LOS VALLES PROJECT

Draft Environmental Impact Report

Volume XI – Appendices

SCH No. 2013121056
Project No. 98-034
Revised Vesting Tentative Tract No. 52584
Variance No. 201300003
Conditional Use Permit No. 201300081
Oak Tree Permit No. 201300023
Environmental Assessment No. 201300138

Lead Agency:

County of Los Angeles
Department of Regional Planning
Land Divisions
320 West Temple Street, Room 1362
Los Angeles, CA 90012

Prepared by:

Impact Sciences, Inc.
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March 2016

APPENDIX 5.6-6

Allan E. Seward Engineering Geology, Inc.,
Geologic and Geotechnical Report, August 27, 2004.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 6
Response to Los Angeles County Geologic Review Sheet dated July 10, 2003
and Soils Engineering Review Sheet dated July 9, 2003

GEOLOGIC AND GEOTECHNICAL REPORT
Amended Vesting Tentative Tract Map (Undated)

Vesting Tentative Tract Map No. 52584
Castaic, County of Los Angeles, California

Prepared for:

Los Valles Land and Golf, LLC
c/o Palmer Investments
233 Wilshire Boulevard, Suite 100
Santa Monica, California 90401

Job No: 04-1617LV-4
Dated August 27, 2004

27825 Smyth Drive, Valencia, California 91355 661-294-0065 FAX 661-294-0833

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Amended Vesting Tentative Tract Map (Undated)

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ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

August 27, 2004 Job No: 04-1617LV-4

Los Valles Land and Golf, LLC.
c/o Palmer Investments
233 Wilshire Boulevard, Suite 100
Santa Monica, California 90401

Attention: Mr. Dan Palmer

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT – ADDENDUM NO. 6**
Response to Los Angeles County Geologic Review Sheet dated July 10, 2003 and Soils Engineering Review Sheet dated July 9, 2003

GEOLOGIC AND GEOTECHNICAL REPORT
Amended Vesting Tentative Tract Map

Project: Vesting Tentative Tract Map No. 52584
Castaic, County of Los Angeles, California

References: At End of Text

Gentlemen:

This report is divided into two parts. The **first part** presents our response to the Geologic Review Sheet dated July 10, 2003 and Soils Engineering Review Sheet dated July 9, 2003 for Vesting Tentative Tract (VTT) 52584 issued by Los Angeles County Department of Public Works Geotechnical and Materials Engineering Division. The **second part** of the report presents our opinions on the existing geologic conditions for Vesting Tentative Tract 52584 relative to the **Amended Vesting Tentative Tract Map (undated)** and their effects on the proposed development. This report is supplementary to our previous reports (see **References**) and the conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

GEOLOGIC AND GEOTECHNICAL REPORT - ADDENDUM NO. 6

In order to facilitate the review process, we have listed the County's remarks in **bold** in the order in which they appear on the original review letter. Each remark is followed immediately by our response. A copy of the review letters are attached after the references**.**

GEOLOGIC REVIEW SHEET (Dated 7/10/03)

Remark

The Soils Engineering review dated 7/9/03 is attached.

Response

Acknowledged.

SOILS ENGINEERING REVIEW SHEET (Dated 7/9/03)

Remark No. 1

It appears that the proposed buttress located southeast of Lot 128 depicted on the previous Tentative Map (dated by Regional Planning 12/30/02) is not shown on the submitted Tentative Map (dated by Regional Planning 5/29/03). Provide static and seismic minimum standards. Also provide a geotechnical cross section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommended mitigation if factors of safety are below County minimum standards.

Response

Cross Section 7-7' has been relabeled as Cross Section 34-34'. The previously recommended buttress located southwest of Lot 128 at Landslide Qls-6 and illustrated on Cross Section 7-7' in our 3/31/00 report is no longer required based upon the revised tentative tract map design and our analyses performed on Cross Section 34-34' (revised

Cross Section 7-7'). See the slope stability analyses presented within **Appendix A** for details.

Remark No. 2

It appears that the previously proposed debris walls (east of Lot 102 & southwest of Lot 156) are not shown on the submitted Tentative Map. Verify whether these debris walls are required. If the debris walls are still required, revise map as necessary. If the debris walls are no longer required, provide substantiating analyses as necessary.

Response

Due to the revisions to the Tentative Tract Map, only one debris wall is recommended northerly of Lot 100 (See **Geologic/Geotechnical Map, Plate I**). We have coordinated with the Supervising Civil Engineer regarding the above item. It is our understanding the Supervising Civil Engineer will add this wall to the Tentative Tract Map. The proposed debris walls recommended within our previous reports are no longer required due to the revisions to the Tentative Tract Map.

Remark No.3

Provide static, seismic and surficial slope stability analyses for all proposed Cut Slopes higher than 30 feet, that were previously proposed as 3:1 (i.e. Cut Slopes north of Lots 89, 98-101, 166 & 171 etc.). Also, provide a geotechnical cross section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommended mitigation if factors of safety are below County minimum standard.

Response

All **proposed** cut slopes higher than 30 feet have been analyzed or evaluated relative to the amended tentative tract map design. The results are presented within **Appendix A** as well as in the Summary of Cut Slopes **Table 2** located after the references. Per our analyses, all proposed cut slopes are considered to be grossly stable as designed based upon the slope stability calculations presented in **Appendix A**. We have included the critical failure plane

and the various shear strength parameters used in the analyses on the cross sections (**Plates IV through VII**) where the calculated factor of safety is less than 1.7. The locations of the cross sections are illustrated on the attached **Geologic/Geotechnical Maps**. Since all of the proposed cut slopes are grossly stable, no buttresses or extensive mitigation measures are necessary, however, we have recommended stability fills for surficial stability reasons on the cut slopes that are located in the vicinity of the Zone of Tectonic Deformation or with a fill over cut configuration (specifically Cut Slopes or portions of Cut Slopes CS-2, CS-10, CS-12, CS-14, CS-16, CS-18, CS-19, CS-31, CS-36 and CS-39). The locations of these recommended stability fill keyways are shown on the **Geologic/Geotechnical Maps**.

Remark No. 4

Show the following on the geotechnical map: All recommended mitigation measures, as necessary.

Response

All of our recommended mitigation measures are shown on the **Geologic/Geotechnical Maps (Plates I and II)**.

Remark No. 5

Requirements of the Geology Section are attached.

Response

Acknowledged.

Remark No. 6

Include a copy of this review sheet with your response.

Response

A copy of this review sheet and the geologic review sheet are attached after the references.

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Amended Vesting Tentative Tract Map (Undated)

This portion of our report presents our opinions on the existing geologic and geotechnical conditions on Vesting Tentative Tract Map (VTTM) No. 52584 relative to the amended map and their effects on the proposed development. This report is supplementary to our reports dated 1/15/99, 10/22/99, 3/31/00, 1/9/01 and 4/16/03 for VTTM 52584, hereinafter called "previous reports", and the conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

1.0 SCOPE OF WORK

The scope of work completed during the preparation of this report included the following tasks:

1. Geologic/geotechnical review of Amended Vesting Tentative Tract Map No 52584 (undated).

2. Coordination with the Supervising Civil Engineer, Alliance Land Planning and Engineering, Inc.

3. Geologic and geotechnical engineering analyses and preparation of Conclusions and Recommendations based on the existing site conditions and future use intended. Analyses included detailed static and pseudostatic stability analyses of proposed and modified grades, including cut slopes, natural slopes and fill slopes where appropriate. Based on the results, the need for tentative stabilization measures was explored.

4. Preparation of the Revised Geologic/Geotechnical Maps, Revised Geologic/Geotechnical Map Legend, Geologic and Geotechnical Cross Sections (slope stability analysis) and this report.

2.0 BACKGROUND

Geologic and geotechnical aspects of the Amended Tentative Tract Map No. 52584 were previously addressed in our report dated April 16, 2003. Our response to the County of Los Angeles Geologic and Soils Engineering Review Sheets dated July 10, 2003 and July 9, 2003 respectively is presented in the first part of this report. An amended Tentative Tract Map

(undated) was subsequently prepared by Alliance Land Planning and is attached as the base map for our 100-Scale **Geologic/Geotechnical Map (Plates I and II)**. The specific details on the geologic units and the laboratory test results are presented in our previous reports listed in the **References**.

3.0 REVISIONS VTTM 52584

Review of the amended tentative tract map indicates that minor to moderate revisions to proposed grades from the previous tentative tract map noted within our April 16, 2003 Report. Minor to moderate changes occur on the locations, gradients, heights and orientations to many of the proposed cut slopes which in turn have affected the configuration of proposed natural slopes. Revisions to the residential lot layout and the street alignments are indicated as well. The total number of residential lots has remained the same since our April 16, 2003 report, however, the lot layout and lot designations have been revised. For specific details on lot designations see the Lotting Summary on the Tentative Tract Map.

Due to the design changes we have re-designated all proposed cut slopes greater than 25 feet in height as CS-1 through CS-39 on the **Geologic/Geotechnical Map (Plates I and II)**. We have also revised all pertinent geologic cross sections presented within the April 16, 2003 report and revised the cross section designations as well as constructed new cross sections to illustrate the anticipated geologic/geotechnical conditions relative to the revised Tentative Tract design.

4.0 GENERAL CONSLUSIONS AND RECOMMENDATIONS

4.1 Feasibility of Development

Amended Tentative Tract Map No. 52584 is feasible for development from the standpoint of geology/geotechnical conditions provided our recommendations are followed and implemented during construction. The conclusions and recommendations presented within our previous reports listed in the references are still applicable, except where they are superceded in this report.

4.2 Earthwork and Grading Recommendations

4.2.1 Revised Removals

Due to the revisions to the Tentative Tract Map, we have revised our recommended removals relative to our previous reports. Recommended removal depths for unsuitable soils, exclusive of landslide material, range from 1 to 15 feet below existing grades. The limits and depths of recommended removals are shown on the **Geologic/Geotechnical Maps (Plates I and II)**. The actual extent of removals can be best determined in the field during grading when observation and evaluation can be performed by the engineering geologist/soils engineer. Recommendations for landslides are presented in **Table 1** and shown on the **Geologic/Geotechnical Maps**.

5.0 GENERAL DESIGN CONSIDERATIONS & RECOMMENDATIONS

5.1 Stability of Proposed Slopes and Proposed Grades

Slope stability analyses were performed on new and revised cross sections of the currently proposed development grades for this project, including cut slopes, natural slopes and fill slopes. Based upon the results from the analyses, the need for recommended stabilization measures was explored, where necessary, and dimensional design of these measures was performed, as needed, in a step-by-step fashion utilizing slope stability analyses (see **Appendix A**).

It should be noted that due to the overall coarse grained nature of the bedrock on the site that well developed planar surfaces are relatively rare. However, we searched for potential bedding planes in the critical cross sections analyzed where no data from subsurface exploration was available. Specified planes of weakness were modeled where encountered in subsurface explorations.

The analyzed cross sections also reflect critical conditions for stability (i.e. adverse geologic conditions and greater slope height). The analyses are presented in **Appendix A**, along with a summary of the results in **Table A1**.

Shear strength parameters used for the stability analyses have not been revised since our 3/31/00 report and are presented below.

MATERIALS	UNIT WEIGHT (PCF)	STATIC		PSEUDOSTATIC	
		PHI (DEG.)	C (PSF)	PHI (DEG.)	C (PSF)
Landslide Plane	130	7	290	28	210
Landslide Debris	133	26	510	29	1800
Bedding Plane (clay bed)	129	17	1650	28	1270
Bedding Plane (silty claystone)	129	22	347	27	1168
Bedding Plane (silty claystone BA-11)	136	22.5	480	34	2687
Bedrock cross bedding	119	40.5	410	42	880
Terrace Deposits	120	41	200	42	290
Compacted Fill	125	29	300	32	316
Alluvium	119	34	169	38	338

5.1.1 Existing Cut Slopes

The three existing Cut Slopes associated with VTT 20685 and located adjacent to Hasley Canyon Road have been designated as ECS-1, ECS-2 and ECS-3 for reference on **Plate I** of the **Geologic/Geotechnical Maps**. Our slope stability analysis performed on cross section 34-34' indicates that ECS-1 satisfies Los Angeles County **minimum factor** of **safety**, however due to the presence of landslide Qls-6, we have recommended that landslide Qls-6 be placed within a geologically recommended Restricted Use Area (RUA). See Section 5.1.7 for details on Restricted Use Areas. Cut Slopes ECS-2 and ECS-3 are **grossly stable** per our slope stability analyses performed on cross section 35-35' at ECS-2, which is more critical than ECS-3.

5.1.2 Proposed Cut Slopes

We have identified thirty-nine (39) proposed cut slopes (greater than 25 feet in height) on the subject site and designated them as CS-1 through CS-39 on the **Geologic/Geotechnical Maps (Plates I and II)**. The slope geometry, anticipated geologic conditions and recommended mitigation, if necessary, for each slope are presented in the cut slope Summary (**Table 2**) located at the end of the text, and shown

on the **Geologic/Geotechnical Maps (Plates I and II)**. If any of the smaller proposed cut slopes (less than 25± feet in height) have adverse geologic or grading configurations (fill over cut) they can be mitigated if necessary with a standard 15 to 20-foot wide keyway (depending on the proposed cut slope height) and benching similar to a Stability Fill.

All permanent cut slopes should be constructed at a slope ratio not steeper than 2:1 (horizontal to vertical). All permanent cut slopes exposing alluvium should be constructed as a stability fill. It is not anticipated however, should any potentially unstable subsurface conditions be exposed during construction, such as adverse bedding or exposed seepage, either flatter slopes than specified above or construction of benches may be required. We recommend that the project Engineering Geologist and/or the project Geotechnical Engineer observe all cut slope excavations during the grading operations and provide appropriate recommendations if necessary.

5.1.3 Natural Slopes

We have updated our slope stability analyses of the natural slopes proposed on the subject site relative to amended design grades. The natural slopes have gradients ranging from 5:1 to ½:1 (h:v). We have revised pertinent cross sections to illustrate the most critical conditions (daylighted bedding and/or steeper than 2:1). With the exception of the natural slope illustrated on cross section 28-28', the natural slopes evaluated within **Appendix A** satisfy the Los Angeles County factor of safety requirement for slope stability. See **Appendix A** for details.

Slope stability analyses performed on this Cross Section 28-28' indicates that this natural slope does not satisfy the County's factor of safety requirement for slope stability, therefore it is recommended that the steep westerly–facing portion of the natural slope be trimmed back to the configuration illustrated on cross section 28-28'. This configuration is required in order to satisfy the factor of safety requirement. We have coordinated with the supervising Civil Engineer relative to incorporating the design recommendations into the Tentative Tract Map.

5.1.4 Proposed Fill Slopes

Review of the amended map indicates that fill slopes are proposed at gradients of 2:1 (h:v) or flatter the majority of which are proposed at 3:1 (h:v). Our slope stability

analyses performed on the highest 2:1 fill slope, which is considered to be the most critical proposed fill slope (located at cross section 31-31'), indicates that this slope will satisfy the Los Angeles County factor of safety requirement for slope stability (see **Appendix A**).

5.1.5 Deep Fill Areas

In areas of deep fills (>40 ft. in thickness) the portion deeper than 40 ft. below proposed grades should be compacted to a minimum 93 percent of the maximum dry density of the fill materials. Areas of deep fills will be shown on the geotechnical maps at the Grading Plan stage. The areas of deep fill will also require settlement monitoring.

5.1.6 Landslides

We have revised the landslide summary table (**Table 1**) in order to reflect the amended map grades. All landslide material is to be completely removed with the exception of landslide Qls-6, which will be partially removed for stabilization and placed within a Restricted Use Area. Refer to Section 5.1.1 for details on Qls-6 and ECS-1 stabilization measures.

Removal depths for the landslides are shown in **Table 1** and on the **Geologic/Geotechnical Maps (Plates I and II)**.

5.1.7 Restricted Use Areas

The Zone of Tectonic Deformation and the area associated with landslide Qls-6 are recommended Restricted Use Areas. These areas are noted on the **Geologic/Geotechnical Maps**. These areas will need to be shown on the Final Map.

5.1.8 Exploratory Trench and Boring Backfill

The location and dimensions of the exploratory trenches and borings should be noted relative to the proposed development unless the trenches or borings are removed by future grading operations. If future foundations do traverse the trenches or borings, they should be designed for potential settlement. Once 40-scale (1″=40′) Grading Plans are available a more detailed review of the effects of boring and trench backfill should be performed.

6.0 LOS ANGELES COUNTY 111 STATEMENT

In compliance with Section 111 of the Los Angeles County Building Code, it is the finding of this firm that the Building Sites designated on the proposed Amended Vesting Tentative Tract Map 52584 will not affect offsite property provided all our recommendations are incorporated in the Grading Plan and implemented during construction.

7.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD

This report has been prepared assuming that Allan E. Seward Engineering Geology, Inc. will refine all geology and geotechnically-related data for the Grading Plan stage. If the recommendations contained in this report are to be utilized, and expansion of the geology/geotechnical work is performed by others, the party performing the work must review this report and assume full responsibility for the recommendations contained herein. That party would then assume the title of responsibility as "Geologist/Geotechnical Engineer of Record" for the project.

At the Grading Stage, representatives of the Geology/Geotechnical Engineer of Record should be present to observe all grading operations. A report presenting the results of those observations and related testing should be issued upon completion of the operations. All footing excavations should be observed by a representative of the Geologist/Geotechnical Engineer of Record prior to placing steel or pouring concrete into the excavations.

8.0 LIMITATIONS

This report has been prepared for the exclusive use of Los Valles Land and Golf, LLC and their design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, we should be notified, as additional work may be required to update this report.

In the event that any modifications in the design or location of the proposed development, as discussed herein, are planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

In performing these professional services, we have used the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists and geotechnical engineers practicing in this or similar localities.

The analyses and interpretations presented in this report have been based on the results of pertinent field and laboratory soil investigations. It should be recognized that subsurface conditions can vary in time and laterally and with depth at a given site. Our conclusions and recommendations are based on the data available and our interpretation of the data based on our experience and background. Hence, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature; therefore, **no warranty** is herein **expressed** or **implied**.

It should be noted that faulting is normally confined to the area immediately adjacent to a known fault, or within a few feet of the last fault movement. Regardless of what criteria is used however, absolute assurance against future fault displacement or strong ground motion cannot be obtained in tectonically active areas. New faults can form, as the orientation and magnitude of deformational forces in the earth's crust change with time. Therefore, the location of new breaks or ground motions during a seismic event cannot be located or anticipated.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. Please contact us if you would like to discuss this report further.

Respectfully submitted,

Eric J. Seward, CEG 2110
Certified Engineering Geologist
Vice President

REGISTERED GEOLOGIST
Eric J. Seward
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CERTIFIED
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Dharmesh P. Amin, M.S., P.E., GE 2553
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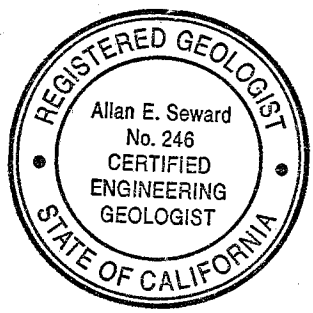
Reviewed By:

Allan E. Seward, CEG 246,
Principal Engineering Geologist
President



The following attachments and appendices complete this report.

References
Soils Engineering Review Sheet dated 7/9/03
Geologic Review Sheet dated 7/10/03
Summary of Landslides **Table 1**
Summary of Cut Slopes **Table 2**

APPENDIX A – Slope Stability
Slope Stability Analysis Results **Table A1**

APPENDIX B - Maps And Cross Sections

- **Maps** (In pockets)
  Geologic/Geotechnical Maps (1"=100') **Plates I & II**
  Geologic/Geotechnical Map Legend **Plate III**

- **Cross Sections** (In pockets)
  Geologic Cross Sections 1-1' through 12-12' **Plate IV**
  Geologic Cross Sections 13-13'through 23-23' **Plate V**
  Geologic Cross Sections 24-24' through 35-35'' **Plate VI**
  Geologic Cross Sections 36-36' through 45-45' **Plate VII**

Distribution: (1) Los Valles Land and Golf, LLC.
Attn: Addressee
(4) Alliance Land Planning & Engineering, Inc.
2 - Attn: Mr. Paul Gaff
2 Los Angeles County Department of Public Works Geotechnical and Materials Engineering
1 - Soils
1 - Geology

REFERENCES

By Allan E. Seward Engineering Geology, Inc.

1. **Geologic and Geotechnical Report**
   Vesting Tentative Tract map 52584
   Castaic, California
   Dated January 15, 1999 – JN: 99-1617-4

2. **Geologic and Geotechnical Report – Addendum No. 1**
   Response to County Comments (Review Sheet dated 3/3/99, 3/4/99, 5/6/99, 9/9/99 and 9/16/99)

3. **Geologic and Geotechnical Report – Revised Map**
   Revised Vesting Tentative Tract No. 52584 (Revised 10/99)
   Castaic, California
   Dated October 22, 1999 – JN: 99-1617-4

4. **Geologic and Geotechnical Report - Addendum No. 2**
   Response to County Comments (Review Sheet dated 11/18/99 and 12/28/99)
   Castaic, California
   Dated March 31, 2000 – JN: 00-1617-4

5. **Geologic and Geotechnical Report – Addendum No. 3**
   Vesting Tentative Tract 52584
   Response to County Comments (Review Sheets dated 5/4/00 and 5/23/00)
   Castaic, California
   Dated June 7, 2000 – JN: 00-1617-4

6. **Geologic and Geotechnical Report – Addendum No. 4**
   Revised Vesting Tentative Tract 52584 (Revised 12/2000)
   Castaic, California
   Dated January 9, 2001 – JN: 01-1617-4

7. **Geologic and Geotechnical Report – Addendum No. 5**
   Response to Los Angeles County Geologic and Soils Engineering
   Review Sheets dated January 27, 2003 and January 28, 2003
   Geologic and Geotechnical Report
   Amended Vesting Tentative Tract map (dated April 15, 2003)
   VTT 52584
   Halsey Canyon
   Dated April 16, 2003 – JN: 03-1617-4

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave., Alhambra, CA 91803
Telephone: (626) 458-4925
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District Office 8.2
Job Number LX001129
Sheet 1 of 1

DISTRIBUTION:
___ Drainage
___ Grading
___ Geo/Soils Central File
___ District Engineer
___ Geologist
___ Soils Engineer
___ Engineer/Architect

Tentative Tract Map 52584
Location Hasley Canyon
Developer/Owner Hasley Canyon Land Co., LLC
Engineer/Architect Penco Engineering, Inc.
Soils Engineer Allen Seward
Geologist Same as above

Review of:

Revised Tentative Tract Map Dated By Regional Planning 5/29/03

Previous review sheet dated 1/28/03

ACTION:

Tentative Map feasibility is not recommended for approval.

REMARKS:

1. It appears that the proposed buttress located southeast of Lot 128 depicted on the previous Tentative Map (dated by Regional Planning 12/30/02) is not shown on the submitted Tentative Map (dated by Regional Planning 5/29/03). Provide static, and seismic slope stability analyses to verify that the proposed slope without the buttress will have factors of safety that will meet County minimum standards. Also, provide a geotechnical cross section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standards.

2. It appears that the previously proposed debris walls (east of Lot 102 & southwest of Lot 156) are not shown on the submitted Tentative Map. Verify whether these debris walls are required. If the debris walls are still required revise map as necessary. If the debris walls are no longer required, provide substantiating analyses as necessary.

As previously requested:

3. Provide static, seismic and surficial slope stability analyses for all proposed cut slopes higher than 30 feet, that were previously proposed as 3:1 (i.e. cut slopes north of lots 89, 98-101,166, & 171 etc.). Also, provide a geotechnical cross section, for each section analyzed, showing the critical failure plane used in the analyses. Indicate the various shear strength parameters used in the analyses, in the appropriate segments of each failure plane. Show locations of the cross sections used in slope stability analyses on the geotechnical map. Recommend mitigation if factors of safety are below County minimum standard.

4. Show the following on the geotechnical map:
   All recommended mitigation measures, as necessary.

5. Requirements of the Geology Section are attached.

6. Include a copy of this review sheet with your response.

REGISTERED PROFESSIONAL ENGINEER
GANN LEM
NO. 4328
EXP. 3/30/07
GEOTECHNICAL
STATE OF CALIFORNIA

Prepared by Yoshiya Morisaku Reviewed by Gan Lem Date 7/9/03

NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.

P:\Yosh\52584TentTa

County of Los Angeles Department of Public Works
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION
GEOLOGIC REVIEW SHEET
900 So. Fremont Ave., Alhambra, CA 91803
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DISTRIBUTION
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1 Soils Engineer
1 GMED File
1 Subdivision

TENTATIVE TRACT 52584
SUBDIVIDER Hasley Canyon Land Co., LLC
ENGINEER Land Design Consultants
GEOLOGIST A.E. Seward
SOILS ENGINEER Same as above

TENTATIVE MAP DATED 5/29/03 (Revision)
LOCATION

REPORT DATE 1/09/01, 6/07/00, 3/31/00, 10/22/99, 1/15/99
REPORT DATE Same as above

The Regional Planning Commission, developer, and engineer are advised that:

PRIOR TO RECOMMENDING APPROVAL OF THE TENTATIVE TRACT OR PARCEL MAP:

[ ] An engineering geology report is required to evaluate the feasibility of the proposed subdivision.

[ ] A soils report is required to evaluate the feasibility of the proposed subdivision.

[ ] Sufficient evidence must be submitted to show that the sustained use of a private sewage disposal system is possible without inducing a geologic hazard. The Health Department and developer are advised that geologic conditions within this tract may severely limit or prohibit the use of private sewage disposal system that will introduce water into the subsurface.

[ ] Based on the State of California Seismic Hazard Maps, the subject site is located in an area with a potential for liquefaction and may be subject to secondary effects of seismic shaking. The above requested reports must address the potential for liquefaction and ground failure. The reports must comply with the provisions of the "Manual for Preparation of Geotechnical Reports" prepared by the County of Los Angeles, Department of Public Works, and is available on the Internet at http://ladpw.org/med/Manual.pdf . Provide this office with two (2) original copies of the reports for review and distribution to the State of California.

All seismic parameters must be magnitude weighted, and the historic high groundwater level for the site must be utilized in the liquefaction analysis (See GS045 @ http://ladpw.org/med/Manual.pdf).

[X] The Soils Engineering review dated 7/9/03 is attached.

NOTE Provide a copy of this review with your resubmittal

Prepared by Karin Vazquez Reviewed by RG 5587, CEG 2050 Date July 10, 2003

P:\Gmepub\Geology Review\Geir.doc
7/10/03

SUMMARY OF LANDSLIDES
AMENDED VTT 52584

LANDSLIDE DESIGNATION	PLATE NO.	COMMENTS AND MITIGATION*
Qls-1	I	Moderate to large landslide located at proposed Cut Slope CS-30 and the fairway for golf course hole number 3. Proposed Cut Slope CS-30 (grading design) will remove approximately 80% of this landslide (upper portion) as illustrated on revised Cross Section 27-27'. The **remainder** will need **to be completely removed** prior to the placement of compacted fill. Estimated maximum removal depths of the remainder portion of Qls-1 below proposed tentative map grades range from 5 to 20 feet.
Qls-2	I	Small landslide located across the canyon (easterly) from Qls-1. Proposed cut will remove most of this landslide however the remaining portion of Qls-2 below proposed grades will need **to be completely removed** prior to placement of compacted fill. Maximum removal depths of the remainder portion of Qls-2 below proposed tentative map grades are estimated to range from 5 to 20 feet.
Qls-3	I	Small to moderate size landslide located within a fill area adjacent to lots 68-70 and partially within proposed Cut Slope CS-24. Qls-3 is **to be completely removed** prior to the placement of compacted fill. Estimated maximum removal depths of Qls-3 range from 15 to 35 feet. Removals at head of this landslide will undercut the lower portion of proposed Cut Slope CS-24. After this Landslide is completely removed, it is recommended that proposed Cut Slope CS-24 be constructed as a compacted fill slope.
Qls-4	I	Small landslide located near the tee for golf hole 7 and lots 18 and 19. Proposed cut will remove most of this landslide however the toe area is located in an area of proposed fill and will need **to be completely removed** prior to placement of compacted fill. Estimated maximum removal depths of the remainder portion of Qls-4 below proposed tentative map grades range from 5 to 20 feet.
Qls-5	I and II	Large landslide located near the entry to the proposed development southerly of Lots 130-132 and proposed Cut Slope CS-17. Cross Section **33-33'** illustrates the landslide geometry, proposed grades, existing grades and underlying geologic structure. Approximately 75% of this landslide will be removed by the proposed cut (grading design), however the remainder portion of Qls-5 below proposed grade will need **to be completely removed** prior to the placement of compacted fill. Estimated maximum removal depths of the remainder portion of Qls-5 below proposed tentative map grades range from 5 to 35 feet.
Qls-6	I	Large landslide located southeast of lot 128 at existing Cut Slope ECS-1. Cross Section 34-34' illustrates the landslide geometry, underlying geologic structure, existing grades and the proposed tentative map grades. Slope stability analysis performed on cross section 34-34' with the tentative map grades indicate this landslide and Cut Slope ECS-1 satisfies the Los Angeles County minimum factor of safety requirement for slope stability. No structures are proposed over this landslide however, we have designated a **Building Setback** around this landslide that will need to be shown as a **Restricted Use Area** on the Final Map.

SUMMARY OF LANDSLIDES
AMENDED VTT 52584

LANDSLIDE DESIGNATION	PLATE NO.	COMMENTS AND MITIGATION*
Qls-7	I	Moderate size landslide located on lots 51-54 and the fairway for golf course hole 4 needs **to be completely removed**. Approximately half of the landslide is in proposed cut and half in proposed fill area. Estimated maximum removal depths of the remainder portion of Qls-7 below proposed tentative map grades, range from 5 to 25 feet.
Qls-8	I	Small landslide located in the fairway of golf course hole 6. Most of this landslide will be removed by proposed cut, however the remainder portion of Qls-8 below proposed grades will need **to be completely removed** prior to the placement of compacted fill. Estimated maximum removal depths of the remainder portion of Qls-8 below proposed tentative map grades range from 5 to 15 feet.

*All landslide removals to be performed under the observation of the project geologist and geotechnical engineer. Where applicable (fill areas) removal bottoms need to be surveyed after geologic/geotechnical observation and mapping has been completed

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-1

Location: Plate II – South of Lot 183
Direction Slope Faces: South
Slope Parameters: 70± feet high with combination 2:1, 2.5:1 and 3:1 (h:v) gradients
Cross Sections: None
Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping 30 to 33° towards the south, steeper than the proposed cut slope face. Slope stability analyses performed on more critical cut slopes (higher and steeper) indicate this cut slope will calculate to meet the Los Angeles County factor of safety requirement of 1.50.
Mitigation Measures: Not required.

Proposed Cut Slope CS-2

Location: Plate II – Southerly of Proposed Cut Slope CS-1 and south and east of golf course hole 13.
Direction Slope Faces: South to Southeast
Slope Parameters: 80± feet high with 2:1, 2.5:1 and 3:1(h:v) gradients
Cross Sections: 15-15'
Anticipated Geologic Conditions: Axis of a syncline anticipated to be exposed within the proposed cut slope face. TQs bedrock north of the axial trace is anticipated to be dipping 16-28° towards the south and is steeper than the proposed cut slope face. The TQs bedrock south of the axial trace is anticipated to be oriented neutral to the proposed cut slope face. The southern portion of this slope is located partially within the zone of tectonic deformation. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Recommend a Stability fill (25 ft. by 3 ft. minimum keyway) on the southern portion of this slope to mitigate potential surficial instability.

Proposed Cut Slope CS-3

Location: Plate II – Southeast of Lots 174-176
Direction Slope Faces: Southeasterly
Slope Parameters: 55± feet high with a 2:1 (h:v) gradient
Cross Sections: 44-44'

SUMMARY OF CUT SLOPES

Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping 20° towards the south. Slope stability analysis on Cross Section 44-44' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-4

Location: Plate II – West of Lot 201
Direction Slope Faces: West to slightly southwest
Slope Parameters: 50± feet high with a 2:1 (h:v) gradient
Cross Sections: None.
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock oriented neutral relative to the proposed cut slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

Proposed Cut Slope CS-5

Location: Plate II – North of Lot 171
Direction Slope Faces: Semicircular - Southerly
Slope Parameters: 85± feet high with a 2:1 (h:v) gradient
Cross Sections: 1-1' and 45-45'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping 30° to the south with an apparent dip of 24° as illustrated on Cross Section 45-45'. Slope stability analysis performed on both cross sections indicates this slope satisfies the Los Angeles County factor of safety requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-6

Location: Plate I – North of Lots 139 and 166
Direction Slope Faces: Southwest
Slope Parameters: 90± feet high with a 2:1 (h:v) gradient
Cross Sections: 4-4'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping 24° towards the south. Slope stability analysis on Cross Section 4-4' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.

SUMMARY OF CUT SLOPES

Mitigation Measures: Not required.

Proposed Cut Slope CS-7

Location: Plate I – Northwest of Lots 101-103
Direction Slope Faces: Southeast
Slope Parameters: 110± feet high with a 2:1 (h:v) gradient
Cross Sections: 6-6'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping an average of 30° towards the south. Slope stability analysis on Cross Section 6-6', indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-8

Location: Plate I – East of Lot 100 and north of golf course hole no. 2
Direction Slope Faces: South
Slope Parameters: 65± feet high with a 2.5:1 (h:v) gradient
Cross Sections: 8-8'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping an average of 32° towards the south which is steeper than the proposed cut slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

Proposed Cut Slope CS-9

Location: Plate I - North and northwest of Lot 108
Direction Slope Faces: Southeast to southwest to northwest
Slope Parameters: 30± feet high with a variable gradients ranging from 2:1 to 4:1 (h:v).
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping between 30 to 35° towards the south which is steeper than the proposed Cut Slope face. Slope stability analysis performed on more critical Cross Sections (1-1', 4-4,' 6-6' and 45-45'), which depict similar geologic conditions with greater slope heights yield factors of safety greater than the Los Angeles County minimum requirement of 1.50. **Grossly stable by inspection**.
Mitigation Measures: Not required.

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-10

Location: Plate I – Southeast of Lots 149 - 154
Direction Slope Faces: Southeast
Slope Parameters: 55± feet high with a 2:1 (h:v) gradient.
Cross Sections: 19-19', 40-40' and 41-41'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock with apparent dips ranging from 26-30° towards the cut slope face. Slope stability analysis performed on Cross Section 41-41', indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**. However due to a fill over cut situation anticipated to be present at the western portion of the cut slope it is considered surficially unstable
Mitigation Measures: Stability fill required for the western portion of the cut slope utilizing a 25 ft. wide by 3 ft. deep minimum keyway.

Proposed Cut Slope CS-11

Location: Plate I – North of Lots 88-90
Direction Slope Faces: Southwest
Slope Parameters: 195± feet high with a 2:1 (h:v) gradient (highest cut slope).
Cross Sections: 21-21'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the south. Slope stability analysis on Cross Section 21-21' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-12

Location: Plates I and II – South of Lots 155 and 156
Direction Slope Faces: South to slightly southwest
Slope Parameters: 70± feet high with a combination 2:1 and 3:1(h:v) gradient.
Cross Sections: 18-18'
Anticipated Geologic Conditions: The axial trace of a syncline traverses the southerly portion of the proposed cut slope. Slope stability analysis performed on Cross Section 18-18' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**. However due to a sliver fill and fill over cut situations anticipated to be present at the central highpoint of the slope it is considered surficially unstable.
Mitigation Measures: Stability fill required utilizing a 25 ft. wide by 3 ft. deep minimum keyway located at the mid-height terrace bench.

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-13

Location: Plate II – South of lot 156 and north of the proposed club house
Direction Slope Faces: Southwest
Slope Parameters: 86± feet high with a combination 2:1 and 3:1 (h:v) gradient.
Cross Sections: 42-42'
Anticipated Geologic Conditions: The axial trace of a syncline traverses just south of the proposed cut slope. Slope stability analyses performed on Cross Section 42-42' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-14

Location: Plate I – south of Lots 55-59
Direction Slope Faces: Southerly
Slope Parameters: 55± feet high with a 2:1 (h:v) gradient
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping into the proposed slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well. However due to a sliver fill and fill over cut situations anticipated to be present along the slope face it is considered surficially unstable.
Mitigation Measures: Stability fill required utilizing a 25 ft. by 3 ft. minimum keyway.

Proposed Cut Slope CS-15

Location: Plate I – North of Lots 73-75
Direction Slope Faces: Southwest
Slope Parameters: 50± feet high with combination 2:1 and 3:1 (h:v) gradients
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping into the proposed slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-16

Location: Plate I – South of Lots 126 & 127
Direction Slope Faces: Southwest
Slope Parameters: 30± feet high with combination 2:1 and 3:1 (h:v) gradients
Cross Sections: None
Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping into the proposed slope face**.** Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well. However, this slope is located within the zone of tectonic deformation and is therefore considered **surficially unstable**.
Mitigation Measures: Recommended **Stability fill** utilizing a 20 ft. by 3 ft. minimum keyway to mitigate potential surficial instability.

Proposed Cut Slope CS-17

Location: Plates I and II - south of Lots 129 - 133
Direction Slope Faces: South to Southwest
Slope Parameters: 40± feet high with variable slope gradients ranging from 2:1 to 4:1 (h:v)
Cross Sections: 33-33'
Anticipated Geologic Conditions: The axial trace of a anticline is anticipated just south of this slope. TQs bedrock is anticipated to be dipping into the proposed slope face with Landslide Qls-5 anticipated to be exposed within portions of the slope face. The portions of slope exposing TQs bedrock are anticipated to be **grossly stable** and the portions exposing landslide deposits are **grossly unstable**.
Mitigation Measures: Landslide Qls-5 is recommended to be completely removed (see Summary of Landslides Table 1 for details) and replaced with compacted fill.

Proposed Cut Slope CS-18

Location: Plate I – West of Lots 118-123
Direction Slope Faces: West to Southwest
Slope Parameters: 43± feet high with a variable (4:1 to 2:1) slope gradients
Cross Sections: None
Anticipated Geologic Conditions: TQs bedrock is anticipated to be oriented neutral with respect to the proposed slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to

SUMMARY OF CUT SLOPES

Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well. However, the southern portion of this slope is located within the zone of tectonic deformation and is therefore considered **surficially unstable**.

Mitigation Measures: A **stability fill** utilizing a 20 ft. by 3 ft. minimum keyway to mitigate potential surficial instability is recommended for the southern portion of this slope located within the Zone of Tectonic Deformation**.**

Proposed Cut Slope CS-19

Location: Plate I – South of Lots 1- 4

Direction Slope Faces: Southwest

Slope Parameters: 28± feet high with 2:1 and 3:1 (h:v) slope gradients

Cross Sections: None

Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping into the proposed cut slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well. However, this slope is located within the zone of tectonic deformation and is therefore considered **surficially unstable**.

Mitigation Measures: Stability fill required utilizing a 20 ft. by 3 ft. minimum keyway**.**

Proposed Cut Slope CS-20

Location: Plate I – North of Lot 73

Direction Slope Faces: South to southeast

Slope Parameters: 25± feet high with a 2:1 (h:v) slope gradient

Cross Sections: None

Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping into the proposed cut slope face**.** Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.

Mitigation Measures: Not required.

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-21

Location: Plate II – South of Lot 135
Direction Slope Faces: Southwest
Slope Parameters: 28± feet high with a 3:1 (h:v) slope gradient
Cross Sections: None
Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping into the proposed cut slope face**.** Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

Proposed Cut Slope CS-22

Location: Plate II – Northeast of the Proposed Tennis Courts
Direction Slope Faces: Southwest
Slope Parameters: 35± feet high with a 2:1 (h:v) gradient
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock oriented neutral to dipping into the proposed cut slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

Proposed Cut Slope CS-23

Location: Plate I – East of Lots 15-17 and golf course hole no 7
Direction Slope Faces: West to northwest
Slope Parameters: 55± feet high with a combination 2:1 and 3:1 (h:v) slope gradient
Cross Sections: 43-43'
Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping 13° towards the proposed cut slope face. Slope stability analysis performed on Cross Sections 26-26', 27-27'(CS-30) and 38-38' (CS-34) depicting similar but more critical geologic conditions indicate this slope is **grossly stable.**
Mitigation Measures: Not required.

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-24

Location: Plate I – North of Lots 68-70
Direction Slope Faces: Northwest
Slope Parameters: 28± feet high with combination 2:1 and 3:1 (h:v) slope gradients
Cross Sections: None
Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping towards the north and Landslide Qls-3 anticipated to be exposed within the proposed slope face. **Grossly unstable** due to the presence of Qls-3.
Mitigation Measures: Recommended removal of entire Landslide Qls-3 and replace with certified compacted fill (see **Summary of Landslides Table 1** for details).

Proposed Cut slope CS-25

Location: Plate I – Northeast of Lot 104
Direction Slope Faces: Southwest
Slope Parameters: 72± feet high with combination 2:1, 2.5:1 and 3:1 (h:v) gradients
Cross Sections: 9-9'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping 23° towards the south. Slope stability analysis on Cross Section 9-9' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-26

Location: Plate I – Northeast of Cut Slope CS-25 and north of the proposed water tank pad.
Direction Slope Faces: South to southeast
Slope Parameters: 60± feet high with a 2:1, 2.5:1 and 3:1 (h:v) gradients
Cross Sections: 10-10'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the south. Slope stability analysis on Cross Section 10-10' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**
Mitigation Measures: Not required.

Proposed Cut Slope CS-27

Location: Plate I – North of Lot 36
Direction Slope Faces: Southerly
Slope Parameters: 98± feet high with a 2:1 (h:v) gradient
Cross Sections: 13-13'

SUMMARY OF CUT SLOPES

Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the south steeper than the proposed cut slope face. Slope stability analysis on Cross Section 14-14' for proposed Cut Slope CS-28-28, which depicts a similar but more critical condition, indicate this cut slope satisfies the Los Angeles County minimum requirement of 1.50.
Mitigation Measures: Not required.

Proposed Cut Slope CS-28

Location: Plate I – Northeast of Lots 31-36 and north of Hayward Drive.
Direction Slope Faces: Southwest
Slope Parameters: 98± feet high with a 2:1gradient
Cross Sections: 14-14'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the south. Slope stability analysis on Cross Section 14-14' indicate this cut slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**
Mitigation Measures: Not required.

Proposed Cut Slope CS-29

Location: Plate I – South of Lots 9 & 101
Direction Slope Faces: Northwest
Slope Parameters: 35± feet high with 2:1 and 3:1 gradients
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping into the proposed slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

Proposed Cut Slope CS-30

Location: Plate I – North of Lot 99, south of the proposed water tank site and west of Golf Hole number 3
Direction Slope Faces: Southeast east and northeast
Slope Parameters: 165± feet high with 2:1, 2.5:1, 3:1 gradients
Cross Sections: , 24-24', 25-25', 26-26' & 27-27'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the south and Landslide Qls-1 is anticipated to be exposed near the toe of the center portion of

this cut slope. Slope stability analysis on Cross Section 27-27' (most critical), including the complete removal of Landside Qls-1, indicate this cut slope satisfies the Los Angeles County minimum requirement of 1.50.
Mitigation Measures: Not required**.**

Proposed Cut Slope CS-31

Location: Plate I – West of Hayward Drive and Proposed Cut Slope CS-30
Direction Slope Faces: East and northeast
Slope Parameters: 30± feet high with a 2:1 slope gradient
Cross Sections: 14-14'
Anticipated Geologic Conditions: TQs bedrock is anticipated to be dipping into the proposed cut slope face and a fill over bedrock condition is indicated. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well. However this slope is anticipated to be **surficially unstable** due to the fill over bedrock condition.
Mitigation Measures: Remove the bedrock portion of this slope and replace with a stability fill utilizing a 20 ft. by 3 ft. minimum keyway.

Proposed Cut Slope CS-32

Location: Plate I – Southeast of Lots 98 and 99
Direction Slope Faces: East and southeast
Slope Parameters: 20 to 30± feet high with a variable slope gradient ranging from 2:1 to 3:1
Cross Sections: 25-25'
Anticipated Geologic Conditions: Axial trace of a synclinal fold is anticipated to be at the extreme northern portion of the slope. TQs bedrock is anticipated to be dipping into the proposed cut slope face for the portion of the slope on the southern limb of the syncline and neutral to the proposed slope face north of the axial trace. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-33

Location: Plate I – West of Lots 37-39
Direction Slope Faces: Westerly
Slope Parameters: 20 to 30± feet high with a variable 2:1 to 3:1 (h:v) slope gradient
Cross Sections: 29-29'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the northwest with a 16° apparent dip towards the proposed cut slope face. Slope stability analysis performed on Cross Section 21-21' for CS-11 illustrating more critical conditions, indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-34

Location: Plate I – East of Lots 26-28
Direction Slope Faces: West
Slope Parameters: 30± feet high with a 3:1gradient.
Cross Sections: 30-30' & 38-38'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the northwest. Slope stability analysis performed on Cross Section 21-21' for CS-11 illustrating more critical conditions, indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

Proposed Cut Slope CS-35

Location: Plate I – North of Lot 168 and 169
Direction Slope Faces: Southwest
Slope Parameters: 35± feet high with a 2:1 (h:v) gradient near the lower portion of the slope to a variable gradient ranging from 2:1 to 3:1 near the upper portion of the slope
Cross Sections: 37-37'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the south. Slope stability analysis on Cross Section 37-37' indicates this slope satisfies the Los Angeles County minimum requirement of 1.50. **Calculated grossly stable**.
Mitigation Measures: Not required.

SUMMARY OF CUT SLOPES

Proposed Cut Slope CS-36

Location: Plate I – North of Lot 132-134
Direction Slope Faces: Northeast
Slope Parameters: 30± feet high with a 2:1 gradient
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the north at angles steeper than the proposed cut slope face - **Grossly stable**. However, the lower portion of this slope is located within the Zone of Tectonic Deformation and may be **surficially unstable**.
Mitigation Measures: Recommended Stability Fill utilizing a 20 ft. by 3 ft. deep keyway.

Proposed Cut Slope CS-37

Location: Plate II – West of Lots 188-190
Direction Slope Faces: West
Slope Parameters: 63± feet high with a combination 2:1, 2.5:1 and 3:1 (h:v) gradients
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock oriented neutral with respect to the proposed cut slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

Proposed Cut Slope CS-38

Location: Plate II – Northwest of the proposed Club House between golf course holes 17 and 18
Direction Slope Faces: South and East
Slope Parameters: 35± feet high with a 3:1 (h:v) gradient near the lower portion of the slope and a 6:1 (h:v) gradient near the upper portion of the slope
Cross Sections: 17-17'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping towards the south steeper than the proposed cut slope face. Based on the comparison of the slope parameters and geologic conditions of this slope to the slope parameters and geologic conditions of more critical proposed cut slopes, of which performed stability analyses

indicate conformance to Los Angeles County factor of safety requirements, indicates this cut slope will calculate to satisfy the safety factor requirement as well.
Mitigation Measures: Not required.

Proposed Cut Slope CS-39

Location: Plate II – Southeast of the proposed Club House
Direction Slope Faces: Southeast and east
Slope Parameters: 38± feet high with a 2:1 (h:v) gradient
Cross Sections: None
Anticipated Geologic Conditions: This cut slope is located within the Zone of Tectonic Deformation with the TQs bedrock is anticipated to be dipping towards the north at angles ranging from 40 to 83 degrees. Faulting and fracturing associated with the tectonic deformation is anticipated to be exposed within the proposed slope face as well. This cut slope is anticipated to be grossly stable, however due to the anticipated deformation associated with the zone of Tectonic deformation it is anticipated to be **surfically unstable**.
Mitigation Measures: Recommended stability fill utilizing a 25 ft. by 3 ft. minimum keyway

Appendix A

APPENDIX A

SLOPE STABILITY ANALYSES

Introduction

Table A1 summarizes the results of state-of-the-practice computerized static and pseudo-static (i.e. with a statically-simulated seismic load) stability analyses performed on critical cross sections of cut slopes, fill slopes and natural slopes for the currently proposed development of the Amended Vesting Tentative Tract 52584. The total numbers of stability calculation runs presented in this report are ninety. Based upon the results from the analyses, factors of safety for gross stability comply with County of Los Angeles minimum factors of safety except for Cross Section 28-28′ and 34-34′.

Remedial Measures

Slope conditions illustrated on Cross Section 28-28′, did not meet required minimum factors of safety as designed per Amended Vesting Tentative Tract map 52584. It is recommended that the steep westerly–facing portion of the natural slope be trimmed back to the configuration illustrated on cross section 28-28’. This configuration is required in order to satisfy the factor of safety requirement. We have coordinated with the supervising Civil Engineer relative to incorporating the design recommendations into the Tentative Tract Map.

Our slope stability analysis performed on Cross Section 34-34’ indicates that ECS-1 satisfies Los Angeles County **minimum factor** of **safety,** however due to the presence of landslide Qls-6, we have recommended that landslide Qls-6 be placed within a geologically recommended Restricted Use Area (RUA).

Analysis Approach and Sections Analyzed

The gross stability of the proposed cut, fill and natural slopes was evaluated. Slope cases representing the critical proposed grades and subsurface conditions were selected for stability analyses. Critical conditions for stability included potential adverse bedding, slope height, slope gradient, and/or anticipated future groundwater. Based on our analyses, the respective factors of safety for gross slope stability, presented in **Table A1**, are the lowest values obtained.

APPENDIX A

Geometry and Groundwater

As shown on the respective cross sections, the analyzed geometries of cut slopes included removal of bedrock, terrace deposits and landslide materials and adding certified compacted fill to achieve the proposed grades, as needed on portions of the slopes. Analyses included cross-bedding and potential adverse bedding with dips ranging from neutral to 32 degrees depending on geologic data obtained near each cross section.

Review of groundwater data in the vicinity and exploratory trench and boring log data indicates that the proposed cut slopes in bedrock are above historic high groundwater levels and no perched groundwater was observed within the bedrock on hillsides or within our exploratory borings and trenches in bedrock. However, due to the future landscaping and irrigation associated with the proposed development along with the proposed golf course, groundwater was modeled on all interior slopes located in close proximity to or down gradient of a potential future water sources as shown on the analyzed cross sections. Backdrains are proposed for all Stability Fills.

In general a static water table was modeled at the proposed golf course area and an assumed pore-pressured parameters (ru of 0.10) was utilized where a future source of ground water could exist, directly above and directly updip of the slope.

Where rapid drawdown and steady state seepage conditions were expectable adjacent to planned debris basins, those conditions were included in the analyses. Backdrains are proposed for all Stability Fill/Buttress slopes.

Shear Strength Parameters

The shear strength parameters utilized in the slope stability analyses are the same as the values presented and utilized in our March 31, 2000 report and are shown in Section 4.1 of this report.

Methods of Analysis

The computer program GSTABL7, originally written by Purdue University and updated by Garry H. Gregory, Gregory Geotechnical Software was used for the analyses. This program computes the minimum factor of safety from trial failure surfaces using limit equilibrium methods of analysis, such as the Modified Bishop's Method for circular slip surfaces or

APPENDIX A

Janbu's methods for both circular or planar surfaces. In many cases, exit of slip planes at the ground surface is not known. For this report, GSTABL7 method was used to determine breakage of slip planes through upper layers and their exit at the ground surface where the failure surface is unknown. Janbu's method was used to provide the static minimum safety factor corresponding to the complete slip plane.

The pseudostatic procedure introduces a static horizontal force equal to a "seismic" (pseudostatic) coefficient times the weight of individual slices in addition to other forces acting on the slice. The seismic coefficient is an empirical number which in no way models actual seismic forces. However, the pseudostatic method provides some indication of stability or instability. We selected a seismic coefficient of 0.15 for our analyses in accordance with Los Angeles County Guidelines.

Rapid Dradown and Steady-State Seepage Stability Evaluation

We have analyzed the slope stability of the proposed debris basin slopes. The methods used in our analyses and the results of our analyses are presented within this **Appendix**. We have analyzed the critical slope designs for the following conditions:

Stability analyses of the highest proposed 2:1 (h:v) debris basin upstream slope considering potential rapid drawdown conditions.

Stability analyses of the highest proposed 2:1 (h:v) debris basin downstream slope considering potential steady-state seepage conditions.

The 2:1 upstream fill slope of the proposed debris basin at the northern portion of the site between Cut-Slope CS-8 and Cut-Slope CS-25 is the highest proposed on the site at 15 feet. The results of the analyses indicate that the analyzed slope has a safety factor of at least 1.5 under static conditions and 1.1 under pseudostatic conditions, which meet Los Angeles County minimum safety requirements for slope stability. The results of our analyses for rapid drawdown conditions of this slope are presented within this **Appendix**.

The highest proposed downstream dike slope is also proposed within the same debris basin. at the "Line N" debris basin. The top of the dike for this basin is approximately 20 feet wide. The downstream slope contains a combination 2:1 and 3:1 fill slope with a height of approximately 11 feet. The results of our analyses indicate that the analyzed slope has a safety factor greater than 1.5 under static conditions and 1.1 under pseudostatic conditions, which meet Los Angeles County minimum safety requirements for slope stability. The

results of our analyses for steady-state seepage conditions of this slope are presented within this **Appendix**.

Surficial Stability Evaluation

Surficial stability of fill and cut slopes was not analyzed using the "Infinite Slope" method since the lower-bound cohesion value of bedrock and proposed fill materials is greater than 250 psf. Surficial stability calculations were not performed on natural slopes because the proposed grading configuration and our debris flow hazard mitigation measure precluded the need for analyzation.

Conclusion

The analyzed cut slopes, proposed grades, remedial grades and compacted fill slopes comply with Los Angeles County minimum requirements for gross stability under static and pseudostatic loading conditions and for surficial stability, as applicable, provided our recommendations are followed and incorporated into project construction. The results of the stability analyses are summarized in **Table A1**.

The following attachments complete this Appendix.

Slope Stability Analyses Results Table A1
Slope Stability Diagrams and Data Sheets for Run No. 1 through 90

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SLOPE STABILITY ANALYSES RESULTS[1]

Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
1-1′	G1S1A	CS-5	Bedding plane search	Janbu	2.01	-	Pseudostatic is not critical and therefore not performed	1
2-2′	G2S1B	Natural Slope	Upper silty clay stone bedding plane	Janbu	2.76	-	Upper silty claystone bed analyses. Pseudostatic is not critical and therefore not analyzed.	2
2-2′	G2S1A	Natural Slope	Lower clay bed bedding plane	Janbu	1.85	-	Pseudostatic is therefore not critical and not analyzed.	3
3-3′	G3S1E	Natural Slope	Bedding plane, upper area	Janbu	1.59	-	Search in upper area, critical surface	4
3-3′	G3PS1E	Natural Slope	Bedding plane, upper area	Janbu	-	1.12	Pseudostatic analyses[2]	5
3-3′	G3S1A	Natural Slope	Bedding plane search (silty claystone)	Janbu	1.70	-	Deeper Search Silty Claystone bed	6
3-3′	G3PS1A	Natural Slope	Bedding plane search	Janbu	-	1.15	Pseudostatic analyses[2]	7
3-3′	G3S1B	Natural Slope	Bedding plane search (upper slope area)	Janbu	1.63	-	Entire Slope	8
3-3′	G3PS1B	Natural Slope	Bedding plane	Janbu	-	1.15	Pseudostatic analyses[2]	9

[1] The above results for static conditions are based upon residual, site-specific shear strength test results presented in the Table of “Summary of Shear Strength Test Data”.
[2] Peak shear strength values were not utilized.

