
10	209.964	432.980
11	214.983	437.998

*** FOS = 1.482 Theta (ki=1.0) = 15.00 ***
Lambda = 0.268

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
4	163.026	403.173
5	170.070	410.271
6	176.220	418.156
7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.495 Theta (ki=1.0) = 17.84 ***
Lambda = 0.322

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	47.063	381.000
2	51.374	379.079
3	59.448	373.179
4	66.533	366.122
5	95.339	373.573
6	182.362	407.196
7	185.472	416.700
8	187.107	426.566
9	187.885	435.388

*** FOS = 1.516 Theta (ki=1.0) = 15.00 ***
Lambda = 0.268

Failure Surface Specified By 9 Coordinate Points

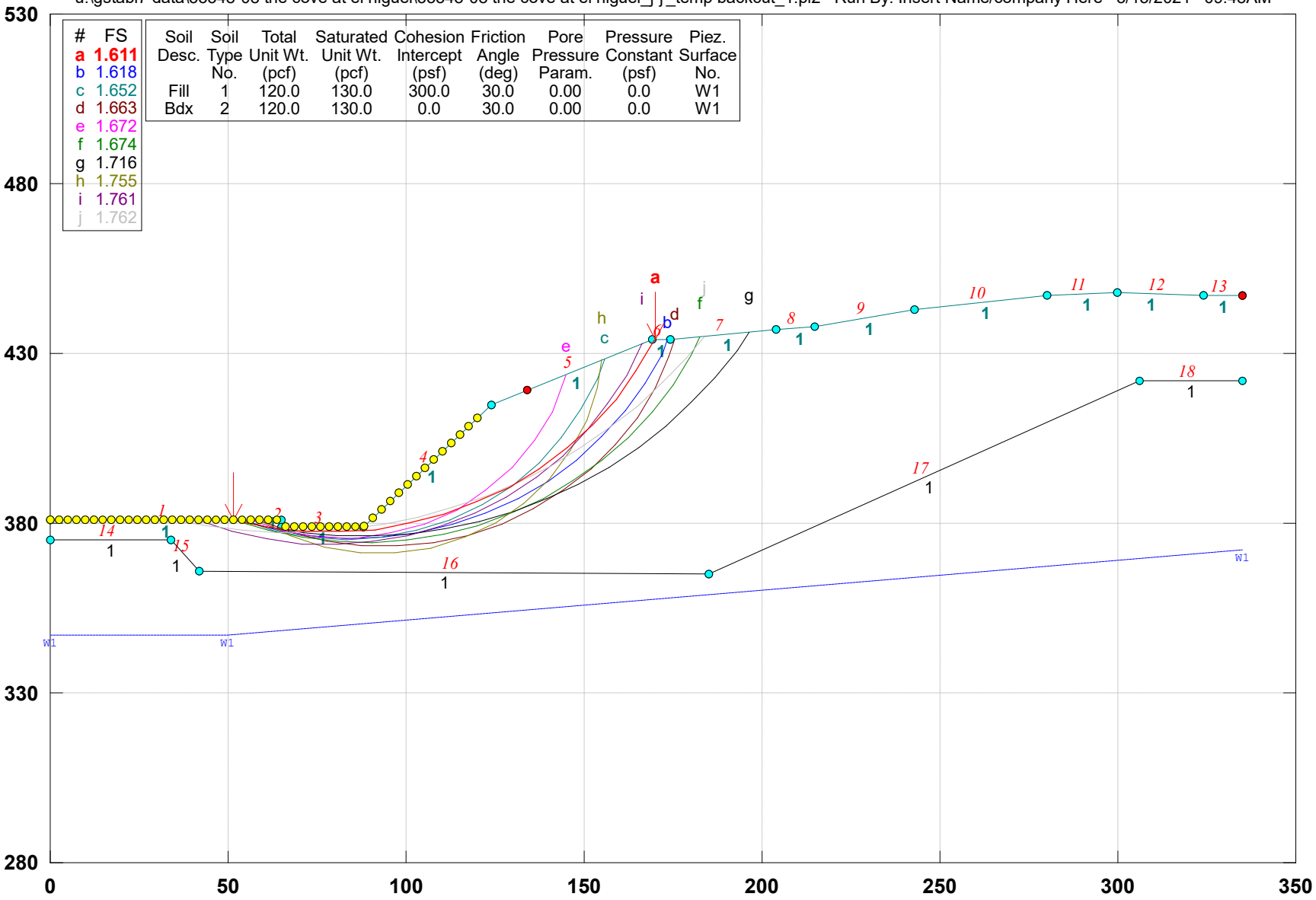
Point No.	X-Surf (ft)	Y-Surf (ft)
1	44.794	381.000
2	51.543	376.473
3	86.980	375.487
4	163.026	403.173
5	170.070	410.271
6	176.220	418.156
7	182.567	425.884
8	188.168	434.168
9	188.894	435.489

*** FOS = 1.516 Theta (ki=1.0) = 17.76 ***
Lambda = 0.320

**** END OF GSTABL7 OUTPUT ****

33348-08 The Cove at El Niguel Section J-J' 15.5' High MSE Wall_Temp BC

u:\gstabl7 data\33348-08 the cove at el niguel\33348-08 the cove at el niguel_j-j'_temp backcut_1.pl2 Run By: Insert Name/company Here 3/15/2021 09:48AM



GSTABL7 v.2 FSmin=1.611

Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1)

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 3/15/2021
Time of Run: 09:48AM
Run By: Insert Name/company Here
Input Data Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_temp backcut_1.in
Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_temp backcut_1.OUT
Unit System: English

Plotted Output Filename: U:\GStabl7 Data\33348-08 The Cove at El Niguel\33348-08 the cove at el niguel_j-j'_temp backcut_1.PLT

PROBLEM DESCRIPTION: 33348-08 The Cove at El Niguel
Section J-J' 15.5' High MSE Wall_Temp BC