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
			search (upper slope area)					
3-3′	G3S1D	Natural Slope	Bedding plane search (deeper search)	Janbu	1.70	-	Pseudostatic is not critical and therefore not analyzed.	10
3-3′	G3S11A	Natural Slope	Circular search	Bishop	2.41	-	Pseudostatic is not critical and therefore not analyzed.	11
4-4′	G4S1B	CS-6 and Natural Slope	Bedding plane search (silty claystone)	Janbu	1.55	-	Critical surface	12
4-4′	G4PS1B	CS-6 and Natural Slope	Bedding plane search	Janbu	-	1.11	Pseudostatic analyses[2]	13
4-4′	G4S1A	CS-6 and Natural Slope	Bedding plane search	Janbu	1.57	-	Increase the box height. Pseudostatic analyses is not critical in compare to Run No. 13 analyses and therefore not analyzed.	14
4-4′	G4S1D	CS-6 and Natural Slope	Circular search	Bishop	2.49	-	Pseudostatic analyses is not critical and therefore not analyzed.	15
5-5′	G5S1A	Natural Slope	Bedding plane search	Janbu	1.65	-	Critical surface	16
5-5′	G5PS1A	Natural Slope	Bedding plane search	Janbu	-	1.27	Pseudostatic analyses[2]	17
5-5′	G5S2A	Natural Slope	Bedding plane search	Janbu	1.89	-	Shallow search, pseudostatic analyses is not critical and therefore not analyzed	18

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
5-5′	G5S3A	Natural Slope	Bedding plane search	Janbu	1.75	-	Deeper search, pseudostatic analyses is not critical and therefore not analyzed.	19
5-5′	G5S4A	Natural Slope	Circular search	Bishop	2.31	-	Pseudostatic analyses	20
6-6′	G6S1A	CS-7	Bedding plane search	Janbu	1.88	-	Critical surface	21
6-6′	G6PS1A	CS-7	Bedding plane search	Janbu	-	1.36	Pseudostatic analyses[2]	22
6-6′	G6S2A	CS-7	Bedding plane, deeper search	Janbu	2.06	-	Pseudostatic analysis is not critical and therefore not analyzed.	23
6-6′	G6S3A	CS-7	Bedding plane, shallower search	Janbu	1.99	-	Pseudostatic analysis is not critical and therefore not analyzed.	24
6-6′	G6S4A	CS-7	Circular search	Janbu	2.66	-	Pseudostatic analysis is not critical and therefore not analyzed.	25
7-7′	G7S1B	Natural Slope	Bedding plane search (silty claystone)	Janbu	1.56	-	Critical surface	26
7-7′	G7PS1B	Natural Slope	Bedding plane search	Janbu	-	1.11	Pseudostatic analysis[2]	27
7-7′	G7S1C	Natural Slope	Bedding plane search (deeper search)	Janbu	1.58	-	Pseudostatic is not critical in compare to above Run No. 27.	28
7-7′	G7S1A	Natural Slope	Bedding plane search (shallower search)	Janbu	1.58	-	Pseudostatic is not critical in compare to above run.	29

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
7-7′	G7S1D	Natural Slope	Circular search	Bishop	2.46	-	Pseudostatic analysis is not critical and therefore not analyzed.	30
9-9′	G9S1A	CS-25	Bedding plane search	Janbu	2.70	-	Circular analyses are not critical and therefore not performed	31
9-9′	G9PS1A	CS-25	Bedding plane search	Janbu	-	1.69	Pseudostatic analysis[2]	32
10-10′	G10S1A	CS-26	Clay bed	Janbu	3.10	-	Analyzed along clay bed with tank load. Pseudostatic is not critical and therefore not analyzed.	33
10-10′	G10S1B	CS-26	Clay bed	Janbu	2.54	-	Analyzed along clay bed without tank load. Pseudostatic is not critical and therefore not analyzed.	34
11-11′	G11S1A	Natural Slope	Bedding plane search (silty claybed)	Janbu	1.58	-	FS<1.5, Analyzed without Qt for sensitivity analyses and is more critical. See mitigation measure below.	35
11-11′	G11S1C	Natural Slope	Bedding plane search	Janbu	1.59	-	Cut ridge to an elevation of 1600′ as shown on proposed grading plan.	36
11-11′	G11PS1C	Natural Slope	Bedding plane search	Janbu	-	1.12	Pseudostatic analysis[2]	37
11-11′	G11S1D	Natural Slope	Bedding plane search	Janbu	1.78	-	Pseudostatic analyses is not critical and therefore not analyzed	38
11-11′	G11S1E	Natural Slope	Circular search	Bishop	1.83	-	Pseudostatic analyses is not critical and therefore not analyzed.	39
12-12′	G12S11	Natural Slope	Bedding plane search	Janbu	2.12	-	Analyzed 29° bedding plane below Qt	40

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
12-12′	G12PS11	Natural Slope	Bedding plane search	Janbu		1.55	Pseudostatic analysis[2]	41
12-12′	G12S12	Natural Slope	Bedding plane search (deeper search)	Janbu	2.32	-	Pseudostatic analysis is not critical and therefore not performed.	42
12-12′	G12S1A	Natural Slope	Bedding plane search (shallower search)	Janbu	2.17	-	Analyzed without Qt, Pseudostatic analysis is not critical and therefore not performed.	43
12-12′	G12S20	Natural Slope	Circular search	Janbu	2.60	-	Circular search through Qt pseudostatic analysis is not critical and therefore not performed.	44
14-14′	G14S1A	CS-28	Bedding plane search (silty claystone bed)	Janbu	1.77	-	Critical surface	45
14-14′	G14PS1A	CS-28	Bedding plane search	Janbu	-	1.30	Pseudostatic analysis[2]	46
14-14′	G14S1B	CS-28	Bedding plane deeper search	Janbu	2.28	-	Deeper search. Pseudostatic analysis is not critical and therefore not analyzed.	47
18-18′	G18S1A	CS-12	Bedding plane search	Janbu	1.69	-	Critical surface	48
18-18′	G18PS1A	CS-12	Bedding plane search	Janbu	-	1.22	Pseudostatic analyses[2]	49

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
21-21′	G21S1A	CS-11	Silty claystone bed located ± 60′ below the toe of 2:1	Janbu	1.81	-	Highest Cut Slope Critical surface	50
21-21′	G21PS1A	CS-11	silty claystone bed	Janbu	-	1.25	Pseudostatic analysis[2]	51
21-21′	G21S1B	CS-11	Upper silty clay bed, bedding plane	Janbu	2.88	-	Upper region search. Pseudostatic analysis is not critical and therefore not analyzed.	52
21-21′	G21S1C	CS-11	Below the silty clay bed, bedding plane	Janbu	3.61	-	Deeper search. Pseudostatic analysis is not critical and therefore not analyzed.	53
21-21′	G21S1D	CS-11	Circular search	Bishop	2.55	-	Pseudostatic analysis is not critical and therefore not analyzed.	54
22-22′	G22S1A	Natural Slope	Bedding plane TQs search	Janbu	2.10	-	Pseudostatic analysis is not critical. Based on subsurface exploration no silty claystone or clay beds, therefore silty claystone and clay beds are not modeled in analyses. This section is considered more critical than 24-24′ and 23-23′ (higher and steeper). 24-24′ and 23-23′ are underlain by same sandy bedrock per borings BA-5, BA-8 and BA-10.	55
22-22′	G22S1B	Natural Slope	TQs search (deeper search)	Janbu	2.36	-	Not critical	56

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
22-22′	G22S1D	Natural Slope	Circular search	Janbu	2.13	-	Critical surface. Pseudostatic analysis is not critical and therefore not analyzed.	57
22-22′	G22S2A	Fill Slope	Circular search	Janbu	2.08	-	Critical surface. Pseudostatic analysis is not critical and therefore not analyzed.	58
27-27′	G27S1A	CS-30	Bedding plane search	Janbu	5.80	-	Pseudostatic analysis is not critical and therefore not analyzed.	59
27-27′	G27S1B	CS-30	Bedding plane search	Janbu	3.81	-	Pseudostatic analysis is not critical and therefore not analyzed.	60
28-28′	G28S1A	Natural Slope	Circular Search	Janbu	1.09	-	Entire Slope FS<1.5, see mitigation measure, Run No. 63	61
28-28′	G28S2A	Natural Slope	Circular search	Janbu	1.08	-	Upper Slope FS<1.5, see mitigation measures below, Run No. 63	62
28-28′	G28S3A	Natural Slope	Circular Search	Janbu	1.51	-	Trim over steepend ridge back to 2:1(H:V). Bedding is neutral, not critical and not analyzed. Analyzed grade more critical than final proposed grade incorporated into grading plan.	63
28-28′	G28PS3A	Natural Slope	Circular Search	Janbu	-	1.12	Pseudostatic analysis[2]	64
28-28′	G28S3D	Natural Slope	Circular Search	Janbu	1.53	-	Entire slope after remediation	65
28-28′	G28PS3D	Natural Slope	Circular Search	Janbu	-	1.13	Pseudostatic analysis[2]	66
31-31′	G31S1A	Fill Slope	Circular search	Janbu	1.85	-	Analyzed critical fill slope (highest 2:1(H:V) fill slope).	67
31-31′	G31PS1A	Fill Slope	Circular search	Janbu	-	1.26	Pseudostatic analysis[2]	68

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
32-32′	G32S1E	Natural Slope	Circular search	Janbu	1.93	-	Pseudostatic analysis is not critical and therefore not analyzed.	69
34-34′	G34S1A	ECS-1	Slide Plane	Janbu	2.09	-	Existing Cut Slope ECS-1 and adjacent area anticipated to expose landside Qls-6 material. Recommended placement of Qls-6 into a Restricted Use Area	70
34-34′	G34S2A	ECS-1	Slide plane	Janbu	2.03	-	Minimum factor of safety. Recommended placement of Qls-6 into a Restricted Use Area	71
34-34′	G34PS2A	ECS-1	Pseudostatic analysis	Janbu	-	2.33	Used peak shear strength in this analysis.	72
34-34′	G34S2B	ECS-1	Slide mass above the 120′ wide bench, bedding plane search	Janbu	15.50	-	Upper slope, bedding plane search in 3:1 cut that catches at CS-18	73
34-34′	G34S2C	ECS-1	Slide mass above the 120′ wide bench, circular search	Bishop	7.12	-	Upper slope, circular analysis in 3:1 cut that catches at CS-18.	74
35-35′	G35OS1A	ECS-2	Bedding plane search	Janbu	2.78	-	With groundwater	75
35-35′	G35PS1A	ECS-2	Bedding plane search	Janbu	-	1.58	Pseudostatic analyses[2]	76
37-37′	G37S1A	CS-35	Bedding plane search	Janbu	1.60	-	Ascending natural slope. Critical surface.	77

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Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
37-37′	G37PS1A	CS-35	Bedding plane search	Janbu	-	1.13	Pseudostatic analyses[2]	78
37-37′	G37S1B	CS-35	Circular	Bishop	2.43	-	Circular analyses. Pseudostatic analyses is not critical and therefore not performed.	79
41-41′	G41S1A	CS-10	Bedding plane search	Janbu	2.23	-	Proposed Cut Slope 10. Critical Surface.	80
41-41′	G41PS1A	CS-10	Bedding plane search	Janbu	-	1.57	Pseudostatic analyses[2]	81
42-42′	G42S1A	CS-13	Bedding plane search	Janbu	1.72	-	Proposed Cut Slope 13. Critical Surface.	82
42-42′	G42PS1A	CS-13	Bedding plane search	Janbu	-	1.21	Pseudostatic analyses[2]	83
42-42′	G42S1B	CS-13	Circular	Bishop	2.53	-	Circular analyses. Pseudostatic analyses is not critical and therefore not performed.	84
44-44′	G44S1A	CS-3	Bedding plane search	Janbu	1.88	-	Pseudostatic analyses[2]	85
45-45′	G45S1A	CS-5	Bedding plane search	Janbu	1.91	-	Proposed Cut Slope 5. Critical Surface.	86
45-45′	G45PS1A	CS-5	Bedding plane search	Janbu	-	1.33	Pseudostatic analyses[2]	87
45-45′	G45S1B	CS-5	Circular	Bishop	2.92	-	Circular analyses. Pseudostatic analyses is not critical and therefore not performed.	88
N/A	GM1A	N/A	Circular	Bishop	2.02	-	15 ft. 2:1 Fill Slope with rapid drawdown of adjacent debris basin	89

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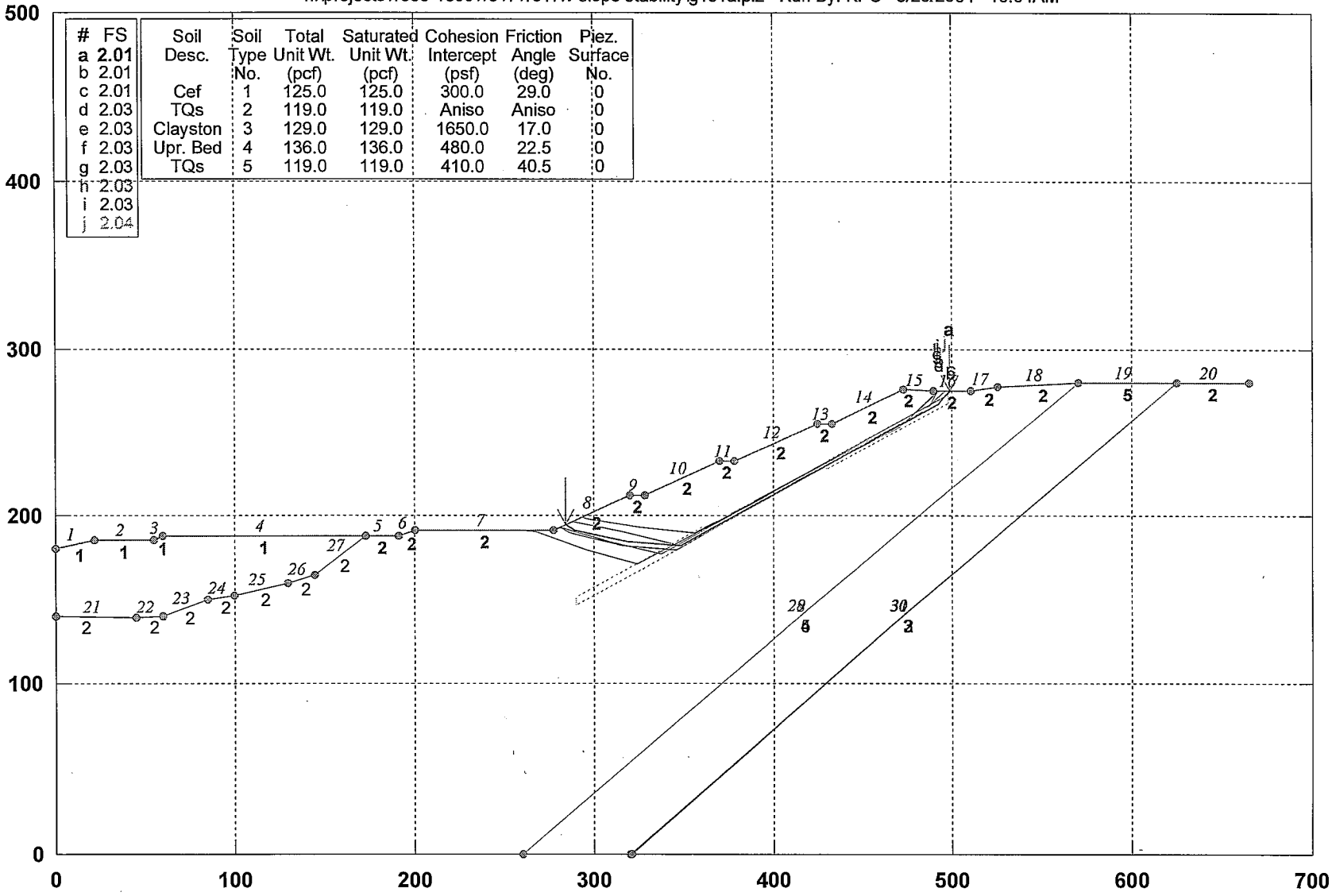
Cross Section	File Name	Slope Designation	Analyzed Plane	Method	Factor of Safety		Comments	Run No.
					Static	Pseudostatic[2] (Coeff = 0.15)		
N/A	GM2A	N/A	Circular	Bishop	3.04	-	Combination 11 ft. 2:1 and 3:1 debris basin dike downstream Fill Slope with steady state seepage conditions	90

G P R T52584, 1-1' Bedding Plane Search

n:\projects\1600-1699\1617\1617lv slope stability\g1s1a.pl2 Run By: KPC 8/20/2004 10:04AM

#	FS
a	2.01
b	2.01
c	2.01
d	2.03
e	2.03
f	2.03
g	2.03
h	2.03
i	2.03
j	2.04

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Clayston	3	129.0	129.0	1650.0	17.0	0
Upr. Bed	4	136.0	136.0	480.0	22.5	0
TQs	5	119.0	119.0	410.0	40.5	0



GSTABL7 v.2 FSmin=2.01

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-1

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
(All Rights Reserved-Unauthorized Use Prohibited)
****
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: 8/20/2004
Time of Run: 10:04AM
Run By: KPC
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g1s1a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g1s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g1s1a.PLT
PROBLEM DESCRIPTION: G P R T52584, 1-1'
Bedding Plane Search

BOUNDARY COORDINATES
20 Top Boundaries
31 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	180.00	22.00	185.00	1
2	22.00	185.00	55.00	185.00	1
3	55.00	185.00	60.00	188.00	1
4	60.00	188.00	173.00	188.00	1
5	173.00	188.00	191.00	188.00	2
6	191.00	188.00	200.00	191.00	2
7	200.00	191.00	278.00	191.00	2
8	278.00	191.00	320.00	212.00	2
9	320.00	212.00	328.00	212.00	2
10	328.00	212.00	370.00	233.00	2
11	370.00	233.00	378.00	233.00	2
12	378.00	233.00	425.00	255.00	2
13	425.00	255.00	433.00	255.00	2
14	433.00	255.00	473.00	276.00	2
15	473.00	276.00	490.00	275.00	2
16	490.00	275.00	510.00	275.00	2
17	510.00	275.00	525.00	278.00	2
18	525.00	278.00	570.00	280.00	2
19	570.00	280.00	625.00	280.00	5
20	625.00	280.00	665.00	280.00	2
21	0.00	140.00	45.00	139.00	2
22	45.00	139.00	60.00	140.00	2
23	60.00	140.00	85.00	150.00	2
24	85.00	150.00	100.00	152.00	2
25	100.00	152.00	130.00	160.00	2
26	130.00	160.00	145.00	165.00	2
27	145.00	165.00	173.00	188.00	2
28	260.00	0.00	570.00	280.00	4
29	260.20	0.00	570.20	280.00	5
30	320.00	0.00	625.00	280.00	3
31	320.50	0.00	625.50	280.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 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	125.0	125.0	300.0	29.0	0.00	0.0	0

2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	129.0	129.0	1650.0	17.0	0.00	0.0	0
4	136.0	136.0	480.0	22.5	0.00	0.0	0
5	119.0	119.0	410.0	40.5	0.00	0.0	0

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	29.0	410.00	40.50
2	31.0	347.00	22.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	290.00	149.00	360.00	190.00	5.00
2	430.00	230.00	498.00	270.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.552 FS Min = 2.010 FS Ave = 2.577
Standard Deviation = 0.428 Coefficient of Variation = 16.61 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	284.54	194.27
2	289.23	190.95
3	318.44	184.12
4	348.39	182.37
5	491.74	266.45
6	498.62	275.00

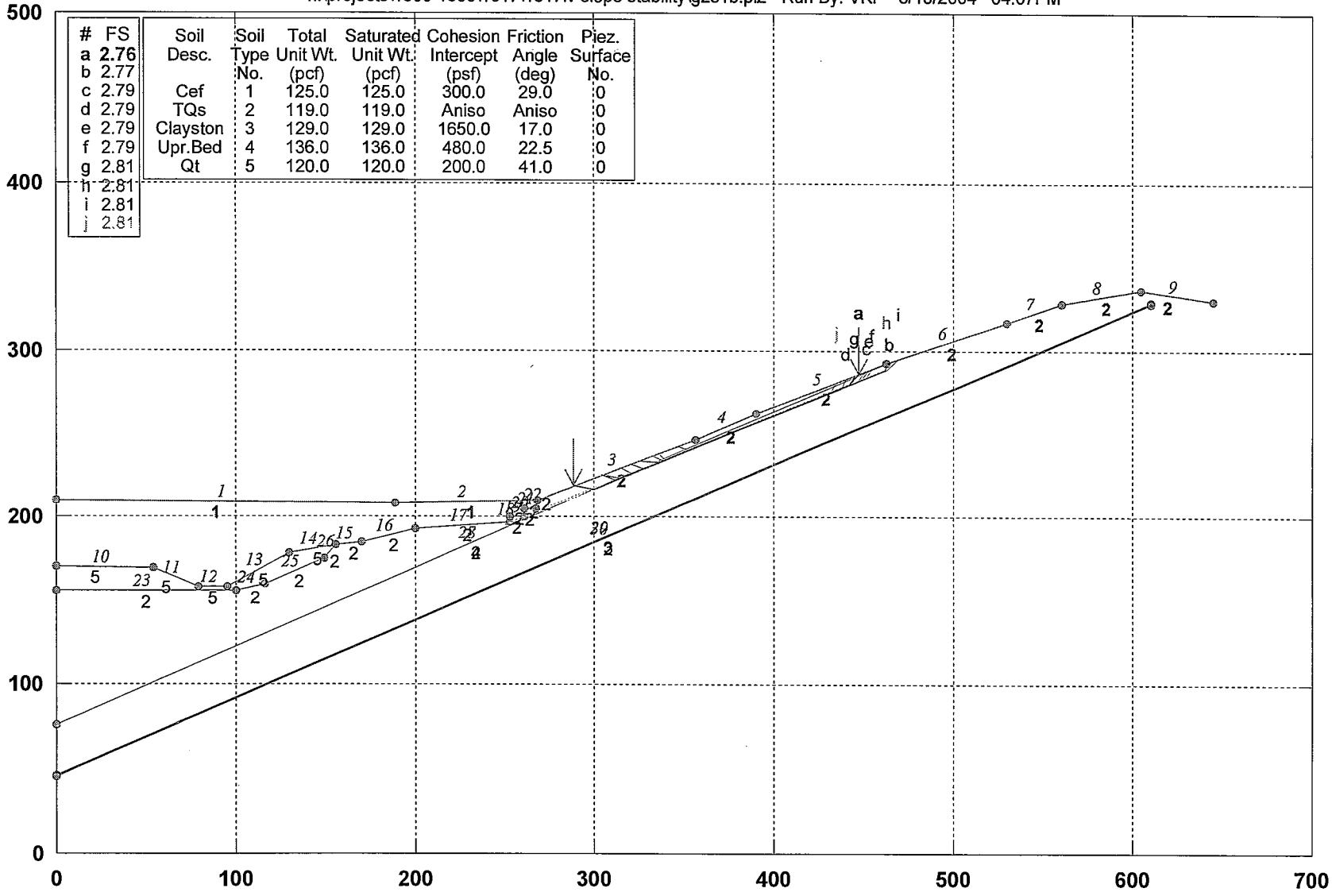
Factor of Safety
*** 2.010 ***

G P R, T52584, Cross Section 2-2'-Nat. Slope - Upper silty clay bed - Static

n:\projects\1600-1699\1617\1617lv slope stability\g2s1b.pl2 Run By: VKP 8/13/2004 04:07PM

#	FS
a	2.76
b	2.77
c	2.79
d	2.79
e	2.79
f	2.79
g	2.81
h	2.81
i	2.81
j	2.81

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Clayston	3	129.0	129.0	1650.0	17.0	0
Upr.Bed	4	136.0	136.0	480.0	22.5	0
Qt	5	120.0	120.0	200.0	41.0	0



GSTABL7 v.2 FSmin=2.76

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.- 2

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                  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:        8/13/2004
Time of Run:              04:07PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g2s1b.
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g2s1b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g2s1b.PLT
PROBLEM DESCRIPTION:  G P R, T52584,  Cross Section 2-2'-Nat.
                      Slope - Upper silty clay bed - Static
BOUNDARY COORDINATES
    9 Top   Boundaries
   30 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	210.00	189.00	208.00	1
2	189.00	208.00	268.10	210.00	1
3	268.10	210.00	356.00	246.00	2
4	356.00	246.00	390.00	262.00	2
5	390.00	262.00	463.00	293.00	2
6	463.00	293.00	530.00	317.00	2
7	530.00	317.00	560.00	328.00	2
8	560.00	328.00	605.00	336.00	2
9	605.00	336.00	645.00	330.00	2
10	0.00	170.00	54.00	169.00	5
11	54.00	169.00	79.00	158.00	5
12	79.00	158.00	95.00	158.00	5
13	95.00	158.00	130.00	178.00	5
14	130.00	178.00	156.00	183.00	5
15	156.00	183.00	170.00	185.00	2
16	170.00	185.00	200.00	193.00	2
17	200.00	193.00	253.00	197.00	2
18	253.00	197.00	253.10	200.00	2
19	253.10	200.00	261.00	200.00	2
20	261.00	200.00	261.10	205.00	2
21	261.10	205.00	268.00	205.00	2
22	268.00	205.00	268.10	210.00	2
23	0.00	156.00	100.00	156.00	2
24	100.00	156.00	116.00	160.00	2
25	116.00	160.00	149.00	175.00	2
26	149.00	175.00	156.00	183.00	2
27	0.00	76.00	463.00	293.00	4
28	0.00	75.80	463.00	292.80	2
29	0.00	46.00	610.00	329.00	3
30	0.00	45.50	610.00	328.50	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 5 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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0

3	129.0	129.0	1650.0	17.0	0.00	0.0	0
4	136.0	136.0	480.0	22.5	0.00	0.0	0
5	120.0	120.0	200.0	41.0	0.00	0.0	0

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	24.0	410.00	40.50
2	26.0	347.00	22.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	250.00	195.00	356.00	241.00	1.00
2	390.00	257.00	463.00	289.00	1.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 6.961 FS Min = 2.760 FS Ave = 3.730
Standard Deviation = 0.826 Coefficient of Variation = 22.16 %
Failure Surface Specified By 4 Coordinate Points

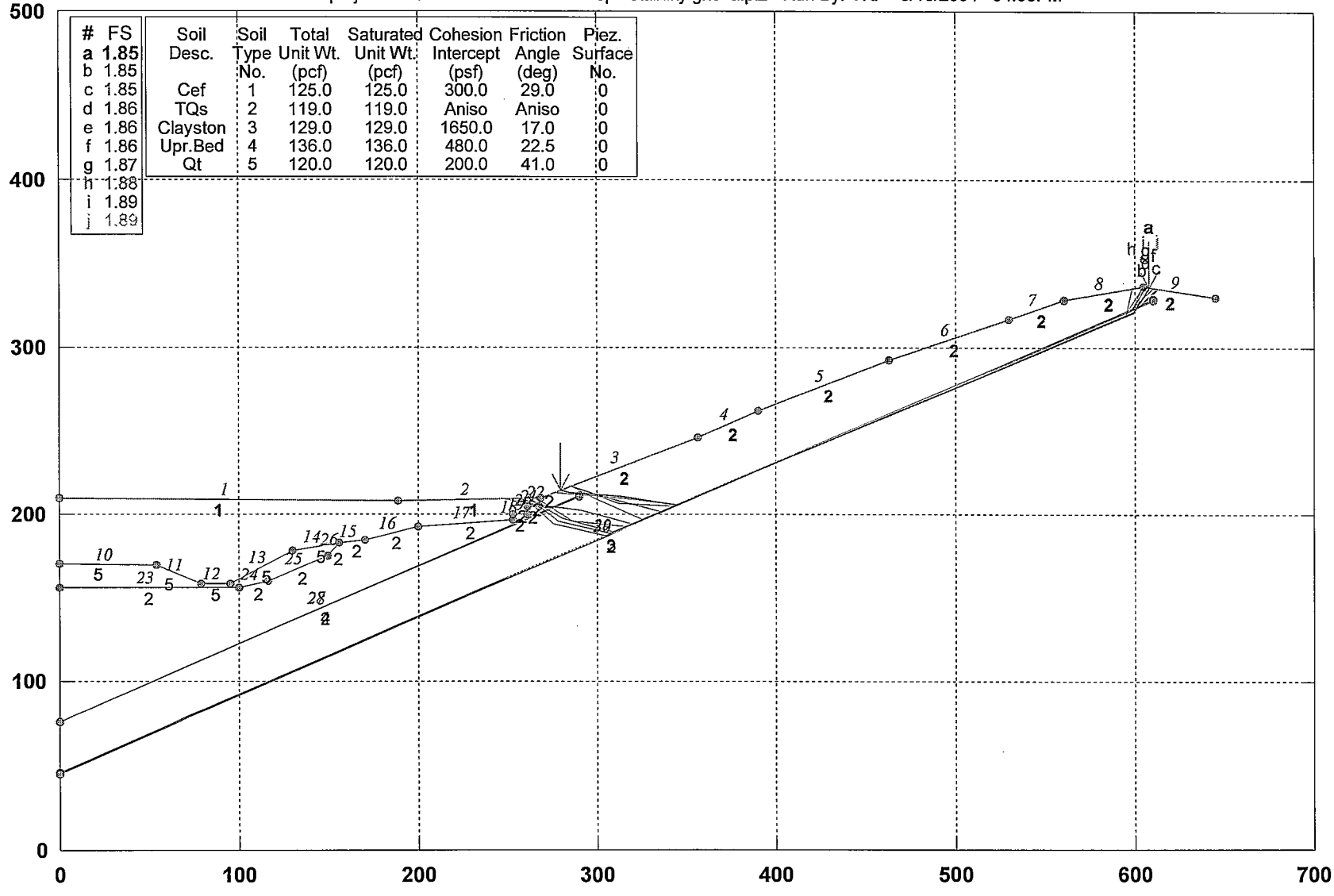
Point No.	X-Surf (ft)	Y-Surf (ft)
1	288.55	218.37
2	299.58	216.05
3	441.93	279.63
4	447.86	286.57

Factor of Safety
*** 2.760 ***
Individual data on the 9 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	10.5	4070.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.3	231.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.2	191.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	56.4	39120.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	34.0	20977.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	51.9	31013.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.7	1506.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	0.3	28.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	1.0	40.1	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Cross Section 2-2'-Nat. Slope - Lower clay bed - Static

n:\projects\1600-1699\1617\1617lv slope stability\g2s1a.pl2 Run By: VKP 8/13/2004 04:08PM



#	FS
a	1.85
b	1.85
c	1.85
d	1.86
e	1.86
f	1.86
g	1.87
h	1.88
i	1.89
j	1.89

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Clayston	3	129.0	129.0	1650.0	17.0	0
Upr.Bed	4	136.0	136.0	480.0	22.5	0
Qt	5	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.85

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-3

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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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: 8/13/2004
Time of Run: 04:08PM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g2s1a.
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g2s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g2s1a.PLT
PROBLEM DESCRIPTION: G P R, T52584, Cross Section 2-2'-Nat.
Slope - Lower clay bed - Static

BOUNDARY COORDINATES
9 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	210.00	189.00	208.00	1
2	189.00	208.00	268.10	210.00	1
3	268.10	210.00	356.00	246.00	2
4	356.00	246.00	390.00	262.00	2
5	390.00	262.00	463.00	293.00	2
6	463.00	293.00	530.00	317.00	2
7	530.00	317.00	560.00	328.00	2
8	560.00	328.00	605.00	336.00	2
9	605.00	336.00	645.00	330.00	2
10	0.00	170.00	54.00	169.00	5
11	54.00	169.00	79.00	158.00	5
12	79.00	158.00	95.00	158.00	5
13	95.00	158.00	130.00	178.00	5
14	130.00	178.00	156.00	183.00	5
15	156.00	183.00	170.00	185.00	2
16	170.00	185.00	200.00	193.00	2
17	200.00	193.00	253.00	197.00	2
18	253.00	197.00	253.10	200.00	2
19	253.10	200.00	261.00	200.00	2
20	261.00	200.00	261.10	205.00	2
21	261.10	205.00	268.00	205.00	2
22	268.00	205.00	268.10	210.00	2
23	0.00	156.00	100.00	156.00	2
24	100.00	156.00	116.00	160.00	2
25	116.00	160.00	149.00	175.00	2
26	149.00	175.00	156.00	183.00	2
27	0.00	76.00	290.00	211.00	4
28	0.00	75.80	290.00	210.80	2
29	0.00	46.00	610.00	329.00	3
30	0.00	45.50	610.00	328.50	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
5 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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0

3	129.0	129.0	1650.0	17.0	0.00	0.0	0
4	136.0	136.0	480.0	22.5	0.00	0.0	0
5	120.0	120.0	200.0	41.0	0.00	0.0	0

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	24.0	410.00	40.50
2	26.0	347.00	22.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	250.00	162.00	410.00	236.30	0.00
2	560.00	305.00	600.00	321.50	0.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.274 FS Min = 1.849 FS Ave = 2.219
Standard Deviation = 0.221 Coefficient of Variation = 9.96 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	279.88	214.82
2	284.41	212.71
3	314.35	210.78
4	343.90	205.60
5	598.85	321.02
6	607.65	335.60

Factor of Safety
*** 1.849 ***

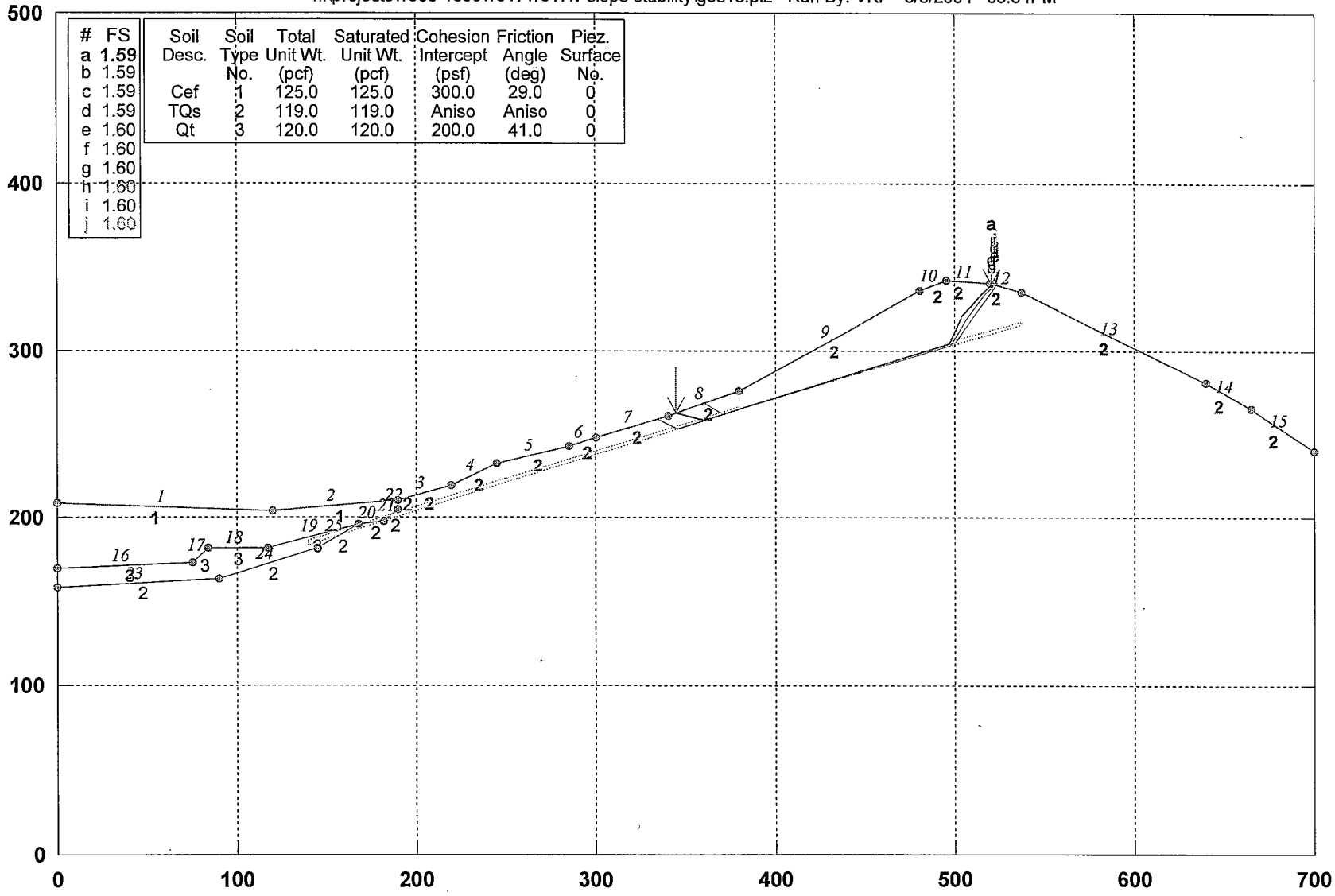
Individual data on the 15 slices

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	4.5	1070.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	29.9	39429.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	29.6	94244.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.2	21654.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.0	29016.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	34.0	142595.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	3.6	15358.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	69.4	284712.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	67.0	241997.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	30.0	92445.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	38.8	89050.7	0.0	0.0	0.	0.	0.0	0.0	0.0

12	1.9	2870.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.4	535.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.8	3439.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	2.6	753.2	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584 Sec. 3-3' Bed plane searchNatural slope, Upper area, Static

n:\projects\1600-1699\1617\1617lv slope stability\g3s1e.pl2 Run By: VKP 8/6/2004 03:54PM



#	FS
a	1.59
b	1.59
c	1.59
d	1.59
e	1.60
f	1.60
g	1.60
h	1.60
i	1.60
j	1.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.59

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 4

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              03:54PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g3s1e.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g3s1e.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g3s1e.PLT
PROBLEM DESCRIPTION:  G P R, T52584 Sec. 3-3' Bed plane search
                      Natural slope, Upper area, Static
BOUNDARY COORDINATES
   15 Top   Boundaries
   25 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     208.00     120.00     204.00        1
    2       120.00     204.00     190.10     210.00        1
    3       190.10     210.00     220.00     219.00        2
    4       220.00     219.00     245.00     232.00        2
    5       245.00     232.00     285.00     242.00        2
    6       285.00     242.00     300.00     248.00        2
    7       300.00     248.00     340.00     261.00        2
    8       340.00     261.00     380.00     276.00        2
    9       380.00     276.00     480.00     336.00        2
   10       480.00     336.00     495.00     342.00        2
   11       495.00     342.00     520.00     340.00        2
   12       520.00     340.00     537.00     335.00        2
   13       537.00     335.00     640.00     281.00        2
   14       640.00     281.00     665.00     265.00        2
   15       665.00     265.00     700.00     240.00        2
   16         0.00     170.00      75.00     173.00        3
   17        75.00     173.00      84.00     182.00        3
   18        84.00     182.00     117.00     182.00        3
   19       117.00     182.00     168.00     196.00        3
   20       168.00     196.00     182.00     198.00        2
   21       182.00     198.00     190.00     205.00        2
   22       190.00     205.00     190.10     210.00        2
   23         0.00     158.00      90.00     164.00        2
   24        90.00     164.00     145.00     182.00        2
   25       145.00     182.00     168.00     196.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total   Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)     (pcf)     (psf)     (deg)   Param.    (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0       0
  2   119.0    119.0     410.0     40.5    0.00       0.0       0
  3   120.0    120.0     200.0     41.0    0.00       0.0       0
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	16.0	410.00	40.50
2	19.0	347.00	22.00
3	90.0	410.00	40.50

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.

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

2500 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	140.00	185.00	380.00	265.00	2.00
2	495.00	304.00	537.00	317.00	2.00

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

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Evaluated = 2500

Statistical Data On All Valid FS Values:

FS Max = 2.827 FS Min = 1.585 FS Ave = 1.826

Standard Deviation = 0.170 Coefficient of Variation = 9.34 %

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	344.80	262.80
2	360.88	258.18
3	497.13	304.69
4	504.01	321.33
5	515.99	334.76
6	520.93	339.73

Factor of Safety

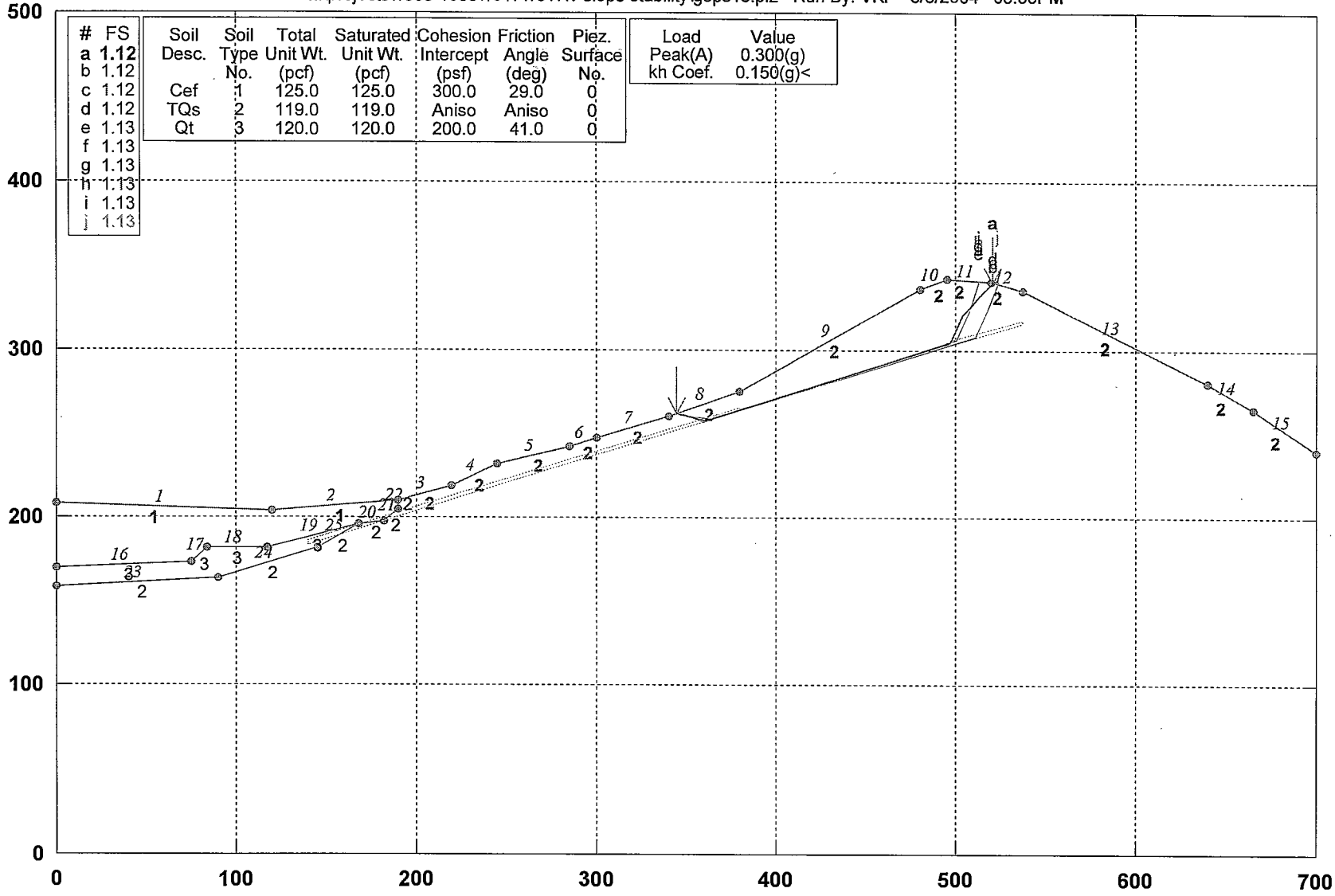
*** 1.585 ***

Individual data on the 9 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	16.1	10192.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	19.1	24965.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	100.0	288283.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	15.0	67106.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.1	9527.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.9	23360.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	12.0	18200.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	4.0	1615.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	0.9	67.1	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584 Sec. 3-3' Bed plane searchNatural slope, Upper area, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g3ps1e.pl2 Run By: VKP 8/6/2004 03:53PM



#	FS
a	1.12
b	1.12
c	1.12
d	1.12
e	1.13
f	1.13
g	1.13
h	1.13
i	1.13
j	1.13

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.12

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. 5

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              03:53PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g3psle.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g3psle.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g3psle.PLT
PROBLEM DESCRIPTION:  G P R, T52584 Sec. 3-3' Bed plane search
                      Natural slope, Upper area, Pseudostatic
BOUNDARY COORDINATES
   15 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	208.00	120.00	204.00	1
2	120.00	204.00	190.10	210.00	1
3	190.10	210.00	220.00	219.00	2
4	220.00	219.00	245.00	232.00	2
5	245.00	232.00	285.00	242.00	2
6	285.00	242.00	300.00	248.00	2
7	300.00	248.00	340.00	261.00	2
8	340.00	261.00	380.00	276.00	2
9	380.00	276.00	480.00	336.00	2
10	480.00	336.00	495.00	342.00	2
11	495.00	342.00	520.00	340.00	2
12	520.00	340.00	537.00	335.00	2
13	537.00	335.00	640.00	281.00	2
14	640.00	281.00	665.00	265.00	2
15	665.00	265.00	700.00	240.00	2
16	0.00	170.00	75.00	173.00	3
17	75.00	173.00	84.00	182.00	3
18	84.00	182.00	117.00	182.00	3
19	117.00	182.00	168.00	196.00	3
20	168.00	196.00	182.00	198.00	2
21	182.00	198.00	190.00	205.00	2
22	190.00	205.00	190.10	210.00	2
23	0.00	158.00	90.00	164.00	2
24	90.00	164.00	145.00	182.00	2
25	145.00	182.00	168.00	196.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	16.0	410.00	40.50
2	19.0	347.00	22.00
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	140.00	185.00	380.00	265.00	2.00
2	495.00	304.00	537.00	317.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 1.972 FS Min = 1.121 FS Ave = 1.260
Standard Deviation = 0.110 Coefficient of Variation = 8.75 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	344.80	262.80
2	360.88	258.18
3	497.13	304.69
4	504.01	321.33
5	515.99	334.76
6	520.93	339.73

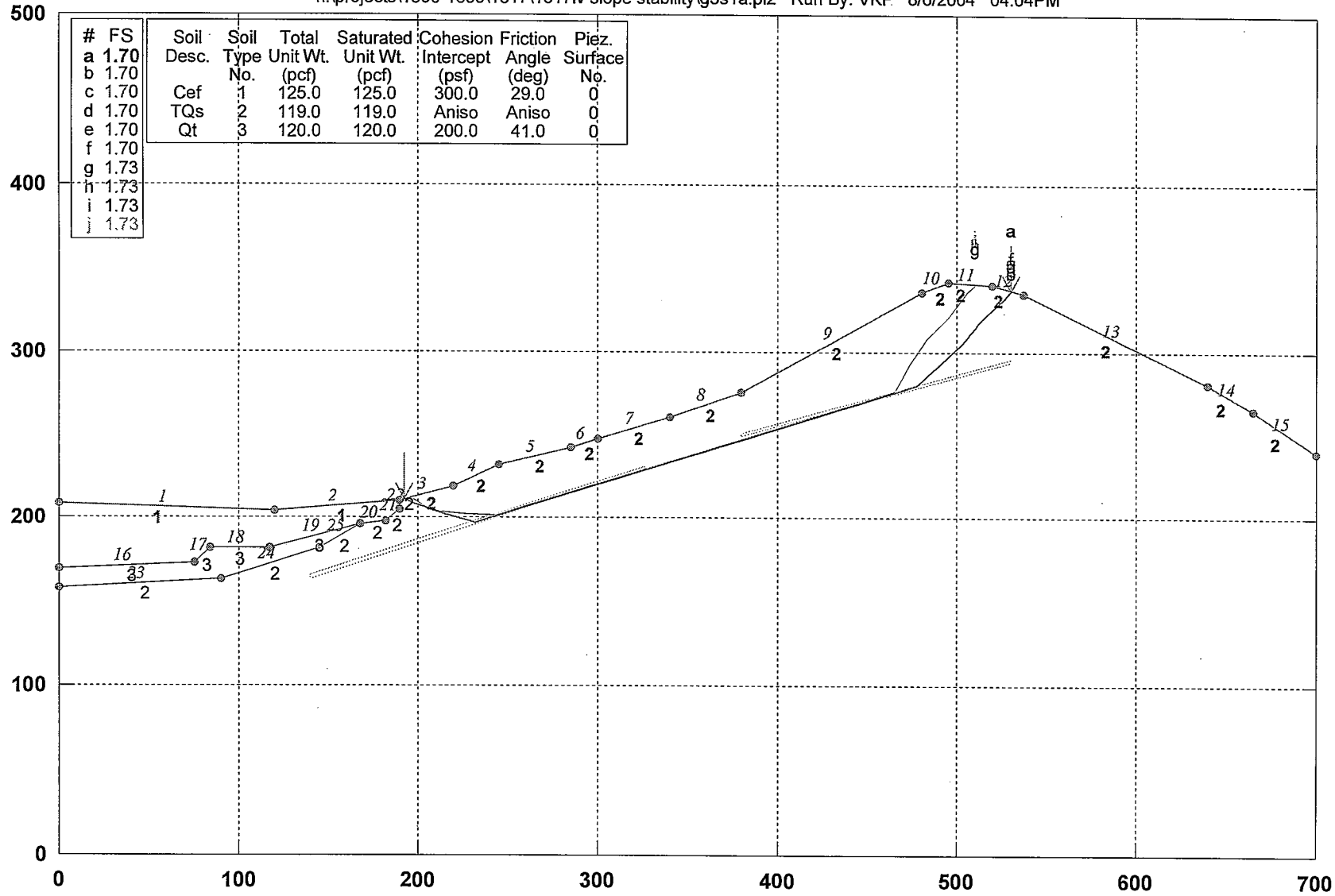
Factor of Safety
*** 1.121 ***

Individual data on the 9 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	16.1	10192.2	0.0	0.0	0.	0.	1528.8	0.0	0.0
2	19.1	24965.0	0.0	0.0	0.	0.	3744.8	0.0	0.0
3	100.0	288283.0	0.0	0.0	0.	0.	43242.5	0.0	0.0
4	15.0	67106.8	0.0	0.0	0.	0.	10066.0	0.0	0.0
5	2.1	9527.9	0.0	0.0	0.	0.	1429.2	0.0	0.0
6	6.9	23360.6	0.0	0.0	0.	0.	3504.1	0.0	0.0
7	12.0	18200.1	0.0	0.0	0.	0.	2730.0	0.0	0.0
8	4.0	1615.0	0.0	0.0	0.	0.	242.3	0.0	0.0
9	0.9	67.1	0.0	0.0	0.	0.	10.1	0.0	0.0

G P R, T52584 Sec. 3-3' Bedding plane search Nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g3s1a.pl2 Run By: VKP 8/6/2004 04:04PM



#	FS
a	1.70
b	1.70
c	1.70
d	1.70
e	1.70
f	1.70
g	1.73
h	1.73
i	1.73
j	1.73

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.70

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 1-6

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****
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: 8/6/2004
Time of Run: 04:04PM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g3s1a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g3s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g3s1a.PLT
PROBLEM DESCRIPTION: G P R, T52584 Sec. 3-3' Bedding plane
search Nat. slope, Static

BOUNDARY COORDINATES
15 Top Boundaries
25 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	208.00	120.00	204.00	1
2	120.00	204.00	190.10	210.00	1
3	190.10	210.00	220.00	219.00	2
4	220.00	219.00	245.00	232.00	2
5	245.00	232.00	285.00	242.00	2
6	285.00	242.00	300.00	248.00	2
7	300.00	248.00	340.00	261.00	2
8	340.00	261.00	380.00	276.00	2
9	380.00	276.00	480.00	336.00	2
10	480.00	336.00	495.00	342.00	2
11	495.00	342.00	520.00	340.00	2
12	520.00	340.00	537.00	335.00	2
13	537.00	335.00	640.00	281.00	2
14	640.00	281.00	665.00	265.00	2
15	665.00	265.00	700.00	240.00	2
16	0.00	170.00	75.00	173.00	3
17	75.00	173.00	84.00	182.00	3
18	84.00	182.00	117.00	182.00	3
19	117.00	182.00	168.00	196.00	3
20	168.00	196.00	182.00	198.00	2
21	182.00	198.00	190.00	205.00	2
22	190.00	205.00	190.10	210.00	2
23	0.00	158.00	90.00	164.00	2
24	90.00	164.00	145.00	182.00	2
25	145.00	182.00	168.00	196.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

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	16.0	410.00	40.50
2	19.0	347.00	22.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	140.00	165.00	326.00	230.00	2.00
2	380.00	250.00	530.00	295.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 5.989 FS Min = 1.704 FS Ave = 2.530
Standard Deviation = 0.841 Coefficient of Variation = 33.23 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	192.44	210.71
2	197.54	208.57
3	214.43	202.36
4	231.54	196.75
5	477.48	279.95
6	490.20	292.68
7	502.91	305.42
8	513.93	319.65
9	526.52	332.52
10	530.19	337.00

Factor of Safety
*** 1.704 ***

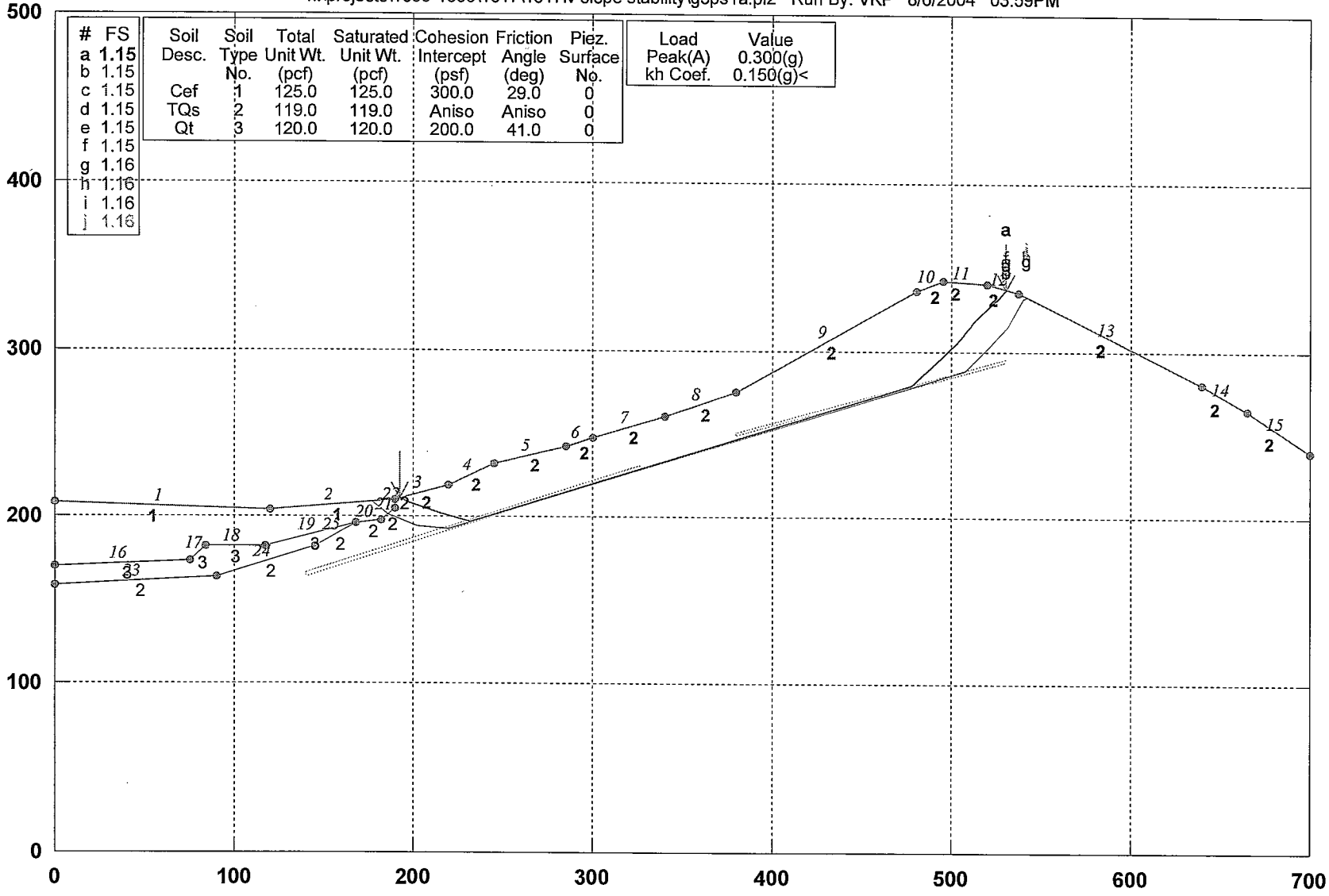
Individual data on the 18 slices

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	5.1	1111.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	16.9	18730.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.6	11078.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	11.5	32066.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	13.5	47224.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	40.0	137711.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	15.0	49316.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	40.0	132447.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	40.0	134677.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	97.5	484669.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	2.5	16227.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	10.2	61256.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	4.8	26247.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	7.9	37888.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	11.0	37223.1	0.0	0.0	0.	0.	0.0	0.0	0.0
16	6.1	12626.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	6.5	7651.9	0.0	0.0	0.	0.	0.0	0.0	0.0

18	3.7	1212.6	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584 Sec. 3-3' Bed plane searchNatural slope, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g3ps1a.pl2 Run By: VKP 8/6/2004 03:59PM



#	FS
a	1.15
b	1.15
c	1.15
d	1.15
e	1.15
f	1.15
g	1.16
h	1.16
i	1.16
j	1.16

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.15

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO-7

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              03:59PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g3ps1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g3ps1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g3ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584 Sec. 3-3' Bed plane search
                      Natural slope, Pseudostatic
BOUNDARY COORDINATES
   15 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	208.00	120.00	204.00	1
2	120.00	204.00	190.10	210.00	1
3	190.10	210.00	220.00	219.00	2
4	220.00	219.00	245.00	232.00	2
5	245.00	232.00	285.00	242.00	2
6	285.00	242.00	300.00	248.00	2
7	300.00	248.00	340.00	261.00	2
8	340.00	261.00	380.00	276.00	2
9	380.00	276.00	480.00	336.00	2
10	480.00	336.00	495.00	342.00	2
11	495.00	342.00	520.00	340.00	2
12	520.00	340.00	537.00	335.00	2
13	537.00	335.00	640.00	281.00	2
14	640.00	281.00	665.00	265.00	2
15	665.00	265.00	700.00	240.00	2
16	0.00	170.00	75.00	173.00	3
17	75.00	173.00	84.00	182.00	3
18	84.00	182.00	117.00	182.00	3
19	117.00	182.00	168.00	196.00	3
20	168.00	196.00	182.00	198.00	2
21	182.00	198.00	190.00	205.00	2
22	190.00	205.00	190.10	210.00	2
23	0.00	158.00	90.00	164.00	2
24	90.00	164.00	145.00	182.00	2
25	145.00	182.00	168.00	196.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	16.0	410.00	40.50
2	19.0	347.00	22.00
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	140.00	165.00	326.00	230.00	2.00
2	380.00	250.00	530.00	295.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.573 FS Min = 1.148 FS Ave = 1.668
Standard Deviation = 0.489 Coefficient of Variation = 29.30 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	192.44	210.71
2	197.54	208.57
3	214.43	202.36
4	231.54	196.75
5	477.48	279.95
6	490.20	292.68
7	502.91	305.42
8	513.93	319.65
9	526.52	332.52
10	530.19	337.00

Factor of Safety
*** 1.148 ***

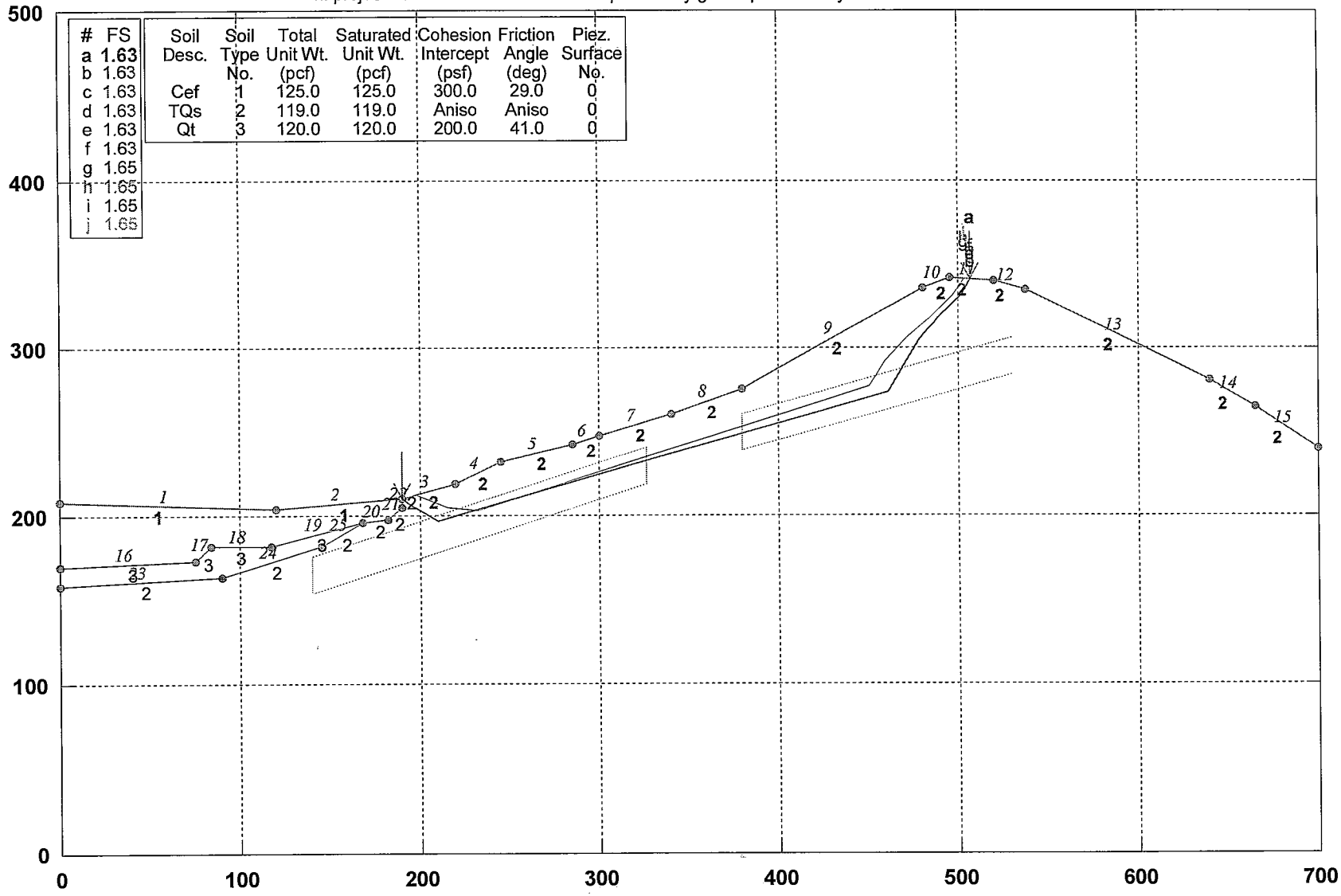
Individual data on the 18 slices

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	5.1	1111.7	0.0	0.0	0.	0.	166.8	0.0	0.0
2	16.9	18730.4	0.0	0.0	0.	0.	2809.6	0.0	0.0
3	5.6	11078.7	0.0	0.0	0.	0.	1661.8	0.0	0.0
4	11.5	32066.6	0.0	0.0	0.	0.	4810.0	0.0	0.0
5	13.5	47224.5	0.0	0.0	0.	0.	7083.7	0.0	0.0
6	40.0	137711.5	0.0	0.0	0.	0.	20656.7	0.0	0.0
7	15.0	49316.1	0.0	0.0	0.	0.	7397.4	0.0	0.0
8	40.0	132447.5	0.0	0.0	0.	0.	19867.1	0.0	0.0
9	40.0	134677.3	0.0	0.0	0.	0.	20201.6	0.0	0.0
10	97.5	484669.8	0.0	0.0	0.	0.	72700.5	0.0	0.0
11	2.5	16227.8	0.0	0.0	0.	0.	2434.2	0.0	0.0

12	10.2	61256.0	0.0	0.0	0.	0.	9188.4	0.0	0.0
13	4.8	26247.9	0.0	0.0	0.	0.	3937.2	0.0	0.0
14	7.9	37888.9	0.0	0.0	0.	0.	5683.3	0.0	0.0
15	11.0	37223.1	0.0	0.0	0.	0.	5583.5	0.0	0.0
16	6.1	12626.9	0.0	0.0	0.	0.	1894.0	0.0	0.0
17	6.5	7651.9	0.0	0.0	0.	0.	1147.8	0.0	0.0
18	3.7	1212.6	0.0	0.0	0.	0.	181.9	0.0	0.0

G P R, T52584 Sec. 3-3' Bed plane searchNatural slope, Larger box ht, Static

n:\projects\1600-1699\1617\1617lv slope stability\g3s1b.pl2 Run By: VKP 8/6/2004 03:57PM



#	FS
a	1.63
b	1.63
c	1.63
d	1.63
e	1.63
f	1.63
g	1.65
h	1.65
i	1.65
j	1.65

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.63

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 8

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              03:57PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g3slb.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g3slb.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g3slb.PLT
PROBLEM DESCRIPTION:  G P R, T52584 Sec. 3-3' Bed plane search
                      Natural slope, Larger box ht, Static
BOUNDARY COORDINATES
   15 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	208.00	120.00	204.00	1
2	120.00	204.00	190.10	210.00	1
3	190.10	210.00	220.00	219.00	2
4	220.00	219.00	245.00	232.00	2
5	245.00	232.00	285.00	242.00	2
6	285.00	242.00	300.00	248.00	2
7	300.00	248.00	340.00	261.00	2
8	340.00	261.00	380.00	276.00	2
9	380.00	276.00	480.00	336.00	2
10	480.00	336.00	495.00	342.00	2
11	495.00	342.00	520.00	340.00	2
12	520.00	340.00	537.00	335.00	2
13	537.00	335.00	640.00	281.00	2
14	640.00	281.00	665.00	265.00	2
15	665.00	265.00	700.00	240.00	2
16	0.00	170.00	75.00	173.00	3
17	75.00	173.00	84.00	182.00	3
18	84.00	182.00	117.00	182.00	3
19	117.00	182.00	168.00	196.00	3
20	168.00	196.00	182.00	198.00	2
21	182.00	198.00	190.00	205.00	2
22	190.00	205.00	190.10	210.00	2
23	0.00	158.00	90.00	164.00	2
24	90.00	164.00	145.00	182.00	2
25	145.00	182.00	168.00	196.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	16.0	410.00	40.50
2	19.0	347.00	22.00
3	90.0	410.00	40.50

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.

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

2500 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	140.00	165.00	326.00	230.00	22.00
2	380.00	250.00	530.00	295.00	22.00

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

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Evaluated = 2500

Statistical Data On All Valid FS Values:

FS Max = 5.091 FS Min = 1.628 FS Ave = 2.617

Standard Deviation = 0.713 Coefficient of Variation = 27.24 %

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	190.02	209.99
2	194.65	206.12
3	210.19	197.04
4	460.85	274.02
5	469.96	289.55
6	478.61	305.33
7	489.85	319.39
8	501.92	332.74
9	506.66	341.07

Factor of Safety

*** 1.628 ***

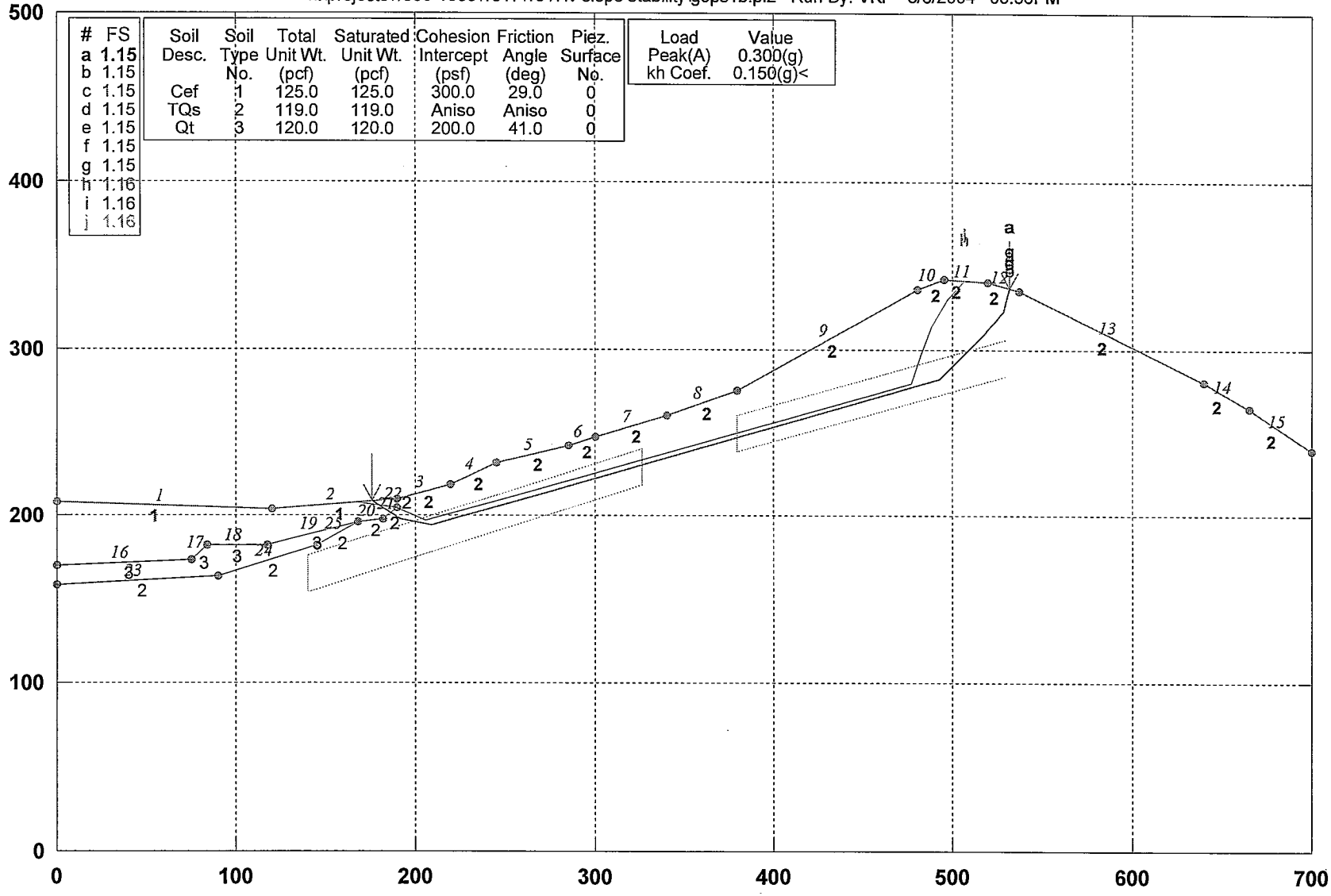
Individual data on the 18 slices

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	0.1	0.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	4.6	1440.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	15.5	22429.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.8	22145.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	25.0	64279.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	40.0	110077.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	15.0	40483.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	40.0	112974.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	40.0	121140.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	80.9	371833.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	9.1	49299.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.6	36145.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	1.4	4863.5	0.0	0.0	0.	0.	0.0	0.0	0.0
15	9.9	29007.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.1	11474.6	0.0	0.0	0.	0.	0.0	0.0	0.0

17	6.9	10551.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	4.7	2454.1	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584 Sec. 3-3' Bed plane searchNatural slope, Larger box ht, Pseudo

n:\projects\1600-1699\1617\1617lv slope stability\g3ps1b.pl2 Run By: VKP 8/6/2004 03:56PM



GSTABL7 v.2 FSmin=1.15

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. - 9

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/6/2004
Time of Run:              03:56PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g3pslb.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g3pslb.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g3pslb.PLT
PROBLEM DESCRIPTION:  G P R, T52584 Sec. 3-3' Bed plane search
                      Natural slope, Larger box ht, Pseudo
BOUNDARY COORDINATES
   15 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	208.00	120.00	204.00	1
2	120.00	204.00	190.10	210.00	1
3	190.10	210.00	220.00	219.00	2
4	220.00	219.00	245.00	232.00	2
5	245.00	232.00	285.00	242.00	2
6	285.00	242.00	300.00	248.00	2
7	300.00	248.00	340.00	261.00	2
8	340.00	261.00	380.00	276.00	2
9	380.00	276.00	480.00	336.00	2
10	480.00	336.00	495.00	342.00	2
11	495.00	342.00	520.00	340.00	2
12	520.00	340.00	537.00	335.00	2
13	537.00	335.00	640.00	281.00	2
14	640.00	281.00	665.00	265.00	2
15	665.00	265.00	700.00	240.00	2
16	0.00	170.00	75.00	173.00	3
17	75.00	173.00	84.00	182.00	3
18	84.00	182.00	117.00	182.00	3
19	117.00	182.00	168.00	196.00	3
20	168.00	196.00	182.00	198.00	2
21	182.00	198.00	190.00	205.00	2
22	190.00	205.00	190.10	210.00	2
23	0.00	158.00	90.00	164.00	2
24	90.00	164.00	145.00	182.00	2
25	145.00	182.00	168.00	196.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	16.0	410.00	40.50
2	19.0	347.00	22.00
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	140.00	165.00	326.00	230.00	22.00
2	380.00	250.00	530.00	295.00	22.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 2.987 FS Min = 1.154 FS Ave = 1.812
Standard Deviation = 0.450 Coefficient of Variation = 24.83 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	175.76	208.77
2	177.02	207.93
3	191.77	197.62
4	209.51	194.55
5	492.23	282.95
6	504.86	295.77
7	517.55	308.55
8	528.20	323.06
9	532.07	336.45

Factor of Safety
*** 1.154 ***

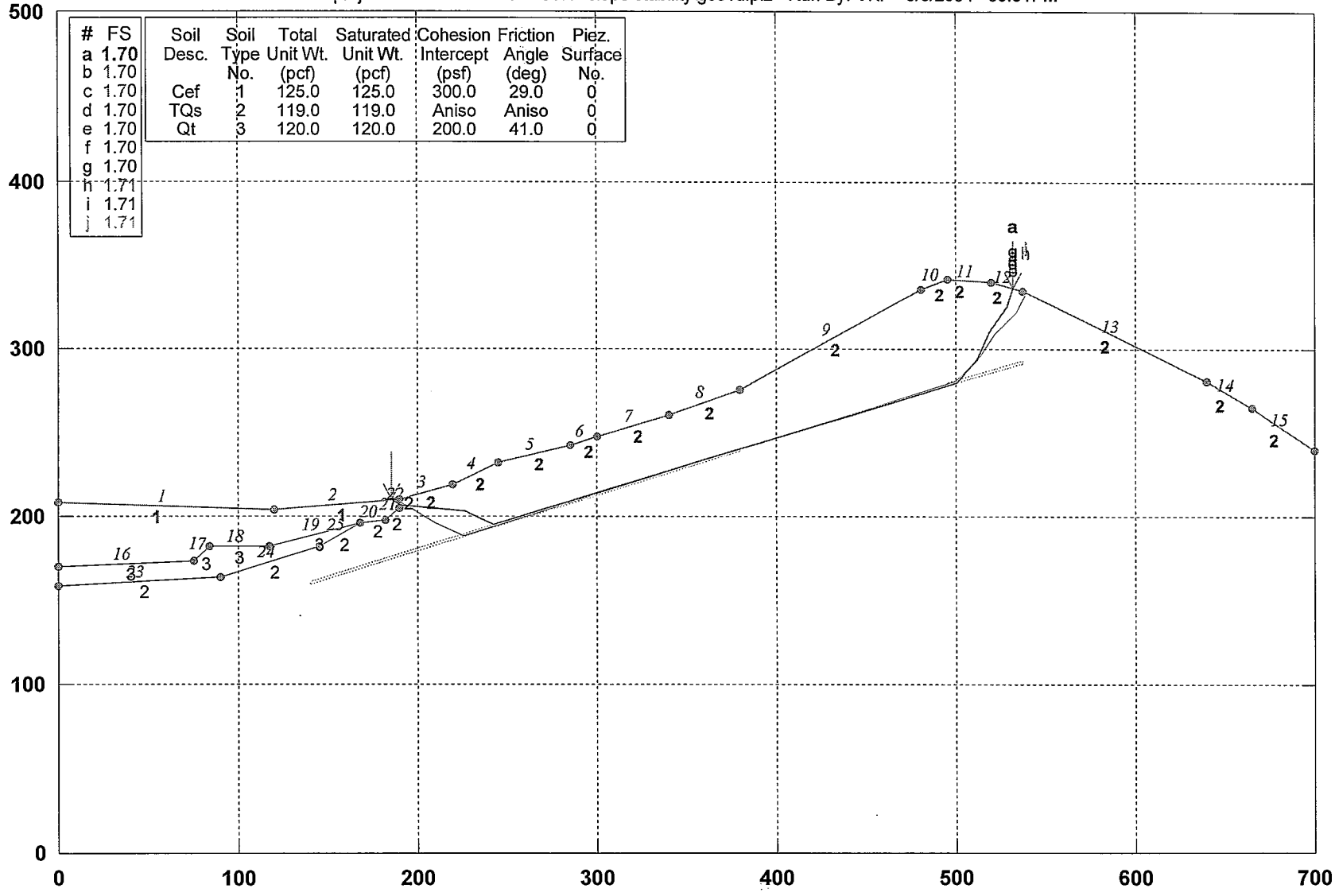
Individual data on the 20 slices

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	1.3	75.3	0.0	0.0	0.	0.	11.3	0.0	0.0
2	9.1	5119.5	0.0	0.0	0.	0.	767.9	0.0	0.0
3	3.9	4613.4	0.0	0.0	0.	0.	692.0	0.0	0.0
4	0.1	134.5	0.0	0.0	0.	0.	20.2	0.0	0.0
5	1.7	2400.6	0.0	0.0	0.	0.	360.1	0.0	0.0
6	17.7	36068.3	0.0	0.0	0.	0.	5410.2	0.0	0.0
7	10.5	26494.9	0.0	0.0	0.	0.	3974.2	0.0	0.0
8	25.0	70681.5	0.0	0.0	0.	0.	10602.2	0.0	0.0
9	40.0	119462.4	0.0	0.0	0.	0.	17919.4	0.0	0.0
10	15.0	43730.9	0.0	0.0	0.	0.	6559.6	0.0	0.0
11	40.0	120908.8	0.0	0.0	0.	0.	18136.3	0.0	0.0
12	40.0	128019.0	0.0	0.0	0.	0.	19202.8	0.0	0.0

13	100.0	505854.2	0.0	0.0	0.	0.	75878.1	0.0	0.0
14	12.2	83583.8	0.0	0.0	0.	0.	12537.6	0.0	0.0
15	2.8	18789.1	0.0	0.0	0.	0.	2818.4	0.0	0.0
16	9.9	59675.5	0.0	0.0	0.	0.	8951.3	0.0	0.0
17	12.7	58170.3	0.0	0.0	0.	0.	8725.5	0.0	0.0
18	2.5	8722.5	0.0	0.0	0.	0.	1308.4	0.0	0.0
19	8.2	20794.3	0.0	0.0	0.	0.	3119.1	0.0	0.0
20	3.9	3348.2	0.0	0.0	0.	0.	502.2	0.0	0.0

G P R, T52584 Sec. 3-3' Bed plane searchNatural slope, Upper area, Deeper Static

n:\projects\1600-1699\1617\1617lv slope stability\g3s1d.pl2 Run By: VKP 8/6/2004 03:51PM



#	FS
a	1.70
b	1.70
c	1.70
d	1.70
e	1.70
f	1.70
g	1.70
h	1.71
i	1.71
j	1.71

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.70

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No.-10

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              03:51PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g3s1d.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g3s1d.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g3s1d.PLT
PROBLEM DESCRIPTION:  G P R, T52584 Sec. 3-3' Bed plane search
                      Natural slope, Upper area, Deeper Static
BOUNDARY COORDINATES
   15 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	208.00	120.00	204.00	1
2	120.00	204.00	190.10	210.00	1
3	190.10	210.00	220.00	219.00	2
4	220.00	219.00	245.00	232.00	2
5	245.00	232.00	285.00	242.00	2
6	285.00	242.00	300.00	248.00	2
7	300.00	248.00	340.00	261.00	2
8	340.00	261.00	380.00	276.00	2
9	380.00	276.00	480.00	336.00	2
10	480.00	336.00	495.00	342.00	2
11	495.00	342.00	520.00	340.00	2
12	520.00	340.00	537.00	335.00	2
13	537.00	335.00	640.00	281.00	2
14	640.00	281.00	665.00	265.00	2
15	665.00	265.00	700.00	240.00	2
16	0.00	170.00	75.00	173.00	3
17	75.00	173.00	84.00	182.00	3
18	84.00	182.00	117.00	182.00	3
19	117.00	182.00	168.00	196.00	3
20	168.00	196.00	182.00	198.00	2
21	182.00	198.00	190.00	205.00	2
22	190.00	205.00	190.10	210.00	2
23	0.00	158.00	90.00	164.00	2
24	90.00	164.00	145.00	182.00	2
25	145.00	182.00	168.00	196.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	16.0	410.00	40.50
2	19.0	347.00	22.00
3	90.0	410.00	40.50

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.

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

2500 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	140.00	160.00	380.00	240.00	2.00
2	495.00	279.00	537.00	292.00	2.00

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

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Evaluated = 2500

Statistical Data On All Valid FS Values:

FS Max = 3.120 FS Min = 1.697 FS Ave = 1.954

Standard Deviation = 0.175 Coefficient of Variation = 8.97 %

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.86	209.64
2	190.52	206.92
3	208.33	204.36
4	226.25	202.61
5	242.64	195.17
6	500.56	279.84
7	511.50	294.14
8	518.72	310.62
9	528.27	325.88
10	531.99	336.47

Factor of Safety

*** 1.697 ***

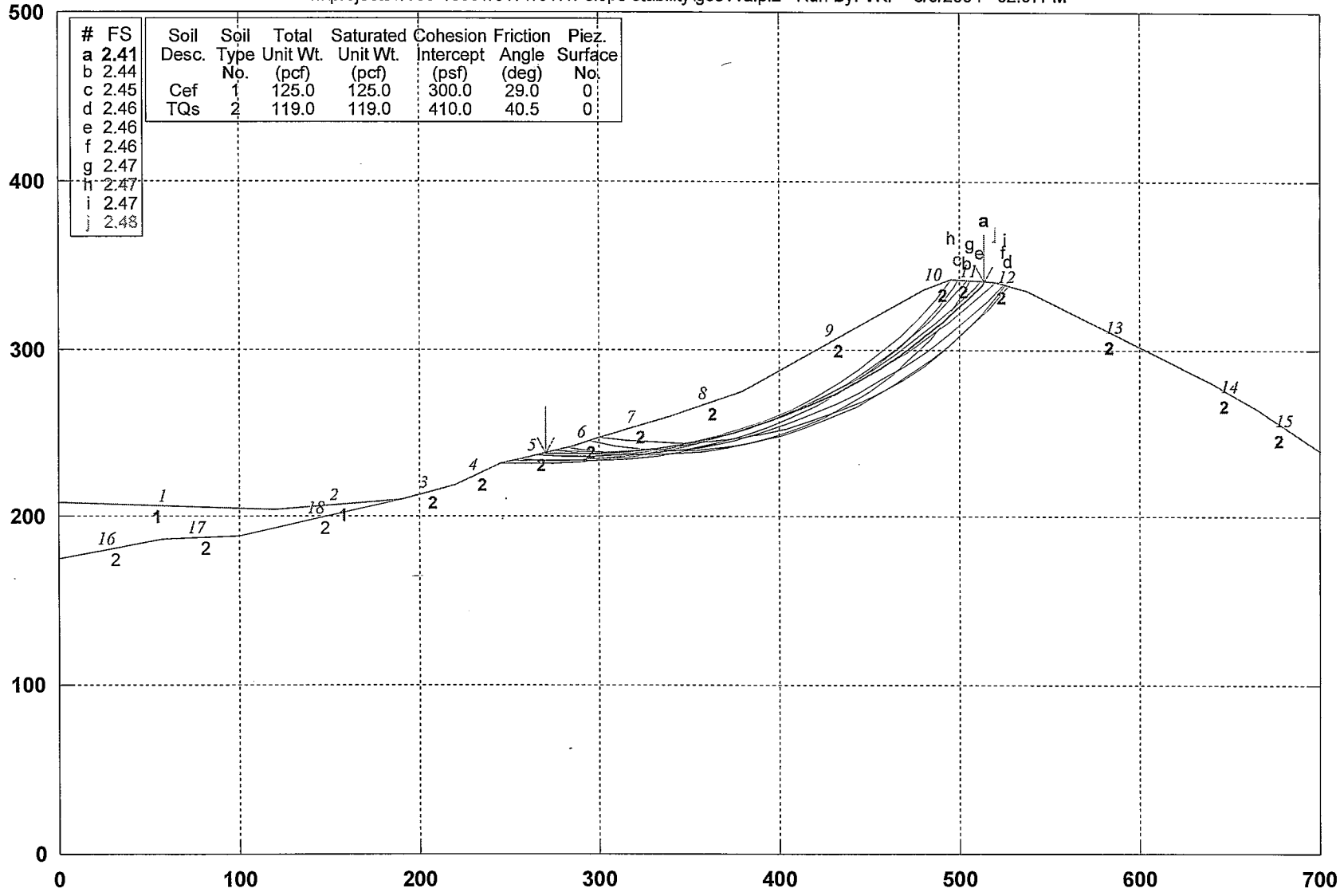
Individual data on the 20 slices

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	4.2	731.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.1	19.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.4	149.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	17.8	15192.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	11.7	18675.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.2	13169.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	16.4	53882.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	2.4	10054.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	40.0	164157.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	15.0	59724.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	40.0	161513.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	40.0	165648.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	100.0	586910.2	0.0	0.0	0.	0.	0.0	0.0	0.0
14	15.0	113247.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	5.6	41545.6	0.0	0.0	0.	0.	0.0	0.0	0.0

16	10.9	70473.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	7.2	32673.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.3	4330.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	8.3	19198.5	0.0	0.0	0.	0.	0.0	0.0	0.0
20	3.7	2590.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584 Sec. 3-3' Circular search Natural slope

n:\projects\1600-1699\1617\1617lv slope stability\g3s11a.pl2 Run By: VKP 8/9/2004 02:07PM



GSTABL7 v.2 FSmin=2.41

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 11

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/9/2004
Time of Run:              02:07PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g3s11a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g3s11a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g3s11a.PLT
PROBLEM DESCRIPTION:  G P R, T52584 Sec. 3-3' Circular search
                      Natural slope
BOUNDARY COORDINATES
   15 Top   Boundaries
   18 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     208.00     120.00     204.00        1
    2       120.00     204.00     190.00     210.00        1
    3       190.00     210.00     220.00     219.00        2
    4       220.00     219.00     245.00     232.00        2
    5       245.00     232.00     285.00     242.00        2
    6       285.00     242.00     300.00     248.00        2
    7       300.00     248.00     340.00     261.00        2
    8       340.00     261.00     380.00     276.00        2
    9       380.00     276.00     480.00     336.00        2
   10       480.00     336.00     495.00     342.00        2
   11       495.00     342.00     520.00     340.00        2
   12       520.00     340.00     537.00     335.00        2
   13       537.00     335.00     640.00     281.00        2
   14       640.00     281.00     665.00     265.00        2
   15       665.00     265.00     700.00     240.00        2
   16         0.00     175.00      58.00     186.00        2
   17        58.00     186.00     100.00     188.00        2
   18       100.00     188.00     190.00     210.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      0
  2   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             16.0             410.00        40.50
    2             19.0             347.00        22.00
    3             90.0             410.00        40.50
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.
ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
3600 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 180 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 300.00(ft)
Each Surface Terminates Between X = 330.00(ft)
and X = 690.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 3600
Statistical Data On All Valid FS Values:
FS Max = 103.163 FS Min = 2.410 FS Ave = 6.057
Standard Deviation = 4.955 Coefficient of Variation = 81.81 %
Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	270.67	238.42
2	285.66	237.89
3	300.66	238.12
4	315.63	239.10
5	330.53	240.84
6	345.32	243.32
7	359.97	246.54
8	374.44	250.49
9	388.69	255.16
10	402.69	260.54
11	416.41	266.62
12	429.80	273.38
13	442.83	280.81
14	455.48	288.88
15	467.70	297.57
16	479.47	306.87
17	490.76	316.75
18	501.54	327.18
19	511.78	338.14
20	513.77	340.50

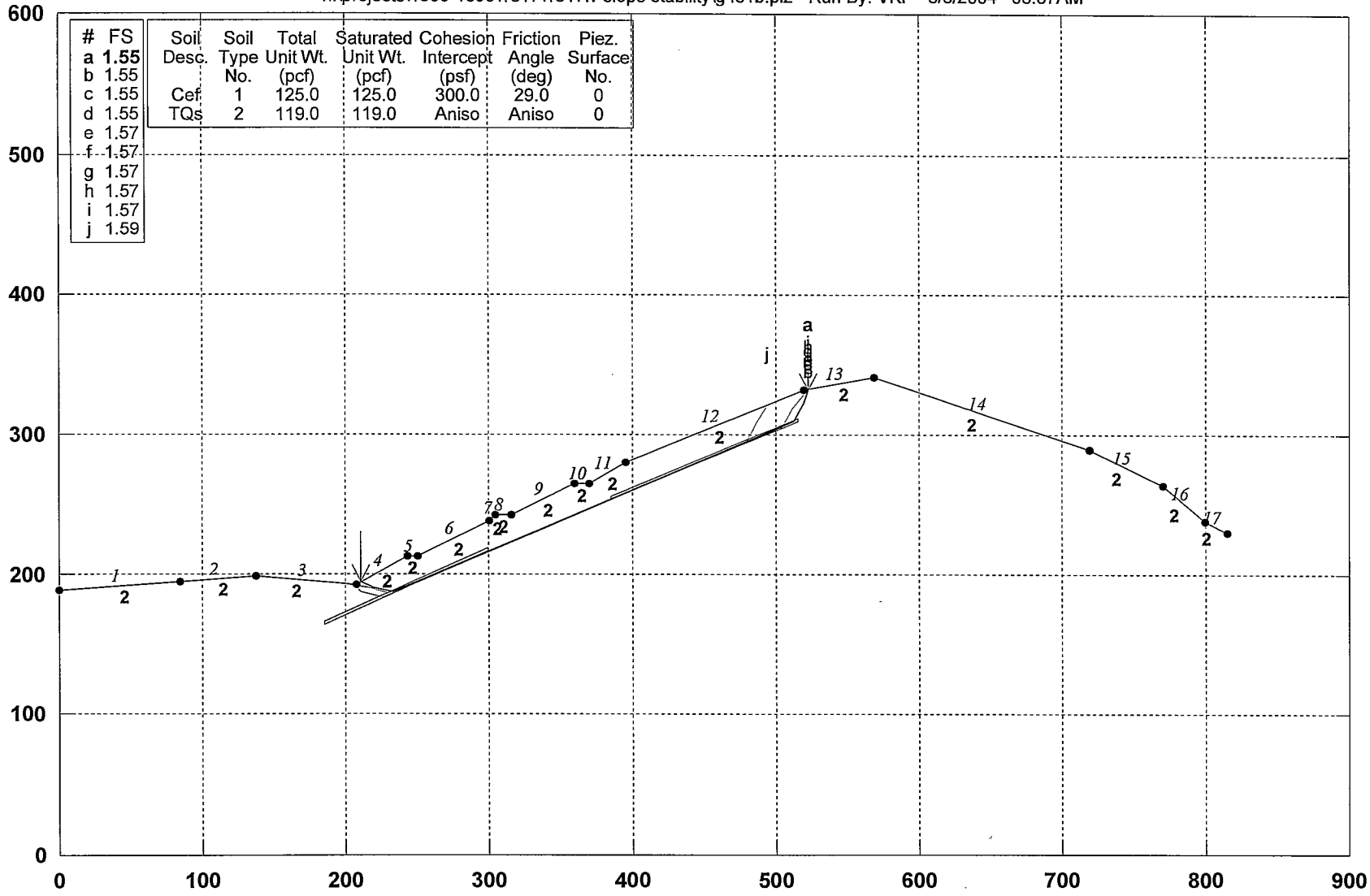
Circle Center At X = 288.65 ; Y = 536.10 ; and Radius = 298.22
Factor of Safety
*** 2.410 ***
Individual data on the 25 slices

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	14.3	3482.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.7	332.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	14.3	12166.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.7	782.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	15.0	21433.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	14.9	27534.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	9.5	20101.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.3	12108.1	0.0	0.0	0.	0.	0.0	0.0	0.0

9	14.7	36291.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	14.5	39073.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.6	15587.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.7	25734.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	14.0	45928.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	13.7	49198.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	13.4	50766.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	13.0	50709.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	12.6	49128.1	0.0	0.0	0.	0.	0.0	0.0	0.0
18	12.2	46149.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	11.8	41923.0	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.5	1815.8	0.0	0.0	0.	0.	0.0	0.0	0.0
21	10.8	33426.9	0.0	0.0	0.	0.	0.0	0.0	0.0
22	4.2	11283.7	0.0	0.0	0.	0.	0.0	0.0	0.0
23	6.5	13784.7	0.0	0.0	0.	0.	0.0	0.0	0.0
24	10.2	10246.9	0.0	0.0	0.	0.	0.0	0.0	0.0
25	2.0	298.6	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec 4-4' Bed plane searchCS-6 and nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g4s1b.pl2 Run By: VKP 8/6/2004 08:37AM



GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 12

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                    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:        8/6/2004
Time of Run:              08:37AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g4s1b.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g4s1b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g4s1b.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec 4-4' Bed plane search
                      CS-6 and nat. slope, Static
BOUNDARY COORDINATES
   17 Top   Boundaries
   17 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	188.00	85.00	195.00	2
2	85.00	195.00	138.00	199.00	2
3	138.00	199.00	208.00	193.00	2
4	208.00	193.00	243.00	213.00	2
5	243.00	213.00	251.00	213.00	2
6	251.00	213.00	301.00	238.00	2
7	301.00	238.00	305.00	242.00	2
8	305.00	242.00	316.00	242.00	2
9	316.00	242.00	360.00	265.00	2
10	360.00	265.00	370.00	265.00	2
11	370.00	265.00	395.00	280.00	2
12	395.00	280.00	520.00	332.00	2
13	520.00	332.00	568.00	341.00	2
14	568.00	341.00	719.00	289.00	2
15	719.00	289.00	770.00	264.00	2
16	770.00	264.00	800.00	238.00	2
17	800.00	238.00	815.00	230.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0

```
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	23.0	410.00	40.50
2	25.0	347.00	22.00
3	90.0	410.00	40.50

```
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.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
2000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	185.00	165.00	300.00	218.00	2.00
2	385.00	255.00	515.00	311.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2000
Statistical Data On All Valid FS Values:
FS Max = 3.600 FS Min = 1.549 FS Ave = 1.930
Standard Deviation = 0.319 Coefficient of Variation = 16.55 %
Failure Surface Specified By 6 Coordinate Points

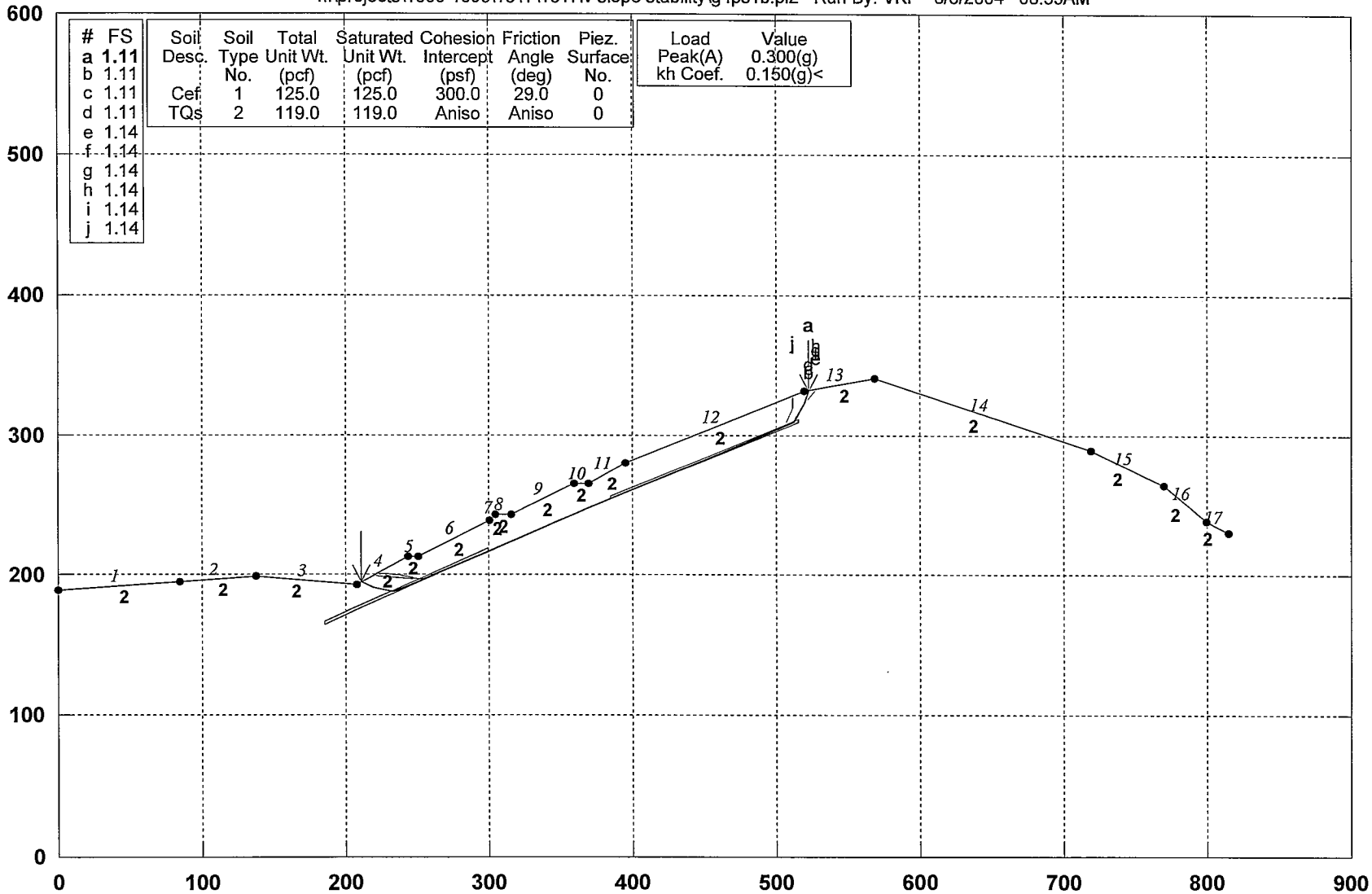
Point No.	X-Surf (ft)	Y-Surf (ft)
1	210.65	194.51
2	219.02	190.95
3	233.68	187.75
4	512.83	309.54
5	519.77	322.84
6	523.01	332.56

Factor of Safety
*** 1.549 ***
Individual data on the 14 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	8.4	4161.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	14.7	24650.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	9.3	22804.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	18506.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	50.0	114763.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.0	10476.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	11.0	27144.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	44.0	105972.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.0	23752.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	25.0	58979.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	117.8	289941.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.9	11779.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.2	241.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.0	1513.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec 4-4' Bed plane searchCS-6 and nat. slope, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g4ps1b.pl2 Run By: VKP 8/6/2004 08:59AM



#	FS
a	1.11
b	1.11
c	1.11
d	1.11
e	1.14
f	1.14
g	1.14
h	1.14
i	1.14
j	1.14

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.11

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 13

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****

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: 8/6/2004
Time of Run: 08:59AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g4ps1b.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g4ps1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g4ps1b.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec 4-4' Bed plane search
CS-6 and nat. slope, Pseudostatic

BOUNDARY COORDINATES
17 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	188.00	85.00	195.00	2
2	85.00	195.00	138.00	199.00	2
3	138.00	199.00	208.00	193.00	2
4	208.00	193.00	243.00	213.00	2
5	243.00	213.00	251.00	213.00	2
6	251.00	213.00	301.00	238.00	2
7	301.00	238.00	305.00	242.00	2
8	305.00	242.00	316.00	242.00	2
9	316.00	242.00	360.00	265.00	2
10	360.00	265.00	370.00	265.00	2
11	370.00	265.00	395.00	280.00	2
12	395.00	280.00	520.00	332.00	2
13	520.00	332.00	568.00	341.00	2
14	568.00	341.00	719.00	289.00	2
15	719.00	289.00	770.00	264.00	2
16	770.00	264.00	800.00	238.00	2
17	800.00	238.00	815.00	230.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0

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	23.0	410.00	40.50
2	25.0	347.00	22.00
3	90.0	410.00	40.50

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.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
2000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	185.00	165.00	300.00	218.00	2.00
2	385.00	255.00	515.00	311.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2000
Statistical Data On All Valid FS Values:
FS Max = 2.331 FS Min = 1.109 FS Ave = 1.423
Standard Deviation = 0.209 Coefficient of Variation = 14.68 %
Failure Surface Specified By 6 Coordinate Points

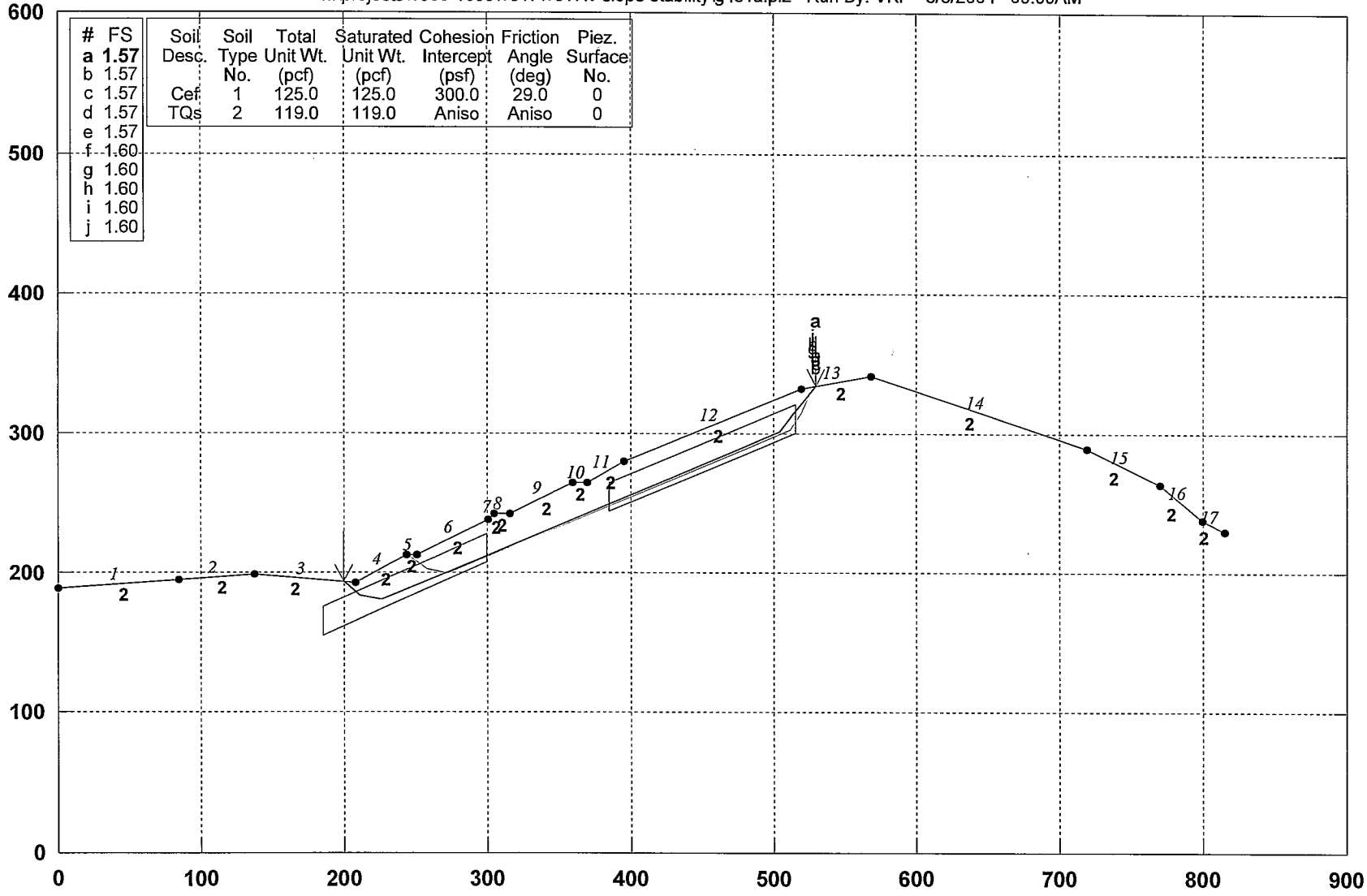
Point No.	X-Surf (ft)	Y-Surf (ft)
1	210.65	194.51
2	219.02	190.95
3	233.68	187.75
4	512.83	309.54
5	519.77	322.84
6	523.01	332.56

Factor of Safety
*** 1.109 ***
Individual data on the 14 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	8.4	4161.0	0.0	0.0	0.	0.	624.1	0.0	0.0
2	14.7	24650.2	0.0	0.0	0.	0.	3697.5	0.0	0.0
3	9.3	22804.3	0.0	0.0	0.	0.	3420.6	0.0	0.0
4	8.0	18506.8	0.0	0.0	0.	0.	2776.0	0.0	0.0
5	50.0	114763.9	0.0	0.0	0.	0.	17214.6	0.0	0.0
6	4.0	10476.1	0.0	0.0	0.	0.	1571.4	0.0	0.0
7	11.0	27144.3	0.0	0.0	0.	0.	4071.6	0.0	0.0
8	44.0	105972.3	0.0	0.0	0.	0.	15895.8	0.0	0.0
9	10.0	23752.2	0.0	0.0	0.	0.	3562.8	0.0	0.0
10	25.0	58979.5	0.0	0.0	0.	0.	8846.9	0.0	0.0
11	117.8	289941.1	0.0	0.0	0.	0.	43491.2	0.0	0.0
12	6.9	11779.3	0.0	0.0	0.	0.	1766.9	0.0	0.0
13	0.2	241.8	0.0	0.0	0.	0.	36.3	0.0	0.0
14	3.0	1513.8	0.0	0.0	0.	0.	227.1	0.0	0.0

G P R, T52584, Sec 4-4' Bed plane searchCS-6 and nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g4s1a.pl2 Run By: VKP 8/6/2004 09:00AM



GSTABL7 v.2 FSmin=1.57

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 14

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              09:00AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g4s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g4s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g4s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec 4-4' Bed plane search
                      CS-6 and nat. slope, Static
BOUNDARY COORDINATES
   17 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     188.00      85.00     195.00        2
    2        85.00     195.00     138.00     199.00        2
    3       138.00     199.00     208.00     193.00        2
    4       208.00     193.00     243.00     213.00        2
    5       243.00     213.00     251.00     213.00        2
    6       251.00     213.00     301.00     238.00        2
    7       301.00     238.00     305.00     242.00        2
    8       305.00     242.00     316.00     242.00        2
    9       316.00     242.00     360.00     265.00        2
   10       360.00     265.00     370.00     265.00        2
   11       370.00     265.00     395.00     280.00        2
   12       395.00     280.00     520.00     332.00        2
   13       520.00     332.00     568.00     341.00        2
   14       568.00     341.00     719.00     289.00        2
   15       719.00     289.00     770.00     264.00        2
   16       770.00     264.00     800.00     238.00        2
   17       800.00     238.00     815.00     230.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      0
  2   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             23.0             410.00        40.50
    2             25.0             347.00        22.00
    3             90.0             410.00        40.50
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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	185.00	165.00	300.00	218.00	20.00
2	385.00	255.00	515.00	311.00	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 The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2000
Statistical Data On All Valid FS Values:
FS Max = 4.406 FS Min = 1.573 FS Ave = 2.606
Standard Deviation = 0.631 Coefficient of Variation = 24.22 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	199.79	193.70
2	200.13	193.50
3	211.36	183.55
4	225.90	179.87
5	503.79	301.99
6	513.31	313.58
7	522.88	325.13
8	529.98	333.87

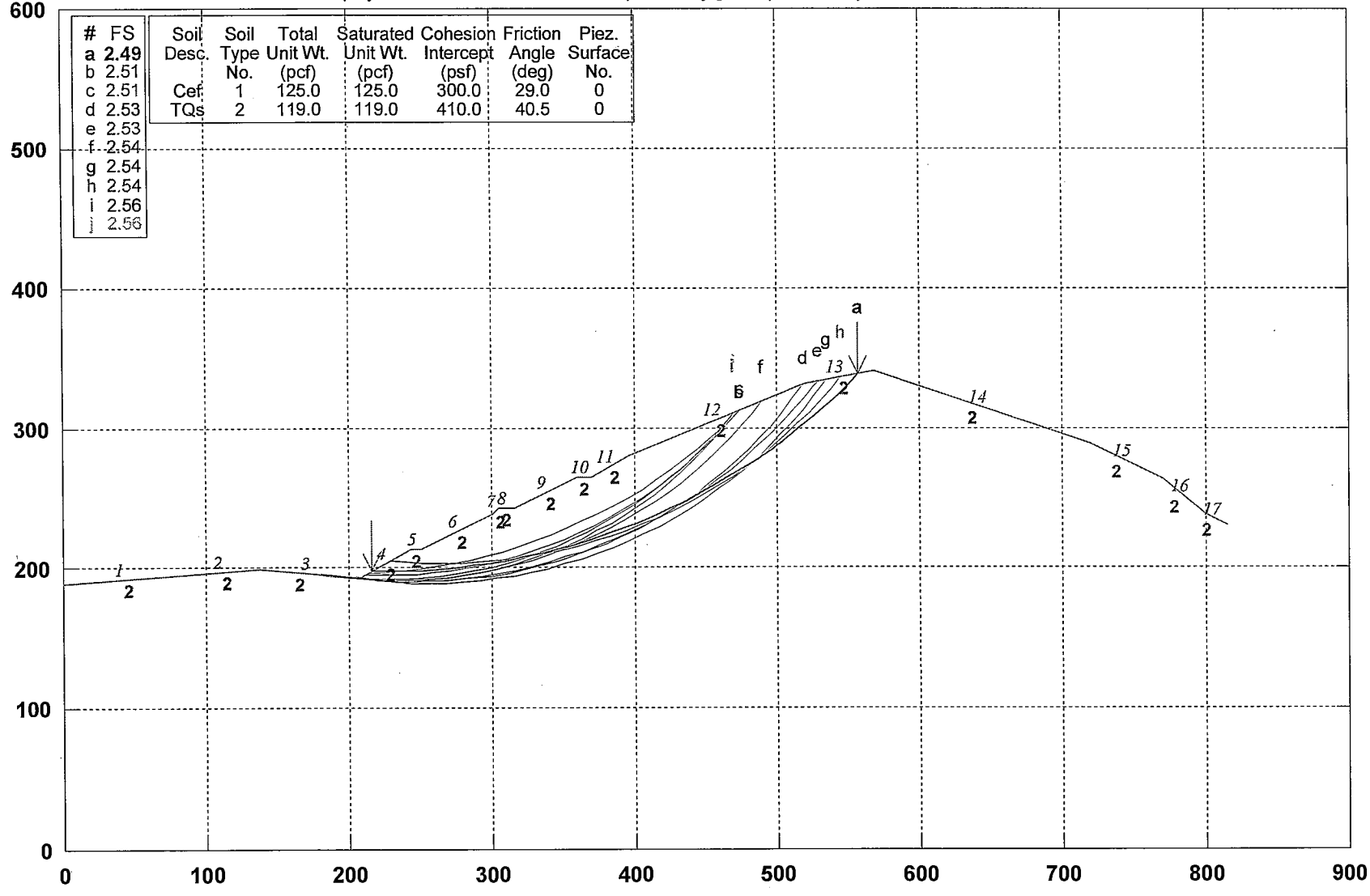
Factor of Safety
*** 1.573 ***

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	0.3	3.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.9	3109.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.4	3564.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	14.5	30041.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	17.1	49821.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.0	22709.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	50.0	140481.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	4.0	12492.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	11.0	32658.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	44.0	127574.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	10.0	28559.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	25.0	70833.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	108.8	317710.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	9.5	22043.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	6.7	10339.1	0.0	0.0	0.	0.	0.0	0.0	0.0
16	2.9	3036.6	0.0	0.0	0.	0.	0.0	0.0	0.0
17	7.1	3129.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 4-4' Circular searchCS-6 and nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g4s1d.pl2 Run By: VKP 8/9/2004 02:50PM



GSTABL7 v.2 FSmin=2.49

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 15

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/9/2004
Time of Run:              02:50PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g4sld.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g4sld.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g4sld.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 4-4' Circular search
                      CS-6 and nat. slope, Static
BOUNDARY COORDINATES
   17 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     188.00      85.00     195.00        2
    2        85.00     195.00     138.00     199.00        2
    3       138.00     199.00     208.00     193.00        2
    4       208.00     193.00     243.00     213.00        2
    5       243.00     213.00     251.00     213.00        2
    6       251.00     213.00     301.00     238.00        2
    7       301.00     238.00     305.00     242.00        2
    8       305.00     242.00     316.00     242.00        2
    9       316.00     242.00     360.00     265.00        2
   10       360.00     265.00     370.00     265.00        2
   11       370.00     265.00     395.00     280.00        2
   12       395.00     280.00     520.00     332.00        2
   13       520.00     332.00     568.00     341.00        2
   14       568.00     341.00     719.00     289.00        2
   15       719.00     289.00     770.00     264.00        2
   16       770.00     264.00     800.00     238.00        2
   17       800.00     238.00     815.00     230.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00      0.0       0
  2   119.0    119.0     410.0     40.5    0.00      0.0       0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             23.0            410.00        40.50
    2             25.0            347.00        22.00
    3             90.0            410.00        40.50
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.
ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1400 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 70 Points Equally Spaced
Along The Ground Surface Between X = 160.00(ft)
and X = 230.00(ft)
Each Surface Terminates Between X = 280.00(ft)
and X = 800.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
12.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1400
Statistical Data On All Valid FS Values:
FS Max = 14.083 FS Min = 2.489 FS Ave = 5.053
Standard Deviation = 2.473 Coefficient of Variation = 48.93 %
Failure Surface Specified By 33 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	215.80	197.46
2	227.80	197.31
3	239.80	197.48
4	251.79	197.96
5	263.76	198.76
6	275.71	199.87
7	287.62	201.30
8	299.49	203.05
9	311.32	205.10
10	323.08	207.47
11	334.78	210.14
12	346.40	213.12
13	357.94	216.41
14	369.40	220.00
15	380.75	223.89
16	391.99	228.08
17	403.12	232.56
18	414.13	237.33
19	425.01	242.39
20	435.76	247.74
21	446.35	253.37
22	456.80	259.28
23	467.09	265.45
24	477.21	271.90
25	487.16	278.61
26	496.92	285.59
27	506.50	292.81
28	515.89	300.29
29	525.08	308.01
30	534.06	315.97
31	542.82	324.16
32	551.37	332.59
33	557.59	339.05

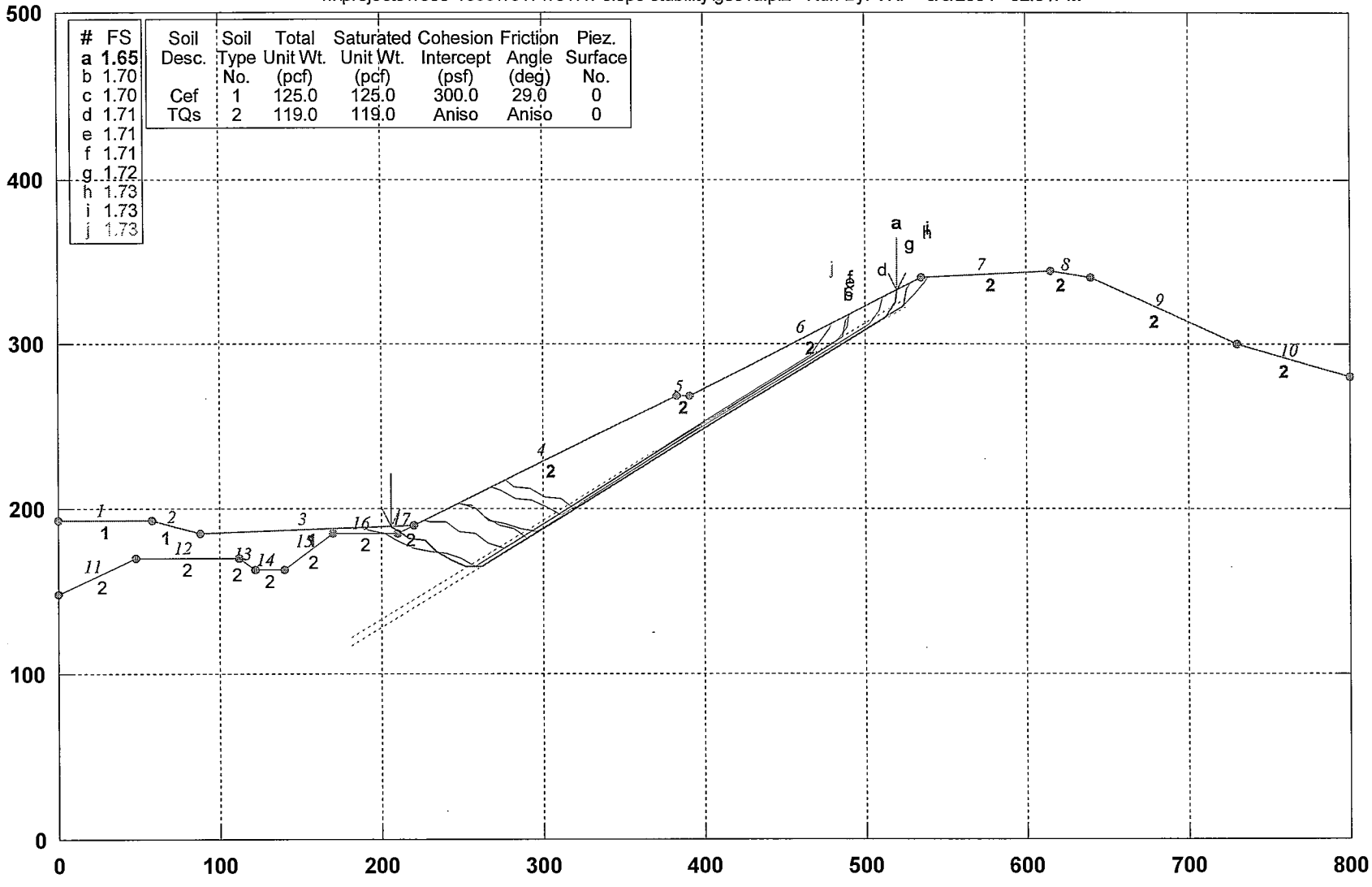
Circle Center At X = 227.42 ; Y = 652.83 ; and Radius = 455.53
Factor of Safety
*** 2.489 ***
Individual data on the 41 slices

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	12.0	5001.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	12.0	14776.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.2	5546.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	14502.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.8	1425.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	12.0	25684.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	11.9	32772.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.9	39335.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	11.9	45359.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	1.5	6172.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	4.0	17300.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.3	28150.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	4.7	20301.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	7.1	31261.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	11.7	55622.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	11.6	59787.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	11.5	63373.6	0.0	0.0	0.	0.	0.0	0.0	0.0
18	2.1	11675.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	9.4	51958.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.6	3232.2	0.0	0.0	0.	0.	0.0	0.0	0.0
21	10.7	59055.9	0.0	0.0	0.	0.	0.0	0.0	0.0
22	11.2	65358.7	0.0	0.0	0.	0.	0.0	0.0	0.0
23	3.0	18042.8	0.0	0.0	0.	0.	0.0	0.0	0.0
24	8.1	49079.5	0.0	0.0	0.	0.	0.0	0.0	0.0
25	11.0	66454.9	0.0	0.0	0.	0.	0.0	0.0	0.0
26	10.9	65199.8	0.0	0.0	0.	0.	0.0	0.0	0.0
27	10.7	63473.7	0.0	0.0	0.	0.	0.0	0.0	0.0
28	10.6	61296.7	0.0	0.0	0.	0.	0.0	0.0	0.0
29	10.4	58690.2	0.0	0.0	0.	0.	0.0	0.0	0.0
30	10.3	55678.5	0.0	0.0	0.	0.	0.0	0.0	0.0
31	10.1	52287.3	0.0	0.0	0.	0.	0.0	0.0	0.0
32	9.9	48544.2	0.0	0.0	0.	0.	0.0	0.0	0.0
33	9.8	44478.5	0.0	0.0	0.	0.	0.0	0.0	0.0
34	9.6	40121.5	0.0	0.0	0.	0.	0.0	0.0	0.0
35	9.4	35505.6	0.0	0.0	0.	0.	0.0	0.0	0.0
36	4.1	14248.8	0.0	0.0	0.	0.	0.0	0.0	0.0
37	5.1	16065.7	0.0	0.0	0.	0.	0.0	0.0	0.0
38	9.0	23299.0	0.0	0.0	0.	0.	0.0	0.0	0.0
39	8.8	16056.0	0.0	0.0	0.	0.	0.0	0.0	0.0
40	8.5	8855.3	0.0	0.0	0.	0.	0.0	0.0	0.0
41	6.2	1960.7	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec 5-5' Bed plane search150' high nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g5s1a.pl2 Run By: VKP 8/6/2004 02:51PM



GSTABL7 v.2 FSmin=1.65

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN No.-16

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/6/2004
Time of Run:              02:51PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g5s1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g5s1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g5s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec 5-5' Bed plane search
                      150' high nat. slope, Static
BOUNDARY COORDINATES
   10 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     193.00      58.00     193.00        1
    2        58.00     193.00      88.00     185.00        1
    3        88.00     185.00     220.00     190.00        1
    4       220.00     190.00     383.00     268.00        2
    5       383.00     268.00     391.00     268.00        2
    6       391.00     268.00     535.00     340.00        2
    7       535.00     340.00     615.00     344.00        2
    8       615.00     344.00     640.00     340.00        2
    9       640.00     340.00     730.00     300.00        2
   10       730.00     300.00     800.00     280.00        2
   11         0.00     148.00      48.00     170.00        2
   12        48.00     170.00     112.00     170.00        2
   13       112.00     170.00     122.00     163.00        2
   14       122.00     163.00     140.00     163.00        2
   15       140.00     163.00     170.00     185.00        2
   16       170.00     185.00     210.00     185.00        2
   17       210.00     185.00     220.00     190.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      0
  2   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion      Friction
  Range        Direction Limit    Intercept       Angle
   No.             (deg)            (psf)         (deg)
    1              31.0             410.00         40.50
    2              33.0             347.00         22.00
    3              90.0             410.00         40.50
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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 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	180.00	118.00	370.00	232.00	5.00
2	465.00	290.00	525.00	325.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.540 FS Min = 1.654 FS Ave = 2.486
Standard Deviation = 0.588 Coefficient of Variation = 23.63 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	206.49	189.49
2	208.35	187.64
3	216.73	182.18
4	226.61	180.66
5	234.19	174.14
6	242.81	169.07
7	251.91	164.92
8	261.91	164.69
9	513.22	316.37
10	518.68	324.75
11	519.59	332.30

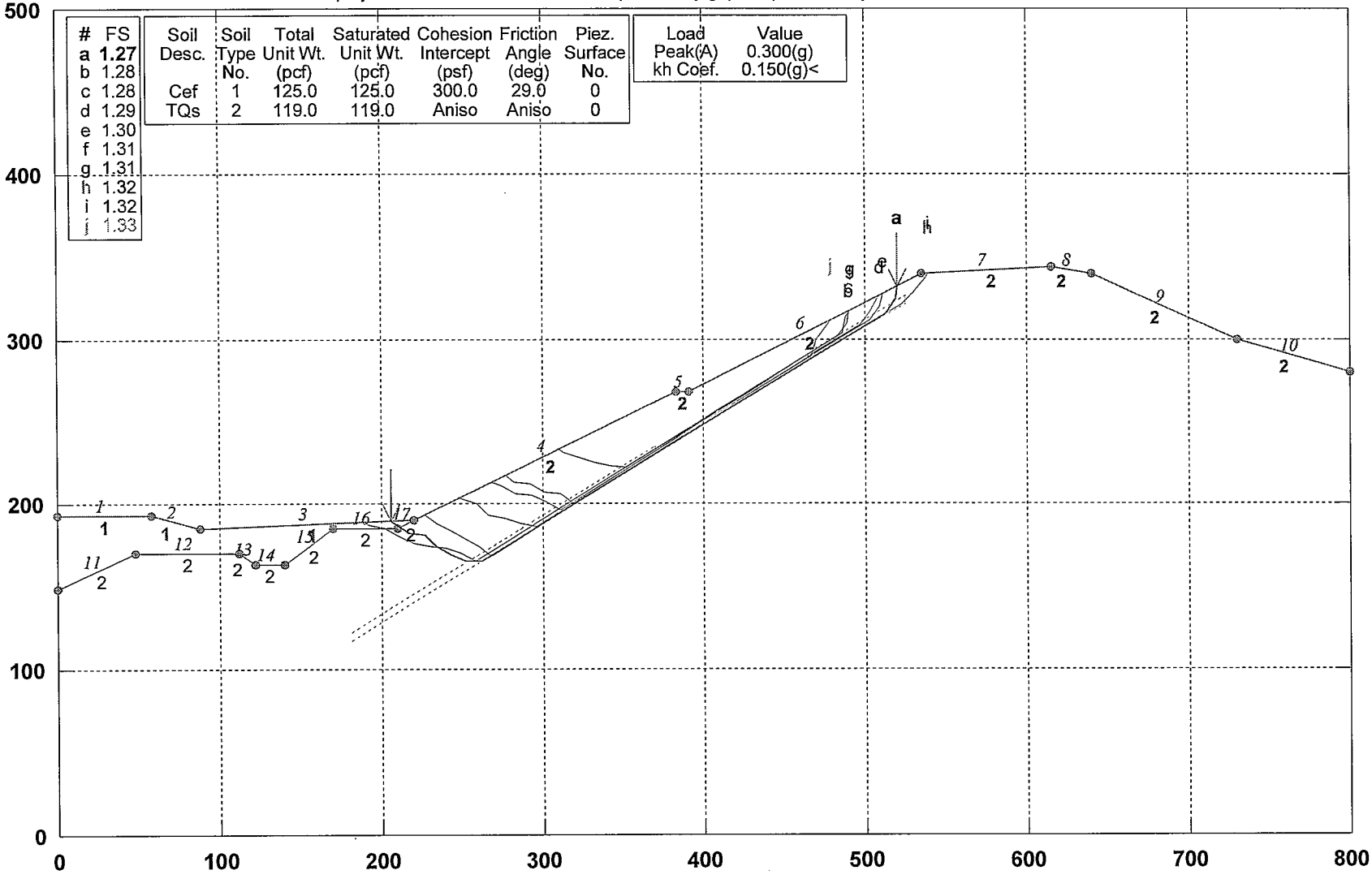
Factor of Safety
*** 1.654 ***

Individual data on the 14 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	1.9	223.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.0	1111.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.4	3825.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.3	3134.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	6.6	8193.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	7.6	15849.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	8.6	27951.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	9.1	39098.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.0	50985.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	121.1	544643.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.0	26476.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	122.2	277322.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	5.5	6447.6	0.0	0.0	0.	0.	0.0	0.0	0.0
14	0.9	384.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec 5-5' Bed plane search150' high nat. slope, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g5ps1a.pl2 Run By: VKP 8/6/2004 02:54PM



GSTABL7 v.2 FSmin=1.27

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. - 17

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  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.
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Analysis Run Date:        8/6/2004
Time of Run:              02:54PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g5ps1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g5ps1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g5ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec 5-5' Bed plane search
                      150' high nat. slope, Pseudostatic
BOUNDARY COORDINATES
   10 Top   Boundaries
   17 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	193.00	58.00	193.00	1
2	58.00	193.00	88.00	185.00	1
3	88.00	185.00	220.00	190.00	1
4	220.00	190.00	383.00	268.00	2
5	383.00	268.00	391.00	268.00	2
6	391.00	268.00	535.00	340.00	2
7	535.00	340.00	615.00	344.00	2
8	615.00	344.00	640.00	340.00	2
9	640.00	340.00	730.00	300.00	2
10	730.00	300.00	800.00	280.00	2
11	0.00	148.00	48.00	170.00	2
12	48.00	170.00	112.00	170.00	2
13	112.00	170.00	122.00	163.00	2
14	122.00	163.00	140.00	163.00	2
15	140.00	163.00	170.00	185.00	2
16	170.00	185.00	210.00	185.00	2
17	210.00	185.00	220.00	190.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0

```
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	31.0	410.00	40.50
2	33.0	347.00	22.00
3	90.0	410.00	40.50