BOUNDARY COORDINATES

13 Top Boundaries
18 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	381.00	65.00	381.00	1
2	65.00	381.00	65.01	379.00	1
3	65.01	379.00	88.00	379.00	1
4	88.00	379.00	124.00	415.00	1
5	124.00	415.00	169.00	434.00	1
6	169.00	434.00	174.00	434.00	1
7	174.00	434.00	204.00	437.00	1
8	204.00	437.00	215.00	438.00	1
9	215.00	438.00	243.00	443.00	1
10	243.00	443.00	280.00	447.00	1
11	280.00	447.00	300.00	448.00	1
12	300.00	448.00	324.00	447.00	1
13	324.00	447.00	335.00	447.00	1
14	0.00	375.00	34.00	375.00	1
15	34.00	375.00	42.00	366.00	1
16	42.00	366.00	185.00	365.00	1
17	185.00	365.00	306.00	422.00	1
18	306.00	422.00	335.00	422.00	1

User Specified Y-Origin = 280.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	130.0	300.0	30.0	0.00	0.0	1
2	120.0	130.0	0.0	30.0	0.00	0.0	1

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	347.00
2	50.00	347.00
3	335.00	372.00

1

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

1000 Trial Surfaces Have Been Generated.

20 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 0.00(ft)
and X = 120.00(ft)

Each Surface Terminates Between X = 134.00(ft)
and X = 335.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 280.00(ft)

10.00(ft) Line Segments Define Each Trial Failure Surface.

**** ERROR - RC11 ****

Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By GLE (Spencer`s) Method (0-1) * *

Selected ki function = Constant (1.0)

Selected Lambda Coefficient = 1.00

Forces from Reinforcement, Piers/Piles, Soil Nails, and Applied Forces
(if applicable) have been applied to the slice base(s)
on which they intersect.

Specified Tension Crack Water Force Factor = 0.000

Total Number of Trial Surfaces Attempted = 1000

Number of Failed Attempts to Generate Trial Surface = 479

Number of Trial Surfaces With Valid FS = 521

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 47.9 %

Statistical Data On All Valid FS Values:
FS Max = 4.100 FS Min = 1.611 FS Ave = 2.660
Standard Deviation = 0.344 Coefficient of Variation = 12.94 %

((Modified Bishop FS for Critical Surface = 1.612))

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	51.429	381.000
2	61.193	378.844
3	71.122	377.650
4	81.119	377.430
5	91.091	378.187
6	100.941	379.913
7	110.575	382.591
8	119.903	386.196
9	128.834	390.694
10	137.285	396.041
11	145.173	402.187
12	152.424	409.073
13	158.969	416.634
14	164.745	424.797
15	169.698	433.484
16	169.928	434.000

Circle Center At X = 78.371 ; Y = 479.734 ; and Radius = 102.344

*** FOS = 1.611 Theta (ki=1.0) = 20.92 ***
Lambda = 0.382

Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.8	1263.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.8	1089.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.0	1.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	6.1	720.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.0	1751.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.9	1080.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	3.1	918.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	9.8	9415.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.6	17928.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	9.3	24452.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	4.1	12647.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.8	15399.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.5	25814.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	7.9	21923.5	0.0	0.0	0.	0.	0.0	0.0	0.0
15	7.3	17263.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	6.5	12196.6	0.0	0.0	0.	0.	0.0	0.0	0.0
17	5.8	7117.8	0.0	0.0	0.	0.	0.0	0.0	0.0
18	4.3	2334.9	0.0	0.0	0.	0.	0.0	0.0	0.0
19	0.7	94.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.2	7.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	53.878	381.000
2	63.468	378.168
3	73.302	376.355
4	83.272	375.581
5	93.269	375.854
6	103.181	377.172
7	112.902	379.519
8	122.324	382.871
9	131.343	387.190
10	139.861	392.429
11	147.784	398.530
12	155.025	405.427
13	161.504	413.044
14	167.152	421.296
15	171.904	430.095
16	173.512	434.000

Circle Center At X = 85.673 ; Y = 470.752 ; and Radius = 95.217

*** FOS = 1.618 Theta (ki=1.0) = 20.95 ***
Lambda = 0.383

1

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	53.878	381.000
2	63.344	377.777
3	73.151	375.821
4	83.129	375.167

5	93.108	375.825
6	102.914	377.784
7	112.379	381.011
8	121.340	385.450
9	129.642	391.024
10	137.143	397.638
11	143.713	405.177
12	149.239	413.511
13	153.625	422.498
14	155.577	428.332

Circle Center At X = 83.115 ; Y = 451.103 ; and Radius = 75.955

*** FOS = 1.652 Theta (ki=1.0) = 19.96 ***
Lambda = 0.363

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	58.776	381.000
2	68.089	377.359
3	77.767	374.841
4	87.674	373.480
5	97.672	373.296
6	107.623	374.290
7	117.386	376.450
8	126.828	379.745
9	135.816	384.130
10	144.224	389.542
11	151.937	395.908
12	158.845	403.137
13	164.854	411.131
14	169.880	419.776
15	173.852	428.953
16	175.403	434.140

Circle Center At X = 94.228 ; Y = 457.743 ; and Radius = 84.536

*** FOS = 1.663 Theta (ki=1.0) = 20.96 ***
Lambda = 0.383

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	56.327	381.000
2	65.771	377.713
3	75.609	375.921
4	85.606	375.664
5	95.523	376.951
6	105.123	379.749
7	114.178	383.992
8	122.472	389.579
9	129.806	396.377
10	136.005	404.224
11	140.923	412.931
12	144.440	422.292

13	144.745	423.759

Circle Center At X = 82.262 ; Y = 440.316 ; and Radius = 64.738

*** FOS = 1.672 Theta (ki=1.0) = 20.12 ***
Lambda = 0.366

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	51.429	381.000
2	60.953	377.951
3	70.724	375.827
4	80.654	374.646
5	90.652	374.419
6	100.625	375.149
7	110.483	376.829
8	120.135	379.443
9	129.493	382.968
10	138.472	387.370
11	146.989	392.611
12	154.966	398.642
13	162.330	405.407
14	169.014	412.845
15	174.956	420.888
16	180.103	429.462
17	182.680	434.868