```
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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 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	180.00	118.00	370.00	232.00	5.00
2	465.00	290.00	525.00	325.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.912 FS Min = 1.271 FS Ave = 1.834
Standard Deviation = 0.349 Coefficient of Variation = 19.02 %
Failure Surface Specified By 11 Coordinate Points

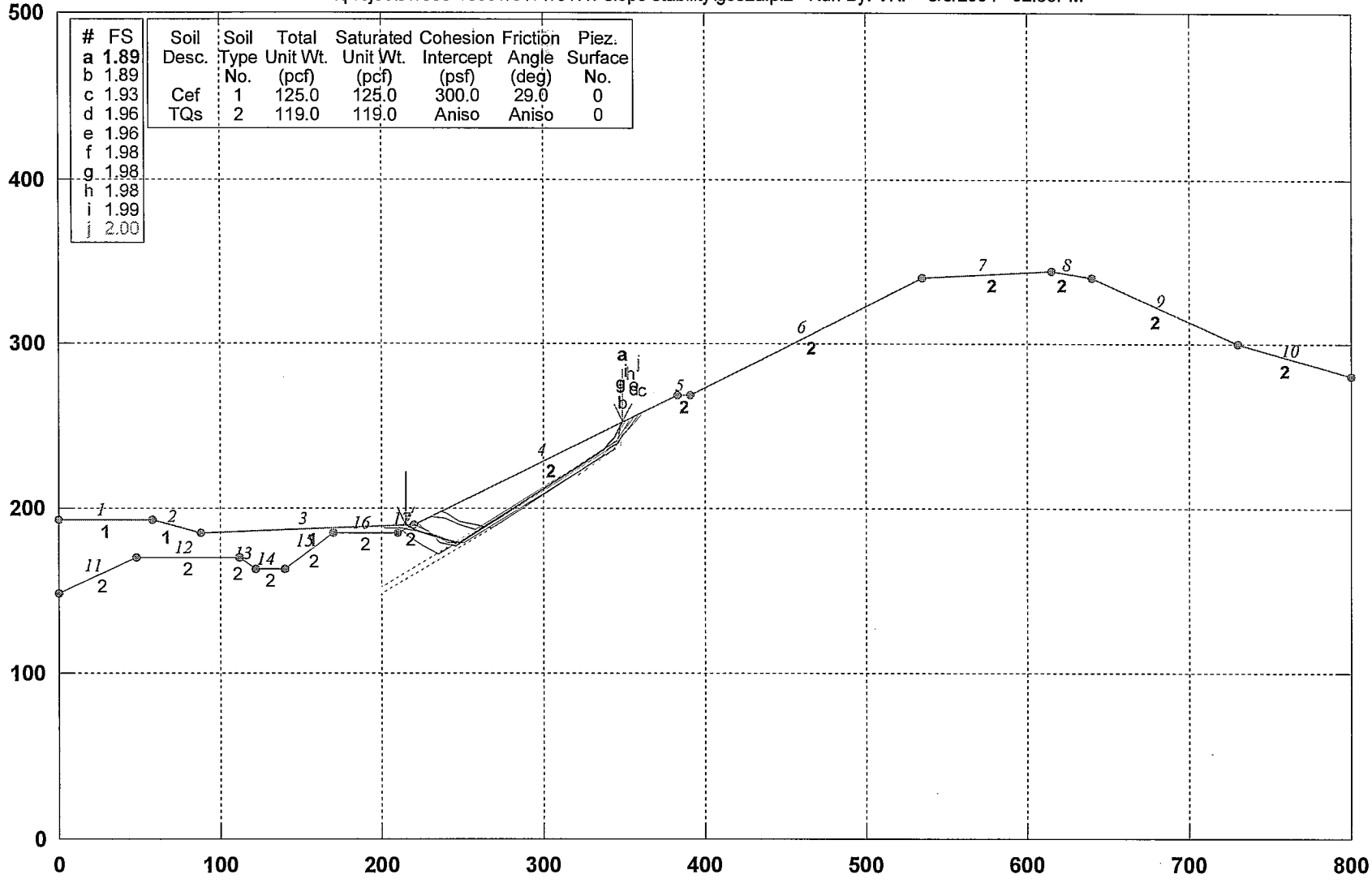
Point No.	X-Surf (ft)	Y-Surf (ft)
1	206.49	189.49
2	208.35	187.64
3	216.73	182.18
4	226.61	180.66
5	234.19	174.14
6	242.81	169.07
7	251.91	164.92
8	261.91	164.69
9	513.22	316.37
10	518.68	324.75
11	519.59	332.30

Factor of Safety
*** 1.271 ***
Individual data on the 14 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	1.9	223.6	0.0	0.0	0.	0.	33.5	0.0	0.0
2	3.0	1111.6	0.0	0.0	0.	0.	166.7	0.0	0.0
3	5.4	3825.0	0.0	0.0	0.	0.	573.8	0.0	0.0
4	3.3	3134.6	0.0	0.0	0.	0.	470.2	0.0	0.0
5	6.6	8193.1	0.0	0.0	0.	0.	1229.0	0.0	0.0
6	7.6	15849.8	0.0	0.0	0.	0.	2377.5	0.0	0.0
7	8.6	27951.4	0.0	0.0	0.	0.	4192.7	0.0	0.0
8	9.1	39098.3	0.0	0.0	0.	0.	5864.7	0.0	0.0
9	10.0	50985.0	0.0	0.0	0.	0.	7647.8	0.0	0.0
10	121.1	544643.8	0.0	0.0	0.	0.	81696.6	0.0	0.0
11	8.0	26476.1	0.0	0.0	0.	0.	3971.4	0.0	0.0
12	122.2	277322.1	0.0	0.0	0.	0.	41598.3	0.0	0.0
13	5.5	6447.6	0.0	0.0	0.	0.	967.1	0.0	0.0
14	0.9	384.8	0.0	0.0	0.	0.	57.7	0.0	0.0

G P R, T52584, Sec 5-5' Bed plane search150' high nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g5s2a.pl2 Run By: VKP 8/6/2004 02:56PM



#	FS
a	1.89
b	1.89
c	1.93
d	1.96
e	1.96
f	1.98
g	1.98
h	1.98
i	1.99
j	2.00

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.89

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO-18

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              02:56PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g5s2a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g5s2a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g5s2a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec 5-5' Bed plane search
                      150' high nat. slope, Static
BOUNDARY COORDINATES
   10 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     193.00      58.00     193.00        1
    2        58.00     193.00      88.00     185.00        1
    3        88.00     185.00     220.00     190.00        1
    4       220.00     190.00     383.00     268.00        2
    5       383.00     268.00     391.00     268.00        2
    6       391.00     268.00     535.00     340.00        2
    7       535.00     340.00     615.00     344.00        2
    8       615.00     344.00     640.00     340.00        2
    9       640.00     340.00     730.00     300.00        2
   10       730.00     300.00     800.00     280.00        2
   11         0.00     148.00      48.00     170.00        2
   12        48.00     170.00     112.00     170.00        2
   13       112.00     170.00     122.00     163.00        2
   14       122.00     163.00     140.00     163.00        2
   15       140.00     163.00     170.00     185.00        2
   16       170.00     185.00     210.00     185.00        2
   17       210.00     185.00     220.00     190.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   125.0    125.0     300.0     29.0    0.00       0.0      0
   2   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise    Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.            (deg)            (psf)        (deg)
     1             31.0             410.00        40.50
     2             33.0             347.00        22.00
     3             90.0             410.00        40.50
 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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 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	200.00	150.00	275.00	195.00	5.00
2	320.00	222.00	348.00	240.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.260 FS Min = 1.891 FS Ave = 2.952
Standard Deviation = 0.652 Coefficient of Variation = 22.08 %
Failure Surface Specified By 8 Coordinate Points

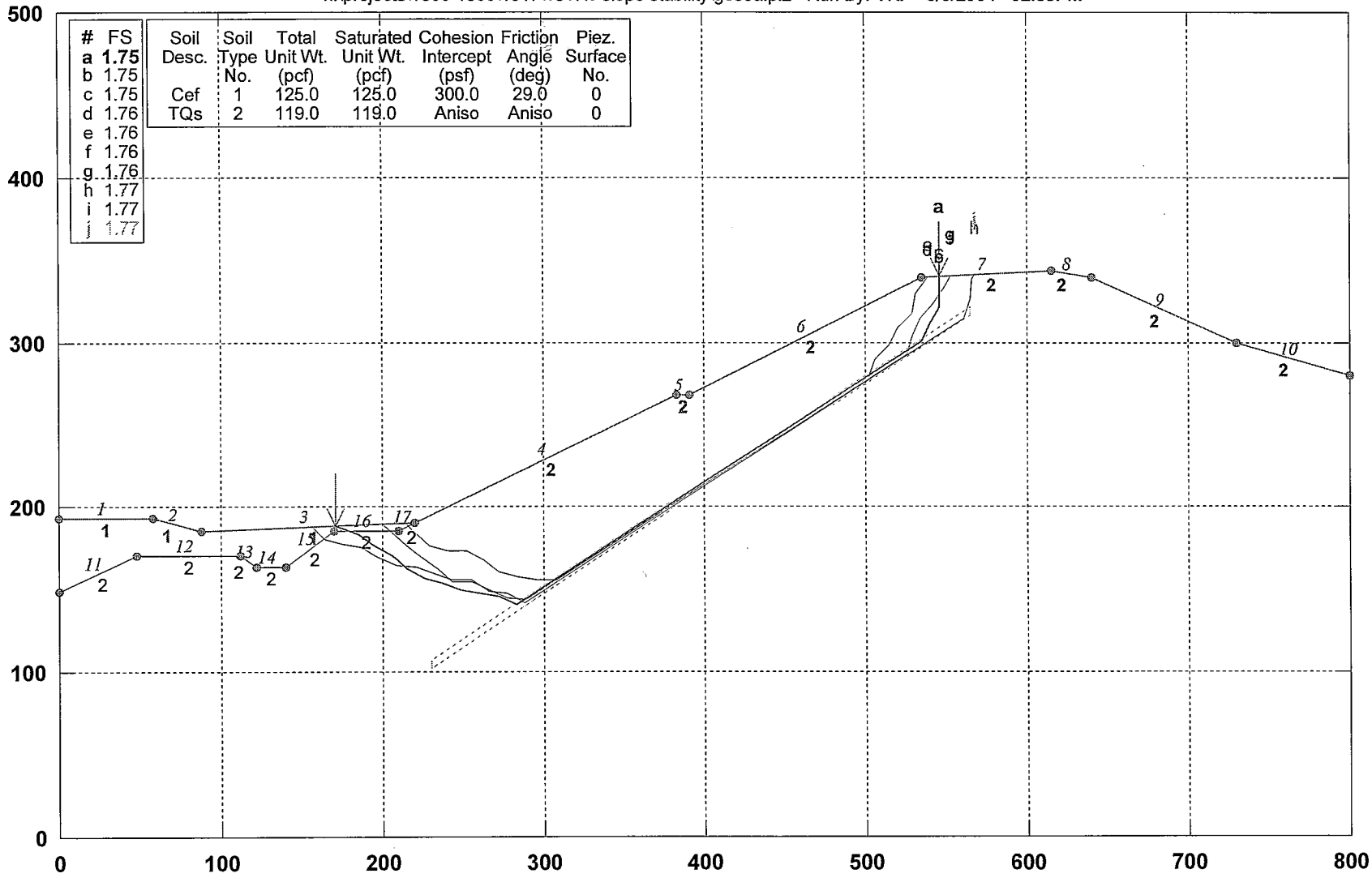
Point No.	X-Surf (ft)	Y-Surf (ft)
1	215.00	189.81
2	219.59	187.28
3	229.03	183.97
4	238.57	180.97
5	248.41	179.19
6	337.46	235.30
7	343.83	243.01
8	348.75	251.61

Factor of Safety
*** 1.891 ***
Individual data on the 9 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	2.2	177.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.4	579.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.4	135.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	9.0	7098.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.5	16043.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.8	24776.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	89.0	187071.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.4	6505.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	4.9	1827.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec 5-5' Bed plane search150' high nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g5s3a.pl2 Run By: VKP 8/6/2004 02:59PM



GSTABL7 v.2 FSmin=1.75

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 19

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              02:59PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g5s3a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g5s3a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g5s3a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec 5-5' Bed plane search
                      150' high nat. slope, Static
BOUNDARY COORDINATES
   10 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     193.00      58.00     193.00        1
    2        58.00     193.00      88.00     185.00        1
    3        88.00     185.00     220.00     190.00        1
    4       220.00     190.00     383.00     268.00        2
    5       383.00     268.00     391.00     268.00        2
    6       391.00     268.00     535.00     340.00        2
    7       535.00     340.00     615.00     344.00        2
    8       615.00     344.00     640.00     340.00        2
    9       640.00     340.00     730.00     300.00        2
   10       730.00     300.00     800.00     280.00        2
   11         0.00     148.00      48.00     170.00        2
   12        48.00     170.00     112.00     170.00        2
   13       112.00     170.00     122.00     163.00        2
   14       122.00     163.00     140.00     163.00        2
   15       140.00     163.00     170.00     185.00        2
   16       170.00     185.00     210.00     185.00        2
   17       210.00     185.00     220.00     190.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)    (deg)   Param.   (psf)     No.
  1   125.0    125.0     300.0    29.0    0.00      0.0      0
  2   119.0    119.0     410.0    40.5    0.00      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise    Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             31.0            410.00        40.50
    2             33.0            347.00        22.00
    3             90.0            410.00        40.50
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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	230.00	104.00	380.00	200.00	5.00
2	480.00	265.00	565.00	320.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.495 FS Min = 1.753 FS Ave = 2.333
Standard Deviation = 0.458 Coefficient of Variation = 19.63 %
Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.16	188.15
2	174.33	187.23
3	185.39	182.58
4	195.35	175.89
5	205.77	169.93
6	215.02	162.28
7	225.52	156.49
8	236.85	152.52
9	248.30	148.92
10	260.10	146.78
11	272.01	145.26
12	282.65	139.72
13	534.86	300.65
14	539.79	311.59
15	545.60	322.09
16	545.99	334.08
17	546.14	340.56

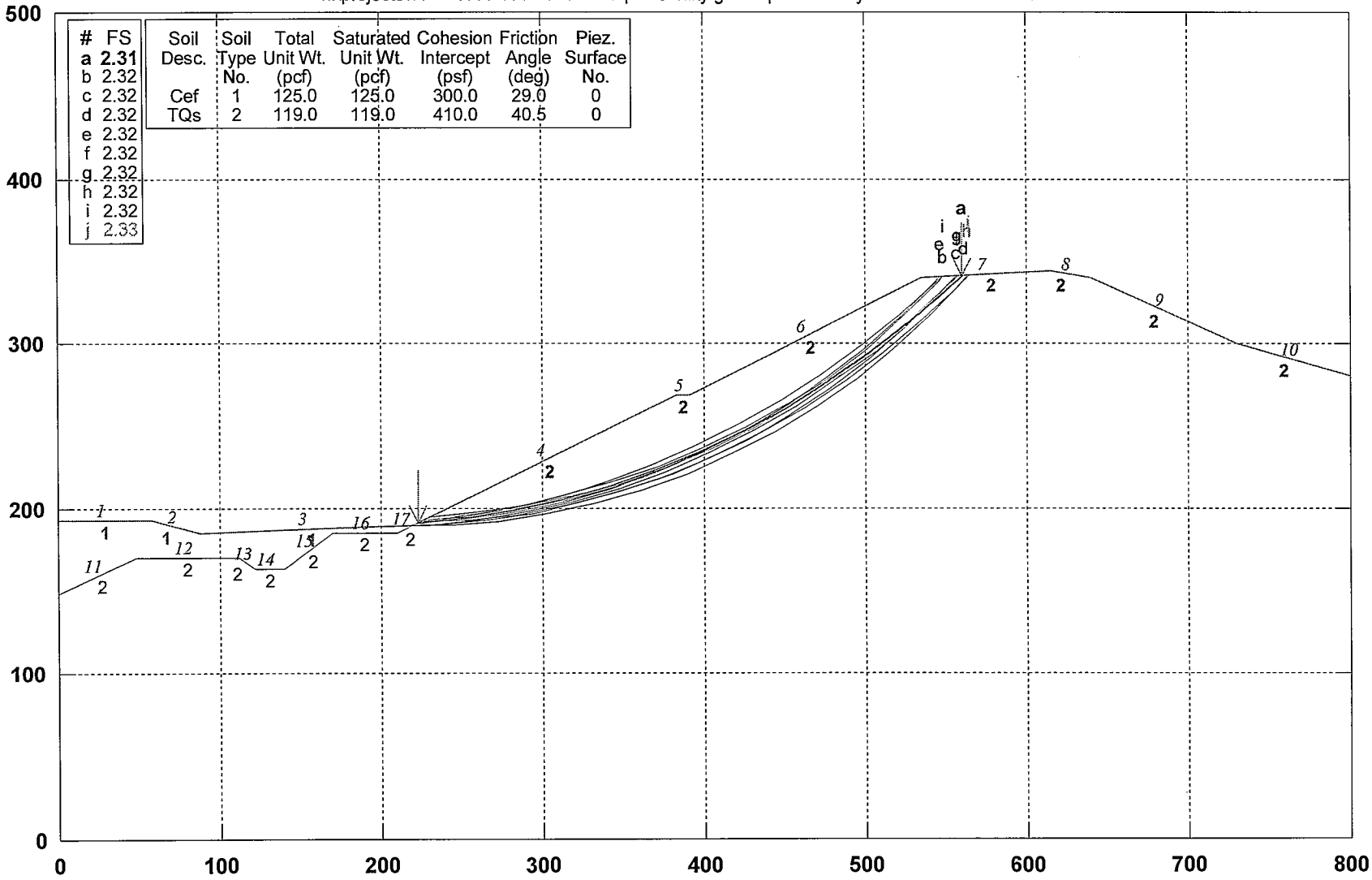
Factor of Safety
*** 1.753 ***
Individual data on the 22 slices

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	3.2	206.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	5.3	1496.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.8	3409.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.0	11661.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.4	20543.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.2	10862.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	5.0	15246.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.0	17223.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	5.5	21900.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	11.3	55049.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	11.4	68230.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	11.8	82229.9	0.0	0.0	0.	0.	0.0	0.0	0.0
13	11.9	93513.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	10.6	94917.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	100.3	862819.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	8.0	58736.4	0.0	0.0	0.	0.	0.0	0.0	0.0
17	143.9	842548.1	0.0	0.0	0.	0.	0.0	0.0	0.0

18	0.1	638.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	4.8	19309.2	0.0	0.0	0.	0.	0.0	0.0	0.0
20	5.8	16279.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	0.4	575.4	0.0	0.0	0.	0.	0.0	0.0	0.0
22	0.1	57.2	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec 5-5' Circular search 150' high nat. slope, Static

n:\projects\1600-1699\1617\1617lv slope stability\g5s4a.pl2 Run By: VKP 8/9/2004 03:13PM



#	FS
a	2.31
b	2.32
c	2.32
d	2.32
e	2.32
f	2.32
g	2.32
h	2.32
i	2.32
j	2.33

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	410.0	40.5	0

GSTABL7 v.2 FSmin=2.31

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No.-20

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/9/2004
Time of Run:              03:13PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g5s4a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g5s4a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g5s4a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec 5-5' Circular search
                      150' high nat. slope, Static
BOUNDARY COORDINATES
   10 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     193.00      58.00     193.00        1
    2        58.00     193.00      88.00     185.00        1
    3        88.00     185.00     220.00     190.00        1
    4       220.00     190.00     383.00     268.00        2
    5       383.00     268.00     391.00     268.00        2
    6       391.00     268.00     535.00     340.00        2
    7       535.00     340.00     615.00     344.00        2
    8       615.00     344.00     640.00     340.00        2
    9       640.00     340.00     730.00     300.00        2
   10       730.00     300.00     800.00     280.00        2
   11         0.00     148.00      48.00     170.00        2
   12        48.00     170.00     112.00     170.00        2
   13       112.00     170.00     122.00     163.00        2
   14       122.00     163.00     140.00     163.00        2
   15       140.00     163.00     170.00     185.00        2
   16       170.00     185.00     210.00     185.00        2
   17       210.00     185.00     220.00     190.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      0
  2   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion      Friction
  Range       Direction Limit    Intercept       Angle
   No.            (deg)            (psf)         (deg)
    1             31.0             410.00         40.50
    2             33.0             347.00         22.00
    3             90.0             410.00         40.50
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.
ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 190.00(ft)
and X = 240.00(ft)
Each Surface Terminates Between X = 520.00(ft)
and X = 580.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.143 FS Min = 2.312 FS Ave = 2.918
Standard Deviation = 0.463 Coefficient of Variation = 15.88 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	222.65	191.27
2	252.49	194.37
3	282.12	199.09
4	311.44	205.42
5	340.38	213.33
6	368.84	222.81
7	396.75	233.82
8	424.01	246.34
9	450.56	260.32
10	476.30	275.73
11	501.16	292.52
12	525.07	310.63
13	547.96	330.02
14	559.83	341.24

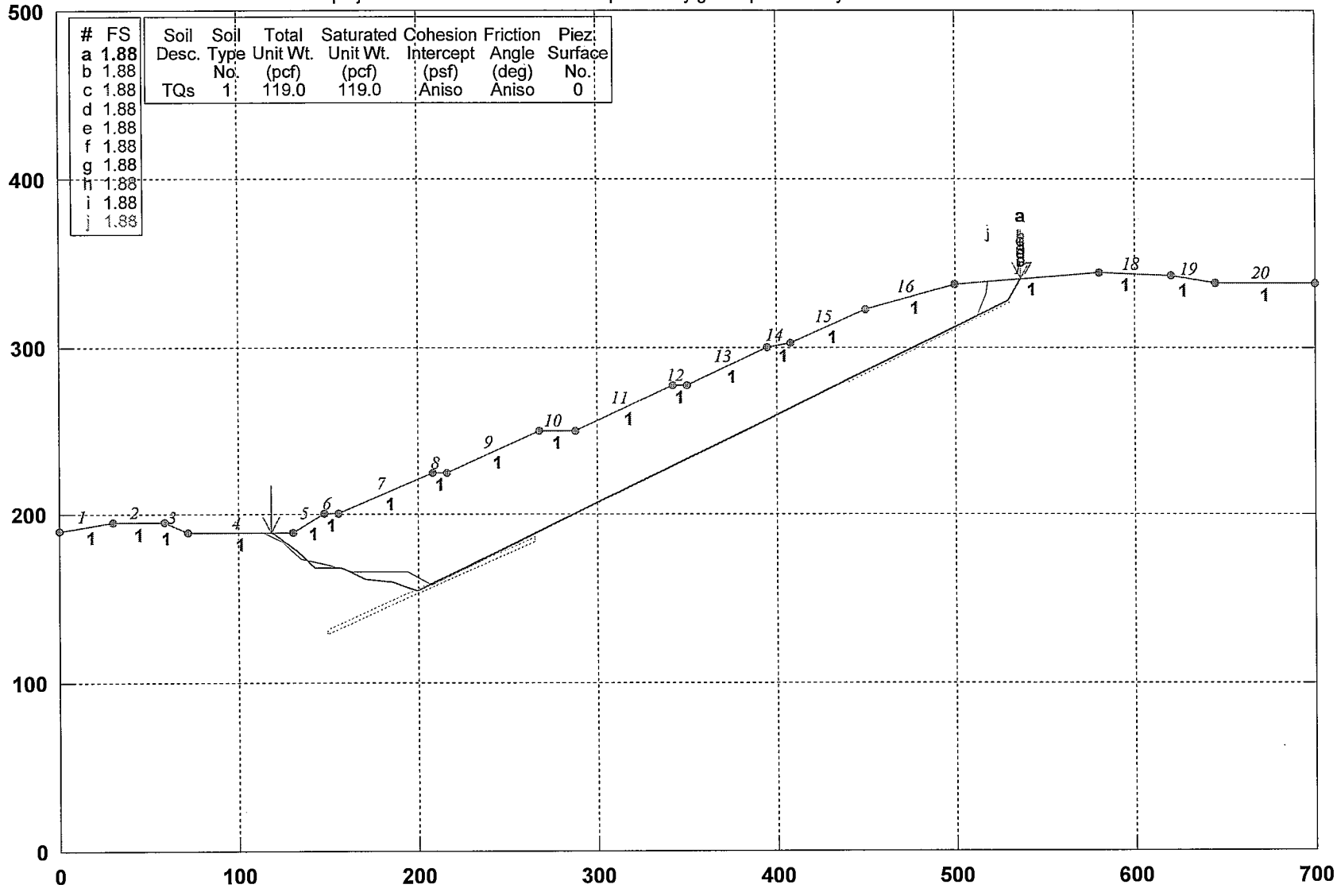
Circle Center At X = 181.10 ; Y = 738.71 ; and Radius = 549.02
Factor of Safety
*** 2.312 ***
Individual data on the 16 slices

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	29.8	19848.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	29.6	56083.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	29.3	85462.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	28.9	107816.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	28.5	123115.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	14.2	65715.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	8.0	36201.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.7	25146.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	27.3	122026.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	26.5	119429.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	25.7	110849.0	0.0	0.0	0.	0.	0.0	0.0	0.0
12	24.9	96874.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	23.9	78209.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	9.9	26794.0	0.0	0.0	0.	0.	0.0	0.0	0.0
15	13.0	24361.7	0.0	0.0	0.	0.	0.0	0.0	0.0

16	11.9	7502.3	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 6-6', Bedding pln search,CS-7, Static

n:\projects\1600-1699\1617\1617lv slope stability\g6s1a.pl2 Run By: VKP 8/6/2004 04:41PM



GSTABL7 v.2 FSmin=1.88

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-21

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              04:41PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g6s1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g6s1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g6s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 6-6', Bedding pln search,
                      CS-7, Static
BOUNDARY COORDINATES
   20 Top   Boundaries
   20 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     190.00      30.00     195.00        1
    2        30.00     195.00      59.00     195.00        1
    3        59.00     195.00      72.00     189.00        1
    4        72.00     189.00     130.00     189.00        1
    5       130.00     189.00     148.00     200.00        1
    6       148.00     200.00     156.00     200.00        1
    7       156.00     200.00     208.00     225.00        1
    8       208.00     225.00     216.00     225.00        1
    9       216.00     225.00     268.00     250.00        1
   10       268.00     250.00     288.00     250.00        1
   11       288.00     250.00     342.00     277.00        1
   12       342.00     277.00     350.00     277.00        1
   13       350.00     277.00     395.00     300.00        1
   14       395.00     300.00     408.00     303.00        1
   15       408.00     303.00     450.00     323.00        1
   16       450.00     323.00     500.00     338.00        1
   17       500.00     338.00     580.00     345.00        1
   18       580.00     345.00     620.00     343.00        1
   19       620.00     343.00     645.00     339.00        1
   20       645.00     339.00     700.00     339.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             27.0             410.00        40.50
    2             29.0             347.00        22.00
    3             90.0             410.00        40.50
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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	130.00	265.00	185.00	2.00
2	440.00	280.00	530.00	328.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 2.504 FS Min = 1.879 FS Ave = 2.138
Standard Deviation = 0.120 Coefficient of Variation = 5.62 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	118.51	189.00
2	119.98	188.17
3	131.77	178.91
4	142.47	168.39
5	157.46	167.84
6	170.69	160.78
7	185.58	158.94
8	199.86	154.33
9	529.77	327.87
10	536.65	341.21

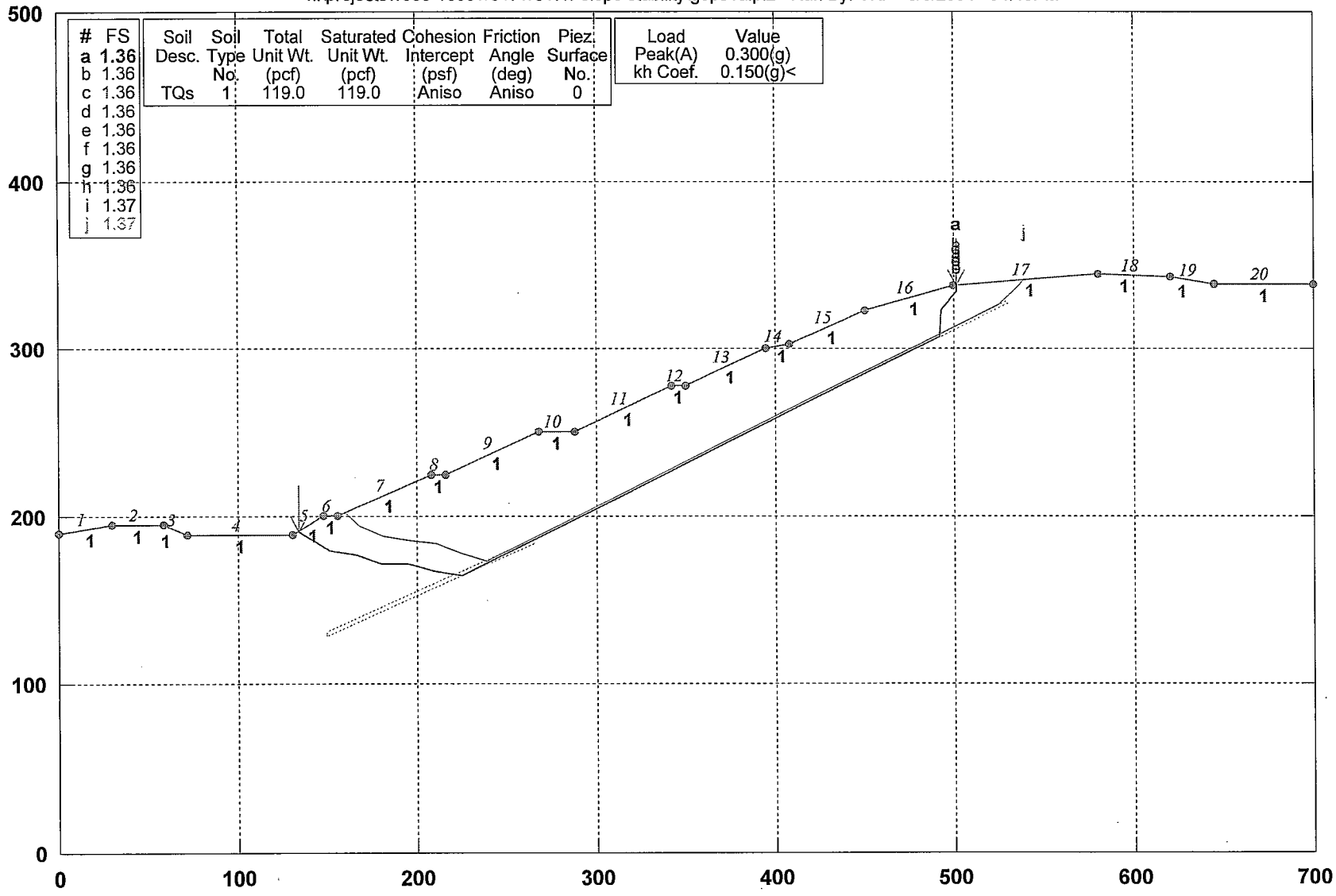
Factor of Safety
*** 1.879 ***
Individual data on the 22 slices

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	1.5	72.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	10.0	5682.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	1.8	2095.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.7	25078.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	5.5	19768.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.0	30429.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	1.5	5632.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	13.2	62341.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	14.9	89961.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	14.3	103658.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.1	64512.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.0	61195.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	52.0	377472.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	20.0	129862.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	54.0	312313.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	8.0	43596.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	45.0	232169.4	0.0	0.0	0.	0.	0.0	0.0	0.0
18	13.0	63583.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	42.0	190602.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	50.0	187062.0	0.0	0.0	0.	0.	0.0	0.0	0.0
21	29.8	68242.8	0.0	0.0	0.	0.	0.0	0.0	0.0

22	6.9	5207.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 6-6', Bedding pln search,CS-7, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g6ps1a.pl2 Run By: VKP 8/6/2004 04:48PM



GSTABL7 v.2 FSmin=1.36

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 22

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/6/2004
Time of Run:              04:48PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g6ps1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g6ps1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g6ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 6-6', Bedding pln search,
                      CS-7, Pseudostatic
BOUNDARY COORDINATES
   20 Top   Boundaries
   20 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     190.00      30.00     195.00        1
    2        30.00     195.00      59.00     195.00        1
    3        59.00     195.00      72.00     189.00        1
    4        72.00     189.00     130.00     189.00        1
    5       130.00     189.00     148.00     200.00        1
    6       148.00     200.00     156.00     200.00        1
    7       156.00     200.00     208.00     225.00        1
    8       208.00     225.00     216.00     225.00        1
    9       216.00     225.00     268.00     250.00        1
   10       268.00     250.00     288.00     250.00        1
   11       288.00     250.00     342.00     277.00        1
   12       342.00     277.00     350.00     277.00        1
   13       350.00     277.00     395.00     300.00        1
   14       395.00     300.00     408.00     303.00        1
   15       408.00     303.00     450.00     323.00        1
   16       450.00     323.00     500.00     338.00        1
   17       500.00     338.00     580.00     345.00        1
   18       580.00     345.00     620.00     343.00        1
   19       620.00     343.00     645.00     339.00        1
   20       645.00     339.00     700.00     339.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             27.0             410.00        40.50
    2             29.0             347.00        22.00
    3             90.0             410.00        40.50
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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	130.00	265.00	185.00	2.00
2	440.00	280.00	530.00	328.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 1.859 FS Min = 1.364 FS Ave = 1.604
Standard Deviation = 0.091 Coefficient of Variation = 5.67 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	133.44	191.10
2	139.06	187.44
3	151.42	178.94
4	166.29	176.95
5	180.31	171.61
6	195.30	171.42
7	209.58	166.82
8	224.45	164.84
9	492.07	307.56
10	492.21	322.56
11	501.45	334.38
12	501.53	338.13

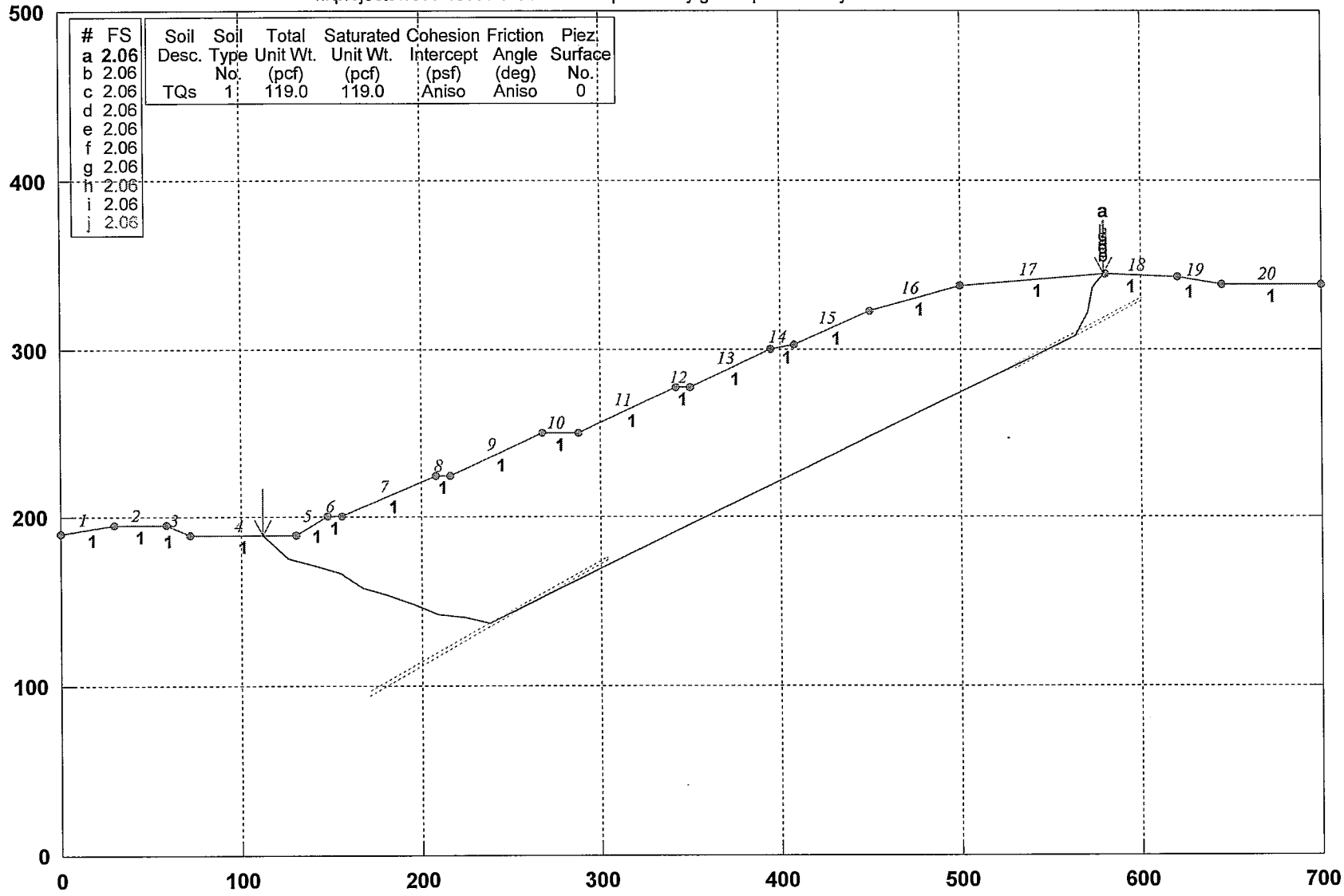
Factor of Safety
*** 1.364 ***
Individual data on the 23 slices

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	5.6	2371.0	0.0	0.0	0.	0.	355.7	0.0	0.0
2	8.9	13725.7	0.0	0.0	0.	0.	2058.9	0.0	0.0
3	3.4	8088.7	0.0	0.0	0.	0.	1213.3	0.0	0.0
4	4.6	11648.6	0.0	0.0	0.	0.	1747.3	0.0	0.0
5	10.3	30398.6	0.0	0.0	0.	0.	4559.8	0.0	0.0
6	14.0	56787.5	0.0	0.0	0.	0.	8518.1	0.0	0.0
7	15.0	78130.9	0.0	0.0	0.	0.	11719.6	0.0	0.0
8	12.7	79427.5	0.0	0.0	0.	0.	11914.1	0.0	0.0
9	1.6	10902.9	0.0	0.0	0.	0.	1635.4	0.0	0.0
10	6.4	44764.9	0.0	0.0	0.	0.	6714.7	0.0	0.0
11	8.5	61977.7	0.0	0.0	0.	0.	9296.7	0.0	0.0
12	43.5	326889.8	0.0	0.0	0.	0.	49033.5	0.0	0.0
13	20.0	134711.2	0.0	0.0	0.	0.	20206.7	0.0	0.0
14	54.0	323676.2	0.0	0.0	0.	0.	48551.4	0.0	0.0
15	8.0	45065.7	0.0	0.0	0.	0.	6759.9	0.0	0.0

16	45.0	239399.8	0.0	0.0	0.	0.	35910.0	0.0	0.0
17	13.0	65346.2	0.0	0.0	0.	0.	9801.9	0.0	0.0
18	42.0	195297.8	0.0	0.0	0.	0.	29294.7	0.0	0.0
19	42.1	165053.0	0.0	0.0	0.	0.	24757.9	0.0	0.0
20	0.1	354.7	0.0	0.0	0.	0.	53.2	0.0	0.0
21	7.8	8607.9	0.0	0.0	0.	0.	1291.2	0.0	0.0
22	1.4	795.2	0.0	0.0	0.	0.	119.3	0.0	0.0
23	0.1	18.9	0.0	0.0	0.	0.	2.8	0.0	0.0

G P R, T52584, 6-6', Bedding pln search,CS-7, Deeper search, Static

n:\projects\1600-1699\1617\1617lv slope stability\g6s2a.pl2 Run By: VKP 8/6/2004 05:02PM



GSTABL7 v.2 FSmin=2.06

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN. NO.- 23

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****

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: 8/6/2004
Time of Run: 05:02PM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g6s2a.in
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g6s2a.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g6s2a.PLT
PROBLEM DESCRIPTION: G P R, T52584, 6-6', Bedding pln search,
CS-7, Deeper search, Static

BOUNDARY COORDINATES
20 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	190.00	30.00	195.00	1
2	30.00	195.00	59.00	195.00	1
3	59.00	195.00	72.00	189.00	1
4	72.00	189.00	130.00	189.00	1
5	130.00	189.00	148.00	200.00	1
6	148.00	200.00	156.00	200.00	1
7	156.00	200.00	208.00	225.00	1
8	208.00	225.00	216.00	225.00	1
9	216.00	225.00	268.00	250.00	1
10	268.00	250.00	288.00	250.00	1
11	288.00	250.00	342.00	277.00	1
12	342.00	277.00	350.00	277.00	1
13	350.00	277.00	395.00	300.00	1
14	395.00	300.00	408.00	303.00	1
15	408.00	303.00	450.00	323.00	1
16	450.00	323.00	500.00	338.00	1
17	500.00	338.00	580.00	345.00	1
18	580.00	345.00	620.00	343.00	1
19	620.00	343.00	645.00	339.00	1
20	645.00	339.00	700.00	339.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
1 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	119.0	119.0	410.0	40.5	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	27.0	410.00	40.50
2	29.0	347.00	22.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	95.00	304.00	175.00	2.00
2	530.00	290.00	600.00	330.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 2.590 FS Min = 2.057 FS Ave = 2.340
Standard Deviation = 0.107 Coefficient of Variation = 4.56 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	111.98	189.00
2	115.42	185.77
3	126.04	175.18
4	140.44	170.99
5	154.74	166.44
6	167.08	157.92
7	181.25	153.00
8	195.47	148.21
9	208.88	141.50
10	223.81	140.09
11	238.37	136.45
12	563.90	308.43
13	570.43	321.93
14	573.05	336.70
15	579.05	344.92

Factor of Safety
*** 2.057 ***

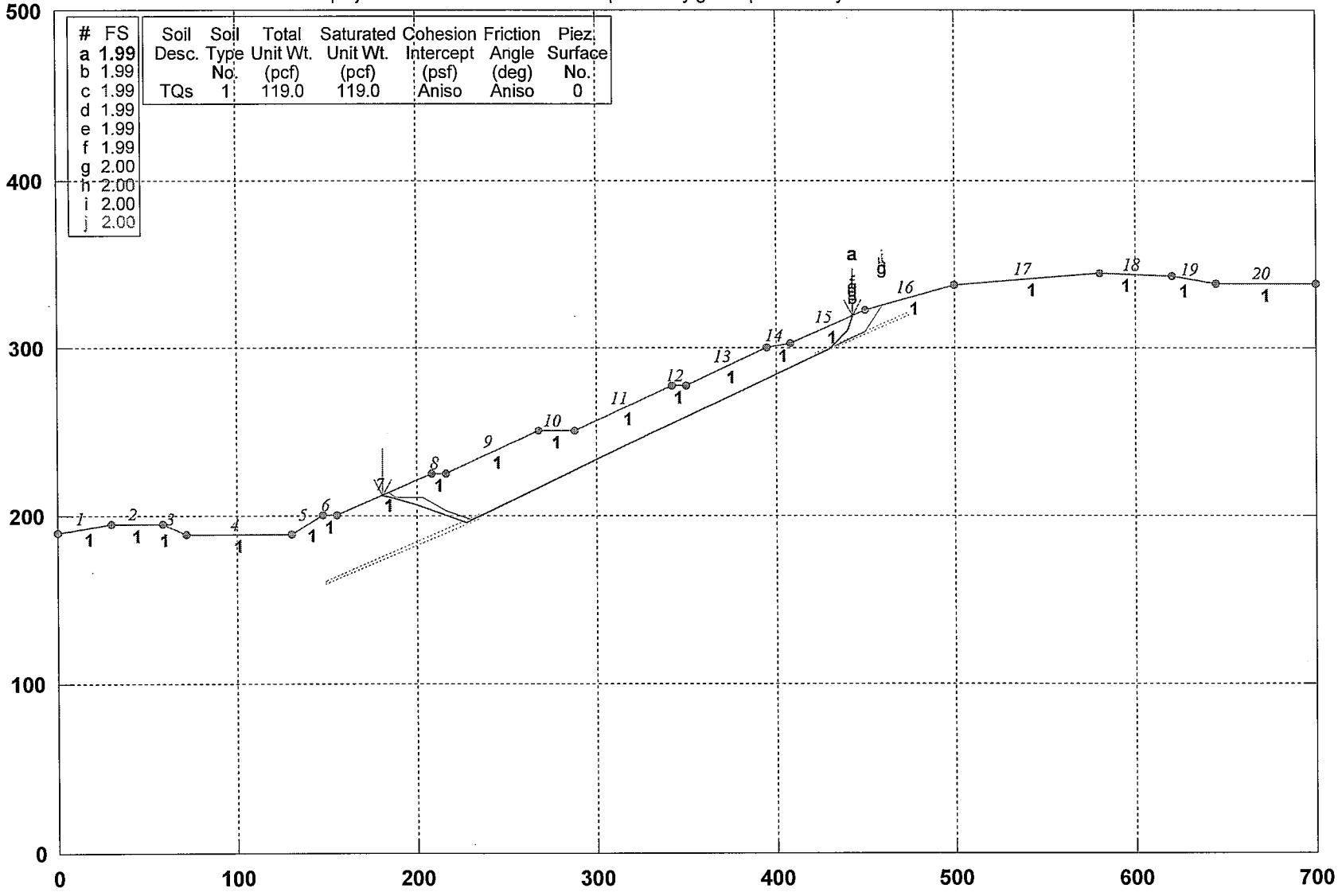
Individual data on the 27 slices

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	3.4	660.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	10.6	10781.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	4.0	6785.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.4	24460.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.6	25089.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.7	26041.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	1.3	5114.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.1	53953.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	14.2	89846.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	14.2	109875.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	12.5	114709.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.9	8721.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	7.1	71033.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	7.8	80355.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	14.6	162754.1	0.0	0.0	0.	0.	0.0	0.0	0.0
16	29.6	347699.2	0.0	0.0	0.	0.	0.0	0.0	0.0

17	20.0	220412.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	54.0	556255.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	8.0	79669.3	0.0	0.0	0.	0.	0.0	0.0	0.0
20	45.0	434753.8	0.0	0.0	0.	0.	0.0	0.0	0.0
21	13.0	122005.8	0.0	0.0	0.	0.	0.0	0.0	0.0
22	42.0	379038.5	0.0	0.0	0.	0.	0.0	0.0	0.0
23	50.0	410767.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	63.9	374480.1	0.0	0.0	0.	0.	0.0	0.0	0.0
25	6.5	22289.7	0.0	0.0	0.	0.	0.0	0.0	0.0
26	2.6	4668.3	0.0	0.0	0.	0.	0.0	0.0	0.0
27	6.0	2743.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 6-6', Bedding pln search,CS-7, Shallower search, Static

n:\projects\1600-1699\1617\1617lv slope stability\g6s3a.pl2 Run By: VKP 8/6/2004 05:05PM



GSTABL7 v.2 FSmin=1.99

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No.-24

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              05:05PM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g6s3a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g6s3a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g6s3a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 6-6', Bedding pln search,
                      CS-7, Shallower search, Static
BOUNDARY COORDINATES
   20 Top   Boundaries
   20 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     190.00      30.00     195.00        1
    2        30.00     195.00      59.00     195.00        1
    3        59.00     195.00      72.00     189.00        1
    4        72.00     189.00     130.00     189.00        1
    5       130.00     189.00     148.00     200.00        1
    6       148.00     200.00     156.00     200.00        1
    7       156.00     200.00     208.00     225.00        1
    8       208.00     225.00     216.00     225.00        1
    9       216.00     225.00     268.00     250.00        1
   10       268.00     250.00     288.00     250.00        1
   11       288.00     250.00     342.00     277.00        1
   12       342.00     277.00     350.00     277.00        1
   13       350.00     277.00     395.00     300.00        1
   14       395.00     300.00     408.00     303.00        1
   15       408.00     303.00     450.00     323.00        1
   16       450.00     323.00     500.00     338.00        1
   17       500.00     338.00     580.00     345.00        1
   18       580.00     345.00     620.00     343.00        1
   19       620.00     343.00     645.00     339.00        1
   20       645.00     339.00     700.00     339.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             27.0             410.00       40.50
    2             29.0             347.00       22.00
    3             90.0             410.00       40.50
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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
2500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	150.00	160.00	235.00	200.00	2.00
2	422.00	296.00	475.00	321.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 2500
Statistical Data On All Valid FS Values:
FS Max = 3.439 FS Min = 1.987 FS Ave = 3.017
Standard Deviation = 0.272 Coefficient of Variation = 9.02 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	181.35	212.19
2	185.54	210.95
3	199.92	206.69
4	213.86	201.14
5	227.90	195.86
6	429.45	299.63
7	439.83	310.46
8	442.98	319.66

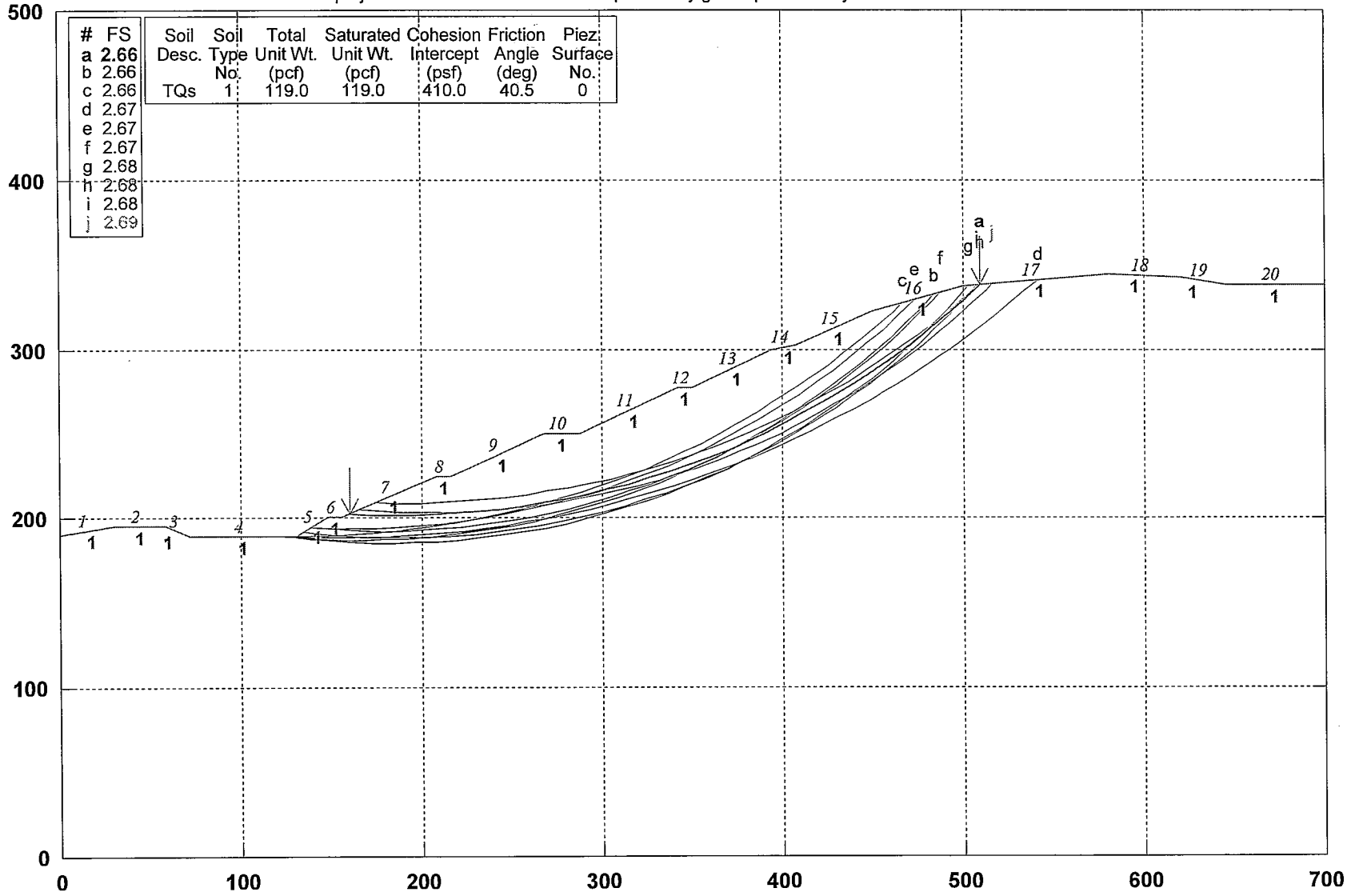
Factor of Safety
*** 1.987 ***

Individual data on the 15 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	4.2	811.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	14.4	15126.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.1	17273.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.9	15823.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.1	6177.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.9	42139.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	40.1	163110.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	20.0	67464.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	54.0	146484.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.0	19357.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	45.0	97403.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	13.0	25150.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	21.4	35724.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	10.4	13137.5	0.0	0.0	0.	0.	0.0	0.0	0.0
15	3.1	1441.7	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 6-6', CS-7, Circular search, Static

n:\projects\1600-1699\1617\1617lv slope stability\g6s4a.pl2 Run By: VKP 8/9/2004 03:18PM



GSTABL7 v.2 FSmin=2.66

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No.-25

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/9/2004
Time of Run:              03:18PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g6s4a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g6s4a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g6s4a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 6-6',
                      CS-7, Circular search, Static
BOUNDARY COORDINATES
   20 Top   Boundaries
   20 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	190.00	30.00	195.00	1
2	30.00	195.00	59.00	195.00	1
3	59.00	195.00	72.00	189.00	1
4	72.00	189.00	130.00	189.00	1
5	130.00	189.00	148.00	200.00	1
6	148.00	200.00	156.00	200.00	1
7	156.00	200.00	208.00	225.00	1
8	208.00	225.00	216.00	225.00	1
9	216.00	225.00	268.00	250.00	1
10	268.00	250.00	288.00	250.00	1
11	288.00	250.00	342.00	277.00	1
12	342.00	277.00	350.00	277.00	1
13	350.00	277.00	395.00	300.00	1
14	395.00	300.00	408.00	303.00	1
15	408.00	303.00	450.00	323.00	1
16	450.00	323.00	500.00	338.00	1
17	500.00	338.00	580.00	345.00	1
18	580.00	345.00	620.00	343.00	1
19	620.00	343.00	645.00	339.00	1
20	645.00	339.00	700.00	339.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 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	119.0	119.0	410.0	40.5	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	27.0	410.00	40.50
2	29.0	347.00	22.00
3	90.0	410.00	40.50

```
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.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
3600 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 180 Points Equally Spaced
Along The Ground Surface Between X = 120.00(ft)
and X = 300.00(ft)
Each Surface Terminates Between X = 400.00(ft)
and X = 700.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
12.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 3600
Statistical Data On All Valid FS Values:
FS Max = 7.007 FS Min = 2.663 FS Ave = 4.074
Standard Deviation = 0.859 Coefficient of Variation = 21.08 %
Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	160.22	202.03
2	172.21	201.50
3	184.21	201.30
4	196.21	201.41
5	208.20	201.85
6	220.18	202.60
7	232.13	203.68
8	244.05	205.07
9	255.93	206.78
10	267.75	208.81
11	279.52	211.15
12	291.22	213.81
13	302.85	216.78
14	314.39	220.06
15	325.84	223.65
16	337.20	227.54
17	348.44	231.73
18	359.57	236.23
19	370.57	241.01
20	381.44	246.10
21	392.17	251.46
22	402.76	257.12
23	413.19	263.05
24	423.45	269.27
25	433.55	275.75
26	443.47	282.50
27	453.21	289.52
28	462.75	296.79
29	472.10	304.31
30	481.25	312.08
31	490.18	320.10
32	498.89	328.35
33	507.38	336.83
34	509.27	338.81

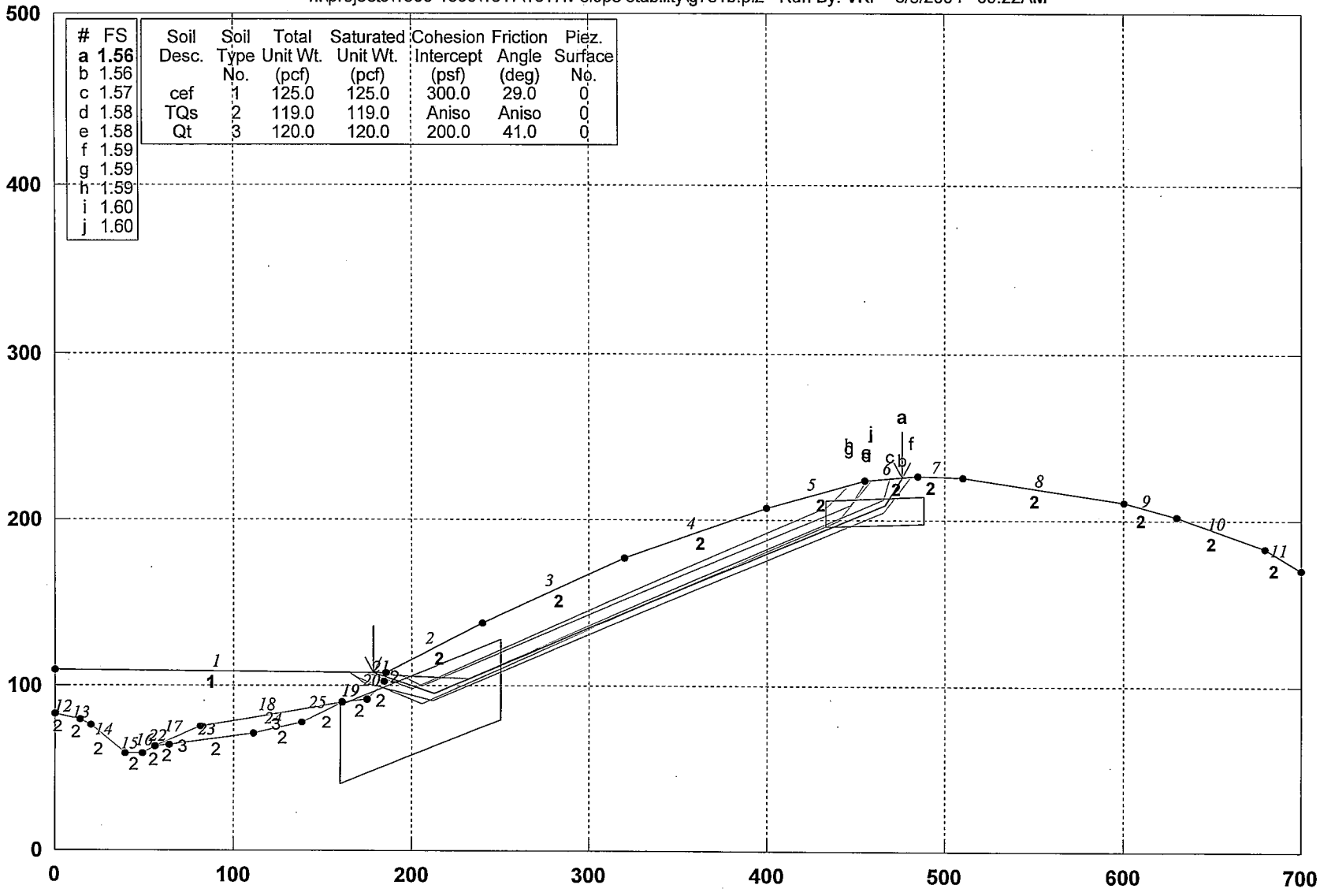
Circle Center At X = 185.96 ; Y = 650.09 ; and Radius = 448.80

Factor of Safety
*** 2.663 ***
Individual data on the 43 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	12.0	4487.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	12.0	13247.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	12.0	21552.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	11.8	28820.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.2	555.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	7.8	21259.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.2	11700.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	12.0	38036.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	11.9	44318.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	11.9	50054.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	11.8	55230.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.2	1209.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	11.5	54832.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.5	38220.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	3.2	14331.1	0.0	0.0	0.	0.	0.0	0.0	0.0
16	11.6	54265.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	11.5	57539.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	11.5	60237.9	0.0	0.0	0.	0.	0.0	0.0	0.0
19	11.4	62361.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	4.8	27074.5	0.0	0.0	0.	0.	0.0	0.0	0.0
21	6.4	35609.0	0.0	0.0	0.	0.	0.0	0.0	0.0
22	1.6	8346.2	0.0	0.0	0.	0.	0.0	0.0	0.0
23	9.6	51402.1	0.0	0.0	0.	0.	0.0	0.0	0.0
24	11.0	60338.2	0.0	0.0	0.	0.	0.0	0.0	0.0
25	10.9	60463.2	0.0	0.0	0.	0.	0.0	0.0	0.0
26	10.7	60064.0	0.0	0.0	0.	0.	0.0	0.0	0.0
27	2.8	15828.8	0.0	0.0	0.	0.	0.0	0.0	0.0
28	7.8	42325.5	0.0	0.0	0.	0.	0.0	0.0	0.0
29	5.2	27314.0	0.0	0.0	0.	0.	0.0	0.0	0.0
30	5.2	26330.8	0.0	0.0	0.	0.	0.0	0.0	0.0
31	10.3	51014.8	0.0	0.0	0.	0.	0.0	0.0	0.0
32	10.1	48370.2	0.0	0.0	0.	0.	0.0	0.0	0.0
33	9.9	45336.9	0.0	0.0	0.	0.	0.0	0.0	0.0
34	6.5	28425.6	0.0	0.0	0.	0.	0.0	0.0	0.0
35	3.2	13410.4	0.0	0.0	0.	0.	0.0	0.0	0.0
36	9.5	36624.9	0.0	0.0	0.	0.	0.0	0.0	0.0
37	9.3	30788.9	0.0	0.0	0.	0.	0.0	0.0	0.0
38	9.1	24811.8	0.0	0.0	0.	0.	0.0	0.0	0.0
39	8.9	18732.0	0.0	0.0	0.	0.	0.0	0.0	0.0
40	8.7	12588.7	0.0	0.0	0.	0.	0.0	0.0	0.0
41	1.1	1177.2	0.0	0.0	0.	0.	0.0	0.0	0.0
42	7.4	4555.3	0.0	0.0	0.	0.	0.0	0.0	0.0
43	1.9	204.1	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec.7-7' Natural Slope Bedg Pln, Static, Critical surface

n:\projects\1600-1699\1617\1617lv slope stability\g7s1b.pl2 Run By: VKP 8/6/2004 09:22AM



#	FS
a	**1.56**
b	1.56
c	1.57
d	1.58
e	1.58
f	1.59
g	1.59
h	1.59
i	1.60
j	1.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.56

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run. No. -26

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****

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: 8/6/2004
Time of Run: 09:22AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g7s1b.
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g7s1b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g7s1b.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec.7-7' Natural Slope
Bedg Pln, Static, Critical surface

BOUNDARY COORDINATES
11 Top Boundaries
25 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	109.00	185.10	108.00	1
2	185.10	108.00	240.00	137.00	2
3	240.00	137.00	320.00	177.00	2
4	320.00	177.00	400.00	207.00	2
5	400.00	207.00	455.00	224.00	2
6	455.00	224.00	485.00	227.00	2
7	485.00	227.00	510.00	226.00	2
8	510.00	226.00	600.00	211.00	2
9	600.00	211.00	630.00	202.00	2
10	630.00	202.00	680.00	183.00	2
11	680.00	183.00	700.00	170.00	2
12	0.00	83.00	14.00	80.00	2
13	14.00	80.00	20.00	76.00	2
14	20.00	76.00	39.00	59.00	2
15	39.00	59.00	49.00	59.00	2
16	49.00	59.00	56.00	63.00	2
17	56.00	63.00	81.00	75.00	3
18	81.00	75.00	161.00	90.00	3
19	161.00	90.00	175.00	92.00	2
20	175.00	92.00	185.00	102.00	2
21	185.00	102.00	185.10	108.00	2
22	56.00	63.00	64.00	64.00	2
23	64.00	64.00	111.00	71.00	2
24	111.00	71.00	138.00	78.00	2
25	138.00	78.00	161.00	90.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

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	24.0	410.00	40.50
2	26.0	347.00	22.50
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0

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

1000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	160.00	64.00	250.00	104.00	48.00
2	433.00	204.00	488.00	206.00	16.00

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

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Evaluated = 1000

Statistical Data On All Valid FS Values:

FS Max = 4.393 FS Min = 1.557 FS Ave = 2.761

Standard Deviation = 0.577 Coefficient of Variation = 20.89 %

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	178.91	108.03
2	212.75	95.72
3	466.71	209.32
4	476.25	226.13

Factor of Safety

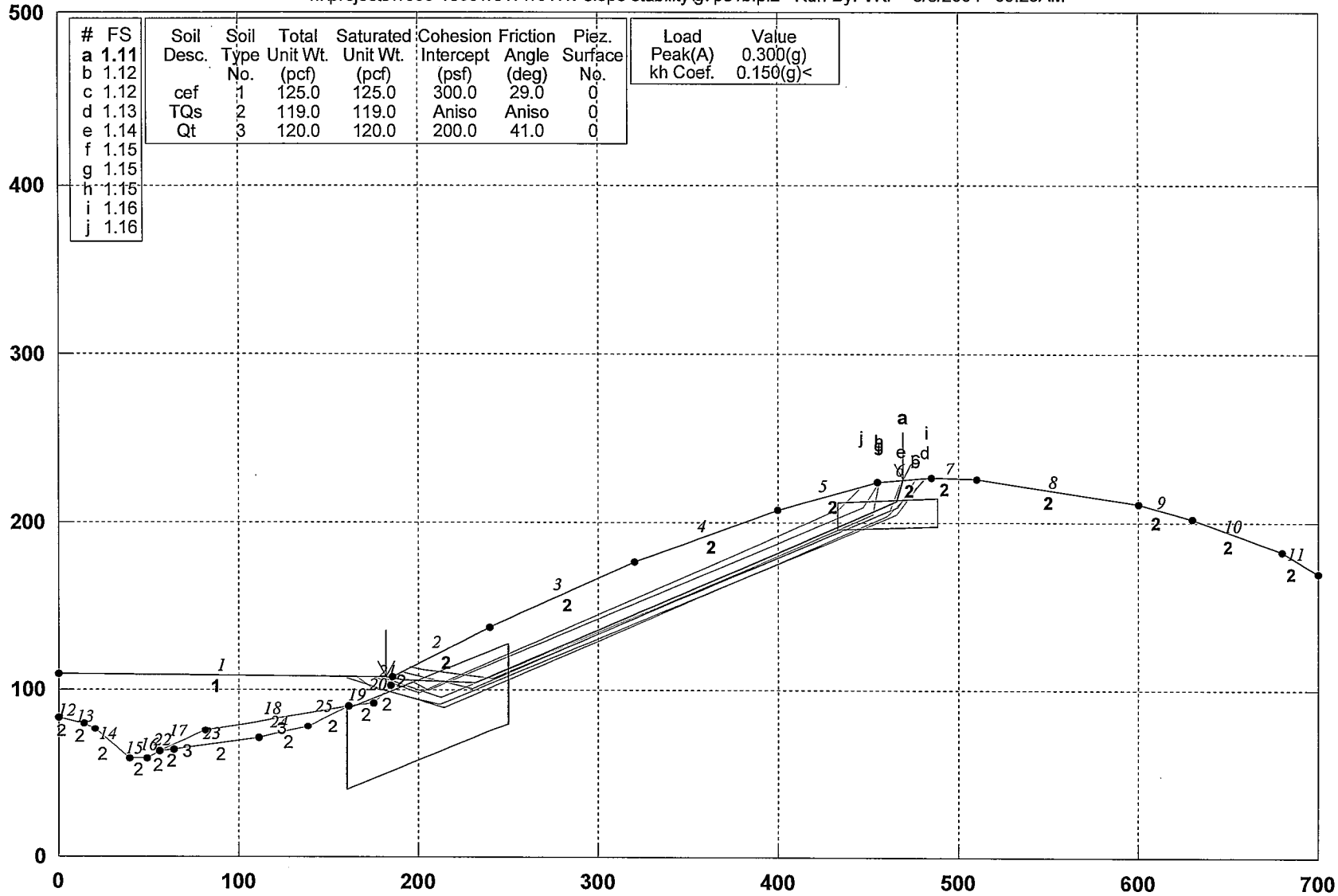
*** 1.557 ***

Individual data on the 9 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	6.1	847.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.0	9.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	27.7	47891.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	27.2	90771.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	80.0	297048.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	80.0	289567.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	55.0	155263.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.7	24933.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.5	8998.0	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec.7-7' Natural Slope Bedg Pln, Pseudostatic, Critical surface

n:\projects\1600-1699\1617\1617lv slope stability\g7ps1b.pl2 Run By: VKP 8/6/2004 09:25AM



#	FS
a	1.11
b	1.12
c	1.12
d	1.13
e	1.14
f	1.15
g	1.15
h	1.15
i	1.16
j	1.16

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.11

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO-27

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/6/2004
Time of Run:              09:25AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g7ps1b.
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g7ps1b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g7ps1b.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec.7-7' Natural Slope
                      Bedg Pln, Pseudostatic, Critical surface
BOUNDARY COORDINATES
   11 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	109.00	185.10	108.00	1
2	185.10	108.00	240.00	137.00	2
3	240.00	137.00	320.00	177.00	2
4	320.00	177.00	400.00	207.00	2
5	400.00	207.00	455.00	224.00	2
6	455.00	224.00	485.00	227.00	2
7	485.00	227.00	510.00	226.00	2
8	510.00	226.00	600.00	211.00	2
9	600.00	211.00	630.00	202.00	2
10	630.00	202.00	680.00	183.00	2
11	680.00	183.00	700.00	170.00	2
12	0.00	83.00	14.00	80.00	2
13	14.00	80.00	20.00	76.00	2
14	20.00	76.00	39.00	59.00	2
15	39.00	59.00	49.00	59.00	2
16	49.00	59.00	56.00	63.00	2
17	56.00	63.00	81.00	75.00	3
18	81.00	75.00	161.00	90.00	3
19	161.00	90.00	175.00	92.00	2
20	175.00	92.00	185.00	102.00	2
21	185.00	102.00	185.10	108.00	2
22	56.00	63.00	64.00	64.00	2
23	64.00	64.00	111.00	71.00	2
24	111.00	71.00	138.00	78.00	2
25	138.00	78.00	161.00	90.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	24.0	410.00	40.50
2	26.0	347.00	22.50
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	160.00	64.00	250.00	104.00	48.00
2	433.00	204.00	488.00	206.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.865 FS Min = 1.113 FS Ave = 1.943
Standard Deviation = 0.363 Coefficient of Variation = 18.70 %
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	182.04	108.02
2	191.90	105.45
3	231.89	104.54
4	465.84	212.86
5	469.37	225.44

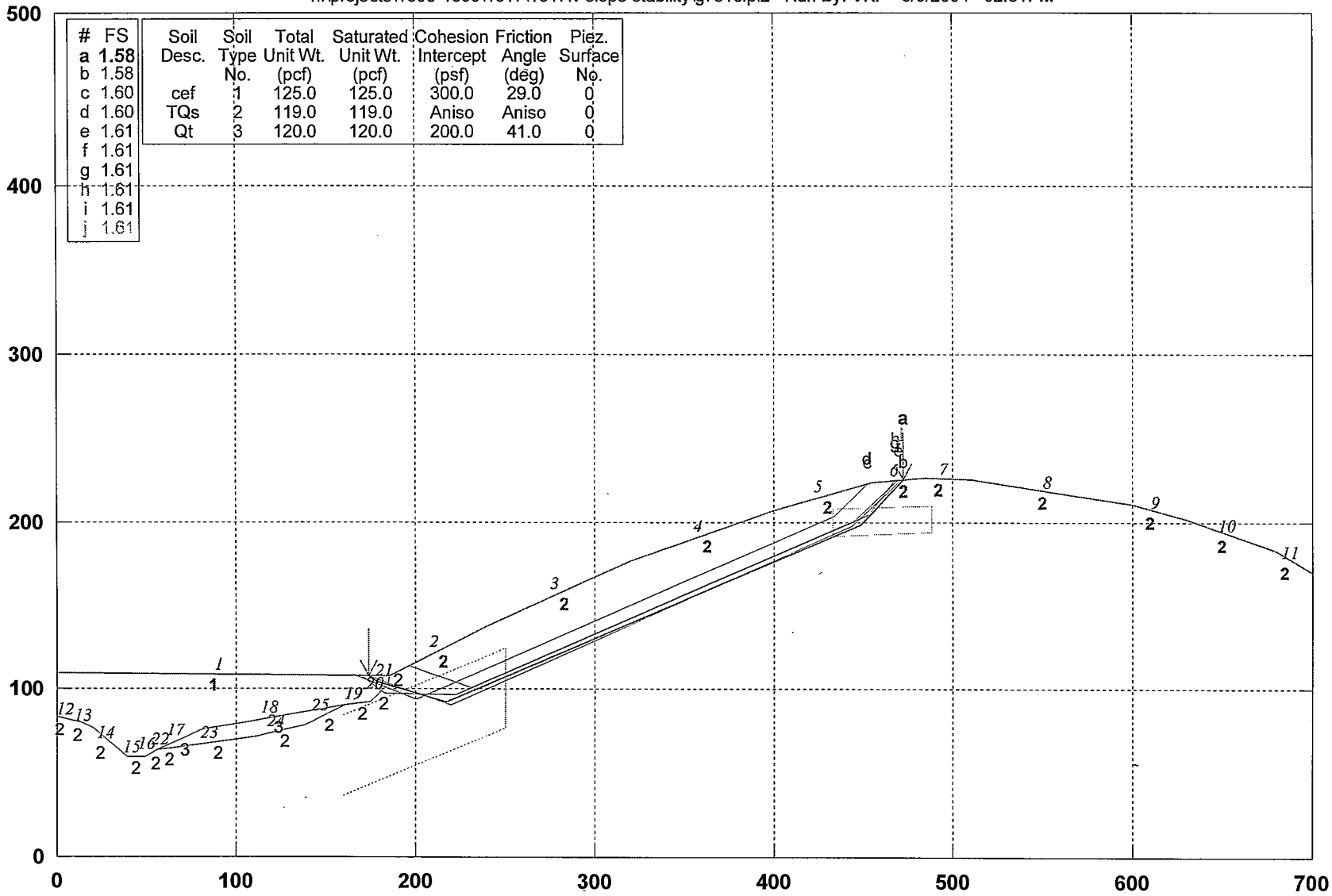
Factor of Safety
*** 1.113 ***

Individual data on the 10 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	3.0	147.8	0.0	0.0	0.	0.	22.2	0.0	0.0
2	0.0	1.2	0.0	0.0	0.	0.	0.2	0.0	0.0
3	6.8	2797.9	0.0	0.0	0.	0.	419.7	0.0	0.0
4	40.0	81647.5	0.0	0.0	0.	0.	12247.1	0.0	0.0
5	8.1	27452.7	0.0	0.0	0.	0.	4117.9	0.0	0.0
6	80.0	287372.9	0.0	0.0	0.	0.	43105.9	0.0	0.0
7	80.0	267939.3	0.0	0.0	0.	0.	40190.9	0.0	0.0
8	55.0	133460.8	0.0	0.0	0.	0.	20019.1	0.0	0.0
9	10.8	18306.8	0.0	0.0	0.	0.	2746.0	0.0	0.0
10	3.5	2568.9	0.0	0.0	0.	0.	385.3	0.0	0.0

G P R, T52584, Sec.7-7' Natural Slope Bedg Pln, Static

n:\projects\1600-1699\1617\1617lv slope stability\g7s1c.pl2 Run By: VKP 8/9/2004 02:31PM



GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No.-28

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/9/2004
Time of Run:              02:31PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g7s1c.
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g7s1c.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g7s1c.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec.7-7' Natural Slope
                      Bedg Pln, Static
BOUNDARY COORDINATES
   11 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	109.00	185.10	108.00	1
2	185.10	108.00	240.00	137.00	2
3	240.00	137.00	320.00	177.00	2
4	320.00	177.00	400.00	207.00	2
5	400.00	207.00	455.00	224.00	2
6	455.00	224.00	485.00	227.00	2
7	485.00	227.00	510.00	226.00	2
8	510.00	226.00	600.00	211.00	2
9	600.00	211.00	630.00	202.00	2
10	630.00	202.00	680.00	183.00	2
11	680.00	183.00	700.00	170.00	2
12	0.00	83.00	14.00	80.00	2
13	14.00	80.00	20.00	76.00	2
14	20.00	76.00	39.00	59.00	2
15	39.00	59.00	49.00	59.00	2
16	49.00	59.00	56.00	63.00	2
17	56.00	63.00	81.00	75.00	3
18	81.00	75.00	161.00	90.00	3
19	161.00	90.00	175.00	92.00	2
20	175.00	92.00	185.00	102.00	2
21	185.00	102.00	185.10	108.00	2
22	56.00	63.00	64.00	64.00	2
23	64.00	64.00	111.00	71.00	2
24	111.00	71.00	138.00	78.00	2
25	138.00	78.00	161.00	90.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	24.0	410.00	40.50
2	26.0	347.00	22.50
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	160.00	60.00	250.00	100.00	48.00
2	433.00	200.00	488.00	202.00	16.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.616 FS Min = 1.583 FS Ave = 2.826
Standard Deviation = 0.582 Coefficient of Variation = 20.60 %
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	174.11	108.06
2	178.75	103.69
3	216.93	91.77
4	449.28	198.52
5	472.58	225.76

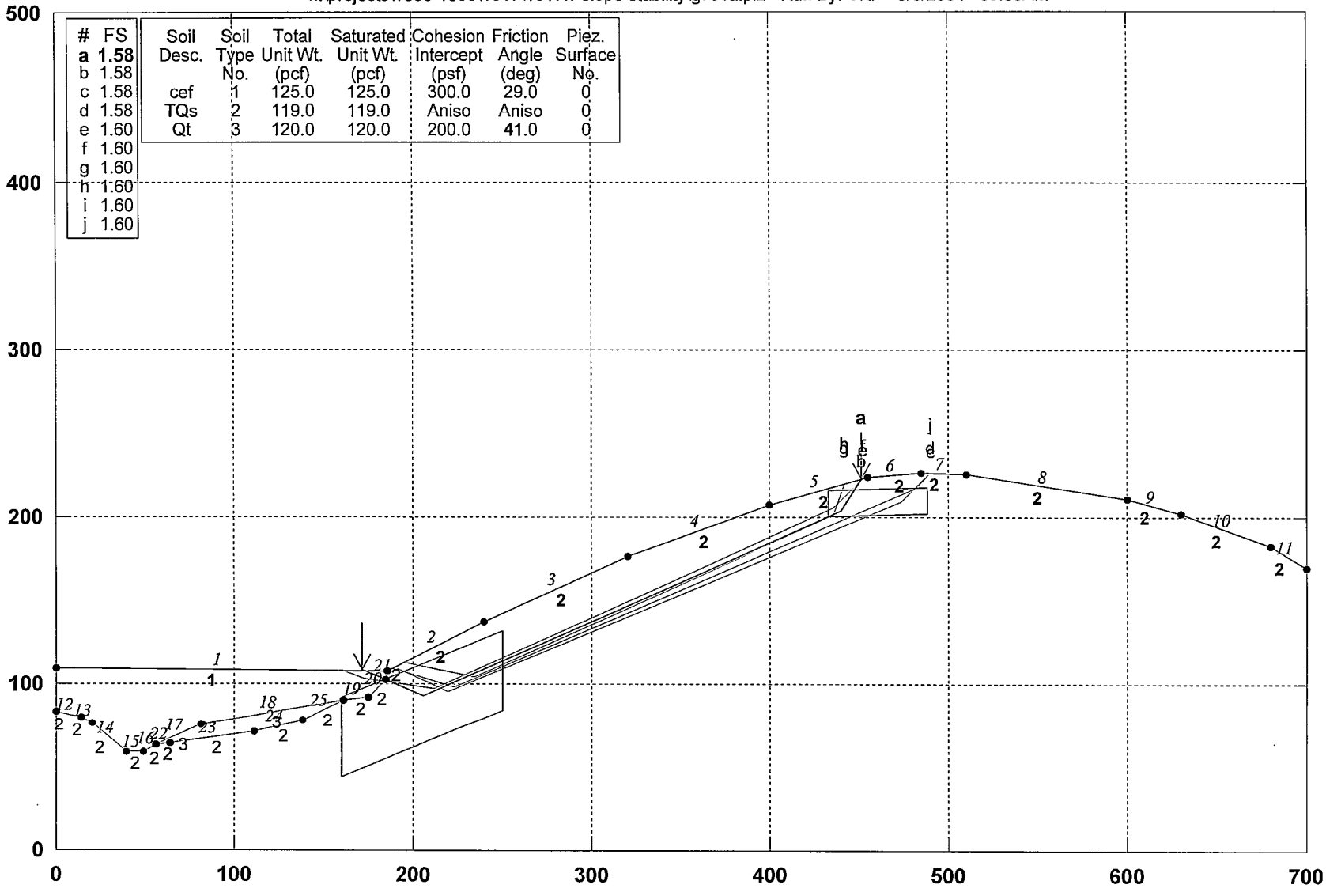
Factor of Safety
*** 1.583 ***

Individual data on the 11 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	4.6	1258.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.1	3989.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.2	154.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.1	76.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	31.8	74488.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	23.1	92916.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	80.0	345148.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	80.0	328439.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	49.3	160799.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	5.7	14456.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	17.6	19668.0	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec.7-7' Natural Slope Bedg Pln, Static

n:\projects\1600-1699\1617\1617lv slope stability\g7s1a.pl2 Run By: VKP 8/6/2004 09:30AM



#	FS
a	**1.58**
b	1.58
c	1.58
d	1.58
e	1.60
f	1.60
g	1.60
h	1.60
i	1.60
j	1.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No-29

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****

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: 8/6/2004
Time of Run: 09:30AM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g7s1a.
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g7s1a.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g7s1a.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec.7-7' Natural Slope
Bedg Pln, Static

BOUNDARY COORDINATES
11 Top Boundaries
25 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	109.00	185.10	108.00	1
2	185.10	108.00	240.00	137.00	2
3	240.00	137.00	320.00	177.00	2
4	320.00	177.00	400.00	207.00	2
5	400.00	207.00	455.00	224.00	2
6	455.00	224.00	485.00	227.00	2
7	485.00	227.00	510.00	226.00	2
8	510.00	226.00	600.00	211.00	2
9	600.00	211.00	630.00	202.00	2
10	630.00	202.00	680.00	183.00	2
11	680.00	183.00	700.00	170.00	2
12	0.00	83.00	14.00	80.00	2
13	14.00	80.00	20.00	76.00	2
14	20.00	76.00	39.00	59.00	2
15	39.00	59.00	49.00	59.00	2
16	49.00	59.00	56.00	63.00	2
17	56.00	63.00	81.00	75.00	3
18	81.00	75.00	161.00	90.00	3
19	161.00	90.00	175.00	92.00	2
20	175.00	92.00	185.00	102.00	2
21	185.00	102.00	185.10	108.00	2
22	56.00	63.00	64.00	64.00	2
23	64.00	64.00	111.00	71.00	2
24	111.00	71.00	138.00	78.00	2
25	138.00	78.00	161.00	90.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

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	24.0	410.00	40.50
2	26.0	347.00	22.50
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0

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

1000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	160.00	68.00	250.00	108.00	48.00
2	433.00	208.00	488.00	210.00	16.00

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

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Evaluated = 1000

Statistical Data On All Valid FS Values:

FS Max = 4.482 FS Min = 1.575 FS Ave = 2.757

Standard Deviation = 0.569 Coefficient of Variation = 20.65 %

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.24	108.07
2	205.85	93.06
3	439.94	203.84
4	451.17	222.82

Factor of Safety

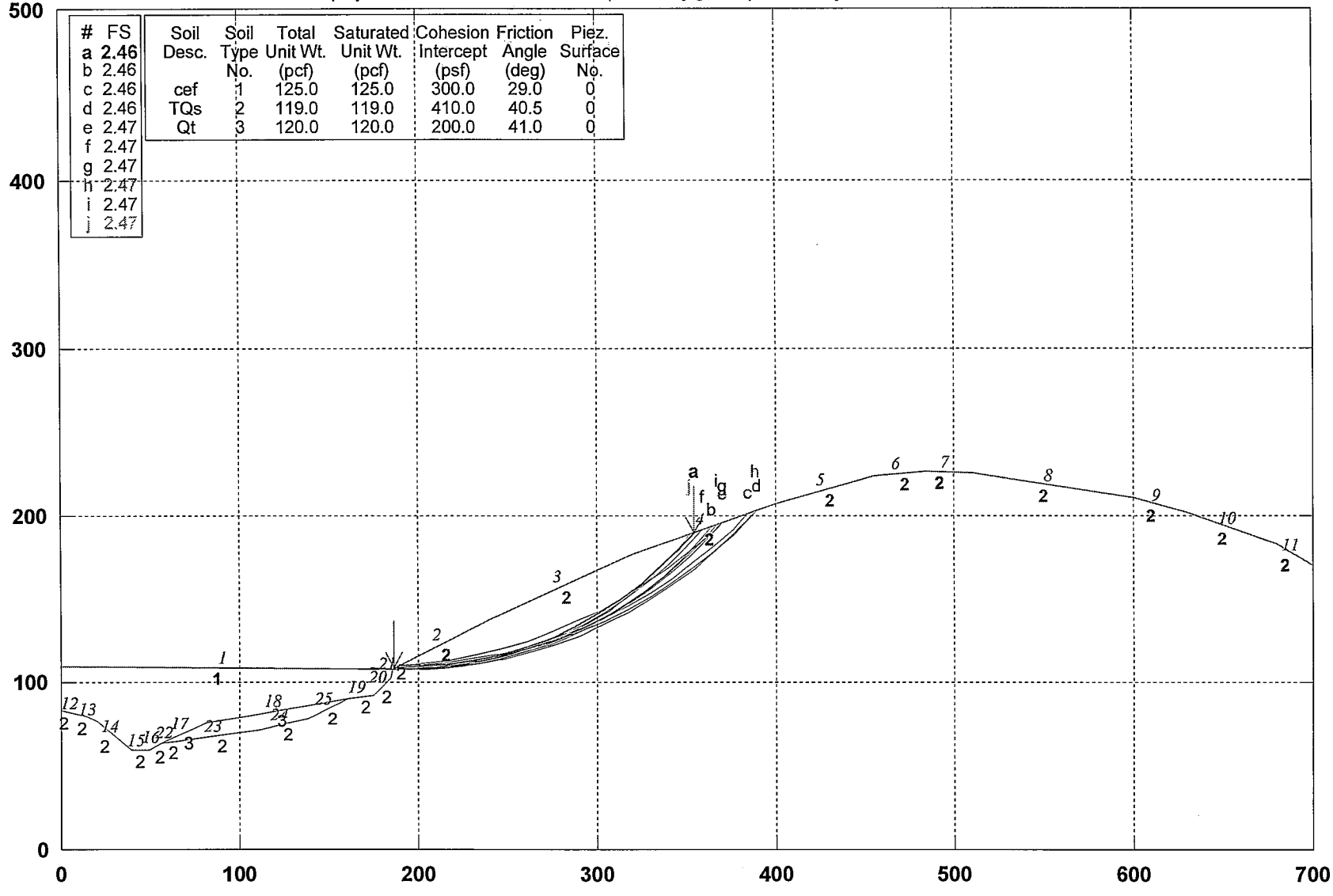
*** 1.575 ***

Individual data on the 8 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	13.8	5071.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.1	70.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	20.8	39308.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	34.1	109060.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	80.0	274638.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	80.0	247435.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	39.9	89279.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.2	10363.0	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec.7-7' Natural Slope Circular, Static

n:\projects\1600-1699\1617\1617lv slope stability\g7s1d.pl2 Run By: VKP 8/6/2004 09:31AM



#	FS
a	2.46
b	2.46
c	2.46
d	2.46
e	2.47
f	2.47
g	2.47
h	2.47
i	2.47
j	2.47

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	410.0	40.5	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=2.46

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN. NO.-30

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/6/2004
Time of Run:              09:31AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g7s1d.
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g7s1d.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g7s1d.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec.7-7' Natural Slope
                      Circular, Static
BOUNDARY COORDINATES
   11 Top   Boundaries
   25 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	109.00	185.10	108.00	1
2	185.10	108.00	240.00	137.00	2
3	240.00	137.00	320.00	177.00	2
4	320.00	177.00	400.00	207.00	2
5	400.00	207.00	455.00	224.00	2
6	455.00	224.00	485.00	227.00	2
7	485.00	227.00	510.00	226.00	2
8	510.00	226.00	600.00	211.00	2
9	600.00	211.00	630.00	202.00	2
10	630.00	202.00	680.00	183.00	2
11	680.00	183.00	700.00	170.00	2
12	0.00	83.00	14.00	80.00	2
13	14.00	80.00	20.00	76.00	2
14	20.00	76.00	39.00	59.00	2
15	39.00	59.00	49.00	59.00	2
16	49.00	59.00	56.00	63.00	2
17	56.00	63.00	81.00	75.00	3
18	81.00	75.00	161.00	90.00	3
19	161.00	90.00	175.00	92.00	2
20	175.00	92.00	185.00	102.00	2
21	185.00	102.00	185.10	108.00	2
22	56.00	63.00	64.00	64.00	2
23	64.00	64.00	111.00	71.00	2
24	111.00	71.00	138.00	78.00	2
25	138.00	78.00	161.00	90.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	24.0	410.00	40.50
2	26.0	347.00	22.50
3	90.0	410.00	40.50

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.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
10000 Trial Surfaces Have Been Generated.
100 Surface(s) Initiate(s) From Each Of 100 Points Equally Spaced
Along The Ground Surface Between X = 150.00(ft)
and X = 250.00(ft)
Each Surface Terminates Between X = 275.00(ft)
and X = 650.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 0
Statistical Data On All Valid FS Values:
FS Max = 0.000 FS Min = 500.000 FS Ave = NaN
Standard Deviation = 0.000 Coefficient of Variation = NaN %

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	186.36	108.67
2	201.36	108.94
3	216.30	110.30
4	231.10	112.75
5	245.68	116.26
6	259.97	120.82
7	273.89	126.41
8	287.37	132.99
9	300.33	140.54
10	312.71	149.01
11	324.45	158.35
12	335.47	168.52
13	345.73	179.47
14	354.07	189.78

Circle Center At X = 190.15 ; Y = 314.77 ; and Radius = 206.14
Factor of Safety
*** 2.457 ***
Individual data on the 0 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)

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.35	108.13
2	200.35	107.89
3	215.33	108.73

4	230.20	110.65
5	244.90	113.64
6	259.34	117.70
7	273.45	122.78
8	287.16	128.88
9	300.39	135.96
10	313.07	143.97
11	325.13	152.88
12	336.52	162.65
13	347.17	173.21
14	357.03	184.52
15	363.69	193.38

Circle Center At X = 196.27 ; Y = 314.70 ; and Radius = 206.86

Factor of Safety

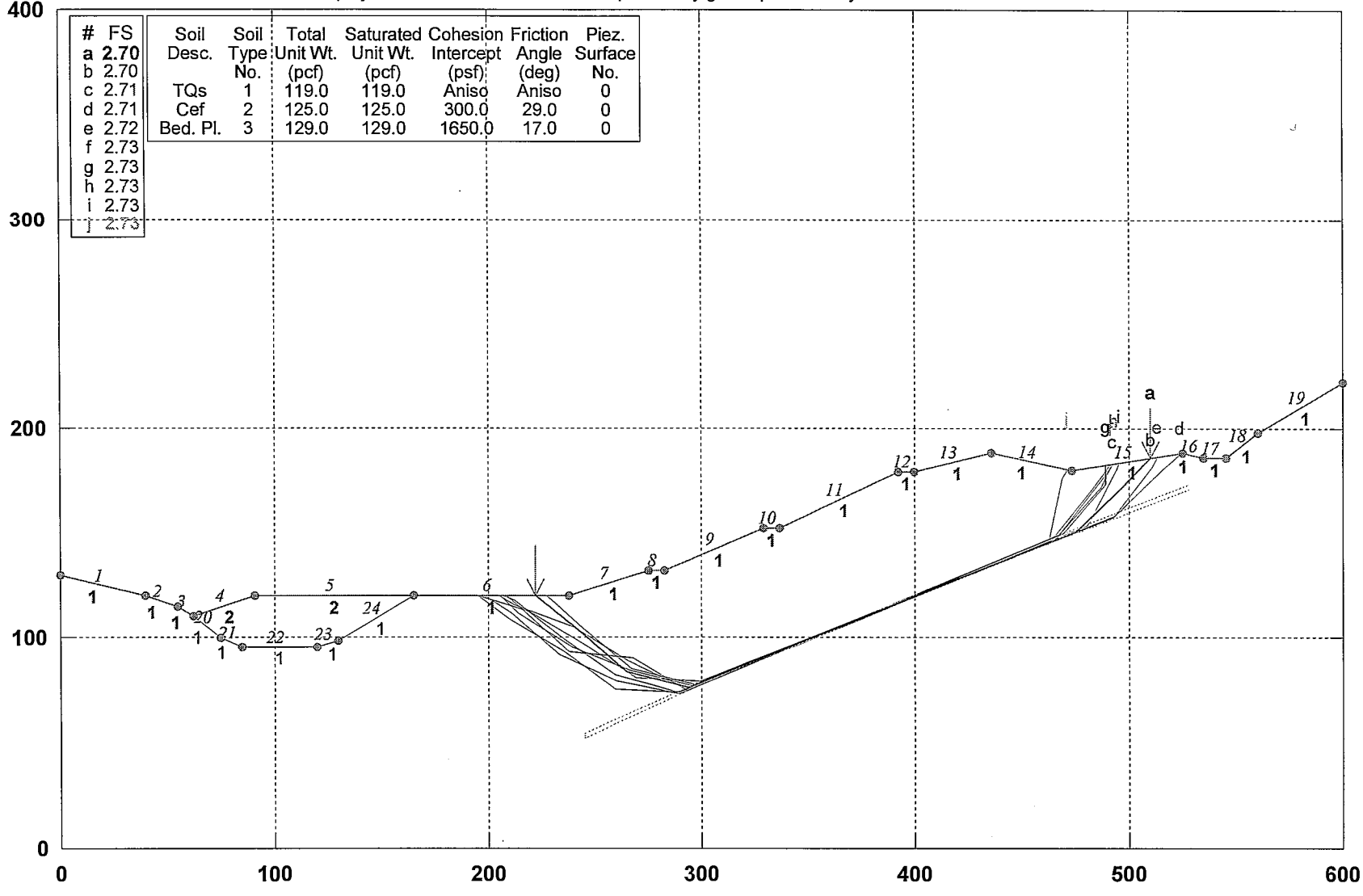
*** 2.457 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	188.38	109.73
2	203.37	110.44
3	218.29	111.99
4	233.10	114.38
5	247.75	117.59
6	262.20	121.62
7	276.39	126.46
8	290.30	132.09
9	303.86	138.49
10	317.05	145.64
11	329.81	153.52
12	342.11	162.11
13	353.91	171.38
14	365.16	181.29
15	375.85	191.82
16	384.26	201.10

G P R, T52584, 9-9', bedding plane search, along clay bed

n:\projects\1600-1699\1617\1617lv slope stability\g9s1a.pl2 Run By: VKP 8/16/2004 10:49AM



GSTABL7 v.2 FSmin=2.70

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. -31

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/16/2004
Time of Run:              10:49AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g9s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g9s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g9s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 9-9',
                      bedding plane search, along clay bed
BOUNDARY COORDINATES
   19 Top   Boundaries
   24 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     130.00      40.00     120.00        1
    2        40.00     120.00      55.00     115.00        1
    3        55.00     115.00      62.00     110.00        1
    4        62.00     110.00      91.00     120.00        2
    5        91.00     120.00     165.00     120.00        2
    6       165.00     120.00     238.00     120.00        1
    7       238.00     120.00     275.00     132.00        1
    8       275.00     132.00     283.00     132.00        1
    9       283.00     132.00     329.00     152.00        1
   10       329.00     152.00     337.00     152.00        1
   11       337.00     152.00     392.00     179.00        1
   12       392.00     179.00     400.00     179.00        1
   13       400.00     179.00     436.00     188.00        1
   14       436.00     188.00     473.00     180.00        1
   15       473.00     180.00     525.00     188.00        1
   16       525.00     188.00     535.00     186.00        1
   17       535.00     186.00     545.00     186.00        1
   18       545.00     186.00     560.00     198.00        1
   19       560.00     198.00     600.00     222.00        1
   20        62.00     110.00      75.00     100.00        1
   21        75.00     100.00      85.00      95.00        1
   22        85.00      95.00     120.00      95.00        1
   23       120.00      95.00     130.00      98.00        1
   24       130.00      98.00     165.00     120.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
  2   125.0    125.0     300.0     29.0    0.00       0.0      0
  3   129.0    129.0    1650.0     17.0    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             21.5             347.00        22.00
```

2	24.5	1650.00	17.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	245.00	53.00	300.00	78.00	2.00
2	462.00	146.00	528.00	172.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.735 FS Min = 2.699 FS Ave = 3.017
Standard Deviation = 0.185 Coefficient of Variation = 6.14 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	222.18	120.00
2	242.45	103.15
3	265.04	83.41
4	294.06	75.80
5	475.34	150.41
6	496.34	171.83
7	509.93	185.68

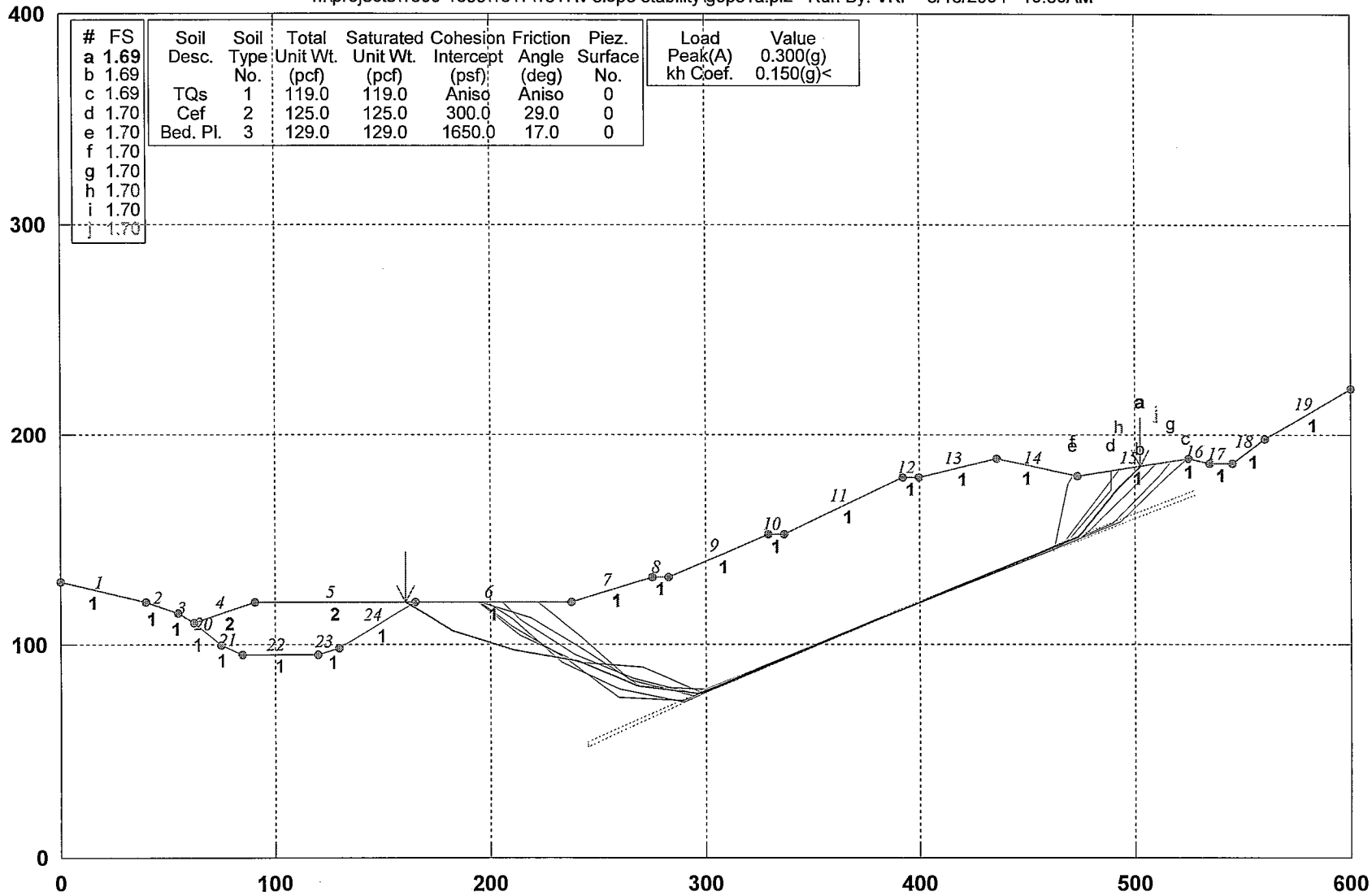
Factor of Safety
*** 2.699 ***

Individual data on the 15 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	15.8	12376.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.5	8327.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	22.6	85567.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.0	57214.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	8.0	49742.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.1	75232.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	34.9	255334.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	8.0	57283.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	55.0	397328.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.0	58302.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	36.0	242851.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	37.0	185654.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	2.3	8415.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	21.0	52114.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	13.6	9508.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 9-9',bedding plane search, along clay bed; pseudo

n:\projects\1600-1699\1617\1617lv slope stability\g9ps1a.pl2 Run By: VKP 8/16/2004 10:50AM



#	FS
a	1.69
b	1.69
c	1.69
d	1.70
e	1.70
f	1.70
g	1.70
h	1.70
i	1.70
j	1.70

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	119.0	119.0	Aniso	Aniso	0
Cef	2	125.0	125.0	300.0	29.0	0
Bed. Pl.	3	129.0	129.0	1650.0	17.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.69

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-32

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/16/2004
Time of Run:              10:50AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g9psla.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g9psla.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g9psla.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 9-9',bedding plane search
                    , along clay bed; pseudo
BOUNDARY COORDINATES
   19 Top   Boundaries
   24 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     130.00      40.00     120.00        1
    2        40.00     120.00      55.00     115.00        1
    3        55.00     115.00      62.00     110.00        1
    4        62.00     110.00      91.00     120.00        2
    5        91.00     120.00     165.00     120.00        2
    6       165.00     120.00     238.00     120.00        1
    7       238.00     120.00     275.00     132.00        1
    8       275.00     132.00     283.00     132.00        1
    9       283.00     132.00     329.00     152.00        1
   10       329.00     152.00     337.00     152.00        1
   11       337.00     152.00     392.00     179.00        1
   12       392.00     179.00     400.00     179.00        1
   13       400.00     179.00     436.00     188.00        1
   14       436.00     188.00     473.00     180.00        1
   15       473.00     180.00     525.00     188.00        1
   16       525.00     188.00     535.00     186.00        1
   17       535.00     186.00     545.00     186.00        1
   18       545.00     186.00     560.00     198.00        1
   19       560.00     198.00     600.00     222.00        1
   20        62.00     110.00      75.00     100.00        1
   21        75.00     100.00      85.00      95.00        1
   22        85.00      95.00     120.00      95.00        1
   23       120.00      95.00     130.00      98.00        1
   24       130.00      98.00     165.00     120.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
  2   125.0    125.0     300.0     29.0    0.00       0.0      0
  3   129.0    129.0    1650.0     17.0    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
```

No.	(deg)	(psf)	(deg)
1	21.5	347.00	22.00
2	24.5	1650.00	17.00
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	245.00	53.00	300.00	78.00	2.00
2	462.00	146.00	528.00	172.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.028 FS Min = 1.686 FS Ave = 1.845
Standard Deviation = 0.071 Coefficient of Variation = 3.86 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	160.56	120.00
2	182.33	106.25
3	211.12	97.82
4	240.59	92.22
5	268.26	80.61
6	298.00	76.65
7	474.00	151.69
8	492.97	174.93
9	502.39	184.52

Factor of Safety
*** 1.686 ***

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	2.2	193.7	0.0	0.0	0.	0.	29.1	0.0	0.0
2	2.2	565.9	0.0	0.0	0.	0.	84.9	0.0	0.0
3	17.3	17066.9	0.0	0.0	0.	0.	2560.0	0.0	0.0
4	28.8	61541.4	0.0	0.0	0.	0.	9231.2	0.0	0.0
5	26.9	79109.8	0.0	0.0	0.	0.	11866.5	0.0	0.0
6	2.6	8628.9	0.0	0.0	0.	0.	1294.3	0.0	0.0
7	27.7	128097.4	0.0	0.0	0.	0.	19214.6	0.0	0.0
8	6.7	40706.1	0.0	0.0	0.	0.	6105.9	0.0	0.0
9	8.0	50281.0	0.0	0.0	0.	0.	7542.2	0.0	0.0
10	15.0	102801.9	0.0	0.0	0.	0.	15420.3	0.0	0.0
11	31.0	228740.7	0.0	0.0	0.	0.	34311.1	0.0	0.0
12	8.0	57523.8	0.0	0.0	0.	0.	8628.6	0.0	0.0
13	55.0	395942.8	0.0	0.0	0.	0.	59391.4	0.0	0.0

14	8.0	57659.6	0.0	0.0	0.	0.	8648.9	0.0	0.0
15	36.0	238567.6	0.0	0.0	0.	0.	35785.1	0.0	0.0
16	37.0	178884.4	0.0	0.0	0.	0.	26832.7	0.0	0.0
17	1.0	3405.2	0.0	0.0	0.	0.	510.8	0.0	0.0
18	19.0	41326.6	0.0	0.0	0.	0.	6199.0	0.0	0.0
19	9.4	4563.3	0.0	0.0	0.	0.	684.5	0.0	0.0

2	24.5	1650.00	17.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	245.00	53.00	300.00	78.00	2.00
2	462.00	146.00	528.00	172.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.735 FS Min = 2.699 FS Ave = 3.017
Standard Deviation = 0.185 Coefficient of Variation = 6.14 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	222.18	120.00
2	242.45	103.15
3	265.04	83.41
4	294.06	75.80
5	475.34	150.41
6	496.34	171.83
7	509.93	185.68

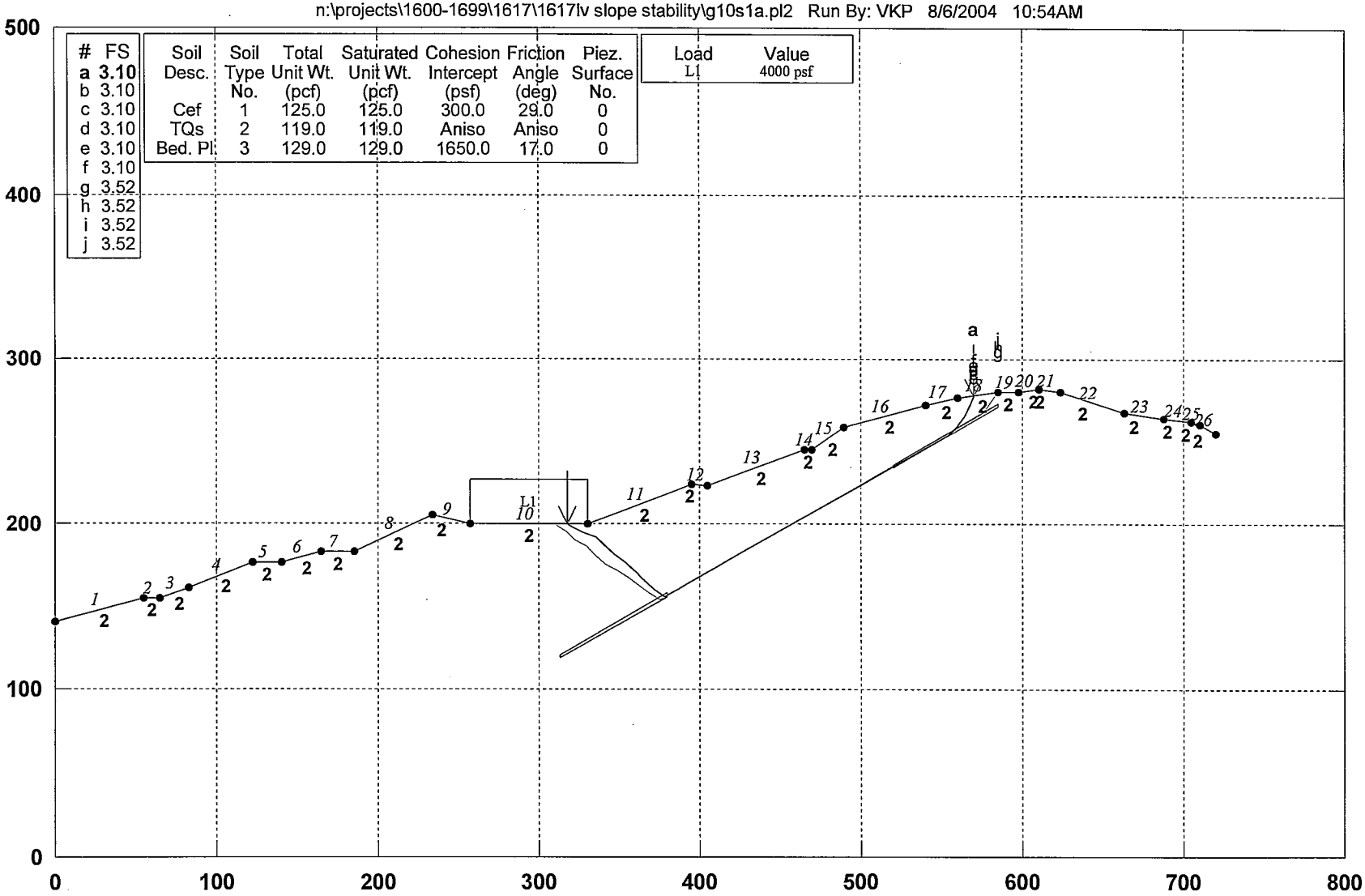
Factor of Safety
*** 2.699 ***

Individual data on the 15 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	15.8	12376.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.5	8327.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	22.6	85567.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.0	57214.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	8.0	49742.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.1	75232.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	34.9	255334.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	8.0	57283.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	55.0	397328.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.0	58302.9	0.0	0.0	0.	0.	0.0	0.0	0.0
11	36.0	242851.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	37.0	185654.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	2.3	8415.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	21.0	52114.4	0.0	0.0	0.	0.	0.0	0.0	0.0
15	13.6	9508.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 10 Specifed Plane CS-26, along clay bed, with tank load

n:\projects\1600-1699\1617\1617lv slope stability\g10s1a.pl2 Run By: VKP 8/6/2004 10:54AM



#	FS
a	3.10
b	3.10
c	3.10
d	3.10
e	3.10
f	3.10
g	3.52
h	3.52
i	3.52
j	3.52

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Bed. Pl	3	129.0	129.0	1650.0	17.0	0

Load	Value
L1	4000 psf

GSTABL7 v.2 FSmin=3.10

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No.-33

```
                    *** GSTABL7 ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                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:        8/6/2004
Time of Run:              10:54AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g10s1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g10s1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g10s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 10  Specifed Plane
                      CS-26, along clay bed, with tank load
BOUNDARY COORDINATES
   26 Top   Boundaries
   26 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	140.00	55.00	155.00	2
2	55.00	155.00	65.00	155.00	2
3	65.00	155.00	83.00	161.00	2
4	83.00	161.00	122.00	176.00	2
5	122.00	176.00	140.00	176.00	2
6	140.00	176.00	165.00	183.00	2
7	165.00	183.00	185.00	183.00	2
8	185.00	183.00	234.00	205.00	2
9	234.00	205.00	257.00	200.00	2
10	257.00	200.00	330.00	200.00	2
11	330.00	200.00	395.00	224.00	2
12	395.00	224.00	405.00	223.00	2
13	405.00	223.00	465.00	245.00	2
14	465.00	245.00	470.00	245.00	2
15	470.00	245.00	490.00	258.00	2
16	490.00	258.00	540.00	272.00	2
17	540.00	272.00	560.00	276.00	2
18	560.00	276.00	585.00	280.00	2
19	585.00	280.00	598.00	280.00	2
20	598.00	280.00	610.00	282.00	2
21	610.00	282.00	624.00	280.00	2
22	624.00	280.00	663.00	267.00	2
23	663.00	267.00	688.00	264.00	2
24	688.00	264.00	705.00	262.00	2
25	705.00	262.00	710.00	260.00	2
26	710.00	260.00	720.00	255.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	129.0	129.0	1650.0	17.0	0.00	0.0	0

```
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	28.0	347.00	22.00
2	30.0	1650.00	17.00
3	90.0	410.00	40.50

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.

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	257.00	330.00	4000.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 8.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	313.00	120.00	380.00	157.00	2.00
2	520.00	235.00	585.00	272.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 8.245 FS Min = 3.102 FS Ave = 5.668
Standard Deviation = 1.133 Coefficient of Variation = 20.00 %
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	317.29	200.00
2	320.80	197.95
3	328.02	194.51
4	335.54	191.77
5	341.33	186.25
6	346.98	180.59
7	353.66	176.19
8	359.63	170.86
9	365.46	165.38
10	371.27	159.88
11	378.02	155.58
12	554.10	253.72
13	559.59	259.53
14	564.74	265.65
15	567.60	273.13
16	569.96	277.59

Factor of Safety
*** 3.102 ***

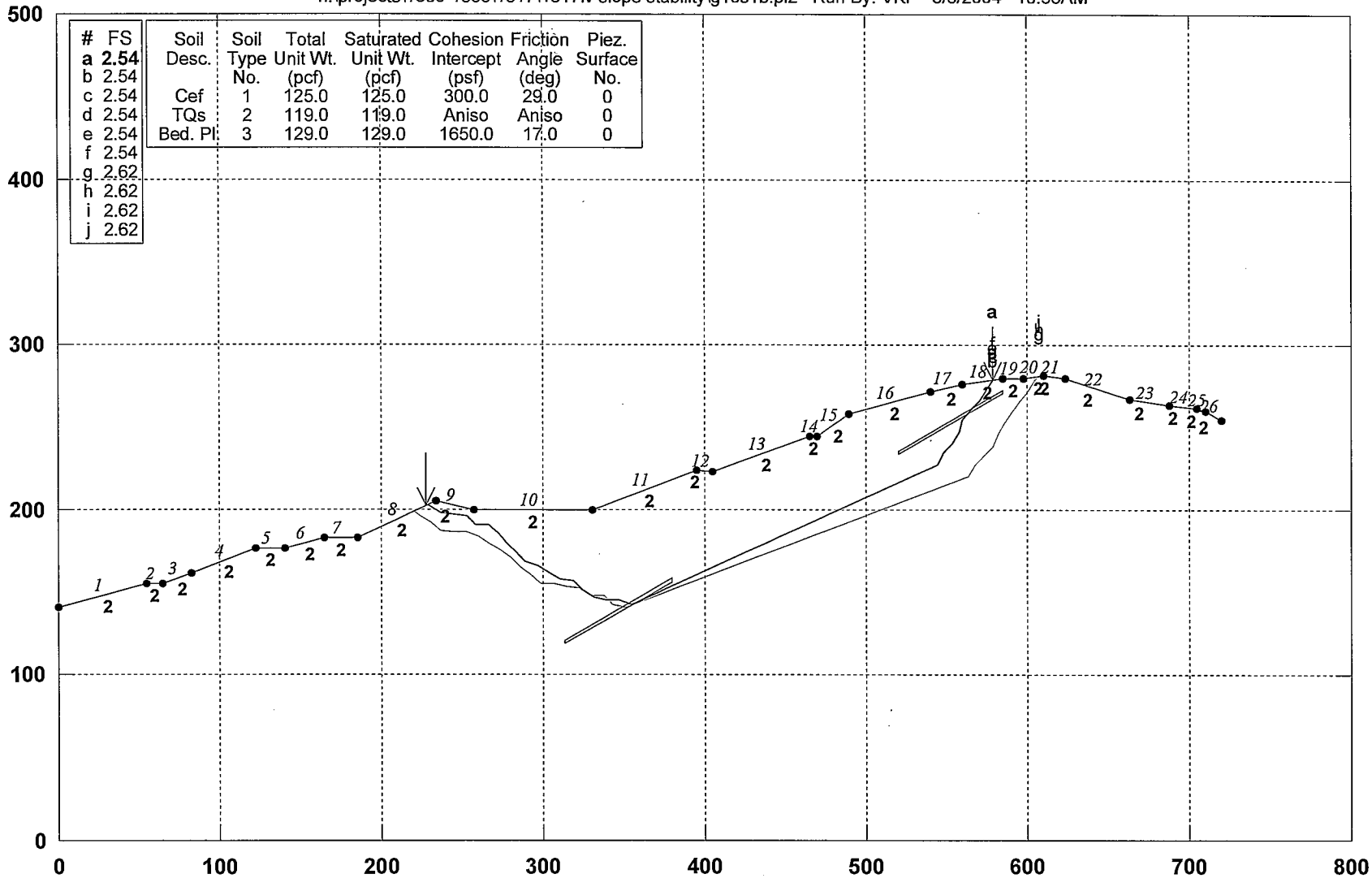
Individual data on the 23 slices

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	3.5	429.1	0.0	0.0	0.	0.	0.0	0.0	14047.5
2	7.2	3243.2	0.0	0.0	0.	0.	0.0	0.0	28891.2
3	2.0	1377.4	0.0	0.0	0.	0.	0.0	0.0	7910.8
4	5.5	5434.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	5.8	9710.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	5.7	14681.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	6.7	23137.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.0	25804.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	5.8	30456.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	5.8	35587.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	6.8	47196.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	17.0	122368.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.0	66240.2	0.0	0.0	0.	0.	0.0	0.0	0.0
14	60.0	333138.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	5.0	23529.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	20.0	93007.6	0.0	0.0	0.	0.	0.0	0.0	0.0
17	50.0	196783.1	0.0	0.0	0.	0.	0.0	0.0	0.0
18	14.1	39630.4	0.0	0.0	0.	0.	0.0	0.0	0.0
19	5.5	12256.8	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.4	782.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	4.7	7648.8	0.0	0.0	0.	0.	0.0	0.0	0.0
22	2.9	2577.8	0.0	0.0	0.	0.	0.0	0.0	0.0
23	2.4	574.2	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 10 Specifed Plane CS-26, along clay bed, without tank

n:\projects\1600-1699\1617\1617lv slope stability\g10s1b.pl2 Run By: VKP 8/6/2004 10:56AM



#	FS
a	2.54
b	2.54
c	2.54
d	2.54
e	2.54
f	2.54
g	2.62
h	2.62
i	2.62
j	2.62

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Bed. Pl	3	129.0	129.0	1650.0	17.0	0

GSTABL7 v.2 FSmin=2.54

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. - 34

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/6/2004
Time of Run:              10:56AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g10s1b.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g10s1b.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g10s1b.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 10  Specifed Plane
                      CS-26, along clay bed, without tank
BOUNDARY COORDINATES
   26 Top   Boundaries
   26 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	140.00	55.00	155.00	2
2	55.00	155.00	65.00	155.00	2
3	65.00	155.00	83.00	161.00	2
4	83.00	161.00	122.00	176.00	2
5	122.00	176.00	140.00	176.00	2
6	140.00	176.00	165.00	183.00	2
7	165.00	183.00	185.00	183.00	2
8	185.00	183.00	234.00	205.00	2
9	234.00	205.00	257.00	200.00	2
10	257.00	200.00	330.00	200.00	2
11	330.00	200.00	395.00	224.00	2
12	395.00	224.00	405.00	223.00	2
13	405.00	223.00	465.00	245.00	2
14	465.00	245.00	470.00	245.00	2
15	470.00	245.00	490.00	258.00	2
16	490.00	258.00	540.00	272.00	2
17	540.00	272.00	560.00	276.00	2
18	560.00	276.00	585.00	280.00	2
19	585.00	280.00	598.00	280.00	2
20	598.00	280.00	610.00	282.00	2
21	610.00	282.00	624.00	280.00	2
22	624.00	280.00	663.00	267.00	2
23	663.00	267.00	688.00	264.00	2
24	688.00	264.00	705.00	262.00	2
25	705.00	262.00	710.00	260.00	2
26	710.00	260.00	720.00	255.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	129.0	129.0	1650.0	17.0	0.00	0.0	0

```
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	28.0	347.00	22.00
2	30.0	1650.00	17.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 8.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	313.00	120.00	380.00	157.00	2.00
2	520.00	235.00	585.00	272.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 6.222 FS Min = 2.539 FS Ave = 3.253
Standard Deviation = 0.437 Coefficient of Variation = 13.43 %
Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	227.75	202.19
2	229.85	202.15
3	236.67	197.97
4	244.66	197.49
5	252.51	195.93
6	258.60	190.75
7	266.60	190.67
8	272.30	185.06
9	277.99	179.43
10	283.67	173.80
11	289.34	168.16
12	296.97	165.77
13	303.77	161.54
14	310.43	157.11
15	318.42	156.67
16	324.38	151.33
17	330.95	146.78
18	338.77	145.06
19	346.77	144.92
20	354.43	142.62
21	544.16	227.75
22	547.81	234.87
23	553.40	240.59
24	558.04	247.11
25	560.01	254.86
26	565.59	260.59
27	570.75	266.70
28	575.29	273.29
29	578.49	278.96