Circle Center At X = 88.018 ; Y = 478.905 ; and Radius = 104.519

*** FOS = 1.674 Theta (ki=1.0) = 20.02 ***
Lambda = 0.364

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	51.429	381.000
2	61.145	378.636
3	71.015	377.027
4	80.979	376.182
5	90.979	376.107
6	100.955	376.801
7	110.847	378.262
8	120.598	380.479
9	130.150	383.441
10	139.445	387.129
11	148.429	391.521
12	157.048	396.592
13	165.251	402.311
14	172.989	408.645
15	180.217	415.556
16	186.892	423.002
17	192.974	430.940
18	196.423	436.242

Circle Center At X = 86.962 ; Y = 505.638 ; and Radius = 129.605

*** FOS = 1.716 Theta (ki=1.0) = 19.74 ***
Lambda = 0.359

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	58.776	381.000
2	67.592	376.281
3	77.047	373.024
4	86.899	371.313
5	96.899	371.192
6	106.790	372.662
7	116.321	375.688
8	125.250	380.191
9	133.348	386.058
10	140.410	393.138
11	146.256	401.251
12	150.737	410.191
13	153.738	419.730
14	154.956	428.070

Circle Center At X = 92.648 ; Y = 433.587 ; and Radius = 62.552

*** FOS = 1.755 Theta (ki=1.0) = 18.71 ***
Lambda = 0.339

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	41.633	381.000
2	51.049	377.635
3	60.768	375.278
4	70.680	373.956
5	80.676	373.683
6	90.646	374.462
7	100.478	376.286
8	110.064	379.132
9	119.298	382.971
10	128.078	387.759
11	136.305	393.443
12	143.889	399.961
13	150.746	407.240
14	156.800	415.199
15	161.984	423.750
16	166.240	432.799
17	166.254	432.841

Circle Center At X = 78.266 ; Y = 468.650 ; and Radius = 94.998

*** FOS = 1.761 Theta (ki=1.0) = 18.44 ***
Lambda = 0.333

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.286	381.000
2	44.102	379.090
3	54.025	377.853
4	64.009	377.295
5	74.008	377.417
6	83.976	378.220
7	93.866	379.700
8	103.632	381.850
9	113.229	384.660
10	122.613	388.117
11	131.739	392.205
12	140.566	396.905
13	149.052	402.195
14	157.159	408.050
15	164.847	414.444
16	172.083	421.347
17	178.832	428.726
18	183.815	434.982

Circle Center At X = 67.218 ; Y = 523.868 ; and Radius = 146.614

*** FOS = 1.762 Theta (ki=1.0) = 18.39 ***
Lambda = 0.333

**** END OF GSTABL7 OUTPUT ****

APPENDIX C

BORING LOG
(AGI-31)

AGSB-31

File No.:	31515.23
Project Name:	Niguel Summit
Location:	End of cul-de-sac at buttress fill
Start Date:	04/24/02
Total Depth:	
Surface Conditions:	Slightly moist soil planted with acacia

FILL

0.0' – 60.0'	Silty CLAY, olive green / olive brown, slightly moist to moist, firm
60.0	Seepage

FORMATION

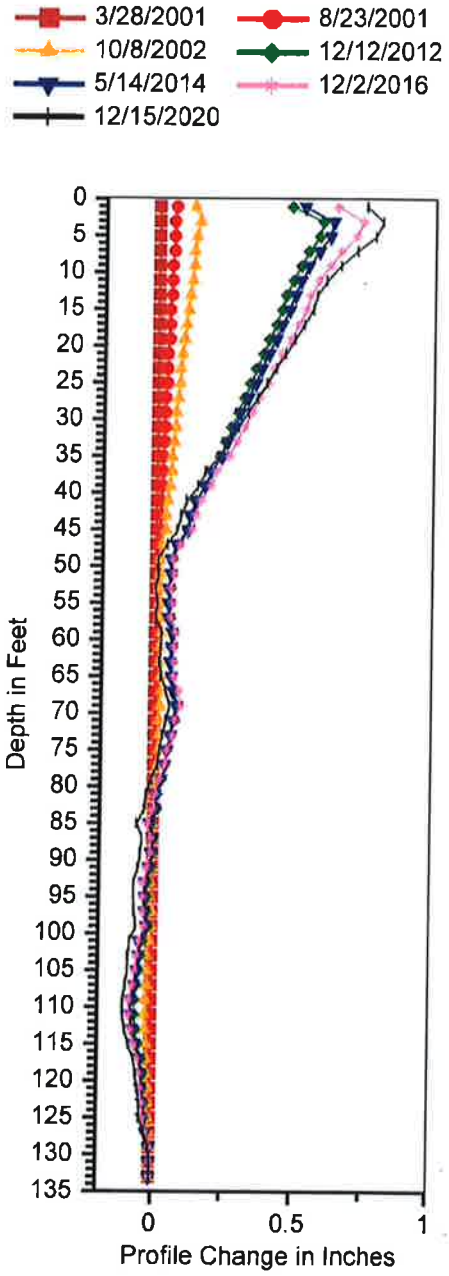
60.0' – 85.0'	Silty CLAY, light brown, very moist, soft to firm
	H2O at 52' after 30 minutes

NOTES:

APPENDIX D

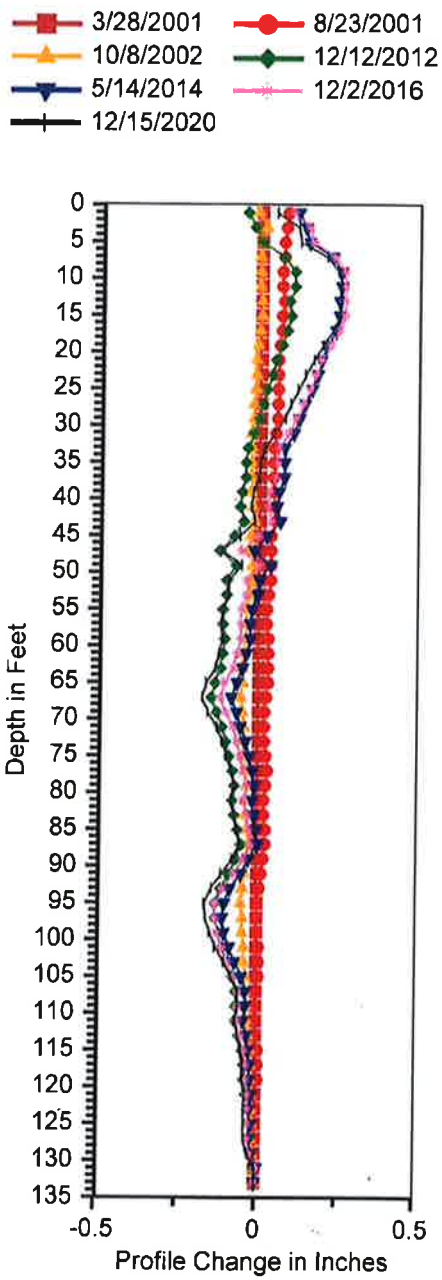
SLOPE INCLINOMETER PLOTS
(AGI-26, AGI-27, AND AGI-31)

31515 AG-26 A

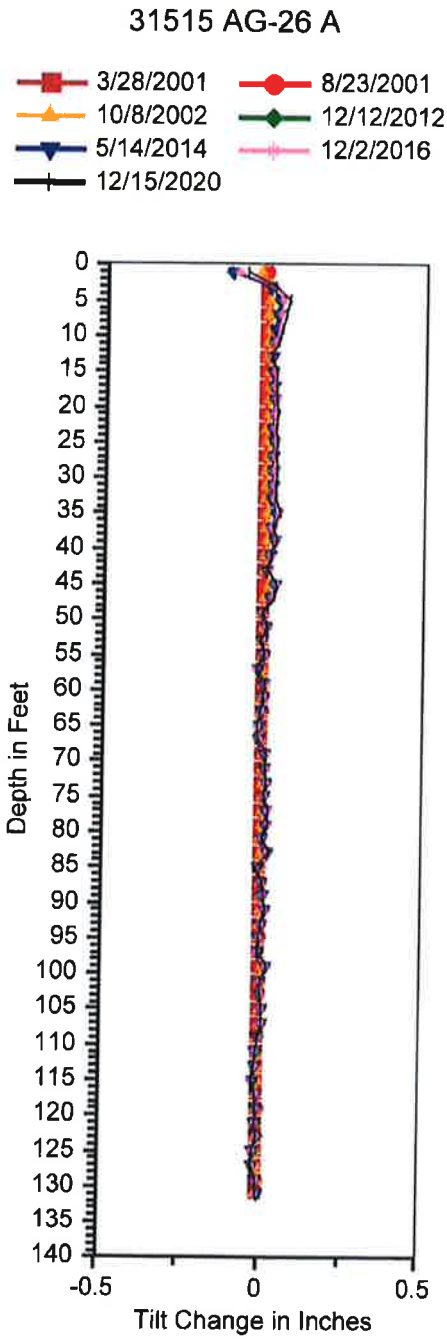


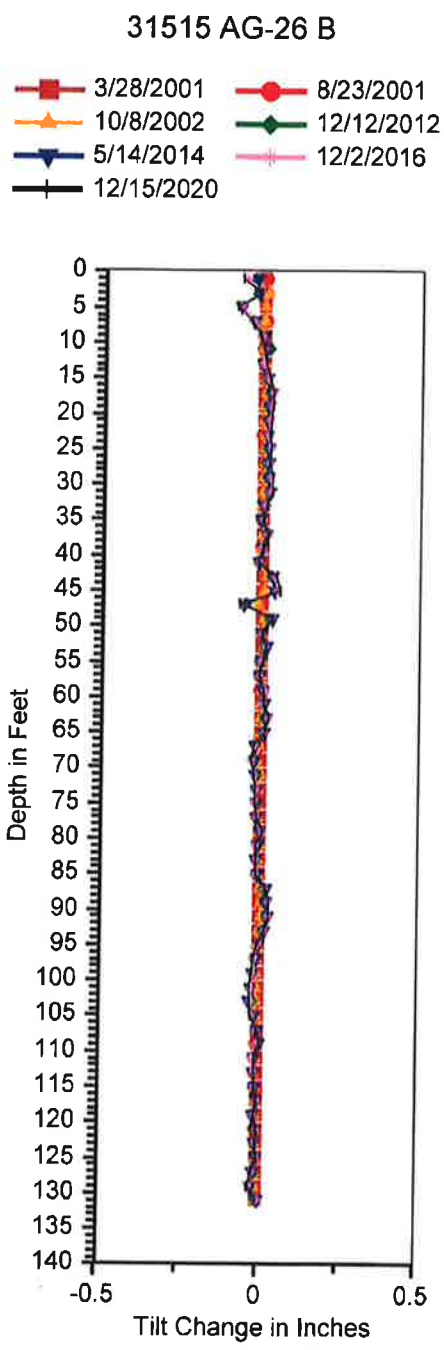
Cumulative Displacement (in)
Niguel Summit FN: 31515
American Geotechnical
Inclinometer elev. 440'
First reading depth: 134'