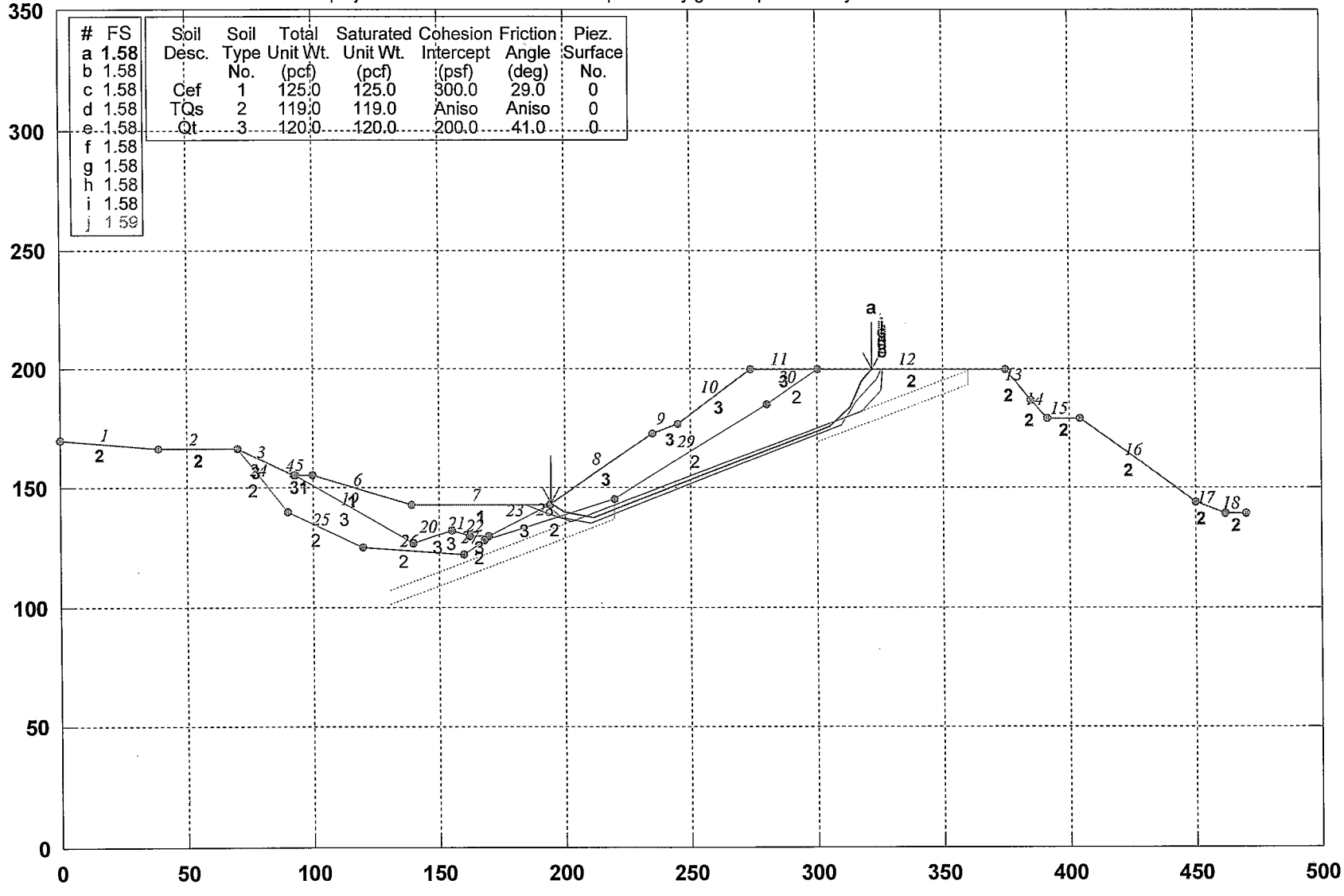
Factor of Safety

*** 2.539 ***
Individual data on the 38 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	2.1	123.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.1	1572.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	2.7	1882.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	5530.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.8	4778.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.5	3458.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	1.6	1632.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	8.0	8842.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	5.7	8231.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	5.7	12020.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.7	15810.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	5.7	19572.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	7.6	30016.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	6.8	29382.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	6.7	32240.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	8.0	40978.0	0.0	0.0	0.	0.	0.0	0.0	0.0
17	6.0	32622.2	0.0	0.0	0.	0.	0.0	0.0	0.0
18	5.6	33869.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	1.0	6024.1	0.0	0.0	0.	0.	0.0	0.0	0.0
20	7.8	51952.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	8.0	56846.4	0.0	0.0	0.	0.	0.0	0.0	0.0
22	7.7	58208.3	0.0	0.0	0.	0.	0.0	0.0	0.0
23	40.6	312777.9	0.0	0.0	0.	0.	0.0	0.0	0.0
24	10.0	71913.0	0.0	0.0	0.	0.	0.0	0.0	0.0
25	60.0	394332.0	0.0	0.0	0.	0.	0.0	0.0	0.0
26	5.0	30730.3	0.0	0.0	0.	0.	0.0	0.0	0.0
27	20.0	125044.2	0.0	0.0	0.	0.	0.0	0.0	0.0
28	50.0	299505.4	0.0	0.0	0.	0.	0.0	0.0	0.0
29	4.2	22601.1	0.0	0.0	0.	0.	0.0	0.0	0.0
30	3.6	18162.5	0.0	0.0	0.	0.	0.0	0.0	0.0
31	5.6	24216.9	0.0	0.0	0.	0.	0.0	0.0	0.0
32	4.6	17285.1	0.0	0.0	0.	0.	0.0	0.0	0.0
33	2.0	5788.0	0.0	0.0	0.	0.	0.0	0.0	0.0
34	0.0	22.6	0.0	0.0	0.	0.	0.0	0.0	0.0
35	5.6	12434.8	0.0	0.0	0.	0.	0.0	0.0	0.0
36	5.2	8395.5	0.0	0.0	0.	0.	0.0	0.0	0.0
37	4.5	4360.8	0.0	0.0	0.	0.	0.0	0.0	0.0
38	3.2	980.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 11, steep nat slope w/ and w/out Qt-- Aniso, Bed. pl.

n:\projects\1600-1699\1617\1617lv slope stability\g11s1a.pl2 Run By: VKP 8/9/2004 08:29AM



#	FS
a	1.58
b	1.58
c	1.58
d	1.58
e	1.58
f	1.58
g	1.58
h	1.58
i	1.58
j	1.59

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 35

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/9/2004
Time of Run:              08:29AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g11s1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g11s1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g11s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 11, steep nat slope
                      w/ and w/out Qt--  Aniso, Bed. pl.
BOUNDARY COORDINATES
   18 Top   Boundaries
   30 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     170.00      39.00     166.00        2
    2        39.00     166.00      70.00     166.00        2
    3        70.00     166.00      92.00     155.00        3
    4        92.00     155.00      93.00     155.00        3
    5        93.00     155.00     100.00     155.00        1
    6       100.00     155.00     139.00     143.00        1
    7       139.00     143.00     194.00     143.00        1
    8       194.00     143.00     235.00     173.00        3
    9       235.00     173.00     245.00     177.00        3
   10       245.00     177.00     274.00     200.00        3
   11       274.00     200.00     300.00     200.00        3
   12       300.00     200.00     375.00     200.00        2
   13       375.00     200.00     385.00     187.00        2
   14       385.00     187.00     391.00     179.00        2
   15       391.00     179.00     404.00     179.00        2
   16       404.00     179.00     450.00     144.00        2
   17       450.00     144.00     462.00     139.00        2
   18       462.00     139.00     470.00     139.00        2
   19        93.00     155.00     140.00     127.00        3
   20       140.00     127.00     155.00     132.00        3
   21       155.00     132.00     162.00     130.00        3
   22       162.00     130.00     170.00     130.00        3
   23       170.00     130.00     194.00     143.00        3
   24        70.00     166.00      90.00     140.00        2
   25        90.00     140.00     120.00     125.00        2
   26       120.00     125.00     160.00     122.00        2
   27       160.00     122.00     168.00     128.00        2
   28       168.00     128.00     220.00     145.00        2
   29       220.00     145.00     280.00     185.00        2
   30       280.00     185.00     300.00     200.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total   Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)   Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00      0.0      0
  2   119.0    119.0     410.0     40.5    0.00      0.0      0
  3   120.0    120.0     200.0     41.0    0.00      0.0      0
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	21.0	410.00	40.50
2	23.0	347.00	22.00
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	104.00	220.00	140.00	6.00
2	300.00	172.00	360.00	196.00	6.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 13.614 FS Min = 1.575 FS Ave = 3.680
Standard Deviation = 2.379 Coefficient of Variation = 64.66 %
Failure Surface Specified By 7 Coordinate Points

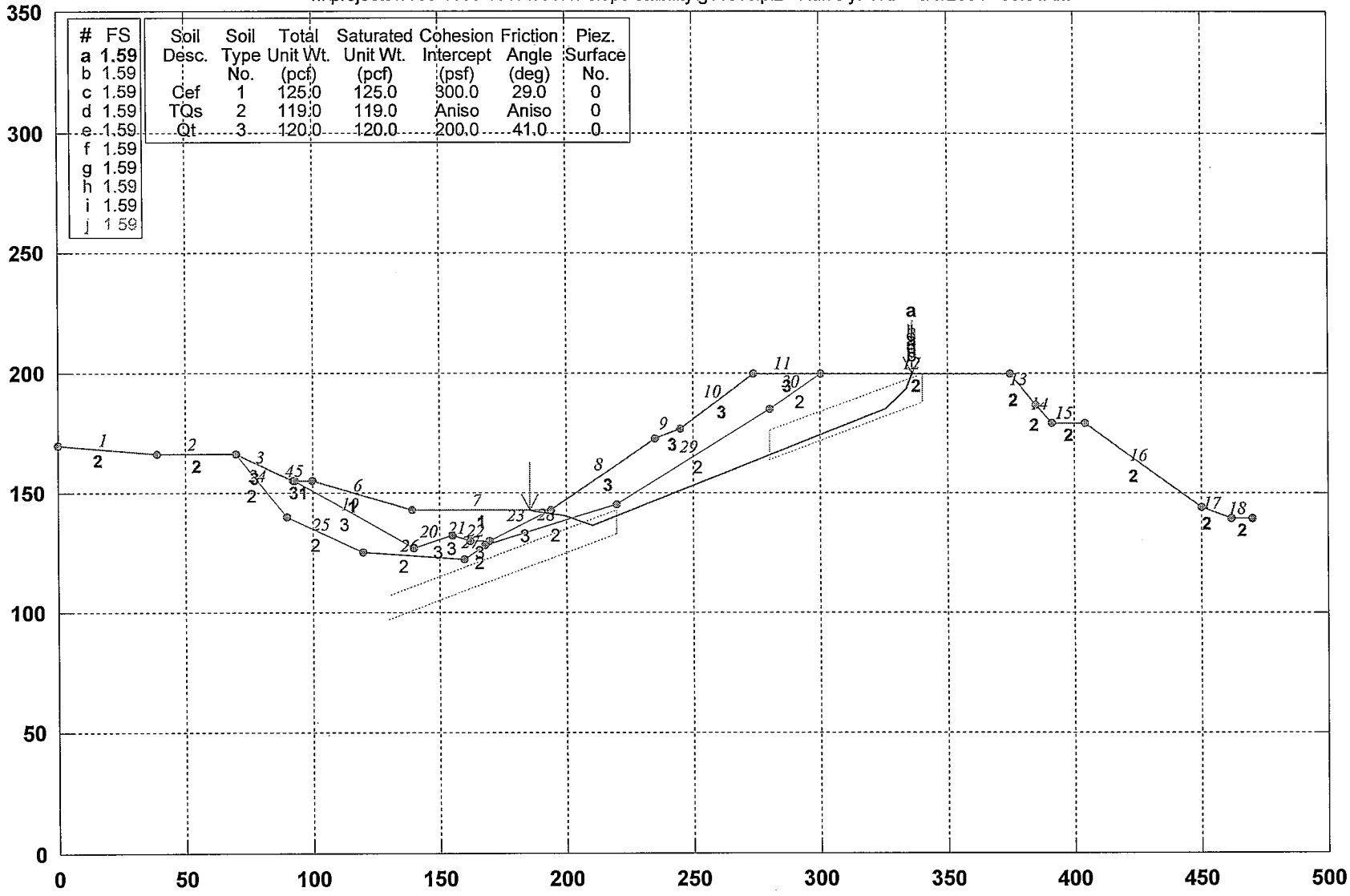
Point No.	X-Surf (ft)	Y-Surf (ft)
1	194.74	143.54
2	200.04	139.98
3	211.73	137.30
4	304.89	175.61
5	313.36	184.11
6	317.74	195.28
7	321.96	200.00

Factor of Safety
*** 1.575 ***
Individual data on the 13 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	5.3	2362.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.7	2834.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	9.0	15473.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.3	19804.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	15.0	42620.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	31197.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	29.0	109397.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.0	25705.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	20.0	72767.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.9	14773.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.5	20308.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.4	5367.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	4.2	1185.3	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 11, Mitigation measw/ and w/out Qt-- Aniso, Bed. Pl

n:\projects\1600-1699\1617\1617lv slope stability\g11s1c.pl2 Run By: VKP 8/9/2004 08:51AM



#	FS
a	1.59
b	1.59
c	1.59
d	1.59
e	1.59
f	1.59
g	1.59
h	1.59
i	1.59
j	1.59

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.59

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No.-36

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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****

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: 8/9/2004
Time of Run: 08:51AM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g11s1c.in
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g11s1c.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g11s1c.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec. 11, Mitigation meas
w/ and w/out Qt-- Aniso, Bed. Pl

BOUNDARY COORDINATES
18 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	170.00	39.00	166.00	2
2	39.00	166.00	70.00	166.00	2
3	70.00	166.00	92.00	155.00	3
4	92.00	155.00	93.00	155.00	3
5	93.00	155.00	100.00	155.00	1
6	100.00	155.00	139.00	143.00	1
7	139.00	143.00	194.00	143.00	1
8	194.00	143.00	235.00	173.00	3
9	235.00	173.00	245.00	177.00	3
10	245.00	177.00	274.00	200.00	3
11	274.00	200.00	300.00	200.00	3
12	300.00	200.00	375.00	200.00	2
13	375.00	200.00	385.00	187.00	2
14	385.00	187.00	391.00	179.00	2
15	391.00	179.00	404.00	179.00	2
16	404.00	179.00	450.00	144.00	2
17	450.00	144.00	462.00	139.00	2
18	462.00	139.00	470.00	139.00	2
19	93.00	155.00	140.00	127.00	3
20	140.00	127.00	155.00	132.00	3
21	155.00	132.00	162.00	130.00	3
22	162.00	130.00	170.00	130.00	3
23	170.00	130.00	194.00	143.00	3
24	70.00	166.00	90.00	140.00	2
25	90.00	140.00	120.00	125.00	2
26	120.00	125.00	160.00	122.00	2
27	160.00	122.00	168.00	128.00	2
28	168.00	128.00	220.00	145.00	2
29	220.00	145.00	280.00	185.00	2
30	280.00	185.00	300.00	200.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

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	21.0	410.00	40.50
2	23.0	347.00	22.00
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	102.00	220.00	138.00	10.00
2	280.00	170.00	340.00	194.00	12.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 27.957 FS Min = 1.585 FS Ave = 5.622
Standard Deviation = 4.654 Coefficient of Variation = 82.79 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.53	143.00
2	187.38	141.98
3	199.27	140.33
4	210.57	136.29
5	325.25	184.87
6	333.69	193.40
7	335.82	200.00

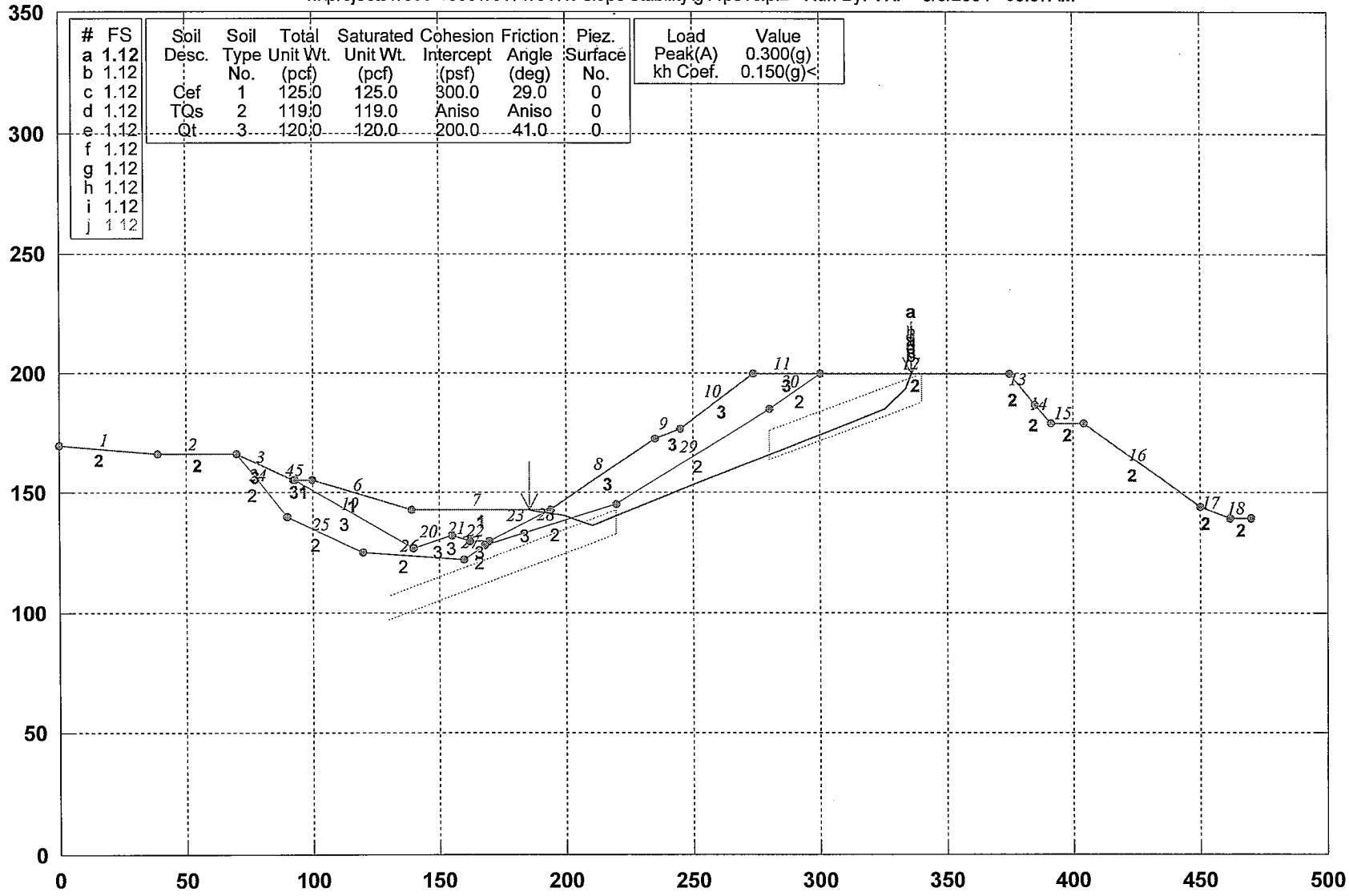
Factor of Safety
*** 1.585 ***

Individual data on the 15 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	1.9	118.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.8	603.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	2.8	604.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.3	2675.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	3.1	3032.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.2	14133.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	9.4	22914.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	15.0	43195.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.0	31397.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	29.0	109147.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	6.0	25498.8	0.0	0.0	0.	0.	0.0	0.0	0.0
12	20.0	71698.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	25.2	61521.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.4	10915.0	0.0	0.0	0.	0.	0.0	0.0	0.0
15	2.1	837.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 11, Mitigation measw/ and w/out Qt-- Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g11ps1c.pl2 Run By: VKP 8/9/2004 08:57AM



#	FS
a	1.12
b	1.12
c	1.12
d	1.12
e	1.12
f	1.12
g	1.12
h	1.12
i	1.12
j	1.12

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.12

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO-37

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*****************************************************************************
                    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.
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Analysis Run Date:        8/9/2004
Time of Run:              08:57AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g11ps1c.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g11ps1c.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g11ps1c.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 11,  Mitigation meas
                      w/ and w/out Qt--  Pseudostatic
BOUNDARY COORDINATES
   18 Top   Boundaries
   30 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	170.00	39.00	166.00	2
2	39.00	166.00	70.00	166.00	2
3	70.00	166.00	92.00	155.00	3
4	92.00	155.00	93.00	155.00	3
5	93.00	155.00	100.00	155.00	1
6	100.00	155.00	139.00	143.00	1
7	139.00	143.00	194.00	143.00	1
8	194.00	143.00	235.00	173.00	3
9	235.00	173.00	245.00	177.00	3
10	245.00	177.00	274.00	200.00	3
11	274.00	200.00	300.00	200.00	3
12	300.00	200.00	375.00	200.00	2
13	375.00	200.00	385.00	187.00	2
14	385.00	187.00	391.00	179.00	2
15	391.00	179.00	404.00	179.00	2
16	404.00	179.00	450.00	144.00	2
17	450.00	144.00	462.00	139.00	2
18	462.00	139.00	470.00	139.00	2
19	93.00	155.00	140.00	127.00	3
20	140.00	127.00	155.00	132.00	3
21	155.00	132.00	162.00	130.00	3
22	162.00	130.00	170.00	130.00	3
23	170.00	130.00	194.00	143.00	3
24	70.00	166.00	90.00	140.00	2
25	90.00	140.00	120.00	125.00	2
26	120.00	125.00	160.00	122.00	2
27	160.00	122.00	168.00	128.00	2
28	168.00	128.00	220.00	145.00	2
29	220.00	145.00	280.00	185.00	2
30	280.00	185.00	300.00	200.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	21.0	410.00	40.50
2	23.0	347.00	22.00
3	90.0	410.00	40.50

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.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	102.00	220.00	138.00	10.00
2	280.00	170.00	340.00	194.00	12.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 6.808 FS Min = 1.122 FS Ave = 2.931
Standard Deviation = 1.349 Coefficient of Variation = 46.03 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.53	143.00
2	187.38	141.98
3	199.27	140.33
4	210.57	136.29
5	325.25	184.87
6	333.69	193.40
7	335.82	200.00

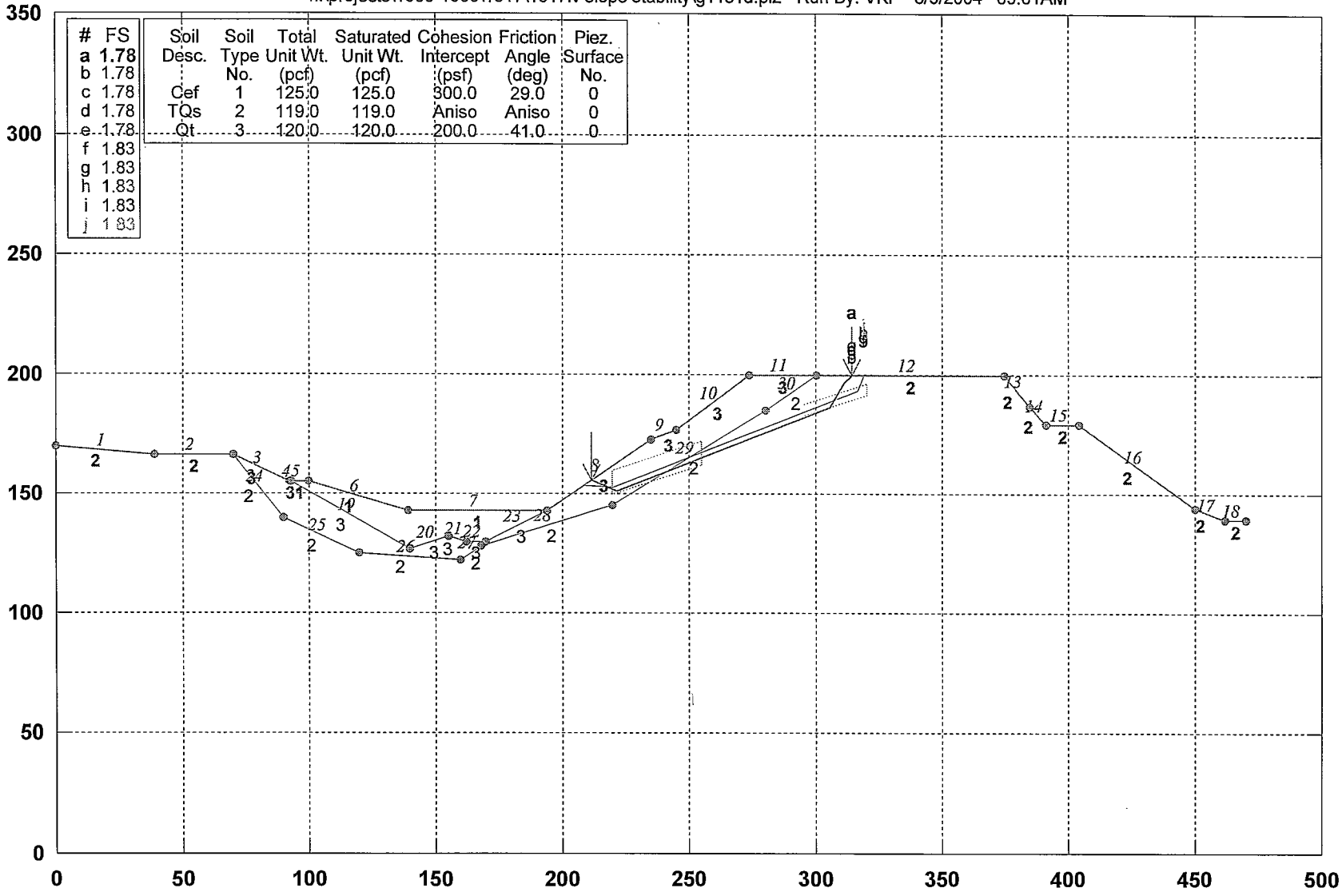
Factor of Safety
*** 1.122 ***
Individual data on the 15 slices

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	1.9	118.3	0.0	0.0	0.	0.	17.7	0.0	0.0
2	3.8	603.3	0.0	0.0	0.	0.	90.5	0.0	0.0
3	2.8	604.7	0.0	0.0	0.	0.	90.7	0.0	0.0
4	5.3	2675.3	0.0	0.0	0.	0.	401.3	0.0	0.0
5	3.1	3032.1	0.0	0.0	0.	0.	454.8	0.0	0.0
6	8.2	14133.6	0.0	0.0	0.	0.	2120.0	0.0	0.0
7	9.4	22914.2	0.0	0.0	0.	0.	3437.1	0.0	0.0
8	15.0	43195.5	0.0	0.0	0.	0.	6479.3	0.0	0.0
9	10.0	31397.4	0.0	0.0	0.	0.	4709.6	0.0	0.0
10	29.0	109147.0	0.0	0.0	0.	0.	16372.0	0.0	0.0
11	6.0	25498.8	0.0	0.0	0.	0.	3824.8	0.0	0.0

12	20.0	71698.5	0.0	0.0	0.	0.	10754.8	0.0	0.0
13	25.2	61521.7	0.0	0.0	0.	0.	9228.2	0.0	0.0
14	8.4	10915.0	0.0	0.0	0.	0.	1637.2	0.0	0.0
15	2.1	837.5	0.0	0.0	0.	0.	125.6	0.0	0.0

G P R, T52584, Sec. 11, Mitigation measAniso, Bed. Pl, Daylighted bedding

n:\projects\1600-1699\1617\1617lv slope stability\g11s1d.pl2 Run By: VKP 8/9/2004 09:01AM



#	FS
a	1.78
b	1.78
c	1.78
d	1.78
e	1.78
f	1.83
g	1.83
h	1.83
i	1.83
j	1.83

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.78

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN No. - 38

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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.
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Analysis Run Date:        8/9/2004
Time of Run:              09:01AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g11s1d.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g11s1d.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g11s1d.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 11,  Mitigation meas
                      Aniso, Bed. Pl, Daylighted bedding
BOUNDARY COORDINATES
   18 Top   Boundaries
   30 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	170.00	39.00	166.00	2
2	39.00	166.00	70.00	166.00	2
3	70.00	166.00	92.00	155.00	3
4	92.00	155.00	93.00	155.00	3
5	93.00	155.00	100.00	155.00	1
6	100.00	155.00	139.00	143.00	1
7	139.00	143.00	194.00	143.00	1
8	194.00	143.00	235.00	173.00	3
9	235.00	173.00	245.00	177.00	3
10	245.00	177.00	274.00	200.00	3
11	274.00	200.00	300.00	200.00	3
12	300.00	200.00	375.00	200.00	2
13	375.00	200.00	385.00	187.00	2
14	385.00	187.00	391.00	179.00	2
15	391.00	179.00	404.00	179.00	2
16	404.00	179.00	450.00	144.00	2
17	450.00	144.00	462.00	139.00	2
18	462.00	139.00	470.00	139.00	2
19	93.00	155.00	140.00	127.00	3
20	140.00	127.00	155.00	132.00	3
21	155.00	132.00	162.00	130.00	3
22	162.00	130.00	170.00	130.00	3
23	170.00	130.00	194.00	143.00	3
24	70.00	166.00	90.00	140.00	2
25	90.00	140.00	120.00	125.00	2
26	120.00	125.00	160.00	122.00	2
27	160.00	122.00	168.00	128.00	2
28	168.00	128.00	220.00	145.00	2
29	220.00	145.00	280.00	185.00	2
30	280.00	185.00	300.00	200.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

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	21.0	410.00	40.50
2	23.0	347.00	22.00
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	155.00	255.00	167.00	10.00
2	295.00	185.00	320.00	194.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 4.355 FS Min = 1.782 FS Ave = 2.887
Standard Deviation = 0.550 Coefficient of Variation = 19.07 %
Failure Surface Specified By 5 Coordinate Points

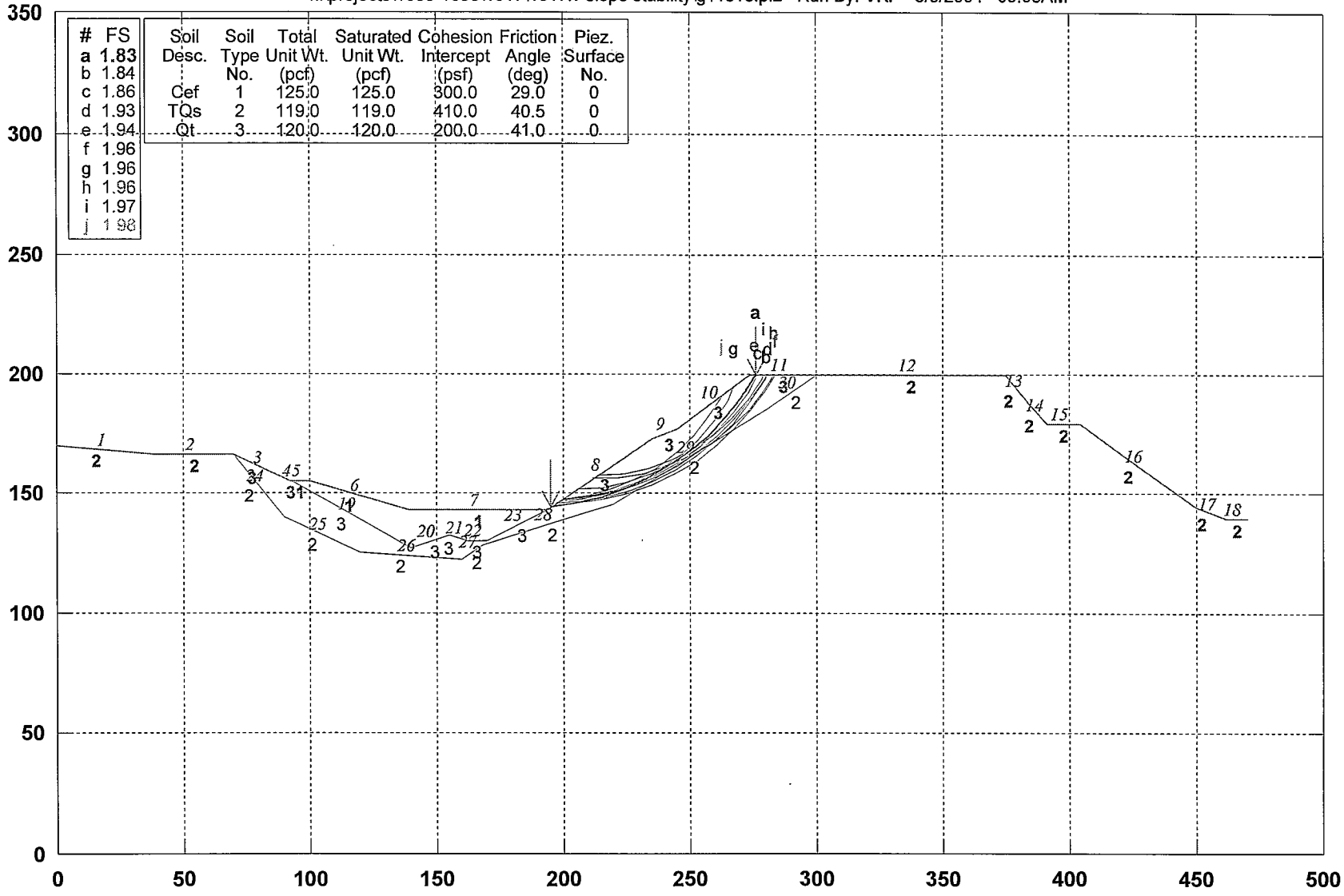
Point No.	X-Surf (ft)	Y-Surf (ft)
1	211.23	155.61
2	221.60	151.02
3	305.36	186.29
4	311.33	196.70
5	314.42	200.00

Factor of Safety
*** 1.782 ***
Individual data on the 10 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	10.4	7579.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	13.4	22920.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.8	13201.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.2	6277.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	29.0	74774.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.0	18419.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	20.0	48180.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	5.4	9470.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.0	6035.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	3.1	607.1	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 11, Mitigation measCircular search

n:\projects\1600-1699\1617\1617lv slope stability\g11s1e.pl2 Run By: VKP 8/9/2004 09:05AM



#	FS
a	1.83
b	1.84
c	1.86
d	1.93
e	1.94
f	1.96
g	1.96
h	1.96
i	1.97
j	1.98

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	410.0	40.5	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=1.83

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No.-39

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****

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: 8/9/2004
Time of Run: 09:05AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g11s1e.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g11s1e.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g11s1e.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec. 11, Mitigation meas
Circular search

BOUNDARY COORDINATES
18 Top Boundaries
30 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	170.00	39.00	166.00	2
2	39.00	166.00	70.00	166.00	2
3	70.00	166.00	92.00	155.00	3
4	92.00	155.00	93.00	155.00	3
5	93.00	155.00	100.00	155.00	1
6	100.00	155.00	139.00	143.00	1
7	139.00	143.00	194.00	143.00	1
8	194.00	143.00	235.00	173.00	3
9	235.00	173.00	245.00	177.00	3
10	245.00	177.00	274.00	200.00	3
11	274.00	200.00	300.00	200.00	3
12	300.00	200.00	375.00	200.00	2
13	375.00	200.00	385.00	187.00	2
14	385.00	187.00	391.00	179.00	2
15	391.00	179.00	404.00	179.00	2
16	404.00	179.00	450.00	144.00	2
17	450.00	144.00	462.00	139.00	2
18	462.00	139.00	470.00	139.00	2
19	93.00	155.00	140.00	127.00	3
20	140.00	127.00	155.00	132.00	3
21	155.00	132.00	162.00	130.00	3
22	162.00	130.00	170.00	130.00	3
23	170.00	130.00	194.00	143.00	3
24	70.00	166.00	90.00	140.00	2
25	90.00	140.00	120.00	125.00	2
26	120.00	125.00	160.00	122.00	2
27	160.00	122.00	168.00	128.00	2
28	168.00	128.00	220.00	145.00	2
29	220.00	145.00	280.00	185.00	2
30	280.00	185.00	300.00	200.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

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	21.0	410.00	40.50
2	23.0	347.00	22.00
3	90.0	410.00	40.50

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.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
3300 Trial Surfaces Have Been Generated.
100 Surface(s) Initiate(s) From Each Of 33 Points Equally Spaced
Along The Ground Surface Between X = 187.00(ft)
and X = 220.00(ft)
Each Surface Terminates Between X = 230.00(ft)
and X = 375.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0 And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 3300
Statistical Data On All Valid FS Values:
FS Max = 7.922 FS Min = 1.827 FS Ave = 4.363
Standard Deviation = 1.357 Coefficient of Variation = 31.11 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	195.25	143.91
2	205.11	145.61
3	214.76	148.22
4	224.12	151.74
5	233.11	156.12
6	241.65	161.33
7	249.65	167.32
8	257.06	174.03
9	263.80	181.42
10	269.82	189.41
11	275.05	197.93
12	276.07	200.00

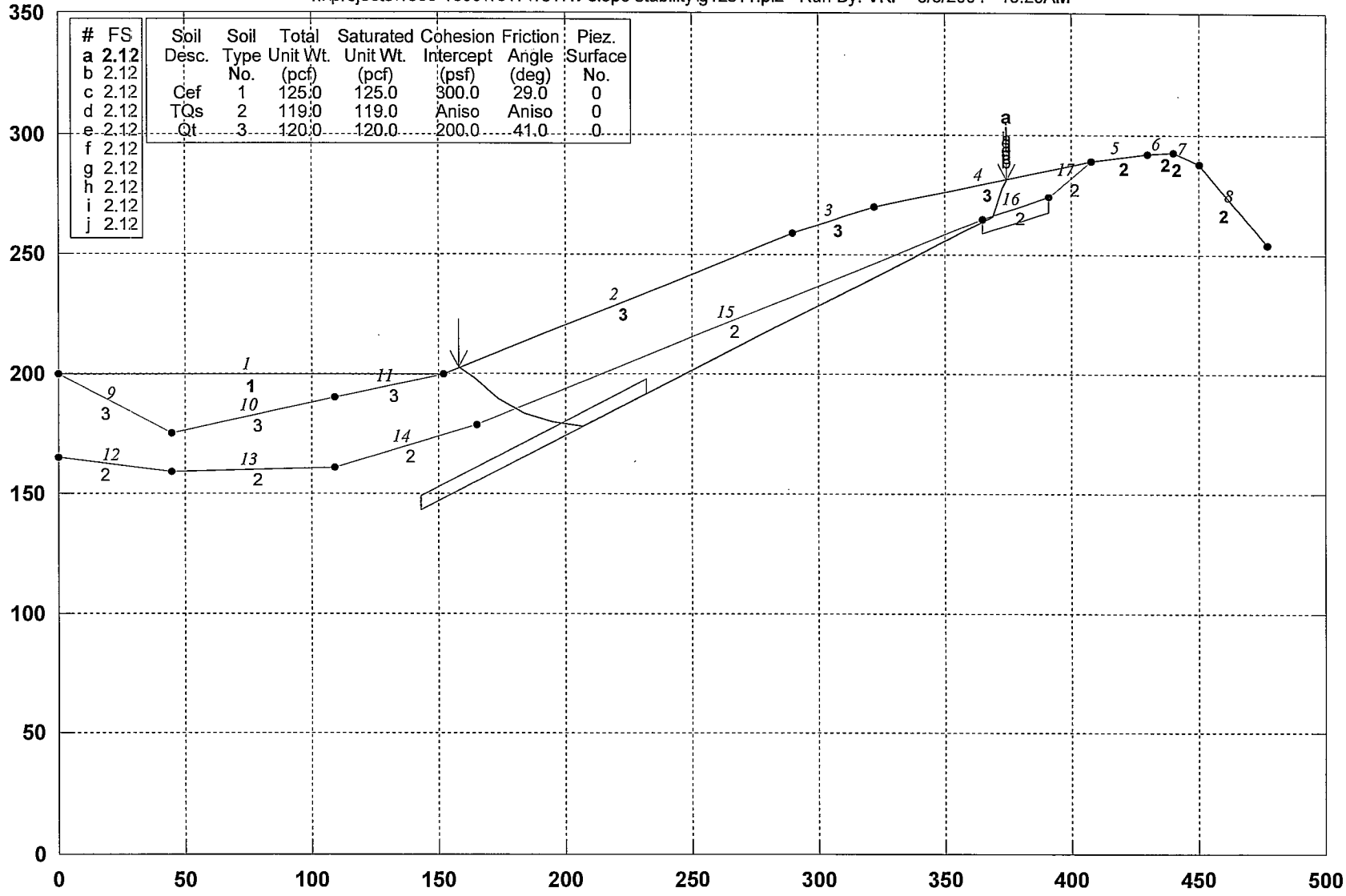
Circle Center At X = 182.38 ; Y = 248.73 ; and Radius = 105.60
Factor of Safety
*** 1.827 ***
Individual data on the 14 slices

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	9.9	3262.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.7	8965.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	9.4	13069.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	9.0	15533.8	0.0	0.0	0.	0.	0.0	0.0	0.0

5	1.9	3542.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.6	11986.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	3.4	5533.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	4.7	7409.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	7.4	11512.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	6.7	9310.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	6.0	6408.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.2	2773.9	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.0	368.2	0.0	0.0	0.	0.	0.0	0.0	0.0
14	1.0	126.1	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 12-12' Nat slope w/ Qt-- Aniso, bed pl surface

n:\projects\1600-1699\1617\1617lv slope stability\g12s11.pl2 Run By: VKP 8/6/2004 10:29AM



#	FS
a	2.12
b	2.12
c	2.12
d	2.12
e	2.12
f	2.12
g	2.12
h	2.12
i	2.12
j	2.12

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=2.12

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. - 40

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                    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:        8/6/2004
Time of Run:              10:29AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g12s11.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g12s11.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g12s11.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 12-12'  Nat slope
                      w/ Qt--  Aniso, bed pl surface
BOUNDARY COORDINATES
    8 Top  Boundaries
   17 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	152.00	200.00	1
2	152.00	200.00	290.00	259.00	3
3	290.00	259.00	322.00	270.00	3
4	322.00	270.00	408.00	289.00	3
5	408.00	289.00	430.00	292.00	2
6	430.00	292.00	440.00	293.00	2
7	440.00	293.00	450.00	288.00	2
8	450.00	288.00	477.00	254.00	2
9	0.00	200.00	45.00	175.00	3
10	45.00	175.00	109.00	190.00	3
11	109.00	190.00	152.00	200.00	3
12	0.00	165.00	45.00	159.00	2
13	45.00	159.00	109.00	161.00	2
14	109.00	161.00	165.00	179.00	2
15	165.00	179.00	365.00	265.00	2
16	365.00	265.00	391.00	274.00	2
17	391.00	274.00	408.00	289.00	2

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

```
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	28.0	410.00	40.50
2	30.0	347.00	22.00
3	90.0	410.00	40.50

```
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.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	143.00	146.00	232.00	195.00	6.00
2	365.00	262.00	391.00	271.00	6.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 4.731 FS Min = 2.122 FS Ave = 3.590
Standard Deviation = 0.417 Coefficient of Variation = 11.62 %
Failure Surface Specified By 9 Coordinate Points

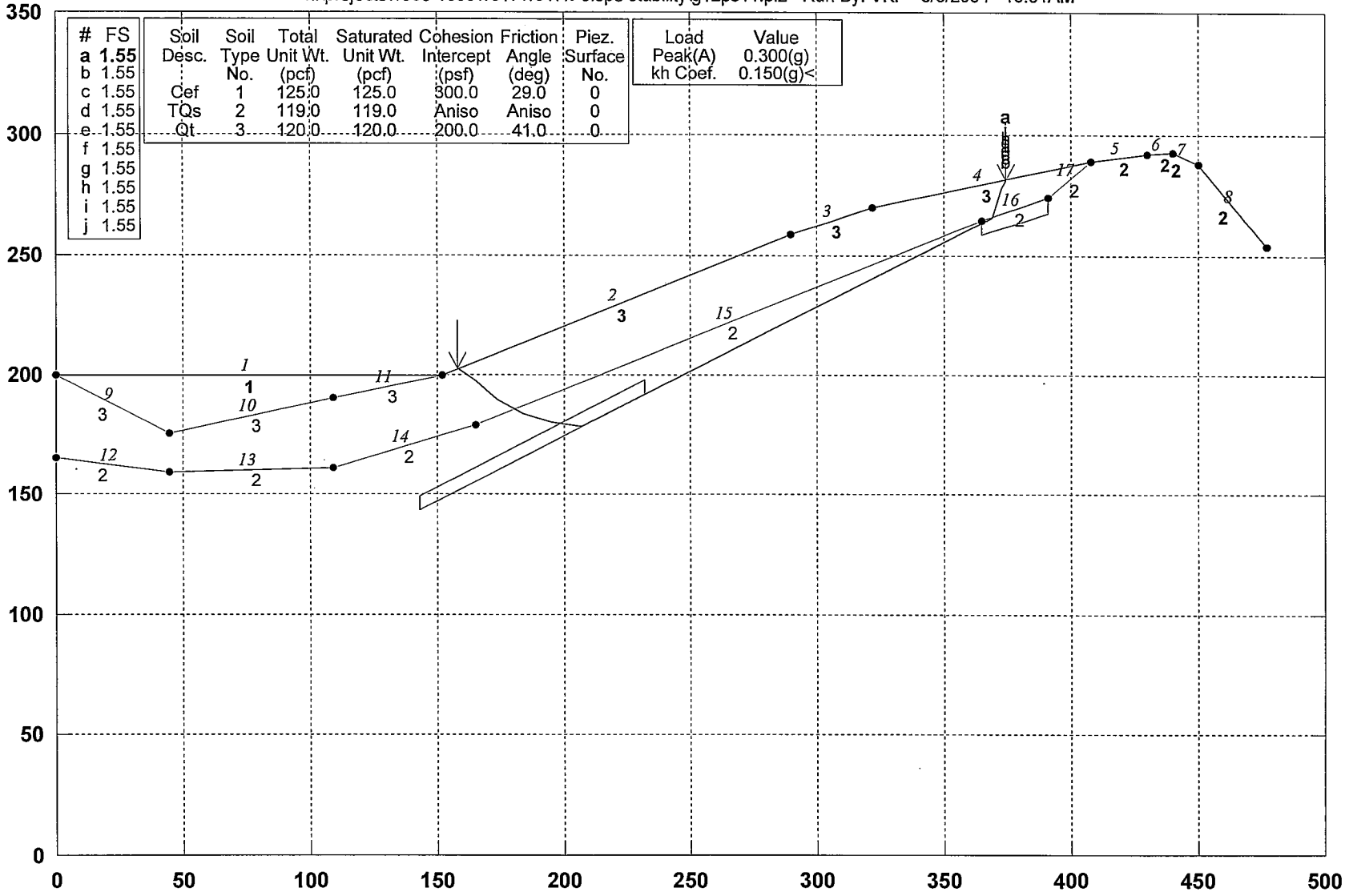
Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.02	202.58
2	164.55	197.76
3	173.46	189.71
4	183.67	183.42
5	195.23	180.19
6	207.09	178.39
7	369.04	266.21
8	372.78	277.61
9	374.64	281.63

Factor of Safety
*** 2.122 ***
Individual data on the 13 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	6.5	2981.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	8.9	14458.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.8	18657.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.5	11732.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	11.6	47358.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.9	59230.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	82.9	400872.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	32.0	124461.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	43.0	115376.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.0	7179.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.1	116.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	3.7	3877.0	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.9	402.9	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 12-12' Nat slope w/ Qt-- Aniso, bed pl surface, Pseudost

n:\projects\1600-1699\1617\1617lv slope stability\g12ps11.pl2 Run By: VKP 8/6/2004 10:31AM



GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. - 41

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                    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:        8/6/2004
Time of Run:              10:31AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g12ps11.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g12ps11.OU
T
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g12ps11.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 12-12'  Nat slope
                      w/ Qt--  Aniso, bed pl surface, Pseudost
BOUNDARY COORDINATES
    8 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)       (ft)        (ft)      Below Bnd
    1         0.00       200.00     152.00      200.00         1
    2       152.00       200.00     290.00      259.00         3
    3       290.00       259.00     322.00      270.00         3
    4       322.00       270.00     408.00      289.00         3
    5       408.00       289.00     430.00      292.00         2
    6       430.00       292.00     440.00      293.00         2
    7       440.00       293.00     450.00      288.00         2
    8       450.00       288.00     477.00      254.00         2
    9         0.00       200.00      45.00      175.00         3
   10        45.00       175.00     109.00      190.00         3
   11       109.00       190.00     152.00      200.00         3
   12         0.00       165.00      45.00      159.00         2
   13        45.00       159.00     109.00      161.00         2
   14       109.00       161.00     165.00      179.00         2
   15       165.00       179.00     365.00      265.00         2
   16       365.00       265.00     391.00      274.00         2
   17       391.00       274.00     408.00      289.00         2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)   Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00      0.0      0
  2   119.0    119.0     410.0     40.5    0.00      0.0      0
  3   120.0    120.0     200.0     41.0    0.00      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion      Friction
  Range       Direction Limit    Intercept       Angle
   No.            (deg)            (psf)         (deg)
    1             28.0             410.00        40.50
    2             30.0             347.00        22.00
    3             90.0             410.00        40.50
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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	143.00	146.00	232.00	195.00	6.00
2	365.00	262.00	391.00	271.00	6.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 3.037 FS Min = 1.554 FS Ave = 2.457
Standard Deviation = 0.226 Coefficient of Variation = 9.18 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.02	202.58
2	164.55	197.76
3	173.46	189.71
4	183.67	183.42
5	195.23	180.19
6	207.09	178.39
7	369.04	266.21
8	372.78	277.61
9	374.64	281.63

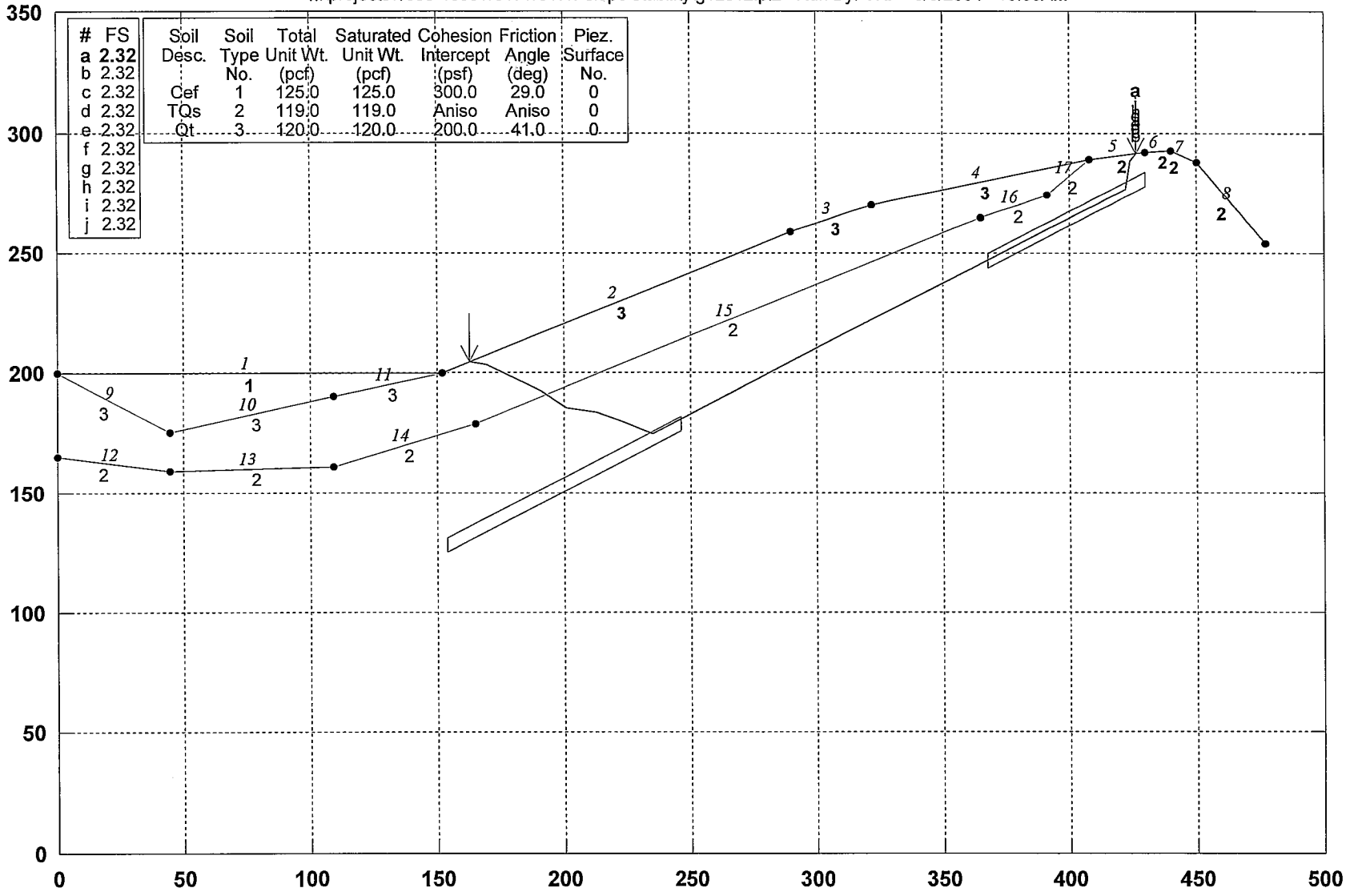
Factor of Safety
*** 1.554 ***

Individual data on the 13 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	6.5	2981.9	0.0	0.0	0.	0.	447.3	0.0	0.0
2	8.9	14458.4	0.0	0.0	0.	0.	2168.8	0.0	0.0
3	6.8	18657.0	0.0	0.0	0.	0.	2798.6	0.0	0.0
4	3.5	11732.9	0.0	0.0	0.	0.	1759.9	0.0	0.0
5	11.6	47358.1	0.0	0.0	0.	0.	7103.7	0.0	0.0
6	11.9	59230.1	0.0	0.0	0.	0.	8884.5	0.0	0.0
7	82.9	400872.1	0.0	0.0	0.	0.	60130.8	0.0	0.0
8	32.0	124461.6	0.0	0.0	0.	0.	18669.2	0.0	0.0
9	43.0	115376.5	0.0	0.0	0.	0.	17306.5	0.0	0.0
10	4.0	7179.0	0.0	0.0	0.	0.	1076.9	0.0	0.0
11	0.1	116.7	0.0	0.0	0.	0.	17.5	0.0	0.0
12	3.7	3877.0	0.0	0.0	0.	0.	581.5	0.0	0.0
13	1.9	402.9	0.0	0.0	0.	0.	60.4	0.0	0.0

G P R, T52584, 12-12' Nat slope w/ Qt-- Aniso, bed pl surface

n:\projects\1600-1699\1617\1617lv slope stability\g12s12.pl2 Run By: VKP 8/6/2004 10:33AM



#	FS
a	2.32
b	2.32
c	2.32
d	2.32
e	2.32
f	2.32
g	2.32
h	2.32
i	2.32
j	2.32

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=2.32

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No.-42

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****

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: 8/6/2004
Time of Run: 10:33AM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\gl2s12.in
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\gl2s12.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g12s12.PLT
PROBLEM DESCRIPTION: G P R, T52584, 12-12' Nat slope
w/ Qt-- Aniso, bed pl surface

BOUNDARY COORDINATES
8 Top Boundaries
17 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	152.00	200.00	1
2	152.00	200.00	290.00	259.00	3
3	290.00	259.00	322.00	270.00	3
4	322.00	270.00	408.00	289.00	3
5	408.00	289.00	430.00	292.00	2
6	430.00	292.00	440.00	293.00	2
7	440.00	293.00	450.00	288.00	2
8	450.00	288.00	477.00	254.00	2
9	0.00	200.00	45.00	175.00	3
10	45.00	175.00	109.00	190.00	3
11	109.00	190.00	152.00	200.00	3
12	0.00	165.00	45.00	159.00	2
13	45.00	159.00	109.00	161.00	2
14	109.00	161.00	165.00	179.00	2
15	165.00	179.00	365.00	265.00	2
16	365.00	265.00	391.00	274.00	2
17	391.00	274.00	408.00	289.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	120.0	120.0	200.0	41.0	0.00	0.0	0

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	28.0	410.00	40.50
2	30.0	347.00	22.00
3	90.0	410.00	40.50

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.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	154.00	128.00	246.00	179.00	6.00
2	368.00	247.00	430.00	281.00	6.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 4.756 FS Min = 2.317 FS Ave = 2.749
Standard Deviation = 0.364 Coefficient of Variation = 13.23 %
Failure Surface Specified By 11 Coordinate Points

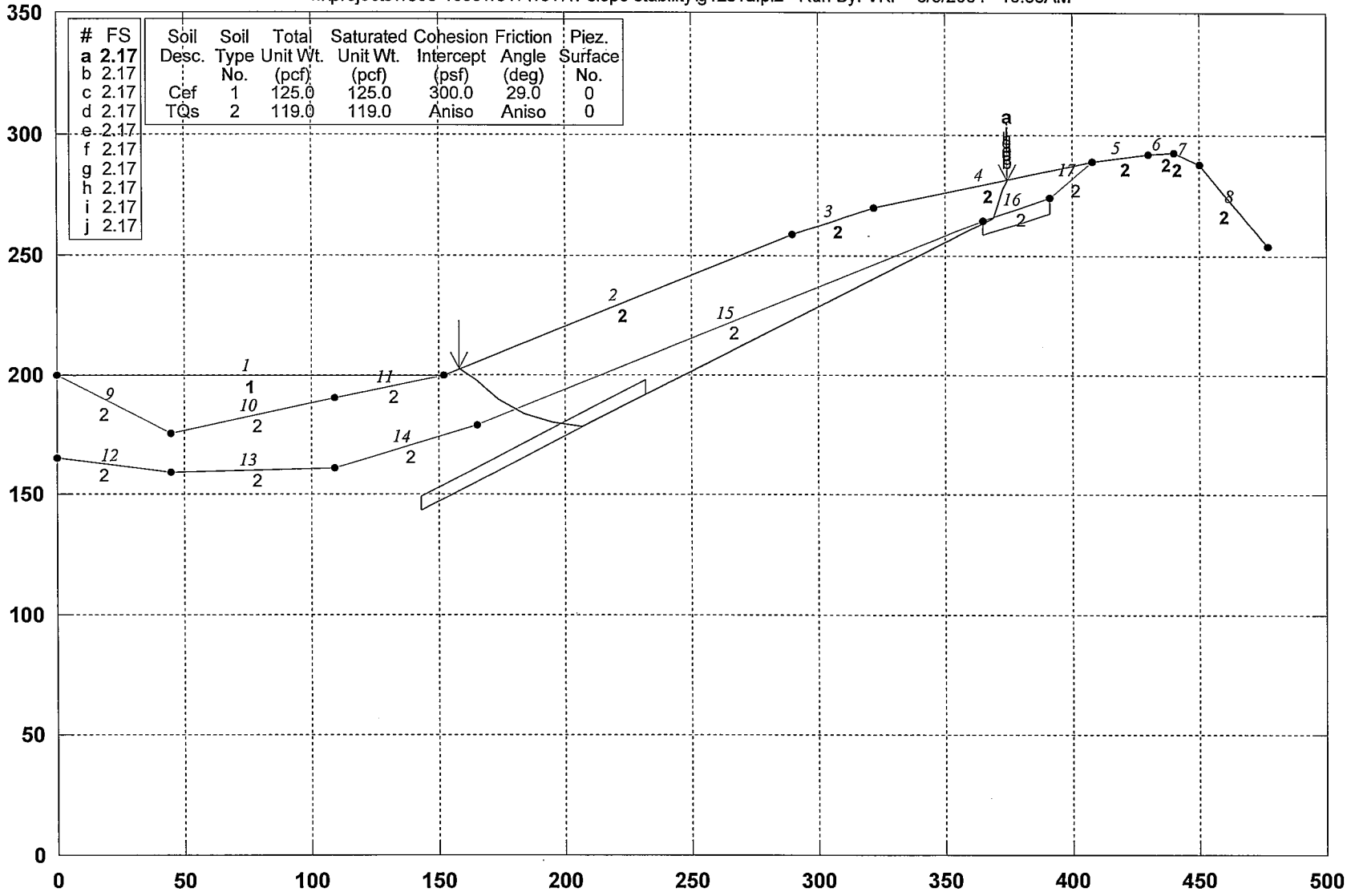
Point No.	X-Surf (ft)	Y-Surf (ft)
1	162.96	204.69
2	169.43	203.25
3	180.30	198.17
4	190.92	192.59
5	200.74	185.69
6	212.61	183.93
7	223.70	179.33
8	234.88	174.97
9	422.23	276.94
10	424.17	288.78
11	426.53	291.53

Factor of Safety
*** 2.317 ***
Individual data on the 16 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	6.5	1630.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	10.9	11827.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.6	24200.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.2	6542.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.7	28307.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.9	54787.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	11.1	61828.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.2	74661.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	55.1	376972.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	32.0	194323.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	43.0	208882.2	0.0	0.0	0.	0.	0.0	0.0	0.0
12	26.0	91628.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	17.0	45724.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	14.2	28627.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.9	1897.5	0.0	0.0	0.	0.	0.0	0.0	0.0
16	2.4	340.7	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 12-12' Nat slope without Qt-- Aniso, bed pl surface

n:\projects\1600-1699\1617\1617lv slope stability\g12s1a.pl2 Run By: VKP 8/6/2004 10:35AM



#	FS
a	2.17
b	2.17
c	2.17
d	2.17
e	2.17
f	2.17
g	2.17
h	2.17
i	2.17
j	2.17

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=2.17

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-43

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  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:        8/6/2004
Time of Run:              10:35AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g12s1a.in
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g12s1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g12s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 12-12'  Nat slope
                      without  Qt--  Aniso, bed pl surface
BOUNDARY COORDINATES
    8 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     200.00     152.00     200.00        1
    2       152.00     200.00     290.00     259.00        2
    3       290.00     259.00     322.00     270.00        2
    4       322.00     270.00     408.00     289.00        2
    5       408.00     289.00     430.00     292.00        2
    6       430.00     292.00     440.00     293.00        2
    7       440.00     293.00     450.00     288.00        2
    8       450.00     288.00     477.00     254.00        2
    9         0.00     200.00      45.00     175.00        2
   10        45.00     175.00     109.00     190.00        2
   11       109.00     190.00     152.00     200.00        2
   12         0.00     165.00      45.00     159.00        2
   13        45.00     159.00     109.00     161.00        2
   14       109.00     161.00     165.00     179.00        2
   15       165.00     179.00     365.00     265.00        2
   16       365.00     265.00     391.00     274.00        2
   17       391.00     274.00     408.00     289.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      0
  2   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
   No.             (deg)            (psf)        (deg)
    1              28.0             410.00        40.50
    2              30.0             347.00        22.00
    3              90.0             410.00        40.50
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.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
3000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 12.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	143.00	146.00	232.00	195.00	6.00
2	365.00	262.00	391.00	271.00	6.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 4.777 FS Min = 2.170 FS Ave = 3.641
Standard Deviation = 0.416 Coefficient of Variation = 11.43 %
Failure Surface Specified By 9 Coordinate Points