31515 AG-26 B



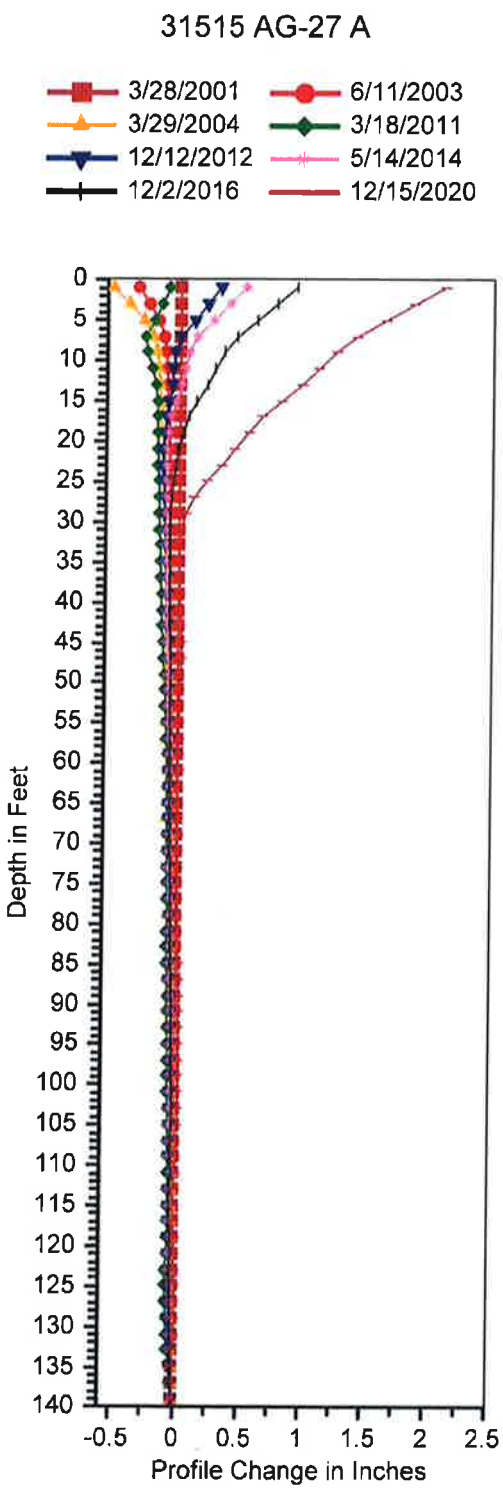
Approx bedrock elev. 375'
(both slip surfaces removed during repair)
Re-zeroed probe on 3/28/01
Note: bottom 4' lost to sediment filling prior to 3/28/01

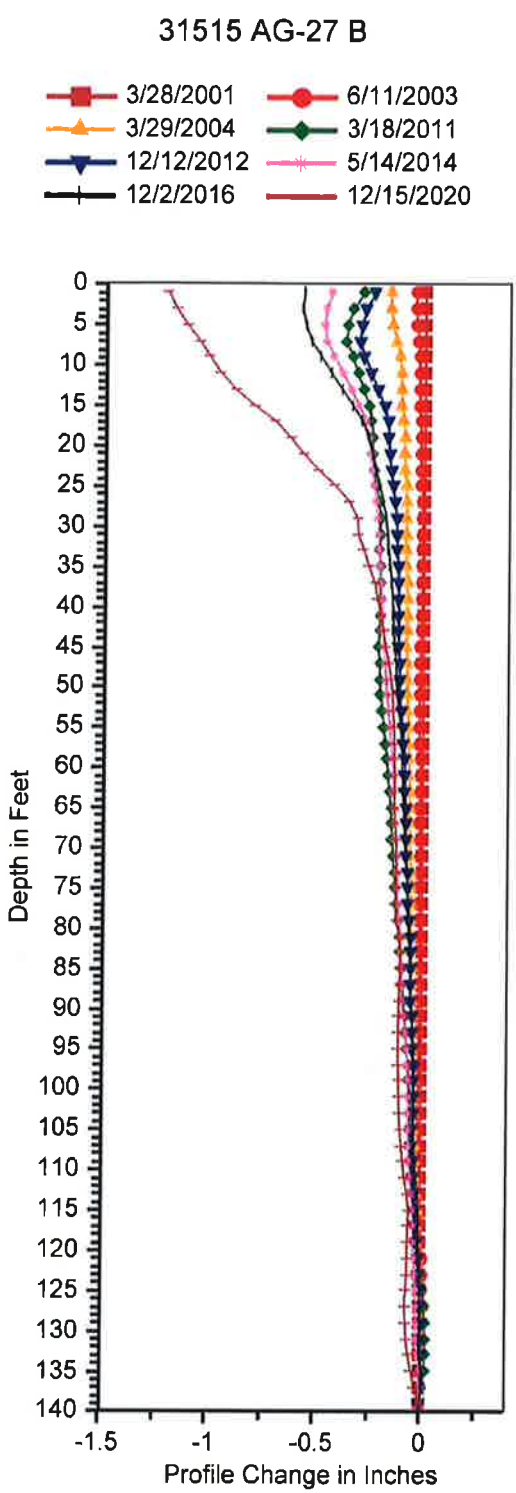




Incremental Displacement (in)
Niguel Summit FN: 31515
American Geotechnical
Inclinometer elev. 440'
First reading depth: 134'

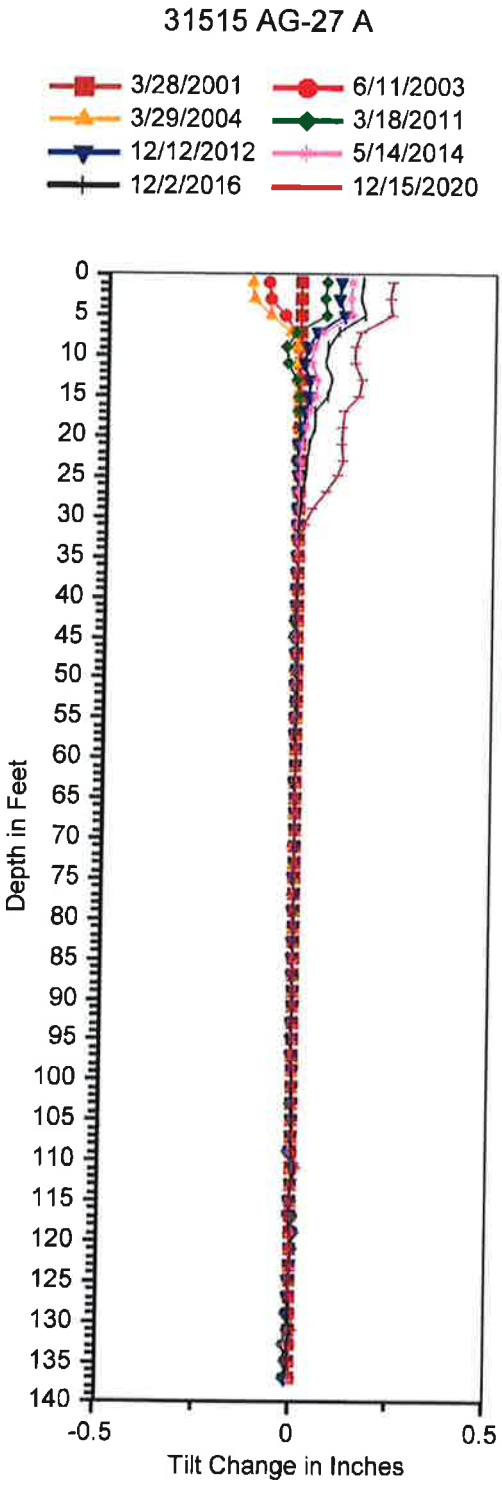
Approx. bedrock elev. 375'
(both slip surfaces removed during repair)
Re-zeroed probe on 3/28/01
Note: bottom 4' lost to sediment filling prior to 3/28/01

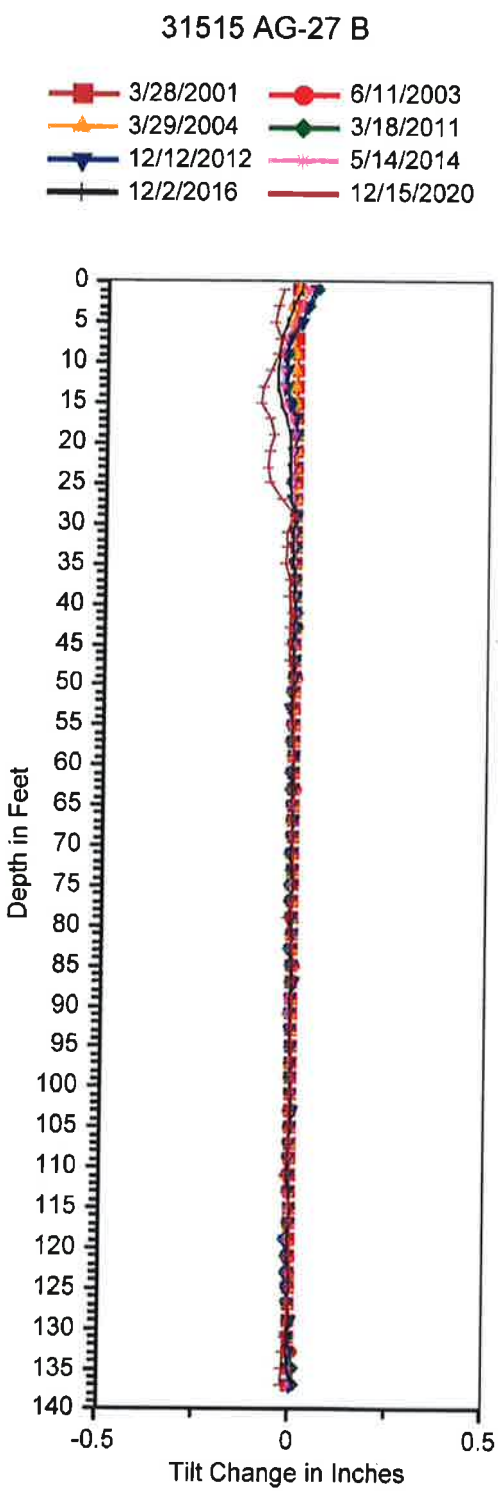




Cumulative Displacement (in)
Niguel Summit FN: 31515
American Geotechnical
Inclinometer elev. 380'
First reading depth: 138'