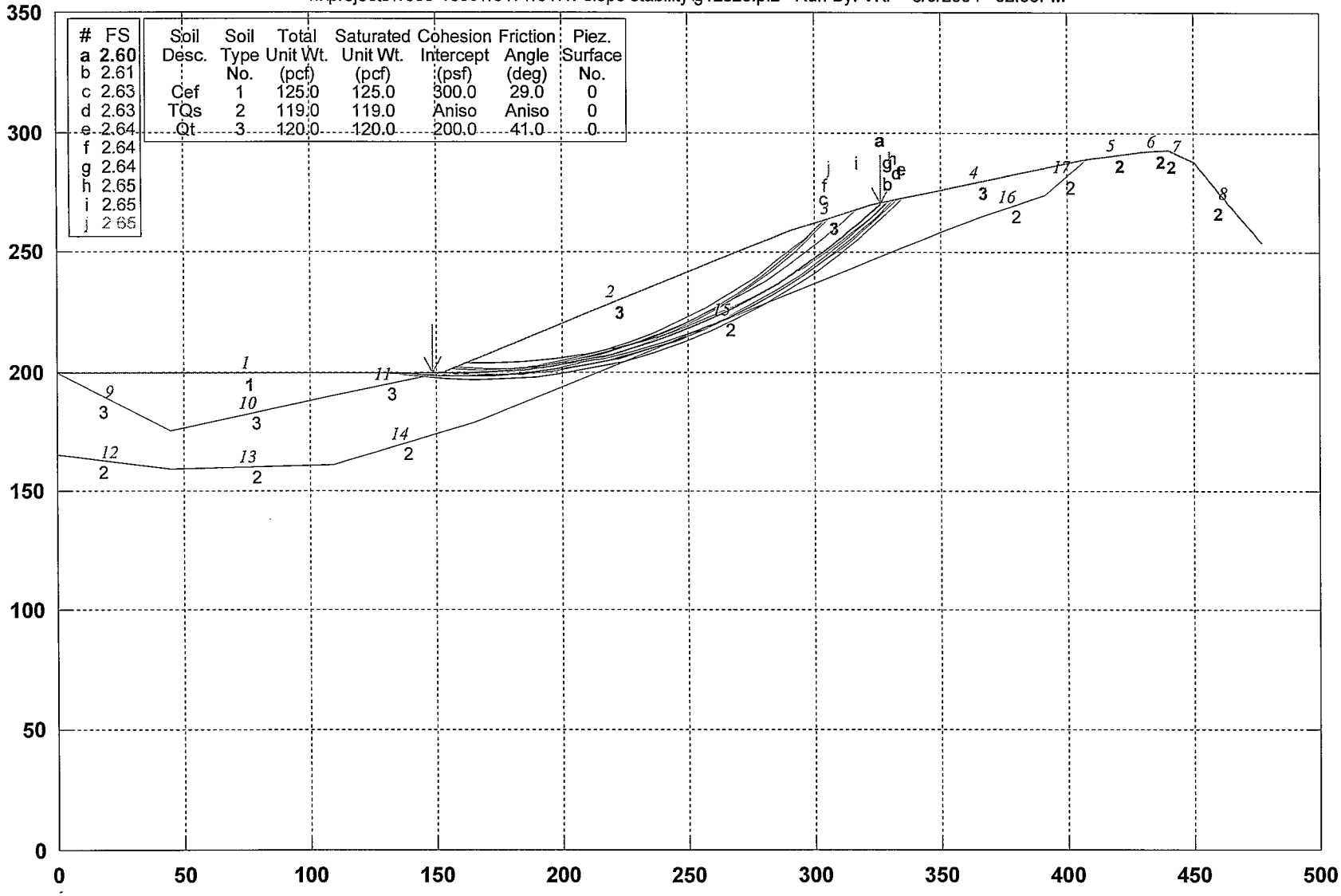
Point No.	X-Surf (ft)	Y-Surf (ft)
1	158.02	202.58
2	164.55	197.76
3	173.46	189.71
4	183.67	183.42
5	195.23	180.19
6	207.09	178.39
7	369.04	266.21
8	372.78	277.61
9	374.64	281.63

Factor of Safety
*** 2.170 ***
Individual data on the 13 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	6.5	2957.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	8.9	14337.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.8	18501.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.5	11641.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	11.6	47051.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.9	58916.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	82.9	398687.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	32.0	123665.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	43.0	114559.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.0	7121.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.1	115.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	3.7	3844.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.9	399.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 12-12' Nat slope w/ Qt-- Circular search, Static

n:\projects\1600-1699\1617\1617lv slope stability\g12s20.pl2 Run By: VKP 8/9/2004 02:38PM



#	FS
a	2.60
b	2.61
c	2.63
d	2.63
e	2.64
f	2.64
g	2.64
h	2.65
i	2.65
j	2.65

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
Qt	3	120.0	120.0	200.0	41.0	0

GSTABL7 v.2 FSmin=2.60

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. - 44

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  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:        8/9/2004
Time of Run:              02:38PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g12s20.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g12s20.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g12s20.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 12-12'  Nat slope
                      w/ Qt--  Circular search, Static
BOUNDARY COORDINATES
    8 Top   Boundaries
   17 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     200.00     152.00     200.00        1
    2       152.00     200.00     290.00     259.00        3
    3       290.00     259.00     322.00     270.00        3
    4       322.00     270.00     408.00     289.00        3
    5       408.00     289.00     430.00     292.00        2
    6       430.00     292.00     440.00     293.00        2
    7       440.00     293.00     450.00     288.00        2
    8       450.00     288.00     477.00     254.00        2
    9         0.00     200.00      45.00     175.00        3
   10        45.00     175.00     109.00     190.00        3
   11       109.00     190.00     152.00     200.00        3
   12         0.00     165.00      45.00     159.00        2
   13        45.00     159.00     109.00     161.00        2
   14       109.00     161.00     165.00     179.00        2
   15       165.00     179.00     365.00     265.00        2
   16       365.00     265.00     391.00     274.00        2
   17       391.00     274.00     408.00     289.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total   Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)     (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0       0
  2   119.0    119.0     410.0     40.5    0.00       0.0       0
  3   120.0    120.0     200.0     41.0    0.00       0.0       0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
   No.            (deg)             (psf)        (deg)
    1             28.0             410.00        40.50
    2             30.0             347.00        22.00
    3             90.0             410.00        40.50
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.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 150 Points Equally Spaced
Along The Ground Surface Between X = 50.00(ft)
and X = 200.00(ft)
Each Surface Terminates Between X = 250.00(ft)
and X = 477.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
12.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 3000
Statistical Data On All Valid FS Values:
FS Max = 7.140 FS Min = 2.600 FS Ave = 4.123
Standard Deviation = 0.789 Coefficient of Variation = 19.13 %
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	148.66	200.00
2	160.65	199.72
3	172.65	200.06
4	184.61	201.03
5	196.50	202.62
6	208.30	204.84
7	219.96	207.67
8	231.46	211.10
9	242.76	215.13
10	253.84	219.75
11	264.66	224.94
12	275.19	230.69
13	285.41	236.98
14	295.28	243.80
15	304.79	251.12
16	313.90	258.93
17	322.59	267.21
18	326.08	270.90

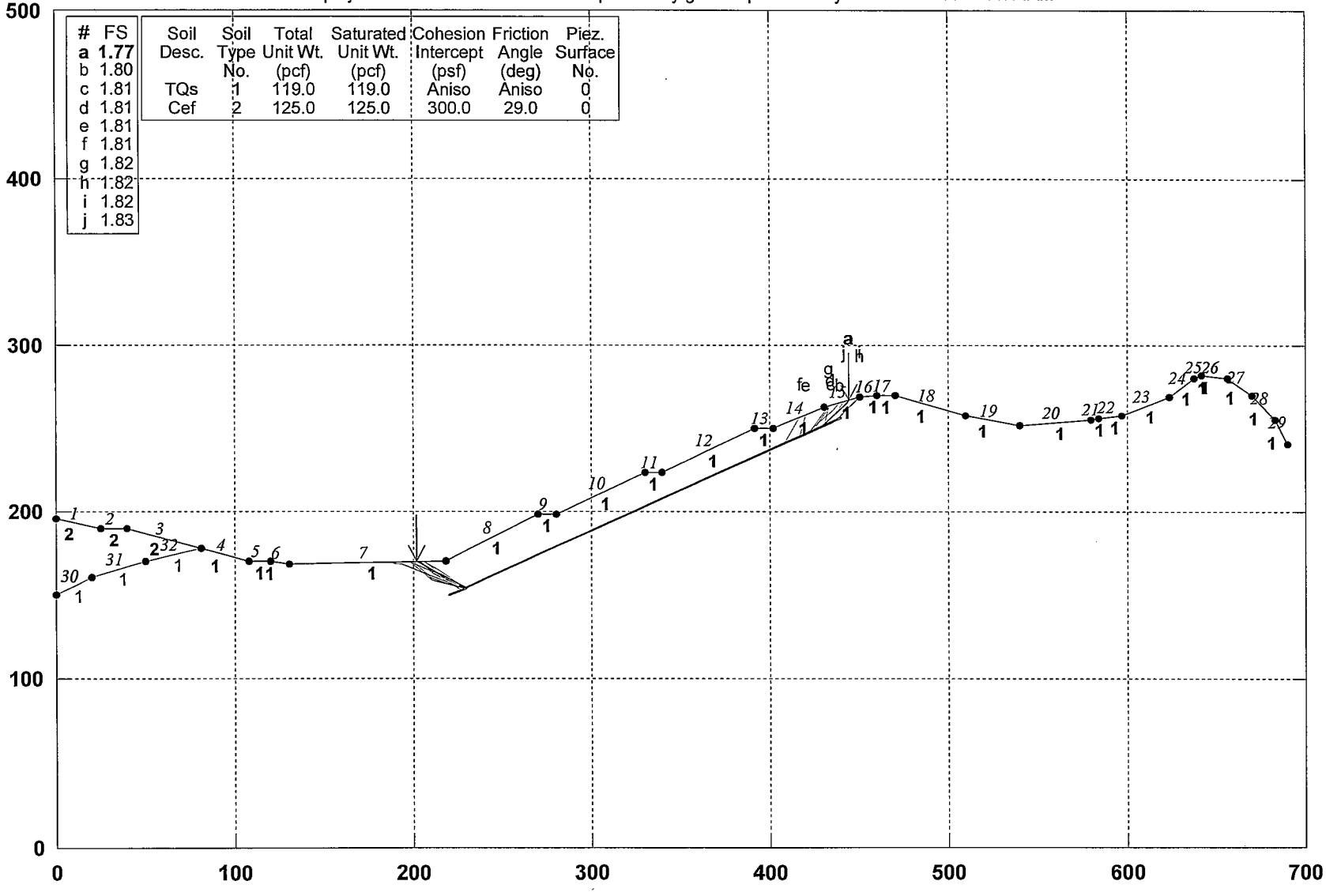
Circle Center At X = 160.15 ; Y = 428.67 ; and Radius = 228.95
Factor of Safety
*** 2.600 ***
Individual data on the 21 slices

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	3.0	13.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.3	2.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.7	2110.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	12.0	9178.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	12.0	15559.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	11.9	20919.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	11.8	25215.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.7	28421.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	11.5	30532.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	11.3	31562.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	11.1	31541.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	10.8	30522.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.5	28571.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	10.2	25775.1	0.0	0.0	0.	0.	0.0	0.0	0.0

15	4.6	10718.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.3	11373.7	0.0	0.0	0.	0.	0.0	0.0	0.0
17	9.5	17101.0	0.0	0.0	0.	0.	0.0	0.0	0.0
18	9.1	11613.1	0.0	0.0	0.	0.	0.0	0.0	0.0
19	8.1	5655.0	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.6	221.0	0.0	0.0	0.	0.	0.0	0.0	0.0
21	3.5	611.7	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, Sec 14-14', Cut Slope-28, Bedding search, Static

n:\projects\1600-1699\1617\1617lv slope stability\g14s1a.pl2 Run By: VKP 8/6/2004 11:14AM



#	FS
a	1.77
b	1.80
c	1.81
d	1.81
e	1.81
f	1.81
g	1.82
h	1.82
i	1.82
j	1.83

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	119.0	119.0	Aniso	Aniso	0
Cef	2	125.0	125.0	300.0	29.0	0

GSTABL7 v.2 FSmin=1.77

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. 45

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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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: 8/6/2004
Time of Run: 11:14AM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\gl4s1a.
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\gl4s1a.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g14s1a.PLT
PROBLEM DESCRIPTION: G P R, Sec 14-14', Cut Slope-28,
Bedding search, Static

BOUNDARY COORDINATES
29 Top Boundaries
32 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	196.00	25.00	190.00	2
2	25.00	190.00	40.00	190.00	2
3	40.00	190.00	81.00	178.00	2
4	81.00	178.00	108.00	170.00	1
5	108.00	170.00	120.00	170.00	1
6	120.00	170.00	130.00	168.00	1
7	130.00	168.00	218.00	170.00	1
8	218.00	170.00	270.00	198.00	1
9	270.00	198.00	280.00	198.00	1
10	280.00	198.00	330.00	223.00	1
11	330.00	223.00	340.00	223.00	1
12	340.00	223.00	392.00	250.00	1
13	392.00	250.00	402.00	250.00	1
14	402.00	250.00	430.00	263.00	1
15	430.00	263.00	450.00	269.00	1
16	450.00	269.00	460.00	270.00	1
17	460.00	270.00	470.00	270.00	1
18	470.00	270.00	510.00	258.00	1
19	510.00	258.00	540.00	252.00	1
20	540.00	252.00	580.00	255.00	1
21	580.00	255.00	584.00	256.00	1
22	584.00	256.00	597.00	258.00	1
23	597.00	258.00	624.00	269.00	1
24	624.00	269.00	637.00	280.00	1
25	637.00	280.00	642.00	282.00	1
26	642.00	282.00	656.00	280.00	1
27	656.00	280.00	670.00	270.00	1
28	670.00	270.00	683.00	255.00	1
29	683.00	255.00	690.00	241.00	1
30	0.00	150.00	20.00	160.00	1
31	20.00	160.00	50.00	170.00	1
32	50.00	170.00	81.00	178.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	119.0	119.0	410.0	40.5	0.00	0.0	0
2	125.0	125.0	300.0	29.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.5	410.00	40.50
2	26.5	347.00	22.00
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 19.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	149.30	230.00	154.10	1.00
2	300.00	188.30	440.00	256.60	1.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.377 FS Min = 1.767 FS Ave = 2.081
Standard Deviation = 0.203 Coefficient of Variation = 9.77 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	201.74	169.63
2	212.76	163.05
3	229.69	154.42
4	429.87	251.64
5	442.98	265.40
6	444.39	267.32

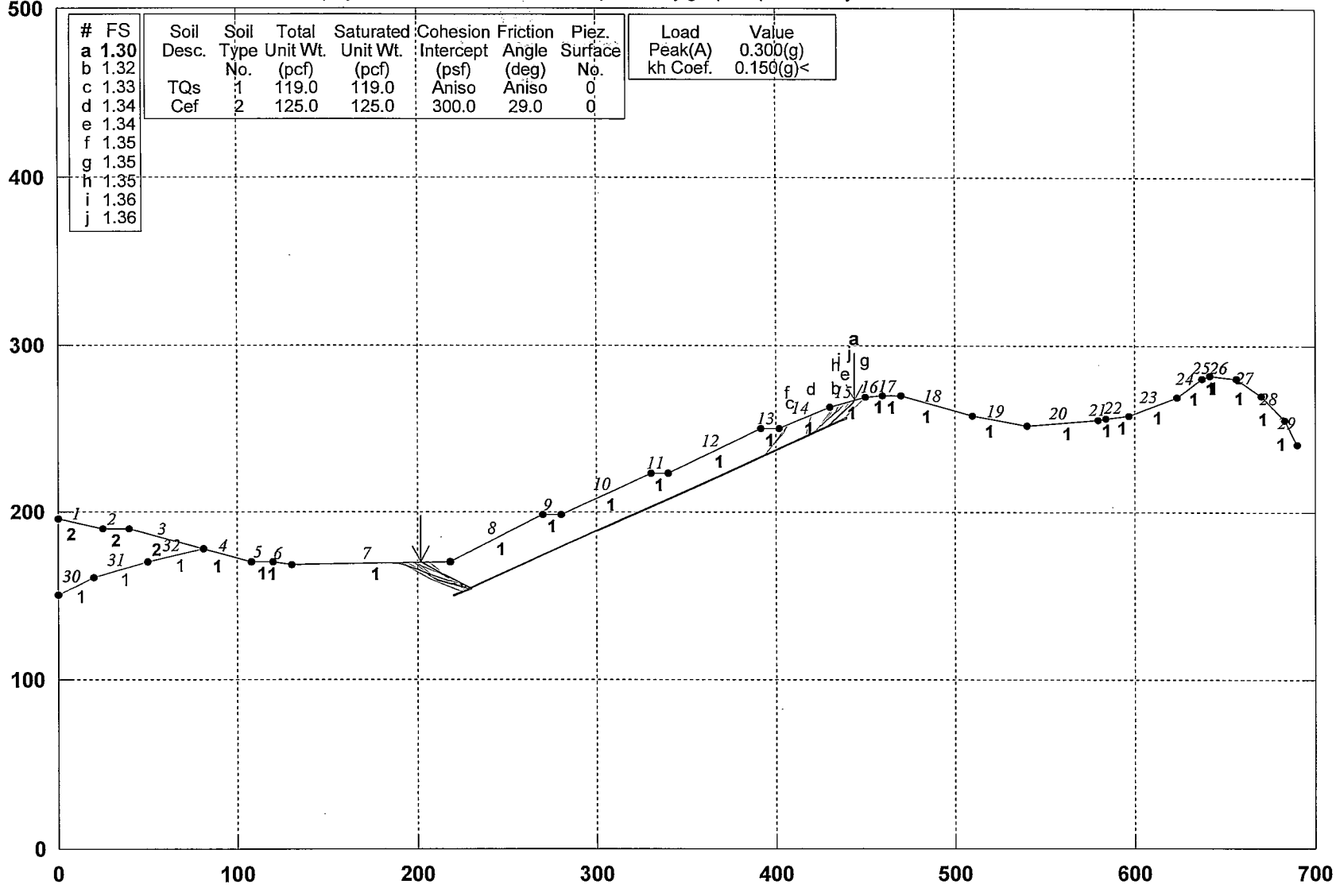
Factor of Safety
*** 1.767 ***

Individual data on the 13 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	11.0	4477.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	5.2	5122.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	11.7	21904.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	40.3	110015.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.0	25671.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	50.0	116045.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	10.0	20746.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	52.0	98263.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.0	17046.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	27.9	38475.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.1	168.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	13.0	9821.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.4	125.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, Sec 14-14', Cut Slope-28, Bedding search, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g14ps1a.pl2 Run By: VKP 8/6/2004 11:19AM