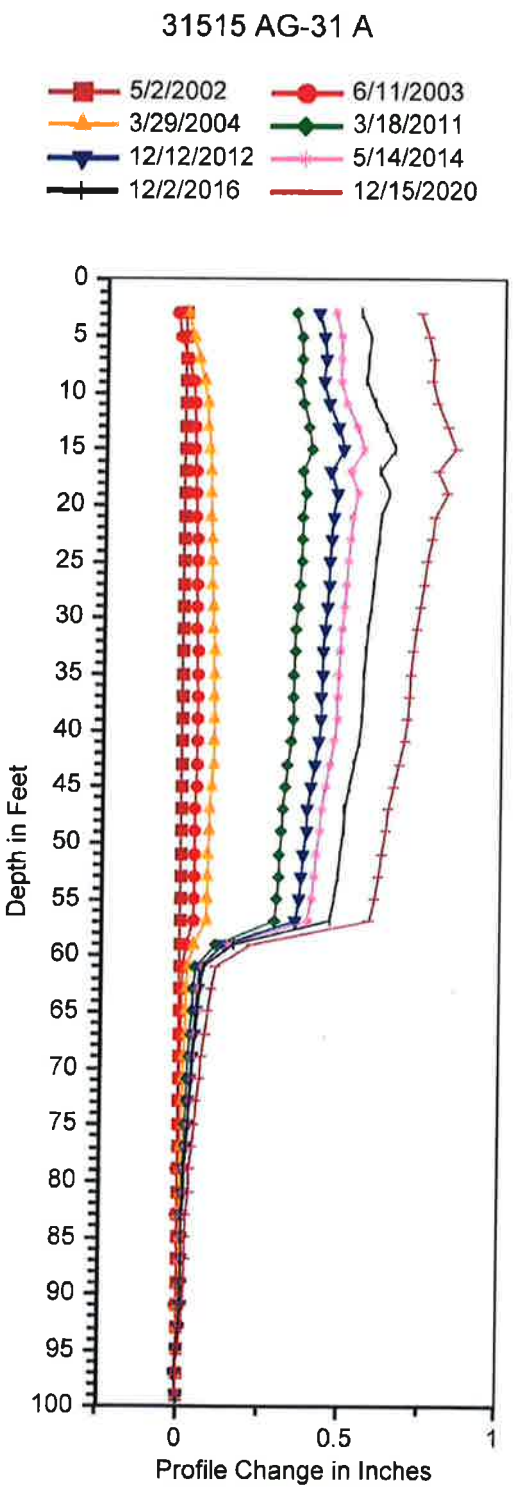
Re-zeroed probe on 3/28/01

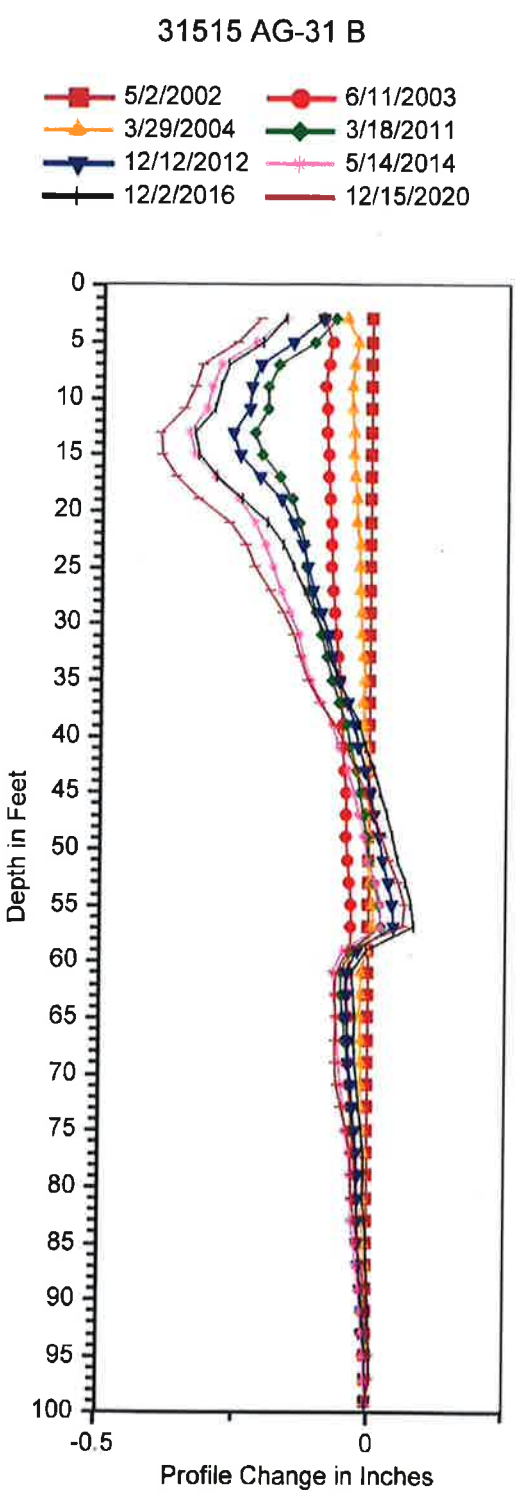




Incremental Displacement (in)
Niguel Summit FN: 31515
American Geotechnical
Inclinometer elev. 380'
First reading depth: 138'

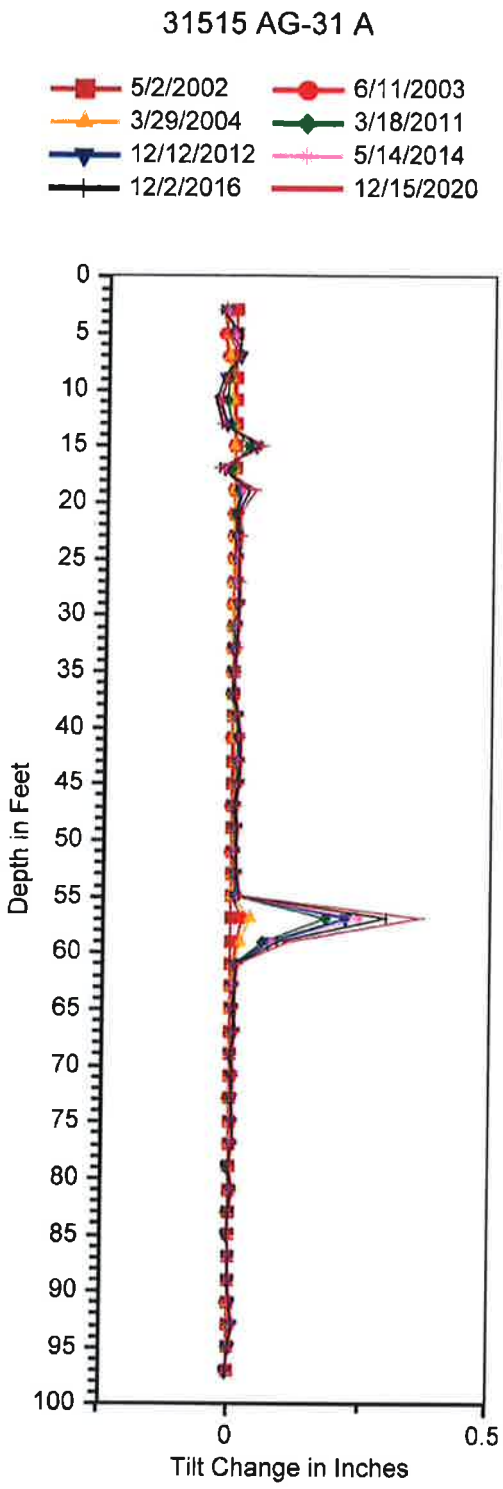
Re-zeroed probe on 3/28/01

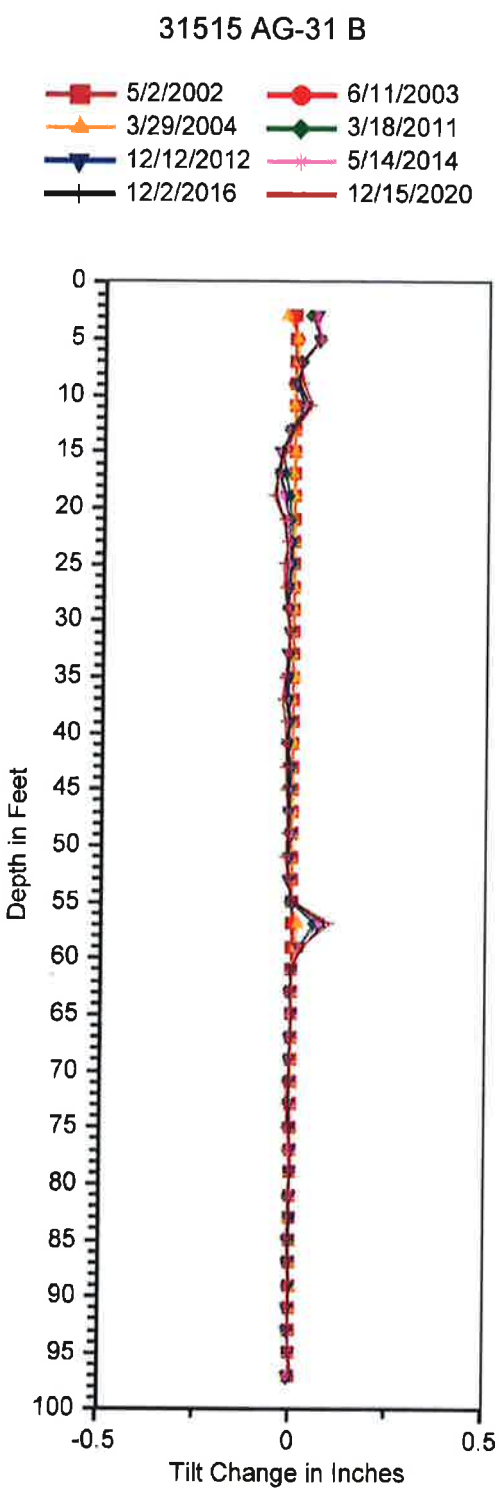




Cumulative Displacement (in)
Niquel Summit FN: 31515
American Geotechnical

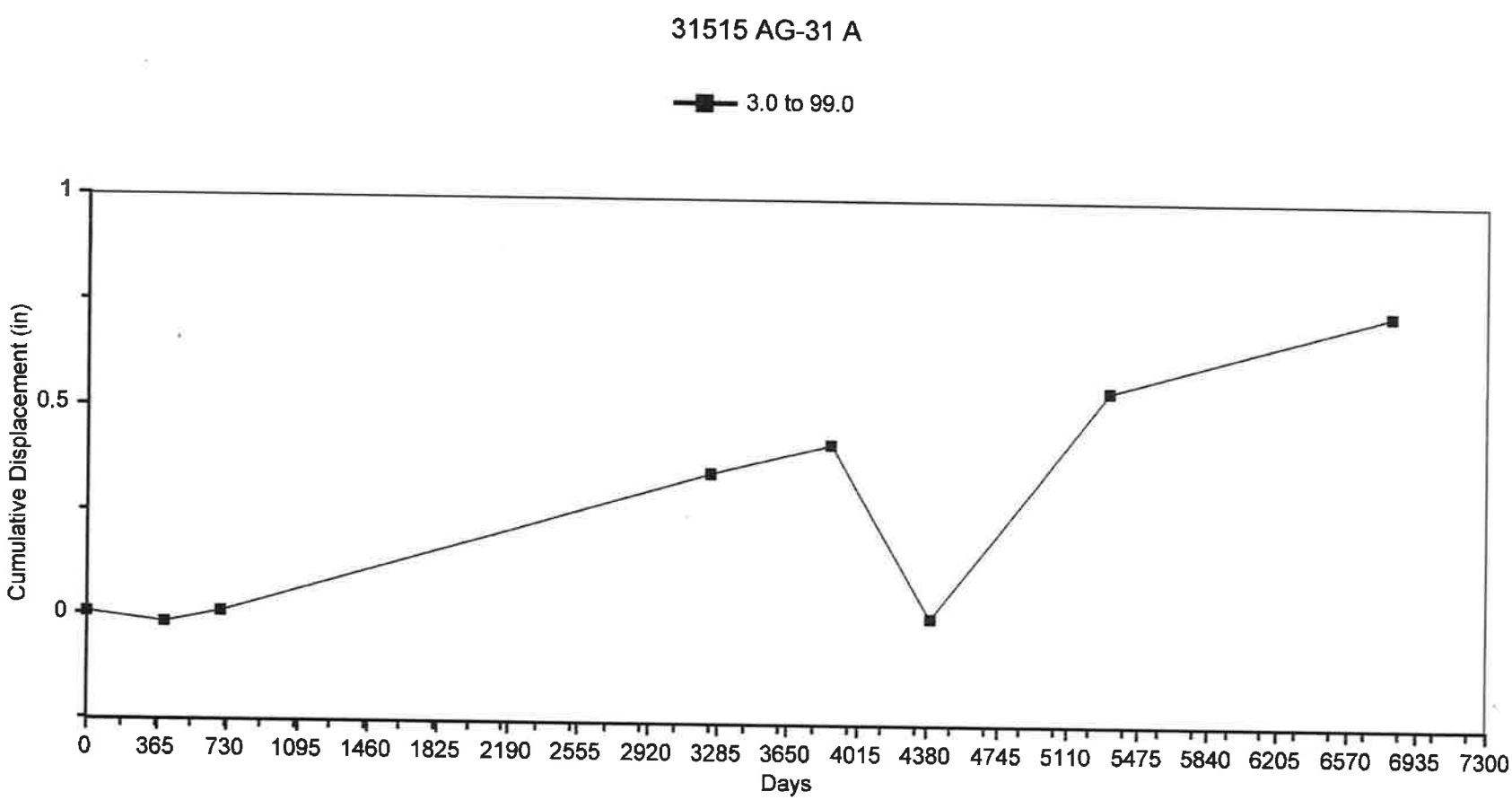
End of fire road





Incremental Displacement (in)
Niguel Summit FN: 31515
American Geotechnical

End of fire road



Time Plot of Cumulative Displacement (in) since 5/2/02
Niguel Summit
AGI-31
American Geotechnical