GSTABL7 v.2 FSmin=1.30

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. - 46

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                    *** GSTABL7 ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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.
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Analysis Run Date:        8/6/2004
Time of Run:              11:19AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g14ps1a.
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g14ps1a.OU
T
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g14ps1a.PLT
PROBLEM DESCRIPTION:  G P R, Sec 14-14',  Cut Slope-28,
                      Bedding search, Pseudostatic
BOUNDARY COORDINATES
   29 Top   Boundaries
   32 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	196.00	25.00	190.00	2
2	25.00	190.00	40.00	190.00	2
3	40.00	190.00	81.00	178.00	2
4	81.00	178.00	108.00	170.00	1
5	108.00	170.00	120.00	170.00	1
6	120.00	170.00	130.00	168.00	1
7	130.00	168.00	218.00	170.00	1
8	218.00	170.00	270.00	198.00	1
9	270.00	198.00	280.00	198.00	1
10	280.00	198.00	330.00	223.00	1
11	330.00	223.00	340.00	223.00	1
12	340.00	223.00	392.00	250.00	1
13	392.00	250.00	402.00	250.00	1
14	402.00	250.00	430.00	263.00	1
15	430.00	263.00	450.00	269.00	1
16	450.00	269.00	460.00	270.00	1
17	460.00	270.00	470.00	270.00	1
18	470.00	270.00	510.00	258.00	1
19	510.00	258.00	540.00	252.00	1
20	540.00	252.00	580.00	255.00	1
21	580.00	255.00	584.00	256.00	1
22	584.00	256.00	597.00	258.00	1
23	597.00	258.00	624.00	269.00	1
24	624.00	269.00	637.00	280.00	1
25	637.00	280.00	642.00	282.00	1
26	642.00	282.00	656.00	280.00	1
27	656.00	280.00	670.00	270.00	1
28	670.00	270.00	683.00	255.00	1
29	683.00	255.00	690.00	241.00	1
30	0.00	150.00	20.00	160.00	1
31	20.00	160.00	50.00	170.00	1
32	50.00	170.00	81.00	178.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
```

No.	(pcf)	(pcf)	(psf)	(deg)	Param.	(psf)	No.
1	119.0	119.0	410.0	40.5	0.00	0.0	0
2	125.0	125.0	300.0	29.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.5	410.00	40.50
2	26.5	347.00	22.00
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 19.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	149.30	230.00	154.10	1.00
2	300.00	188.30	440.00	256.60	1.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.413 FS Min = 1.302 FS Ave = 1.548
Standard Deviation = 0.134 Coefficient of Variation = 8.67 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	201.74	169.63
2	212.76	163.05
3	229.69	154.42
4	429.87	251.64
5	442.98	265.40
6	444.39	267.32

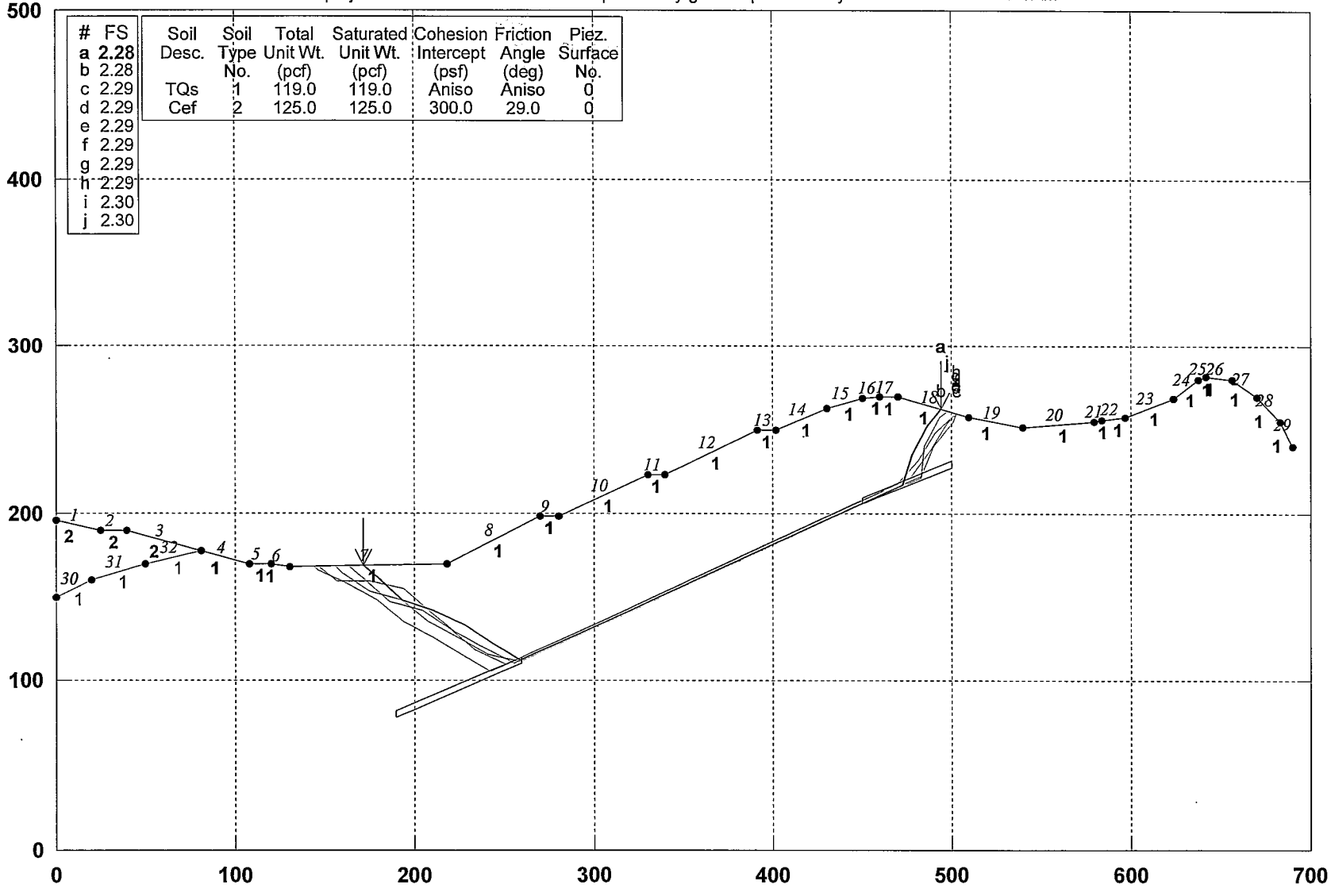
Factor of Safety
*** 1.302 ***
Individual data on the 13 slices

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	11.0	4477.4	0.0	0.0	0.	0.	671.6	0.0	0.0
2	5.2	5122.4	0.0	0.0	0.	0.	768.4	0.0	0.0
3	11.7	21904.0	0.0	0.0	0.	0.	3285.6	0.0	0.0
4	40.3	110015.9	0.0	0.0	0.	0.	16502.4	0.0	0.0
5	10.0	25671.1	0.0	0.0	0.	0.	3850.7	0.0	0.0
6	50.0	116045.2	0.0	0.0	0.	0.	17406.8	0.0	0.0
7	10.0	20746.9	0.0	0.0	0.	0.	3112.0	0.0	0.0
8	52.0	98263.8	0.0	0.0	0.	0.	14739.6	0.0	0.0

9	10.0	17046.9	0.0	0.0	0.	0.	2557.0	0.0	0.0
10	27.9	38475.6	0.0	0.0	0.	0.	5771.3	0.0	0.0
11	0.1	168.5	0.0	0.0	0.	0.	25.3	0.0	0.0
12	13.0	9821.2	0.0	0.0	0.	0.	1473.2	0.0	0.0
13	1.4	125.8	0.0	0.0	0.	0.	18.9	0.0	0.0

G P R, Sec 14-14', Cut Slope-28, Bedding Pln Deeper Search, Static

n:\projects\1600-1699\1617\1617lv slope stability\g14s1b.pl2 Run By: VKP 8/6/2004 11:23AM



#	FS
a	2.28
b	2.28
c	2.29
d	2.29
e	2.29
f	2.29
g	2.29
h	2.29
i	2.30
j	2.30

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	119.0	119.0	Aniso	Aniso	0
Cef	2	125.0	125.0	300.0	29.0	0

GSTABL7 v.2 FSmin=2.28

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. 147

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                    *** GSTABL7 ***
            ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                    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:        8/6/2004
Time of Run:              11:23AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g14s1b.
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g14s1b.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stabi1ity\g14s1b.PLT
PROBLEM DESCRIPTION:  G P R, Sec 14-14',  Cut Slope-28,
                      Bedding Pln Deeper Search, Static
BOUNDARY COORDINATES
   29 Top   Boundaries
   32 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	196.00	25.00	190.00	2
2	25.00	190.00	40.00	190.00	2
3	40.00	190.00	81.00	178.00	2
4	81.00	178.00	108.00	170.00	1
5	108.00	170.00	120.00	170.00	1
6	120.00	170.00	130.00	168.00	1
7	130.00	168.00	218.00	170.00	1
8	218.00	170.00	270.00	198.00	1
9	270.00	198.00	280.00	198.00	1
10	280.00	198.00	330.00	223.00	1
11	330.00	223.00	340.00	223.00	1
12	340.00	223.00	392.00	250.00	1
13	392.00	250.00	402.00	250.00	1
14	402.00	250.00	430.00	263.00	1
15	430.00	263.00	450.00	269.00	1
16	450.00	269.00	460.00	270.00	1
17	460.00	270.00	470.00	270.00	1
18	470.00	270.00	510.00	258.00	1
19	510.00	258.00	540.00	252.00	1
20	540.00	252.00	580.00	255.00	1
21	580.00	255.00	584.00	256.00	1
22	584.00	256.00	597.00	258.00	1
23	597.00	258.00	624.00	269.00	1
24	624.00	269.00	637.00	280.00	1
25	637.00	280.00	642.00	282.00	1
26	642.00	282.00	656.00	280.00	1
27	656.00	280.00	670.00	270.00	1
28	670.00	270.00	683.00	255.00	1
29	683.00	255.00	690.00	241.00	1
30	0.00	150.00	20.00	160.00	1
31	20.00	160.00	50.00	170.00	1
32	50.00	170.00	81.00	178.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	119.0	119.0	410.0	40.5	0.00	0.0	0
2	125.0	125.0	300.0	29.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.5	410.00	40.50
2	26.5	347.00	22.00
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 19.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	190.00	80.00	260.00	112.00	4.00
2	450.00	208.00	500.00	230.00	4.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.759 FS Min = 2.276 FS Ave = 3.135
Standard Deviation = 0.644 Coefficient of Variation = 20.56 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.37	168.94
2	179.43	161.86
3	192.97	148.53
4	210.84	142.07
5	228.02	133.97
6	242.96	122.23
7	258.92	111.91
8	472.45	217.37
9	477.78	235.60
10	486.85	252.30
11	494.11	262.77

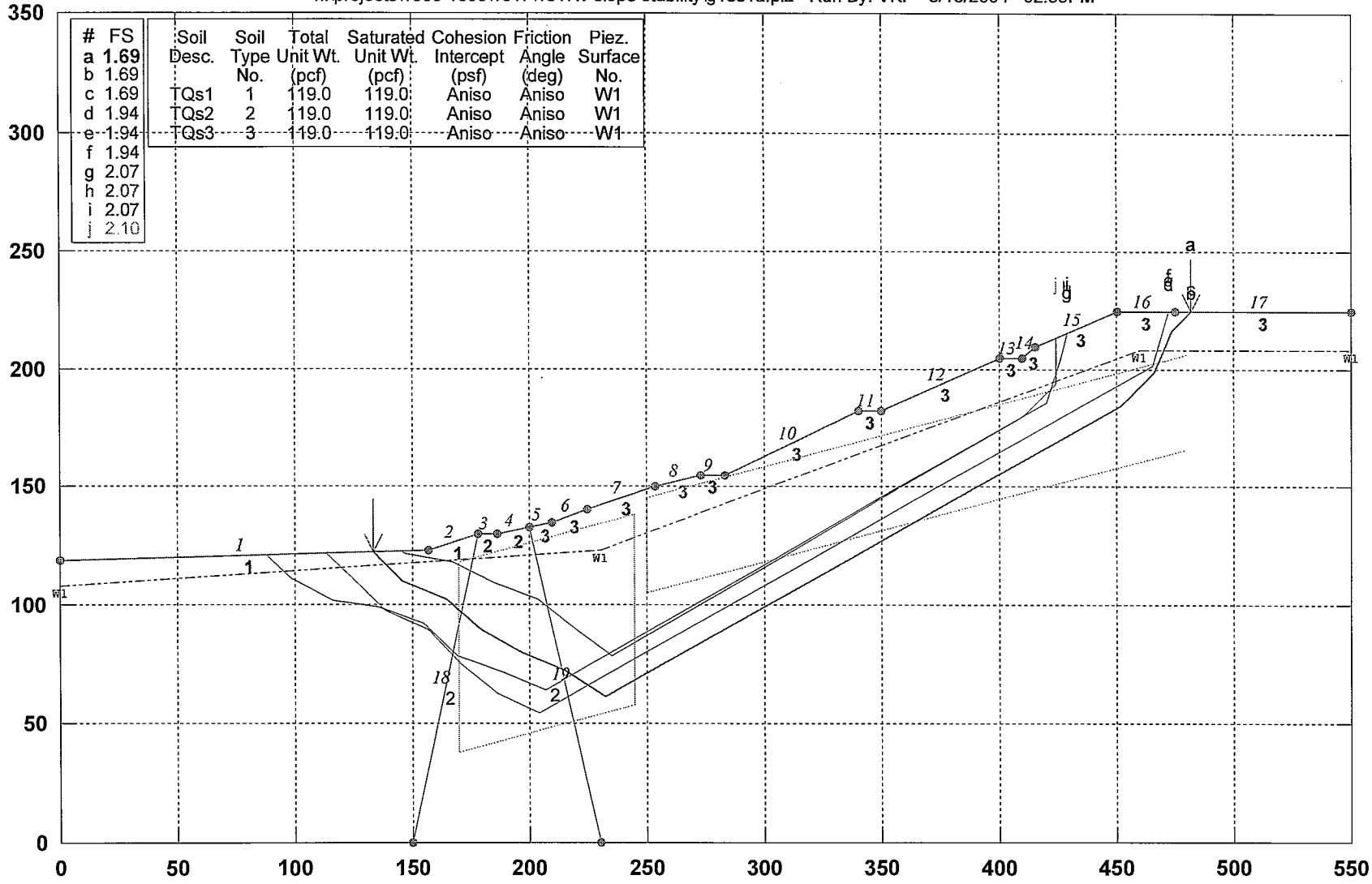
Factor of Safety
*** 2.276 ***
Individual data on the 21 slices

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	8.1	3483.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	13.5	22686.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	17.9	51736.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	7.2	25179.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	10.0	43380.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	14.9	91244.8	0.0	0.0	0.	0.	0.0	0.0	0.0
7	16.0	134163.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	11.1	105973.9	0.0	0.0	0.	0.	0.0	0.0	0.0

9	10.0	92991.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	50.0	451178.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	10.0	87479.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	52.0	443693.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	10.0	83171.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	28.0	223273.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	20.0	153881.0	0.0	0.0	0.	0.	0.0	0.0	0.0
16	10.0	72289.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	10.0	67007.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	2.4	15386.8	0.0	0.0	0.	0.	0.0	0.0	0.0
19	5.3	26650.0	0.0	0.0	0.	0.	0.0	0.0	0.0
20	9.1	24121.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	7.3	5459.9	0.0	0.0	0.	0.	0.0	0.0	0.0

GPR, T52584, Hasley Cyn, C S 18-18' Cut Slope 12, 3:1, Static

n:\projects\1600-1699\1617\1617lv slope stability\g18s1a.pl2 Run By: VKP 8/13/2004 02:55PM



#	FS
a	1.69
b	1.69
c	1.69
d	1.94
e	1.94
f	1.94
g	2.07
h	2.07
i	2.07
j	2.10

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs1	1	119.0	119.0	Aniso	Aniso	W1
TQs2	2	119.0	119.0	Aniso	Aniso	W1
TQs3	3	119.0	119.0	Aniso	Aniso	W1

GSTABL7 v.2 FSmin=1.69

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-48

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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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: 8/13/2004
Time of Run: 02:55PM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g18s1a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g18s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g18s1a.PLT
PROBLEM DESCRIPTION: GPR, T52584, Hasley Cyn, C S 18-18'
Cut Slope 12, 3:1, Static

BOUNDARY COORDINATES
17 Top Boundaries
19 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	119.00	157.00	123.00	1
2	157.00	123.00	178.00	130.00	1
3	178.00	130.00	186.00	130.00	2
4	186.00	130.00	200.00	133.00	2
5	200.00	133.00	210.00	135.00	3
6	210.00	135.00	225.00	140.00	3
7	225.00	140.00	254.00	150.00	3
8	254.00	150.00	273.00	155.00	3
9	273.00	155.00	283.00	155.00	3
10	283.00	155.00	340.00	182.00	3
11	340.00	182.00	350.00	182.00	3
12	350.00	182.00	400.00	205.00	3
13	400.00	205.00	410.00	205.00	3
14	410.00	205.00	415.00	210.00	3
15	415.00	210.00	450.00	225.00	3
16	450.00	225.00	475.00	225.00	3
17	475.00	225.00	550.00	225.00	3
18	150.00	0.00	178.00	130.00	2
19	200.00	133.00	230.00	0.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	119.0	119.0	410.0	40.5	0.00	0.0	1
2	119.0	119.0	410.0	40.5	0.00	0.0	1
3	119.0	119.0	410.0	40.5	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
3 soil type(s)
Soil Type 1 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-41.0	410.00	40.50
2	-39.0	347.00	22.00
3	90.0	410.00	40.50

Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction	Counterclockwise	Cohesion	Friction

Range No.	Direction Limit (deg)	Intercept (psf)	Angle (deg)
1	-41.0	410.00	40.50
2	29.0	347.00	22.00
3	90.0	410.00	40.50

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	410.00	40.50
2	31.0	347.00	22.00
3	90.0	410.00	40.50

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 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	108.00
2	230.00	123.00
3	460.00	208.00
4	550.00	208.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	78.00	245.00	98.00	80.00
2	250.00	125.00	480.00	186.00	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 The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 9.041 FS Min = 1.694 FS Ave = 3.530
Standard Deviation = 1.072 Coefficient of Variation = 30.36 %
Failure Surface Specified By 11 Coordinate Points

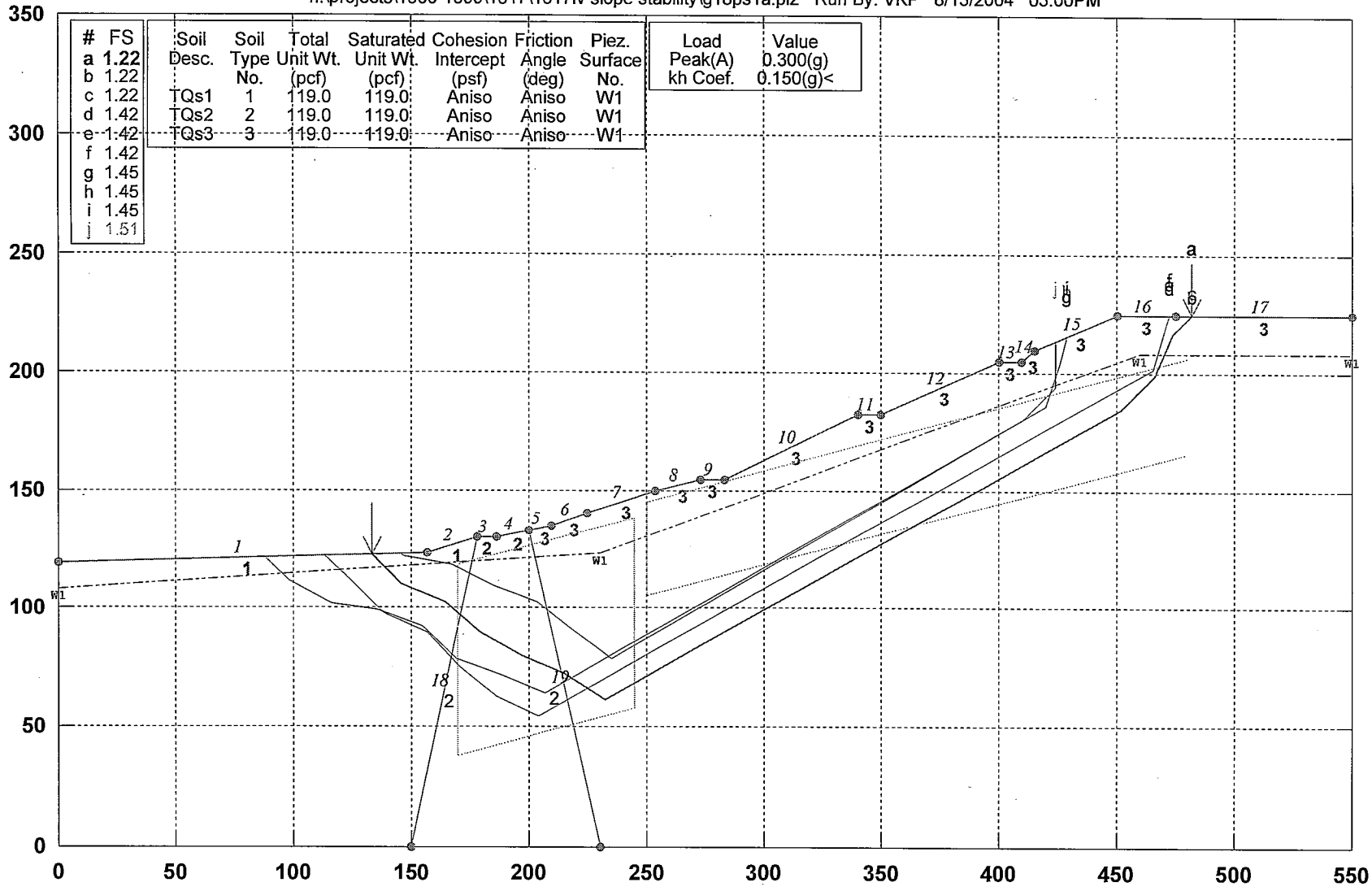
Point No.	X-Surf (ft)	Y-Surf (ft)
1	133.05	122.39
2	145.77	110.23
3	164.07	102.18
4	179.40	89.33
5	196.82	79.50
6	215.48	72.30
7	232.25	61.41
8	452.02	184.00
9	465.89	198.41
10	473.61	216.86
11	481.64	225.00

Factor of Safety
*** 1.694 ***
Individual data on the 34 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	5.6	1827.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.1	7615.9	0.0	2231.5	0.	0.	0.0	0.0	0.0
3	11.2	20177.2	0.0	7725.0	0.	0.	0.0	0.0	0.0
4	7.1	17209.5	0.0	7089.5	0.	0.	0.0	0.0	0.0
5	6.7	21681.3	0.0	10679.5	0.	0.	0.0	0.0	0.0
6	4.9	19935.8	0.0	9956.9	0.	0.	0.0	0.0	0.0
7	2.3	10310.2	0.0	5180.5	0.	0.	0.0	0.0	0.0
8	1.4	6669.0	0.0	3379.1	0.	0.	0.0	0.0	0.0
9	6.6	33414.2	0.0	15314.0	0.	0.	0.0	0.0	0.0
10	10.8	62570.8	0.0	29333.1	0.	0.	0.0	0.0	0.0
11	3.2	20359.0	0.0	8930.1	0.	0.	0.0	0.0	0.0
12	2.7	17554.7	0.0	7693.3	0.	0.	0.0	0.0	0.0
13	7.3	51053.2	0.0	22357.5	0.	0.	0.0	0.0	0.0
14	3.5	25913.8	0.0	11297.2	0.	0.	0.0	0.0	0.0
15	2.0	14853.1	0.0	6436.7	0.	0.	0.0	0.0	0.0
16	9.5	78425.0	0.0	37579.6	0.	0.	0.0	0.0	0.0
17	5.0	45437.5	0.0	21656.0	0.	0.	0.0	0.0	0.0
18	2.3	21424.1	0.0	9646.1	0.	0.	0.0	0.0	0.0
19	21.7	203871.6	0.0	88181.0	0.	0.	0.0	0.0	0.0
20	19.0	166540.7	0.0	72142.9	0.	0.	0.0	0.0	0.0
21	10.0	81003.4	0.0	36137.1	0.	0.	0.0	0.0	0.0
22	57.0	426543.5	0.0	*******	0.	0.	0.0	0.0	0.0
23	10.0	68661.0	0.0	27667.9	0.	0.	0.0	0.0	0.0
24	50.0	312165.0	0.0	*******	0.	0.	0.0	0.0	0.0
25	10.0	56205.0	0.0	20083.5	0.	0.	0.0	0.0	0.0
26	5.0	27100.9	0.0	9567.7	0.	0.	0.0	0.0	0.0
27	35.0	184892.4	0.0	58125.8	0.	0.	0.0	0.0	0.0
28	2.0	10002.2	0.0	2885.0	0.	0.	0.0	0.0	0.0
29	8.0	34989.0	0.0	12407.6	0.	0.	0.0	0.0	0.0
30	5.9	20764.1	0.0	6700.7	0.	0.	0.0	0.0	0.0
31	4.0	10406.0	0.0	3108.8	0.	0.	0.0	0.0	0.0
32	3.7	5547.5	0.0	0.0	0.	0.	0.0	0.0	0.0
33	1.4	1232.0	0.0	0.0	0.	0.	0.0	0.0	0.0
34	6.6	2655.5	0.0	0.0	0.	0.	0.0	0.0	0.0

GPR, T52584, Hasley Cyn, C S 18-18' Cut Slope 12, 3:1, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g18ps1a.pl2 Run By: VKP 8/13/2004 03:00PM



#	FS
a	1.22
b	1.22
c	1.22
d	1.42
e	1.42
f	1.42
g	1.45
h	1.45
i	1.45
j	1.51

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs1	1	119.0	119.0	Aniso	Aniso	W1
TQs2	2	119.0	119.0	Aniso	Aniso	W1
TQs3	3	119.0	119.0	Aniso	Aniso	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.22

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. - 49

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/13/2004
Time of Run:              03:00PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g18psla.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g18psla.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g18psla.PLT
PROBLEM DESCRIPTION:  GPR, T52584,  Hasley Cyn, C S 18-18'
                      Cut Slope 12, 3:1, Pseudostatic
BOUNDARY COORDINATES
   17 Top   Boundaries
   19 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     119.00     157.00     123.00        1
    2       157.00     123.00     178.00     130.00        1
    3       178.00     130.00     186.00     130.00        2
    4       186.00     130.00     200.00     133.00        2
    5       200.00     133.00     210.00     135.00        3
    6       210.00     135.00     225.00     140.00        3
    7       225.00     140.00     254.00     150.00        3
    8       254.00     150.00     273.00     155.00        3
    9       273.00     155.00     283.00     155.00        3
   10       283.00     155.00     340.00     182.00        3
   11       340.00     182.00     350.00     182.00        3
   12       350.00     182.00     400.00     205.00        3
   13       400.00     205.00     410.00     205.00        3
   14       410.00     205.00     415.00     210.00        3
   15       415.00     210.00     450.00     225.00        3
   16       450.00     225.00     475.00     225.00        3
   17       475.00     225.00     550.00     225.00        3
   18       150.00       0.00     178.00     130.00        2
   19       200.00     133.00     230.00       0.00        2
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)   Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00      0.0      1
  2   119.0    119.0     410.0     40.5    0.00      0.0      1
  3   119.0    119.0     410.0     40.5    0.00      0.0      1
ANISOTROPIC STRENGTH PARAMETERS
     3 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1            -41.0            410.00        40.50
    2            -39.0            347.00        22.00
    3             90.0            410.00        40.50
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	-41.0	410.00	40.50
2	29.0	347.00	22.00
3	90.0	410.00	40.50

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	29.0	410.00	40.50
2	31.0	347.00	22.00
3	90.0	410.00	40.50

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 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	108.00
2	230.00	123.00
3	460.00	208.00
4	550.00	208.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	170.00	78.00	245.00	98.00	80.00
2	250.00	125.00	480.00	186.00	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 The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.490 FS Min = 1.224 FS Ave = 2.243
Standard Deviation = 0.567 Coefficient of Variation = 25.27 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	133.05	122.39
2	145.77	110.23
3	164.07	102.18
4	179.40	89.33
5	196.82	79.50
6	215.48	72.30
7	232.25	61.41
8	452.02	184.00
9	465.89	198.41

10	473.61	216.86
11	481.64	225.00

Factor of Safety

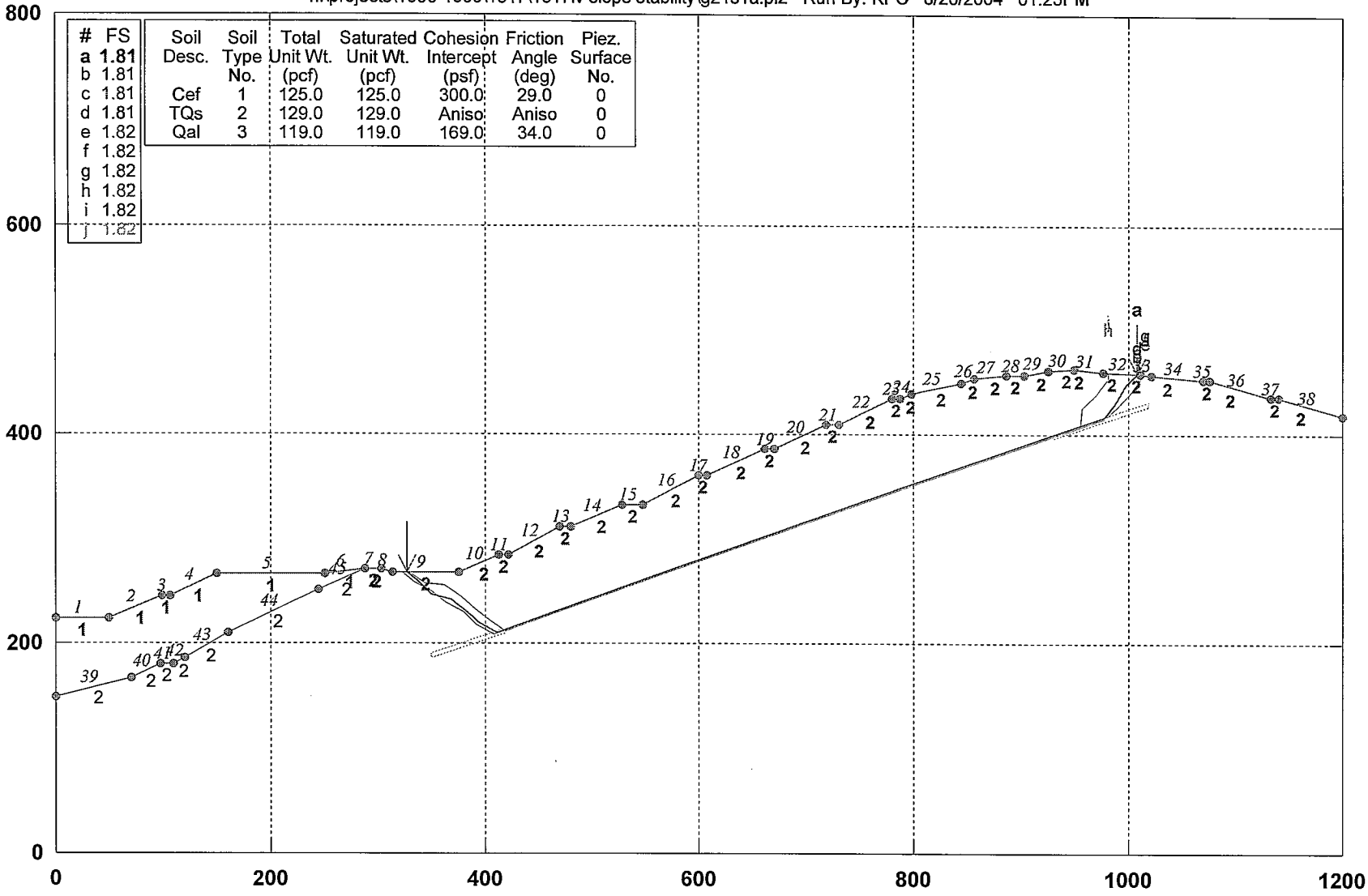
*** 1.224 ***

Individual data on the 34 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	5.6	1827.3	0.0	0.0	0.	0.	274.1	0.0	0.0
2	7.1	7615.9	0.0	2231.5	0.	0.	1142.4	0.0	0.0
3	11.2	20177.2	0.0	7725.0	0.	0.	3026.6	0.0	0.0
4	7.1	17209.5	0.0	7089.5	0.	0.	2581.4	0.0	0.0
5	6.7	21681.3	0.0	10679.5	0.	0.	3252.2	0.0	0.0
6	4.9	19935.8	0.0	9956.9	0.	0.	2990.4	0.0	0.0
7	2.3	10310.2	0.0	5180.5	0.	0.	1546.5	0.0	0.0
8	1.4	6669.0	0.0	3379.1	0.	0.	1000.3	0.0	0.0
9	6.6	33414.2	0.0	15314.0	0.	0.	5012.1	0.0	0.0
10	10.8	62570.8	0.0	29333.1	0.	0.	9385.6	0.0	0.0
11	3.2	20359.0	0.0	8930.1	0.	0.	3053.8	0.0	0.0
12	2.7	17554.7	0.0	7693.3	0.	0.	2633.2	0.0	0.0
13	7.3	51053.2	0.0	22357.5	0.	0.	7658.0	0.0	0.0
14	3.5	25913.8	0.0	11297.2	0.	0.	3887.1	0.0	0.0
15	2.0	14853.1	0.0	6436.7	0.	0.	2228.0	0.0	0.0
16	9.5	78425.0	0.0	37579.6	0.	0.	11763.7	0.0	0.0
17	5.0	45437.5	0.0	21656.0	0.	0.	6815.6	0.0	0.0
18	2.3	21424.1	0.0	9646.1	0.	0.	3213.6	0.0	0.0
19	21.7	203871.6	0.0	88181.0	0.	0.	30580.7	0.0	0.0
20	19.0	166540.7	0.0	72142.9	0.	0.	24981.1	0.0	0.0
21	10.0	81003.4	0.0	36137.1	0.	0.	12150.5	0.0	0.0
22	57.0	426543.5	0.0	*******	0.	0.	63981.5	0.0	0.0
23	10.0	68661.0	0.0	27667.9	0.	0.	10299.2	0.0	0.0
24	50.0	312165.0	0.0	*******	0.	0.	46824.8	0.0	0.0
25	10.0	56205.0	0.0	20083.5	0.	0.	8430.7	0.0	0.0
26	5.0	27100.9	0.0	9567.7	0.	0.	4065.1	0.0	0.0
27	35.0	184892.4	0.0	58125.8	0.	0.	27733.9	0.0	0.0
28	2.0	10002.2	0.0	2885.0	0.	0.	1500.3	0.0	0.0
29	8.0	34989.0	0.0	12407.6	0.	0.	5248.3	0.0	0.0
30	5.9	20764.1	0.0	6700.7	0.	0.	3114.6	0.0	0.0
31	4.0	10406.0	0.0	3108.8	0.	0.	1560.9	0.0	0.0
32	3.7	5547.5	0.0	0.0	0.	0.	832.1	0.0	0.0
33	1.4	1232.0	0.0	0.0	0.	0.	184.8	0.0	0.0
34	6.6	2655.5	0.0	0.0	0.	0.	398.3	0.0	0.0

G P R, T52584, 21-21', Cut Slope 11, Along silty clay bed, Static

n:\projects\1600-1699\1617\1617lv slope stability\g21s1a.pl2 Run By: KPC 8/20/2004 01:25PM



#	FS
a	1.81
b	1.81
c	1.81
d	1.81
e	1.82
f	1.82
g	1.82
h	1.82
i	1.82
j	1.82

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	129.0	129.0	Aniso	Aniso	0
Qal	3	119.0	119.0	169.0	34.0	0

GSTABL7 v.2 FSmin=1.81

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 5D

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****
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: 8/20/2004
Time of Run: 01:25PM
Run By: KPC
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g21s1a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g21s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g21s1a.PLT
PROBLEM DESCRIPTION: G P R, T52584, 21-21', Cut Slope 11,
Along silty clay bed, Static

BOUNDARY COORDINATES
38 Top Boundaries
45 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	223.00	50.00	223.00	1
2	50.00	223.00	99.00	245.00	1
3	99.00	245.00	107.00	245.00	1
4	107.00	245.00	150.00	265.00	1
5	150.00	265.00	250.00	265.00	1
6	250.00	265.00	288.00	270.00	1
7	288.00	270.00	303.00	270.00	2
8	303.00	270.00	314.00	267.00	2
9	314.00	267.00	375.00	267.00	2
10	375.00	267.00	413.00	284.00	2
11	413.00	284.00	421.00	284.00	2
12	421.00	284.00	470.00	310.00	2
13	470.00	310.00	480.00	310.00	2
14	480.00	310.00	528.00	332.00	2
15	528.00	332.00	548.00	332.00	2
16	548.00	332.00	600.00	360.00	2
17	600.00	360.00	608.00	360.00	2
18	608.00	360.00	662.00	385.00	2
19	662.00	385.00	670.00	385.00	2
20	670.00	385.00	718.00	410.00	2
21	718.00	410.00	730.00	410.00	2
22	730.00	410.00	780.00	435.00	2
23	780.00	435.00	788.00	435.00	2
24	788.00	435.00	798.00	440.00	2
25	798.00	440.00	845.00	450.00	2
26	845.00	450.00	856.00	454.00	2
27	856.00	454.00	886.00	457.00	2
28	886.00	457.00	903.00	457.00	2
29	903.00	457.00	925.00	462.00	2
30	925.00	462.00	950.00	463.00	2
31	950.00	463.00	977.00	460.00	2
32	977.00	460.00	1011.00	459.00	2
33	1011.00	459.00	1022.00	458.00	2
34	1022.00	458.00	1070.00	453.00	2
35	1070.00	453.00	1075.00	453.00	2
36	1075.00	453.00	1132.00	436.00	2
37	1132.00	436.00	1140.00	436.00	2
38	1140.00	436.00	1200.00	419.00	2
39	0.00	148.00	70.00	167.00	2
40	70.00	167.00	98.00	180.00	2

41	98.00	180.00	110.00	180.00	2
42	110.00	180.00	120.00	186.00	2
43	120.00	186.00	160.00	210.00	2
44	160.00	210.00	245.00	250.00	2
45	245.00	250.00	288.00	270.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	129.0	129.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

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	20.0	410.00	40.50
2	24.0	347.00	22.00
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	350.00	188.00	420.00	212.00	4.00
2	930.00	398.00	1018.00	430.00	4.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.718 FS Min = 1.813 FS Ave = 2.801
Standard Deviation = 0.680 Coefficient of Variation = 24.29 %
Failure Surface Specified By 11 Coordinate Points

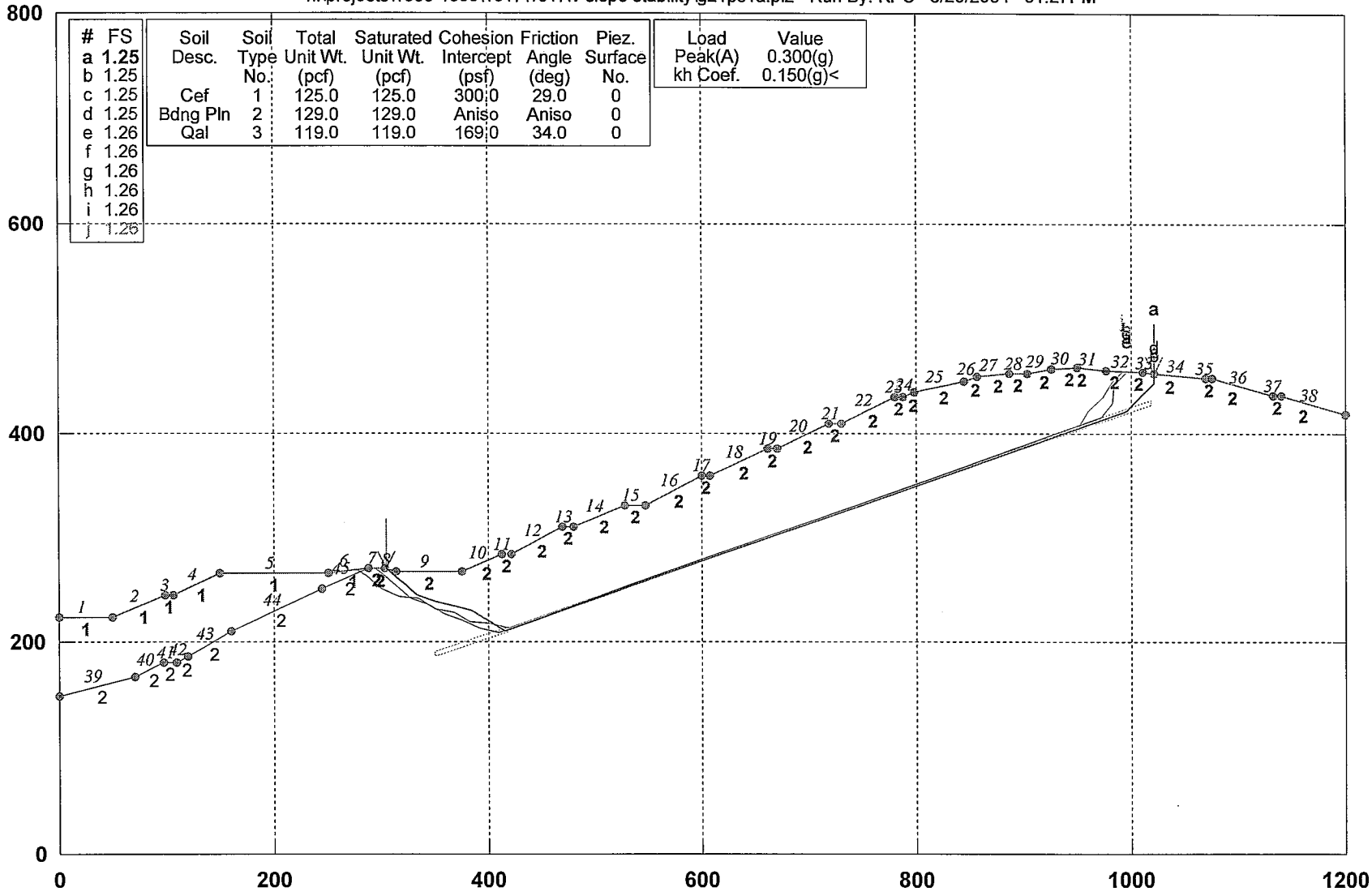
Point No.	X-Surf (ft)	Y-Surf (ft)
1	327.08	267.00
2	336.73	258.84
3	349.63	246.28
4	367.07	241.86
5	381.73	231.41
6	394.61	218.83
7	410.63	210.63
8	978.16	417.47
9	988.36	432.30
10	997.21	447.97
11	1008.11	459.09

Factor of Safety

*** 1.813 ***

G P R, T52584, 21-21', Cut Slope 11, Along silty clay bed, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g21ps1a.pl2 Run By: KPC 8/20/2004 01:27PM



#	FS
a	1.25
b	1.25
c	1.25
d	1.25
e	1.26
f	1.26
g	1.26
h	1.26
i	1.26
j	1.26

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
Bdng Pln	2	129.0	129.0	Aniso	Aniso	0
Qal	3	119.0	119.0	169.0	34.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.25

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. - 51

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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.
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Analysis Run Date:        8/20/2004
Time of Run:              01:27PM
Run By:                   KPC
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g21ps1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g21ps1a.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g21ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 21-21', Cut Slope 11,
                      Along silty clay bed, Pseudostatic
BOUNDARY COORDINATES
   38 Top   Boundaries
   45 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	223.00	50.00	223.00	1
2	50.00	223.00	99.00	245.00	1
3	99.00	245.00	107.00	245.00	1
4	107.00	245.00	150.00	265.00	1
5	150.00	265.00	250.00	265.00	1
6	250.00	265.00	288.00	270.00	1
7	288.00	270.00	303.00	270.00	2
8	303.00	270.00	314.00	267.00	2
9	314.00	267.00	375.00	267.00	2
10	375.00	267.00	413.00	284.00	2
11	413.00	284.00	421.00	284.00	2
12	421.00	284.00	470.00	310.00	2
13	470.00	310.00	480.00	310.00	2
14	480.00	310.00	528.00	332.00	2
15	528.00	332.00	548.00	332.00	2
16	548.00	332.00	600.00	360.00	2
17	600.00	360.00	608.00	360.00	2
18	608.00	360.00	662.00	385.00	2
19	662.00	385.00	670.00	385.00	2
20	670.00	385.00	718.00	410.00	2
21	718.00	410.00	730.00	410.00	2
22	730.00	410.00	780.00	435.00	2
23	780.00	435.00	788.00	435.00	2
24	788.00	435.00	798.00	440.00	2
25	798.00	440.00	845.00	450.00	2
26	845.00	450.00	856.00	454.00	2
27	856.00	454.00	886.00	457.00	2
28	886.00	457.00	903.00	457.00	2
29	903.00	457.00	925.00	462.00	2
30	925.00	462.00	950.00	463.00	2
31	950.00	463.00	977.00	460.00	2
32	977.00	460.00	1011.00	459.00	2
33	1011.00	459.00	1022.00	458.00	2
34	1022.00	458.00	1070.00	453.00	2
35	1070.00	453.00	1075.00	453.00	2
36	1075.00	453.00	1132.00	436.00	2
37	1132.00	436.00	1140.00	436.00	2
38	1140.00	436.00	1200.00	419.00	2
39	0.00	148.00	70.00	167.00	2
40	70.00	167.00	98.00	180.00	2

41	98.00	180.00	110.00	180.00	2
42	110.00	180.00	120.00	186.00	2
43	120.00	186.00	160.00	210.00	2
44	160.00	210.00	245.00	250.00	2
45	245.00	250.00	288.00	270.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	129.0	129.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

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	20.0	410.00	40.50
2	24.0	347.00	22.00
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	350.00	188.00	420.00	212.00	4.00
2	930.00	398.00	1018.00	430.00	4.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 2.318 FS Min = 1.254 FS Ave = 1.860
Standard Deviation = 0.397 Coefficient of Variation = 21.32 %
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	305.13	269.42
2	305.86	268.72
3	319.39	256.85
4	332.43	244.44
5	349.24	237.99
6	366.75	233.84
7	384.09	229.02
8	399.54	219.78

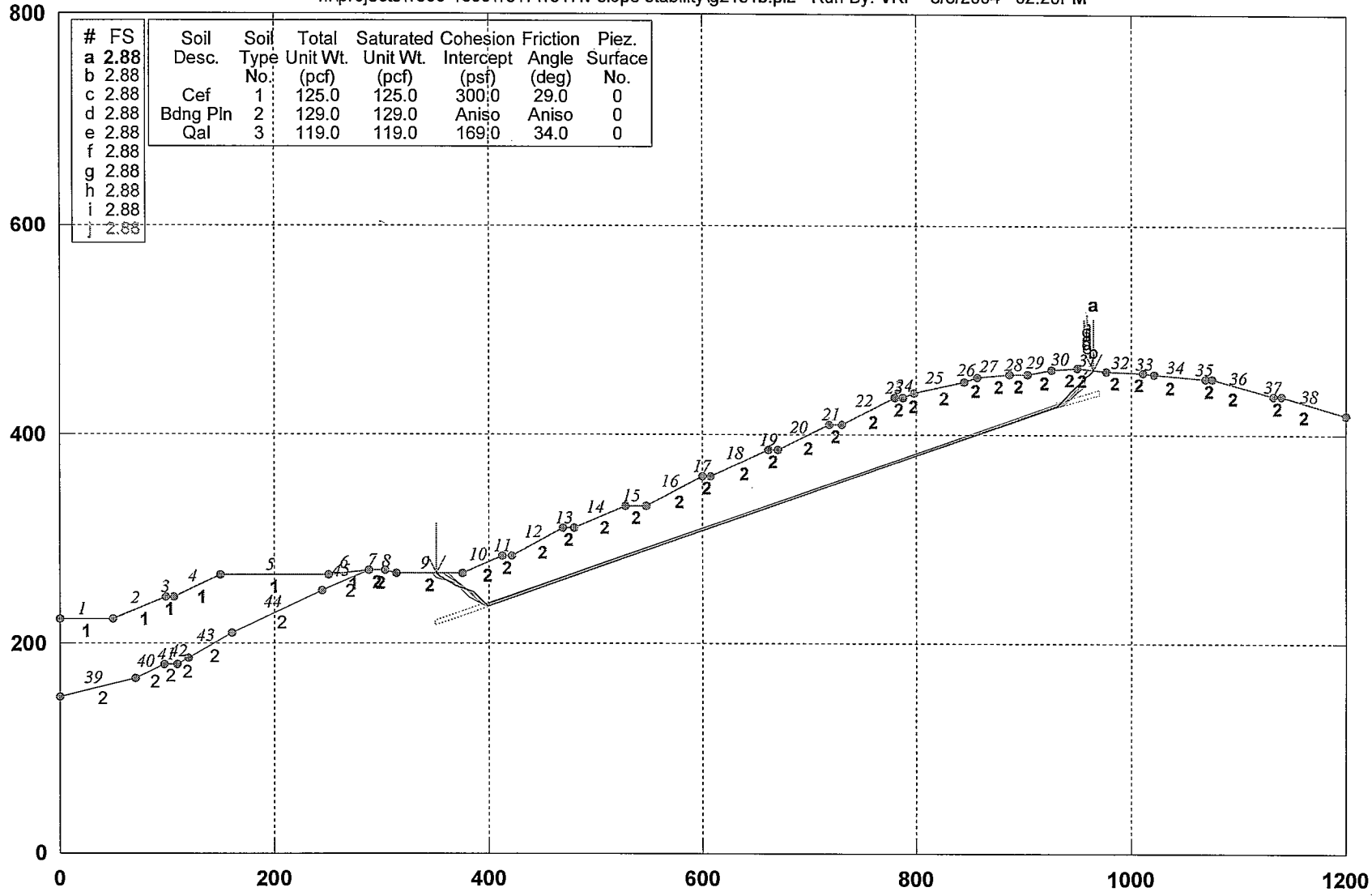
9	414.95	210.48
10	996.15	422.04
11	1008.46	435.17
12	1020.95	448.12
13	1021.86	458.01

Factor of Safety

*** 1.254 ***

G P R, T52584, 21-21', Cut Slope 11, Above silty clay bed, Static

n:\projects\1600-1699\1617\1617lv slope stability\g21s1b.pl2 Run By: VKP 8/6/2004 02:20PM



#	FS
a	2.88
b	2.88
c	2.88
d	2.88
e	2.88
f	2.88
g	2.88
h	2.88
i	2.88
j	2.88

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
Bdng Pln	2	129.0	129.0	Aniso	Aniso	0
Qal	3	119.0	119.0	169.0	34.0	0

GSTABL7 v.2 FSmin=2.88

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 52

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****
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: 8/6/2004
Time of Run: 02:20PM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g21s1b.in
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g21s1b.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g21s1b.PLT
PROBLEM DESCRIPTION: G P R, T52584, 21-21', Cut Slope 11,
Above silty clay bed, Static

BOUNDARY COORDINATES
38 Top Boundaries
45 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	223.00	50.00	223.00	1
2	50.00	223.00	99.00	245.00	1
3	99.00	245.00	107.00	245.00	1
4	107.00	245.00	150.00	265.00	1
5	150.00	265.00	250.00	265.00	1
6	250.00	265.00	288.00	270.00	1
7	288.00	270.00	303.00	270.00	2
8	303.00	270.00	314.00	267.00	2
9	314.00	267.00	375.00	267.00	2
10	375.00	267.00	413.00	284.00	2
11	413.00	284.00	421.00	284.00	2
12	421.00	284.00	470.00	310.00	2
13	470.00	310.00	480.00	310.00	2
14	480.00	310.00	528.00	332.00	2
15	528.00	332.00	548.00	332.00	2
16	548.00	332.00	600.00	360.00	2
17	600.00	360.00	608.00	360.00	2
18	608.00	360.00	662.00	385.00	2
19	662.00	385.00	670.00	385.00	2
20	670.00	385.00	718.00	410.00	2
21	718.00	410.00	730.00	410.00	2
22	730.00	410.00	780.00	435.00	2
23	780.00	435.00	788.00	435.00	2
24	788.00	435.00	798.00	440.00	2
25	798.00	440.00	845.00	450.00	2
26	845.00	450.00	856.00	454.00	2
27	856.00	454.00	886.00	457.00	2
28	886.00	457.00	903.00	457.00	2
29	903.00	457.00	925.00	462.00	2
30	925.00	462.00	950.00	463.00	2
31	950.00	463.00	977.00	460.00	2
32	977.00	460.00	1011.00	459.00	2
33	1011.00	459.00	1022.00	458.00	2
34	1022.00	458.00	1070.00	453.00	2
35	1070.00	453.00	1075.00	453.00	2
36	1075.00	453.00	1132.00	436.00	2
37	1132.00	436.00	1140.00	436.00	2
38	1140.00	436.00	1200.00	419.00	2
39	0.00	148.00	70.00	167.00	2
40	70.00	167.00	98.00	180.00	2
41	98.00	180.00	110.00	180.00	2

42	110.00	180.00	120.00	186.00	2
43	120.00	186.00	160.00	210.00	2
44	160.00	210.00	245.00	250.00	2
45	245.00	250.00	288.00	270.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	129.0	129.0	347.0	22.0	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

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	20.0	410.00	40.50
2	24.0	410.00	40.50
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	350.00	220.00	400.00	238.00	4.00
2	930.00	428.00	970.00	440.00	4.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.427 FS Min = 2.880 FS Ave = 3.080
Standard Deviation = 0.127 Coefficient of Variation = 4.12 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	351.08	267.00
2	353.66	264.58
3	369.28	255.64
4	385.74	248.36
5	398.47	235.63
6	931.88	428.22
7	944.09	441.45
8	956.79	454.21
9	963.75	461.47

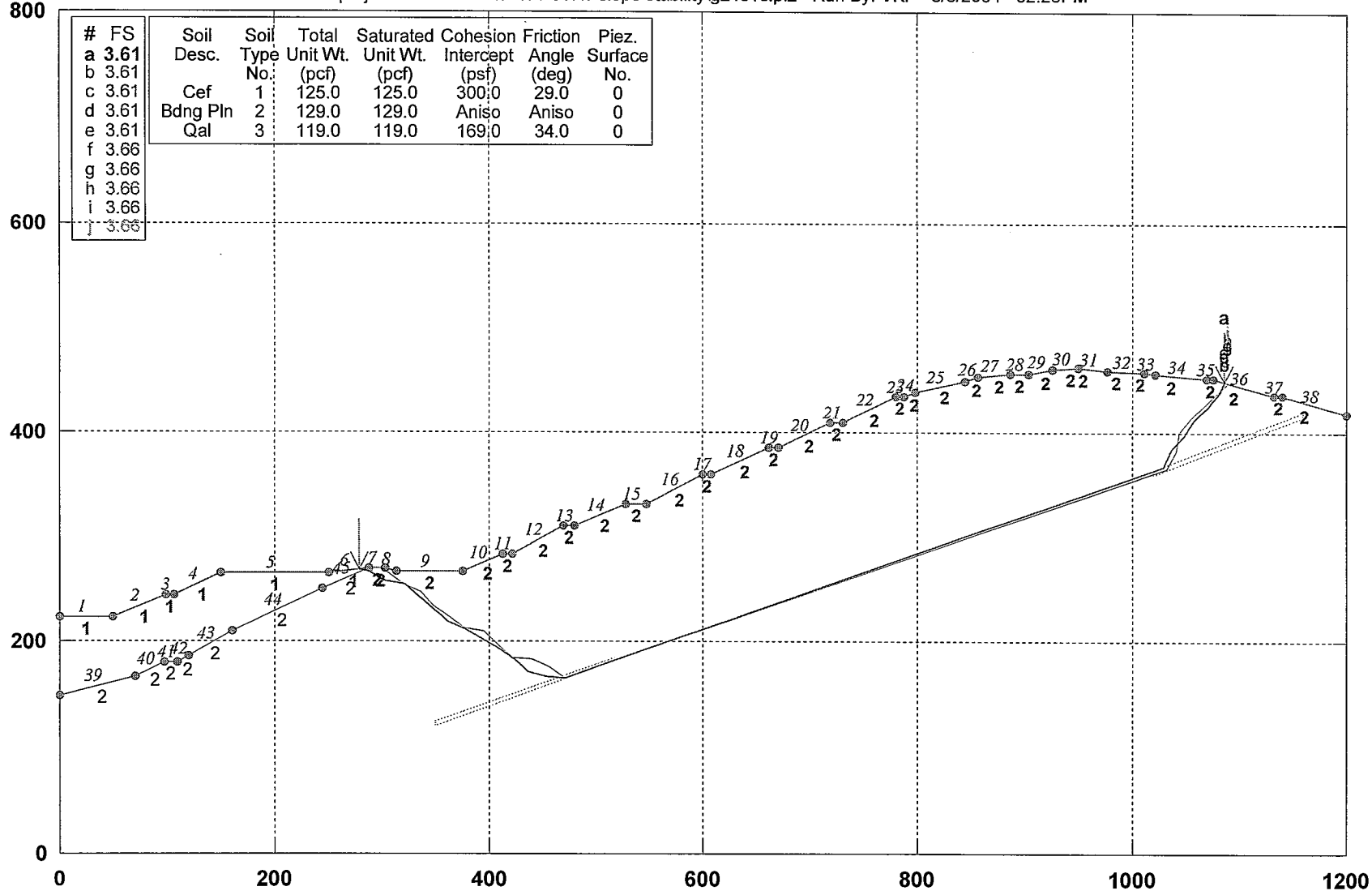
Factor of Safety
*** 2.880 ***
Individual data on the 30 slices

	Water	Water	Tie	Tie	Earthquake

Slice No.	Width (ft)	Weight (lbs)	Force Top (lbs)	Force Bot (lbs)	Force Norm (lbs)	Force Tan (lbs)	Force Hor (lbs)	Force Ver (lbs)	Surcharge Load (lbs)
1	2.6	401.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	15.6	13880.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.7	9316.9	0.0	0.0	0.	0.	0.0	0.0	0.0
4	10.7	25868.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	12.7	53624.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	14.5	79644.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	8.0	43010.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	49.0	280571.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	10.0	60289.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	48.0	292668.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	20.0	118653.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	52.0	315221.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.0	51765.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	54.0	358523.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	8.0	54463.8	0.0	0.0	0.	0.	0.0	0.0	0.0
16	48.0	341584.6	0.0	0.0	0.	0.	0.0	0.0	0.0
17	12.0	87978.8	0.0	0.0	0.	0.	0.0	0.0	0.0
18	50.0	375011.0	0.0	0.0	0.	0.	0.0	0.0	0.0
19	8.0	62096.1	0.0	0.0	0.	0.	0.0	0.0	0.0
20	10.0	76653.4	0.0	0.0	0.	0.	0.0	0.0	0.0
21	47.0	343355.1	0.0	0.0	0.	0.	0.0	0.0	0.0
22	11.0	75435.0	0.0	0.0	0.	0.	0.0	0.0	0.0
23	30.0	190632.7	0.0	0.0	0.	0.	0.0	0.0	0.0
24	17.0	92707.7	0.0	0.0	0.	0.	0.0	0.0	0.0
25	22.0	107088.5	0.0	0.0	0.	0.	0.0	0.0	0.0
26	6.9	31213.4	0.0	0.0	0.	0.	0.0	0.0	0.0
27	12.2	43607.5	0.0	0.0	0.	0.	0.0	0.0	0.0
28	5.9	14069.9	0.0	0.0	0.	0.	0.0	0.0	0.0
29	6.8	10349.5	0.0	0.0	0.	0.	0.0	0.0	0.0
30	7.0	3610.6	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 21-21', Cut Slope 11, Below silty clay bed, Static

n:\projects\1600-1699\1617\1617lv slope stability\g21s1c.pl2 Run By: VKP 8/6/2004 02:26PM



GSTABL7 v.2 FSmin=3.61

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO.-53

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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****

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: 8/6/2004
Time of Run: 02:26PM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g21s1c.in
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g21s1c.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g21s1c.PLT
PROBLEM DESCRIPTION: G P R, T52584, 21-21', Cut Slope 11,
Below silty clay bed, Static

BOUNDARY COORDINATES
38 Top Boundaries
45 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	223.00	50.00	223.00	1
2	50.00	223.00	99.00	245.00	1
3	99.00	245.00	107.00	245.00	1
4	107.00	245.00	150.00	265.00	1
5	150.00	265.00	250.00	265.00	1
6	250.00	265.00	288.00	270.00	1
7	288.00	270.00	303.00	270.00	2
8	303.00	270.00	314.00	267.00	2
9	314.00	267.00	375.00	267.00	2
10	375.00	267.00	413.00	284.00	2
11	413.00	284.00	421.00	284.00	2
12	421.00	284.00	470.00	310.00	2
13	470.00	310.00	480.00	310.00	2
14	480.00	310.00	528.00	332.00	2
15	528.00	332.00	548.00	332.00	2
16	548.00	332.00	600.00	360.00	2
17	600.00	360.00	608.00	360.00	2
18	608.00	360.00	662.00	385.00	2
19	662.00	385.00	670.00	385.00	2
20	670.00	385.00	718.00	410.00	2
21	718.00	410.00	730.00	410.00	2
22	730.00	410.00	780.00	435.00	2
23	780.00	435.00	788.00	435.00	2
24	788.00	435.00	798.00	440.00	2
25	798.00	440.00	845.00	450.00	2
26	845.00	450.00	856.00	454.00	2
27	856.00	454.00	886.00	457.00	2
28	886.00	457.00	903.00	457.00	2
29	903.00	457.00	925.00	462.00	2
30	925.00	462.00	950.00	463.00	2
31	950.00	463.00	977.00	460.00	2
32	977.00	460.00	1011.00	459.00	2
33	1011.00	459.00	1022.00	458.00	2
34	1022.00	458.00	1070.00	453.00	2
35	1070.00	453.00	1075.00	453.00	2
36	1075.00	453.00	1132.00	436.00	2
37	1132.00	436.00	1140.00	436.00	2
38	1140.00	436.00	1200.00	419.00	2
39	0.00	148.00	70.00	167.00	2
40	70.00	167.00	98.00	180.00	2
41	98.00	180.00	110.00	180.00	2

42	110.00	180.00	120.00	186.00	2
43	120.00	186.00	160.00	210.00	2
44	160.00	210.00	245.00	250.00	2
45	245.00	250.00	288.00	270.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	129.0	129.0	347.0	22.0	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

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	20.0	410.00	40.50
2	24.0	410.00	40.50
3	90.0	410.00	40.50

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.

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	350.00	122.00	518.00	183.00	4.00
2	1020.00	362.00	1160.00	418.00	4.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.429 FS Min = 3.608 FS Ave = 3.951
Standard Deviation = 0.197 Coefficient of Variation = 4.98 %
Failure Surface Specified By 21 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	278.89	268.80
2	287.44	266.85
3	303.27	258.28
4	320.97	254.98
5	334.41	243.01
6	347.87	231.06
7	360.87	218.62
8	377.48	211.67
9	393.03	202.61
10	408.53	193.45
11	423.67	183.72
12	436.40	171.00
13	453.67	165.90

14	471.64	164.94
15	1029.15	367.36
16	1037.18	383.47
17	1049.10	396.96
18	1057.86	412.69
19	1070.58	425.42
20	1081.30	439.88
21	1085.87	449.76

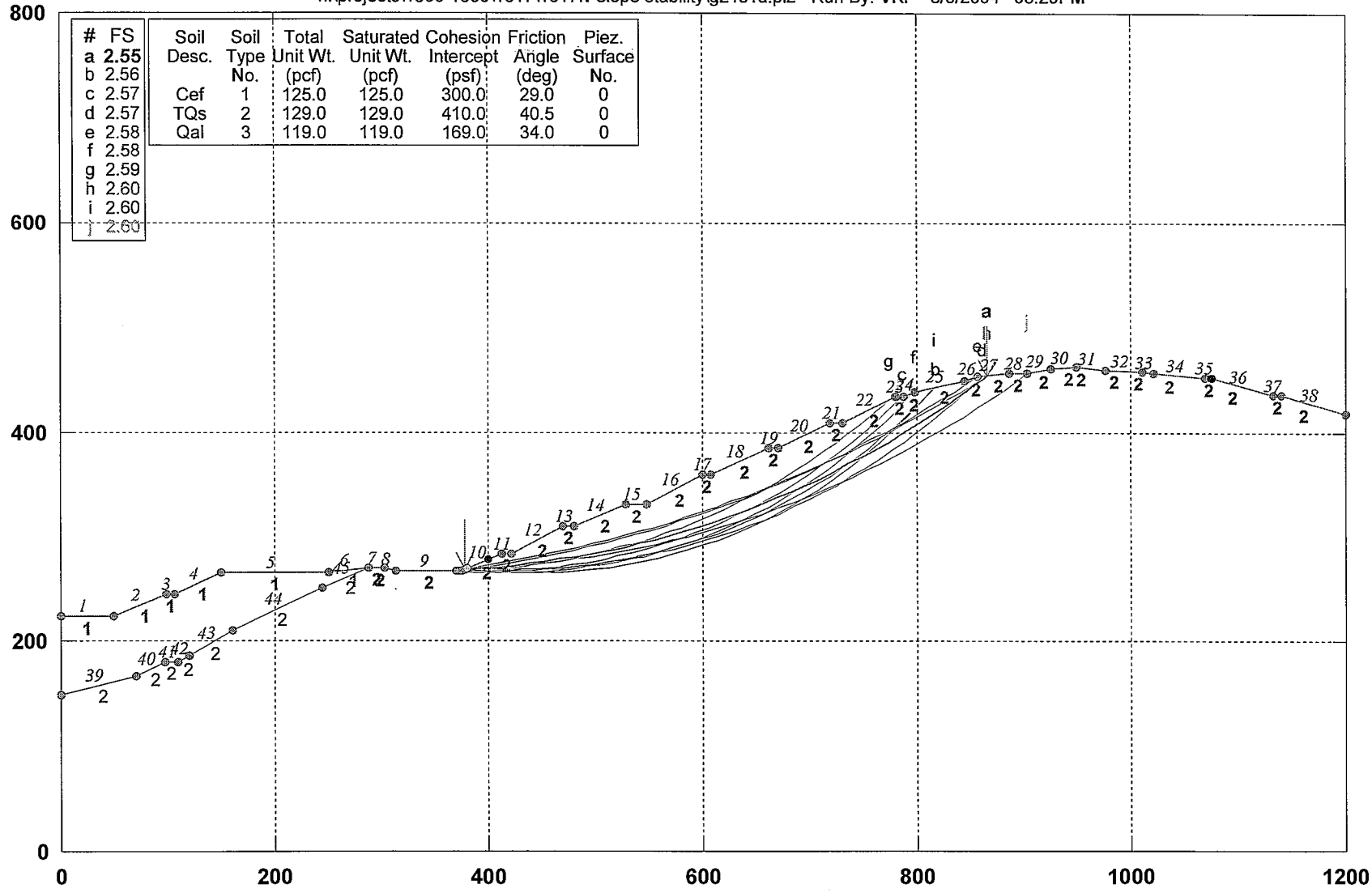
Factor of Safety
*** 3.608 ***

Individual data on the 51 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	4.4	431.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.2	1237.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.6	234.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	15.0	14539.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.3	405.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.7	15481.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	7.0	10217.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	13.4	31219.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	13.5	52047.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	13.0	70708.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	14.1	93551.7	0.0	0.0	0.	0.	0.0	0.0	0.0
12	2.5	17715.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	15.6	129302.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	15.5	160915.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	4.5	52494.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	8.0	99064.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	2.7	34531.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	12.7	183013.0	0.0	0.0	0.	0.	0.0	0.0	0.0
19	17.3	285735.4	0.0	0.0	0.	0.	0.0	0.0	0.0
20	16.3	295388.5	0.0	0.0	0.	0.	0.0	0.0	0.0
21	1.6	30719.5	0.0	0.0	0.	0.	0.0	0.0	0.0
22	8.4	154767.8	0.0	0.0	0.	0.	0.0	0.0	0.0
23	48.0	893598.8	0.0	0.0	0.	0.	0.0	0.0	0.0
24	20.0	368862.2	0.0	0.0	0.	0.	0.0	0.0	0.0
25	52.0	965270.8	0.0	0.0	0.	0.	0.0	0.0	0.0
26	8.0	151709.8	0.0	0.0	0.	0.	0.0	0.0	0.0
27	54.0	1032707.4	0.0	0.0	0.	0.	0.0	0.0	0.0
28	8.0	154277.6	0.0	0.0	0.	0.	0.0	0.0	0.0
29	48.0	940113.6	0.0	0.0	0.	0.	0.0	0.0	0.0
30	12.0	237516.3	0.0	0.0	0.	0.	0.0	0.0	0.0
31	50.0	997675.5	0.0	0.0	0.	0.	0.0	0.0	0.0
32	8.0	161661.4	0.0	0.0	0.	0.	0.0	0.0	0.0
33	10.0	201086.2	0.0	0.0	0.	0.	0.0	0.0	0.0
34	47.0	927836.8	0.0	0.0	0.	0.	0.0	0.0	0.0
35	11.0	212144.6	0.0	0.0	0.	0.	0.0	0.0	0.0
36	30.0	563315.1	0.0	0.0	0.	0.	0.0	0.0	0.0
37	17.0	303789.1	0.0	0.0	0.	0.	0.0	0.0	0.0
38	22.0	380139.8	0.0	0.0	0.	0.	0.0	0.0	0.0
39	25.0	414134.1	0.0	0.0	0.	0.	0.0	0.0	0.0
40	27.0	410900.8	0.0	0.0	0.	0.	0.0	0.0	0.0
41	34.0	460086.3	0.0	0.0	0.	0.	0.0	0.0	0.0
42	11.0	135839.8	0.0	0.0	0.	0.	0.0	0.0	0.0
43	7.2	84470.7	0.0	0.0	0.	0.	0.0	0.0	0.0
44	8.0	84334.2	0.0	0.0	0.	0.	0.0	0.0	0.0
45	11.9	100834.5	0.0	0.0	0.	0.	0.0	0.0	0.0
46	8.8	56391.8	0.0	0.0	0.	0.	0.0	0.0	0.0
47	12.1	54602.7	0.0	0.0	0.	0.	0.0	0.0	0.0
48	0.6	2099.3	0.0	0.0	0.	0.	0.0	0.0	0.0
49	4.4	14015.0	0.0	0.0	0.	0.	0.0	0.0	0.0
50	6.3	13361.9	0.0	0.0	0.	0.	0.0	0.0	0.0
51	4.6	3310.4	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 21-21', Cut Slope 11, Circular, Static

n:\projects\1600-1699\1617\1617lv slope stability\g21s1d.pl2 Run By: VKP 8/9/2004 03:29PM



#	FS
a	2.55
b	2.56
c	2.57
d	2.57
e	2.58
f	2.58
g	2.59
h	2.60
i	2.60
j	2.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	129.0	129.0	410.0	40.5	0
Qal	3	119.0	119.0	169.0	34.0	0

GSTABL7 v.2 FSmin=2.55

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO.-54

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                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  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:        8/9/2004
Time of Run:              03:29PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g21s1d.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g21s1d.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g21s1d.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 21-21', Cut Slope 11,
                      Circular, Static
BOUNDARY COORDINATES
   38 Top   Boundaries
   45 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	223.00	50.00	223.00	1
2	50.00	223.00	99.00	245.00	1
3	99.00	245.00	107.00	245.00	1
4	107.00	245.00	150.00	265.00	1
5	150.00	265.00	250.00	265.00	1
6	250.00	265.00	288.00	270.00	1
7	288.00	270.00	303.00	270.00	2
8	303.00	270.00	314.00	267.00	2
9	314.00	267.00	375.00	267.00	2
10	375.00	267.00	413.00	284.00	2
11	413.00	284.00	421.00	284.00	2
12	421.00	284.00	470.00	310.00	2
13	470.00	310.00	480.00	310.00	2
14	480.00	310.00	528.00	332.00	2
15	528.00	332.00	548.00	332.00	2
16	548.00	332.00	600.00	360.00	2
17	600.00	360.00	608.00	360.00	2
18	608.00	360.00	662.00	385.00	2
19	662.00	385.00	670.00	385.00	2
20	670.00	385.00	718.00	410.00	2
21	718.00	410.00	730.00	410.00	2
22	730.00	410.00	780.00	435.00	2
23	780.00	435.00	788.00	435.00	2
24	788.00	435.00	798.00	440.00	2
25	798.00	440.00	845.00	450.00	2
26	845.00	450.00	856.00	454.00	2
27	856.00	454.00	886.00	457.00	2
28	886.00	457.00	903.00	457.00	2
29	903.00	457.00	925.00	462.00	2
30	925.00	462.00	950.00	463.00	2
31	950.00	463.00	977.00	460.00	2
32	977.00	460.00	1011.00	459.00	2
33	1011.00	459.00	1022.00	458.00	2
34	1022.00	458.00	1070.00	453.00	2
35	1070.00	453.00	1075.00	453.00	2
36	1075.00	453.00	1132.00	436.00	2
37	1132.00	436.00	1140.00	436.00	2
38	1140.00	436.00	1200.00	419.00	2
39	0.00	148.00	70.00	167.00	2
40	70.00	167.00	98.00	180.00	2

41	98.00	180.00	110.00	180.00	2
42	110.00	180.00	120.00	186.00	2
43	120.00	186.00	160.00	210.00	2
44	160.00	210.00	245.00	250.00	2
45	245.00	250.00	288.00	270.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	129.0	129.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

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	20.0	410.00	40.50
2	24.0	410.00	40.50
3	90.0	410.00	40.50

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.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
100 Surface(s) Initiate(s) From Each Of 10 Points Equally Spaced
Along The Ground Surface Between X = 370.00(ft)
and X = 380.00(ft)
Each Surface Terminates Between X = 400.00(ft)
and X =1075.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0 And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 7.932 FS Min = 2.545 FS Ave = 4.196
Standard Deviation = 0.842 Coefficient of Variation = 20.07 %
Failure Surface Specified By 37 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	377.78	268.24
2	392.74	269.27
3	407.69	270.55
4	422.61	272.09
5	437.50	273.89
6	452.36	275.95
7	467.18	278.27
8	481.96	280.84

9	496.69	283.67
10	511.37	286.75
11	525.99	290.09
12	540.55	293.68
13	555.05	297.52
14	569.48	301.61
15	583.84	305.96
16	598.12	310.55
17	612.32	315.38
18	626.43	320.47
19	640.46	325.79
20	654.38	331.36
21	668.21	337.17
22	681.94	343.22
23	695.56	349.51
24	709.07	356.03
25	722.46	362.78
26	735.73	369.77
27	748.89	376.98
28	761.91	384.43
29	774.80	392.09
30	787.56	399.98
31	800.18	408.09
32	812.66	416.41
33	824.99	424.96
34	837.17	433.71
35	849.20	442.67
36	861.07	451.84
37	864.87	454.89

Circle Center At X = 326.20 ; Y = 1131.88 ; and Radius = 865.17

Factor of Safety

*** 2.545 ***

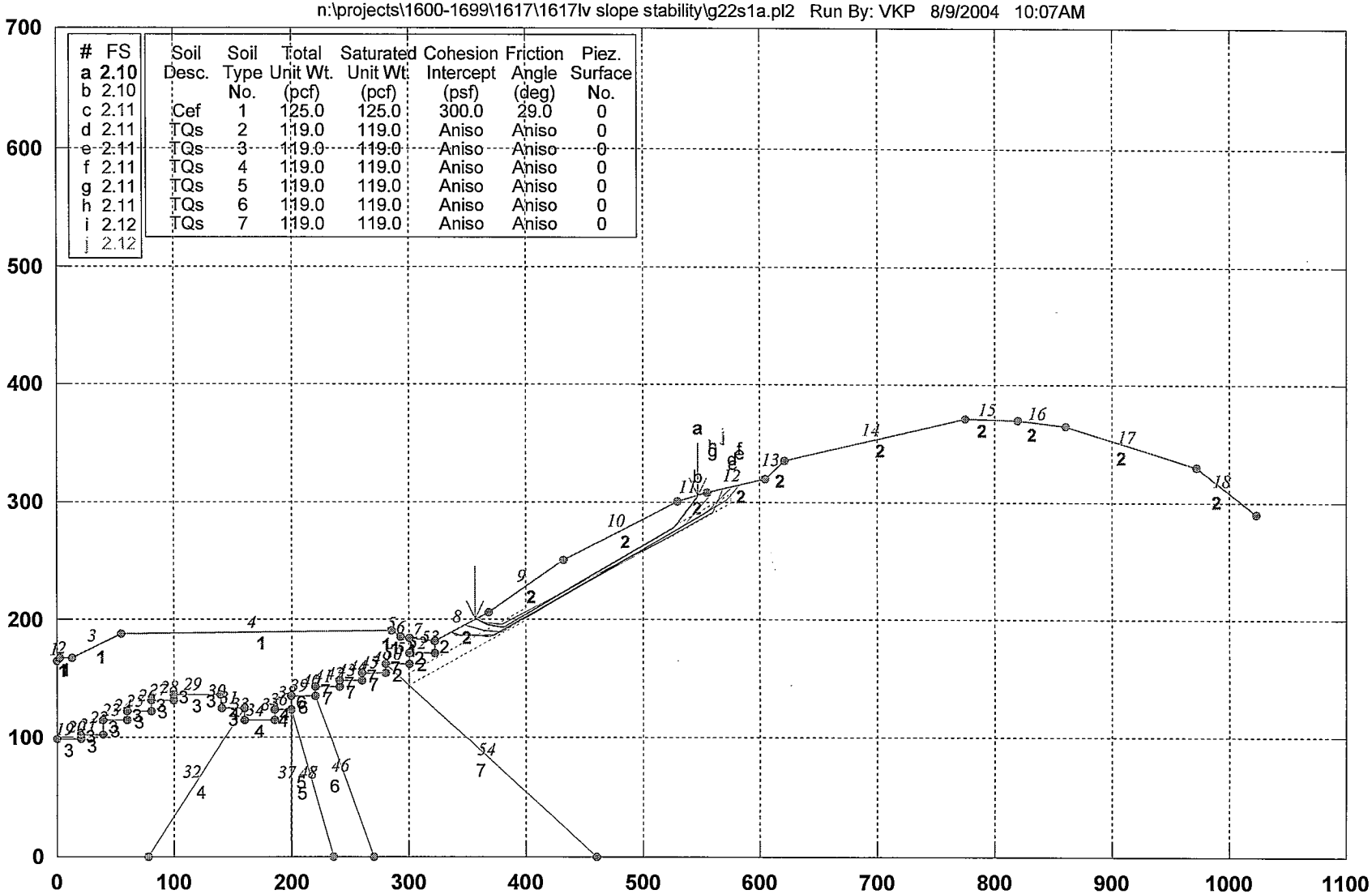
Individual data on the 53 slices

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	15.0	5473.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	14.9	16140.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.3	8214.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	12887.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	1.6	2576.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	14.9	30374.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	14.9	41736.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.8	52501.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	2.8	11189.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.0	39179.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	2.0	7513.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	14.7	60845.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	14.7	67799.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	14.6	74155.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	2.0	10680.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	12.6	64570.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	7.4	35858.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	7.1	33955.0	0.0	0.0	0.	0.	0.0	0.0	0.0
19	14.4	74680.3	0.0	0.0	0.	0.	0.0	0.0	0.0
20	14.4	80845.4	0.0	0.0	0.	0.	0.0	0.0	0.0
21	14.3	86384.3	0.0	0.0	0.	0.	0.0	0.0	0.0
22	1.9	11775.3	0.0	0.0	0.	0.	0.0	0.0	0.0
23	8.0	48969.2	0.0	0.0	0.	0.	0.0	0.0	0.0
24	4.3	25839.2	0.0	0.0	0.	0.	0.0	0.0	0.0
25	14.1	86185.5	0.0	0.0	0.	0.	0.0	0.0	0.0
26	14.0	87999.5	0.0	0.0	0.	0.	0.0	0.0	0.0
27	13.9	89242.3	0.0	0.0	0.	0.	0.0	0.0	0.0
28	7.6	49393.0	0.0	0.0	0.	0.	0.0	0.0	0.0
29	6.2	39376.8	0.0	0.0	0.	0.	0.0	0.0	0.0
30	1.8	10934.9	0.0	0.0	0.	0.	0.0	0.0	0.0

31	11.9	73183.8	0.0	0.0	0.	0.	0.0	0.0	0.0
32	13.6	85032.8	0.0	0.0	0.	0.	0.0	0.0	0.0
33	13.5	85491.5	0.0	0.0	0.	0.	0.0	0.0	0.0
34	8.9	56916.9	0.0	0.0	0.	0.	0.0	0.0	0.0
35	4.5	27813.6	0.0	0.0	0.	0.	0.0	0.0	0.0
36	7.5	43994.2	0.0	0.0	0.	0.	0.0	0.0	0.0
37	5.7	31936.5	0.0	0.0	0.	0.	0.0	0.0	0.0
38	13.2	72572.6	0.0	0.0	0.	0.	0.0	0.0	0.0
39	13.0	70553.7	0.0	0.0	0.	0.	0.0	0.0	0.0
40	12.9	68056.9	0.0	0.0	0.	0.	0.0	0.0	0.0
41	5.2	26820.8	0.0	0.0	0.	0.	0.0	0.0	0.0
42	7.6	36435.2	0.0	0.0	0.	0.	0.0	0.0	0.0
43	0.4	1977.0	0.0	0.0	0.	0.	0.0	0.0	0.0
44	10.0	43891.9	0.0	0.0	0.	0.	0.0	0.0	0.0
45	2.2	9236.8	0.0	0.0	0.	0.	0.0	0.0	0.0
46	12.5	47544.9	0.0	0.0	0.	0.	0.0	0.0	0.0
47	12.3	37770.5	0.0	0.0	0.	0.	0.0	0.0	0.0
48	12.2	27820.8	0.0	0.0	0.	0.	0.0	0.0	0.0
49	7.8	12667.2	0.0	0.0	0.	0.	0.0	0.0	0.0
50	4.2	5225.5	0.0	0.0	0.	0.	0.0	0.0	0.0
51	6.8	6549.0	0.0	0.0	0.	0.	0.0	0.0	0.0
52	5.1	2853.8	0.0	0.0	0.	0.	0.0	0.0	0.0
53	3.8	652.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R T52584, 22-22', 195' High Nat. Slope, Bed. Pln. Static

n:\projects\1600-1699\1617\1617lv slope stability\g22s1a.pl2 Run By: VKP 8/9/2004 10:07AM



#	FS	Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
a	2.10							
b	2.10							
c	2.11	Cef	1	125.0	125.0	300.0	29.0	0
d	2.11	TQs	2	119.0	119.0	Aniso	Aniso	0
e	2.11	TQs	3	119.0	119.0	Aniso	Aniso	0
f	2.11	TQs	4	119.0	119.0	Aniso	Aniso	0
g	2.11	TQs	5	119.0	119.0	Aniso	Aniso	0
h	2.11	TQs	6	119.0	119.0	Aniso	Aniso	0
i	2.12	TQs	7	119.0	119.0	Aniso	Aniso	0
j	2.12							

GSTABL7 v.2 FSmin=2.10

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No.-55

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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.
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Analysis Run Date:        8/9/2004
Time of Run:              10:07AM
Run By:                   VKP
Input Data Filename:      n:\Projects\1600-1699\1617\1617LV slope stability\g22s1a.
Output Filename:          n:\Projects\1600-1699\1617\1617LV slope stability\g22s1a.OUT
Unit System:              English
Plotted Output Filename:  n:\Projects\1600-1699\1617\1617Lope stability\g22s1a.PLT
PROBLEM DESCRIPTION:  G P R T52584, 22-22', 195' High Nat.
                      Slope,  Bed. Pln. Static
BOUNDARY COORDINATES
   18 Top   Boundaries
   54 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	165.00	3.00	168.00	1
2	3.00	168.00	13.00	168.00	1
3	13.00	168.00	55.00	188.00	1
4	55.00	188.00	285.00	190.00	1
5	285.00	190.00	293.00	185.00	1
6	293.00	185.00	300.00	184.00	1
7	300.00	184.00	322.10	182.00	1
8	322.10	182.00	368.00	206.00	2
9	368.00	206.00	432.00	250.00	2
10	432.00	250.00	530.00	300.00	2
11	530.00	300.00	555.00	308.00	2
12	555.00	308.00	605.00	320.00	2
13	605.00	320.00	621.00	335.00	2
14	621.00	335.00	775.00	371.00	2
15	775.00	371.00	820.00	370.00	2
16	820.00	370.00	860.00	365.00	2
17	860.00	365.00	972.00	330.00	2
18	972.00	330.00	1023.00	290.00	2
19	0.00	98.00	20.00	98.00	3
20	20.00	98.00	20.10	102.00	3
21	20.10	102.00	40.00	102.00	3
22	40.00	102.00	40.10	115.00	3
23	40.10	115.00	60.00	115.00	3
24	60.00	115.00	60.10	123.00	3
25	60.10	123.00	80.00	123.00	3
26	80.00	123.00	80.10	132.00	3
27	80.10	132.00	100.00	132.00	3
28	100.00	132.00	100.10	137.00	3
29	100.10	137.00	140.00	137.00	3
30	140.00	137.00	140.10	125.00	3
31	140.10	125.00	160.00	125.00	3
32	78.00	0.00	160.00	125.00	4
33	160.00	125.00	160.10	115.00	4
34	160.10	115.00	185.00	115.00	4
35	185.00	115.00	185.10	124.00	4
36	185.10	124.00	200.00	124.00	4
37	199.90	0.00	200.00	124.00	5
38	200.00	124.00	200.10	135.00	6
39	200.10	135.00	220.00	135.00	6
40	220.00	135.00	220.10	143.00	7
41	220.10	143.00	240.00	143.00	7

42	240.00	143.00	240.10	148.00	7
43	240.10	148.00	260.00	148.00	7
44	260.00	148.00	260.10	155.00	7
45	260.10	155.00	280.00	155.00	7
46	220.00	135.00	270.00	0.00	6
47	200.00	124.00	235.00	0.00	5
48	200.00	124.00	235.00	0.00	5
49	280.00	155.00	280.10	163.00	7
50	280.10	163.00	300.00	163.00	2
51	300.00	163.00	300.10	171.00	2
52	300.10	171.00	322.00	171.00	2
53	322.00	171.00	322.10	182.00	2
54	280.10	163.00	460.00	0.00	7

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
7 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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	410.0	40.5	0.00	0.0	0
4	119.0	119.0	410.0	40.5	0.00	0.0	0
5	119.0	119.0	410.0	40.5	0.00	0.0	0
6	119.0	119.0	410.0	40.5	0.00	0.0	0
7	119.0	119.0	410.0	40.5	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
6 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	29.0	410.00	40.50
2	31.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-35.0	410.00	40.50
2	-33.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-19.0	410.00	40.50
2	-17.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	410.00	40.50
2	6.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	13.0	410.00	40.50
2	15.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.0	410.00	40.50
2	27.0	410.00	40.50
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	300.00	150.00	400.00	205.00	10.00
2	520.00	272.00	575.00	303.00	8.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.925 FS Min = 2.101 FS Ave = 2.460
Standard Deviation = 0.398 Coefficient of Variation = 16.18 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	357.13	200.32
2	366.68	195.67
3	381.41	192.86
4	526.51	278.65
5	536.38	289.95
6	544.82	302.35
7	547.50	305.60

Factor of Safety
*** 2.101 ***

Individual data on the 9 slices

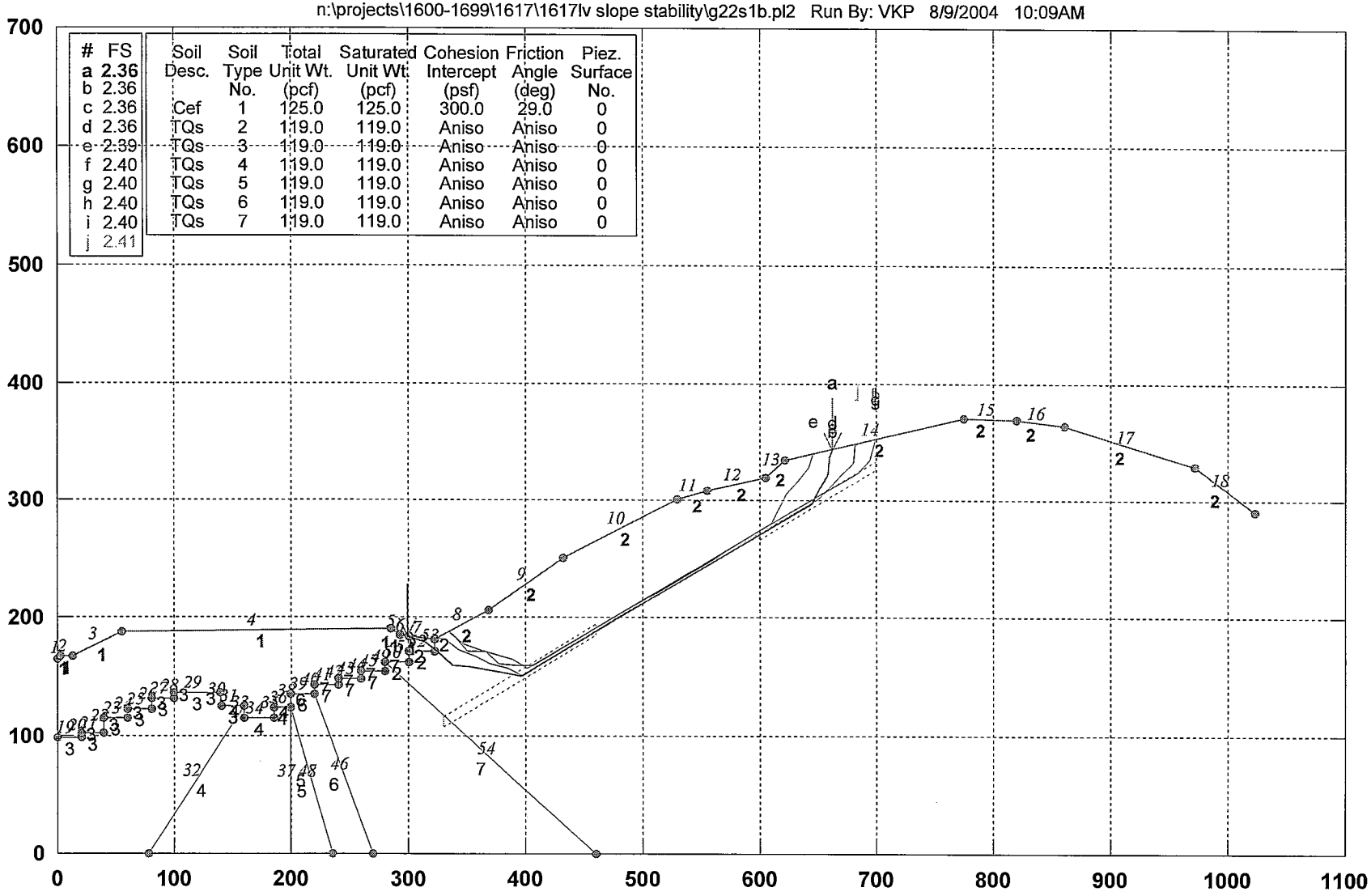
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	9.6	5476.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.3	1586.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	13.4	26289.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	50.6	149250.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	94.5	263163.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	3.5	7669.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	6.4	11172.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	8.4	7279.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	2.7	381.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R T52584, 22-22', 195' High Nat. Slope, Bed. Pln. Static

n:\projects\1600-1699\1617\1617lv slope stability\g22s1b.pl2 Run By: VKP 8/9/2004 10:09AM

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

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	Aniso	Aniso	0
TQs	3	119.0	119.0	Aniso	Aniso	0
TQs	4	119.0	119.0	Aniso	Aniso	0
TQs	5	119.0	119.0	Aniso	Aniso	0
TQs	6	119.0	119.0	Aniso	Aniso	0
TQs	7	119.0	119.0	Aniso	Aniso	0



GSTABL7 v.2 FSmin=2.36

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-56

*** **GSTABL7** ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****
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: 8/9/2004
Time of Run: 10:09AM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g22s1b.
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g22s1b.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g22s1b.PLT
PROBLEM DESCRIPTION: G P R T52584, 22-22', 195' High Nat.
Slope, Bed. Pln. Static

BOUNDARY COORDINATES
18 Top Boundaries
54 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	165.00	3.00	168.00	1
2	3.00	168.00	13.00	168.00	1
3	13.00	168.00	55.00	188.00	1
4	55.00	188.00	285.00	190.00	1
5	285.00	190.00	293.00	185.00	1
6	293.00	185.00	300.00	184.00	1
7	300.00	184.00	322.10	182.00	1
8	322.10	182.00	368.00	206.00	2
9	368.00	206.00	432.00	250.00	2
10	432.00	250.00	530.00	300.00	2
11	530.00	300.00	555.00	308.00	2
12	555.00	308.00	605.00	320.00	2
13	605.00	320.00	621.00	335.00	2
14	621.00	335.00	775.00	371.00	2
15	775.00	371.00	820.00	370.00	2
16	820.00	370.00	860.00	365.00	2
17	860.00	365.00	972.00	330.00	2
18	972.00	330.00	1023.00	290.00	2
19	0.00	98.00	20.00	98.00	3
20	20.00	98.00	20.10	102.00	3
21	20.10	102.00	40.00	102.00	3
22	40.00	102.00	40.10	115.00	3
23	40.10	115.00	60.00	115.00	3
24	60.00	115.00	60.10	123.00	3
25	60.10	123.00	80.00	123.00	3
26	80.00	123.00	80.10	132.00	3
27	80.10	132.00	100.00	132.00	3
28	100.00	132.00	100.10	137.00	3
29	100.10	137.00	140.00	137.00	3
30	140.00	137.00	140.10	125.00	3
31	140.10	125.00	160.00	125.00	3
32	78.00	0.00	160.00	125.00	4
33	160.00	125.00	160.10	115.00	4
34	160.10	115.00	185.00	115.00	4
35	185.00	115.00	185.10	124.00	4
36	185.10	124.00	200.00	124.00	4
37	199.90	0.00	200.00	124.00	5
38	200.00	124.00	200.10	135.00	6
39	200.10	135.00	220.00	135.00	6
40	220.00	135.00	220.10	143.00	7
41	220.10	143.00	240.00	143.00	7

42	240.00	143.00	240.10	148.00	7
43	240.10	148.00	260.00	148.00	7
44	260.00	148.00	260.10	155.00	7
45	260.10	155.00	280.00	155.00	7
46	220.00	135.00	270.00	0.00	6
47	200.00	124.00	235.00	0.00	5
48	200.00	124.00	235.00	0.00	5
49	280.00	155.00	280.10	163.00	7
50	280.10	163.00	300.00	163.00	2
51	300.00	163.00	300.10	171.00	2
52	300.10	171.00	322.00	171.00	2
53	322.00	171.00	322.10	182.00	2
54	280.10	163.00	460.00	0.00	7

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
7 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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	410.0	40.5	0.00	0.0	0
4	119.0	119.0	410.0	40.5	0.00	0.0	0
5	119.0	119.0	410.0	40.5	0.00	0.0	0
6	119.0	119.0	410.0	40.5	0.00	0.0	0
7	119.0	119.0	410.0	40.5	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
6 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	29.0	410.00	40.50
2	31.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-35.0	410.00	40.50
2	-33.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-19.0	410.00	40.50
2	-17.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	410.00	40.50
2	6.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	13.0	410.00	40.50
2	15.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.0	410.00	40.50
2	27.0	410.00	40.50
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	330.00	112.00	460.00	190.00	10.00
2	600.00	270.00	700.00	330.00	8.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 3.378 FS Min = 2.358 FS Ave = 2.747
Standard Deviation = 0.217 Coefficient of Variation = 7.90 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	299.49	184.07
2	299.81	183.76
3	314.19	179.52
4	325.94	170.19
5	337.37	160.48
6	352.21	158.26
7	366.96	155.54
8	381.88	154.00
9	396.58	151.01
10	643.94	296.42
11	650.62	309.85
12	658.95	322.33
13	660.05	337.29
14	661.88	344.56

Factor of Safety
*** 2.358 ***
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	0.3	5.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.2	6.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	14.2	3094.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	7.8	5821.4	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.1	84.3	0.0	0.0	0.	0.	0.0	0.0	0.0

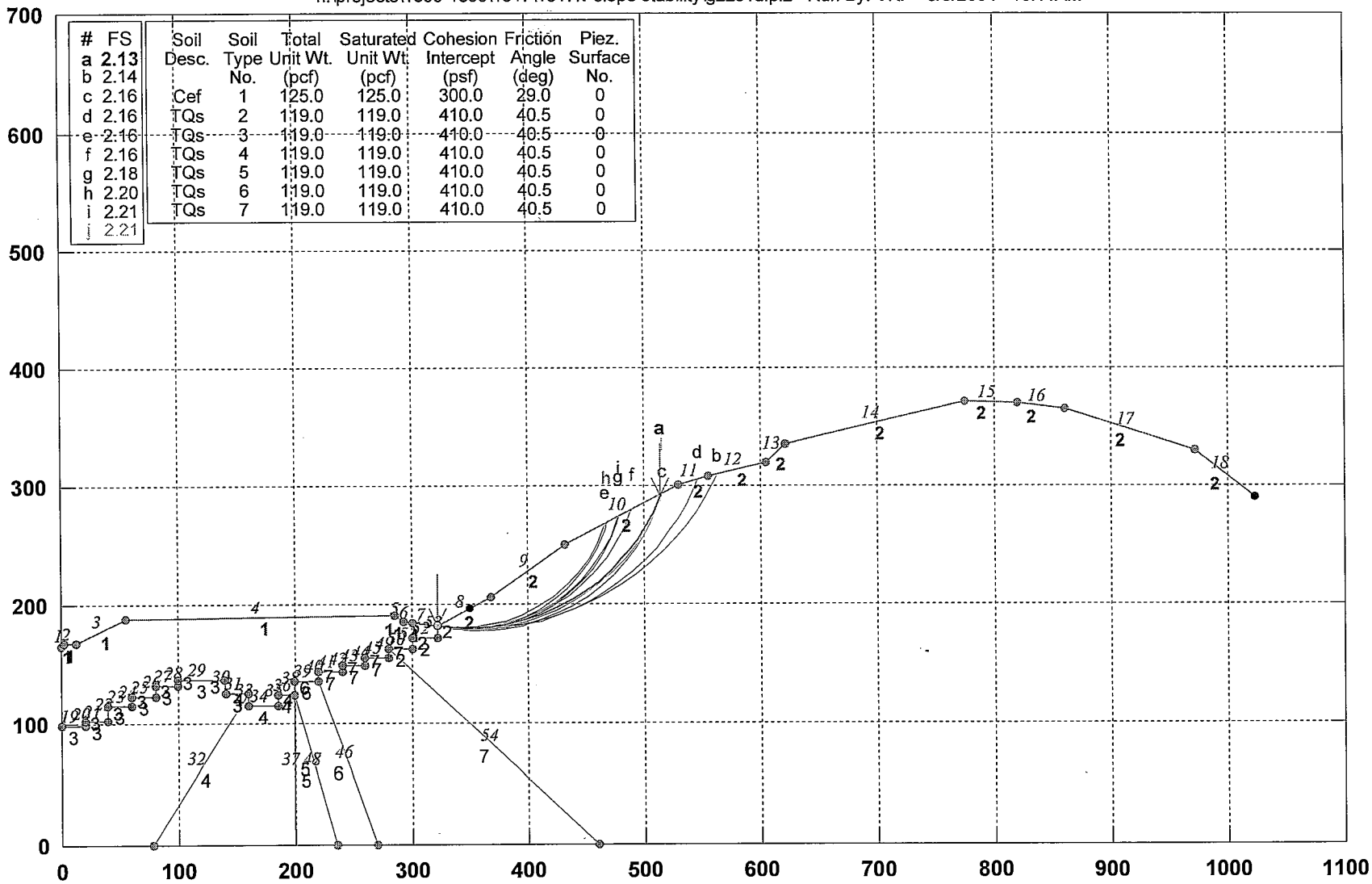
6	3.8	5155.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	11.4	29483.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.8	60891.2	0.0	0.0	0.	0.	0.0	0.0	0.0
9	14.8	78458.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	1.0	6221.2	0.0	0.0	0.	0.	0.0	0.0	0.0
11	13.9	92593.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	14.7	119102.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	35.4	322058.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	98.0	867250.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	25.0	199956.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	50.0	328246.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	16.0	93806.6	0.0	0.0	0.	0.	0.0	0.0	0.0
18	22.9	131039.8	0.0	0.0	0.	0.	0.0	0.0	0.0
19	6.7	30220.6	0.0	0.0	0.	0.	0.0	0.0	0.0
20	8.3	26566.2	0.0	0.0	0.	0.	0.0	0.0	0.0
21	1.1	1859.5	0.0	0.0	0.	0.	0.0	0.0	0.0
22	1.8	745.0	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R T52584, 22-22', 195' High Nat. Slope, Circular, Static

n:\projects\1600-1699\1617\1617lv slope stability\g22s1d.pl2 Run By: VKP 8/9/2004 10:11AM

#	FS
a	2.13
b	2.14
c	2.16
d	2.16
e	2.16
f	2.16
g	2.18
h	2.20
i	2.21
j	2.21

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	410.0	40.5	0
TQs	3	119.0	119.0	410.0	40.5	0
TQs	4	119.0	119.0	410.0	40.5	0
TQs	5	119.0	119.0	410.0	40.5	0
TQs	6	119.0	119.0	410.0	40.5	0
TQs	7	119.0	119.0	410.0	40.5	0



GSTABL7 v.2 FSmin=2.13

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO.-57

***** GSTABL7 *****

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/9/2004
Time of Run: 10:11AM
Run By: VKP
Input Data Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g22s1d.
Output Filename: n:\Projects\1600-1699\1617\1617LV slope stability\g22s1d.OUT
Unit System: English
Plotted Output Filename: n:\Projects\1600-1699\1617\1617Lope stability\g22s1d.PLT
PROBLEM DESCRIPTION: G P R T52584, 22-22', 195' High Nat.
Slope, Circular, Static

BOUNDARY COORDINATES
18 Top Boundaries
54 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	165.00	3.00	168.00	1
2	3.00	168.00	13.00	168.00	1
3	13.00	168.00	55.00	188.00	1
4	55.00	188.00	285.00	190.00	1
5	285.00	190.00	293.00	185.00	1
6	293.00	185.00	300.00	184.00	1
7	300.00	184.00	322.10	182.00	1
8	322.10	182.00	368.00	206.00	2
9	368.00	206.00	432.00	250.00	2
10	432.00	250.00	530.00	300.00	2
11	530.00	300.00	555.00	308.00	2
12	555.00	308.00	605.00	320.00	2
13	605.00	320.00	621.00	335.00	2
14	621.00	335.00	775.00	371.00	2
15	775.00	371.00	820.00	370.00	2
16	820.00	370.00	860.00	365.00	2
17	860.00	365.00	972.00	330.00	2
18	972.00	330.00	1023.00	290.00	2
19	0.00	98.00	20.00	98.00	3
20	20.00	98.00	20.10	102.00	3
21	20.10	102.00	40.00	102.00	3
22	40.00	102.00	40.10	115.00	3
23	40.10	115.00	60.00	115.00	3
24	60.00	115.00	60.10	123.00	3
25	60.10	123.00	80.00	123.00	3
26	80.00	123.00	80.10	132.00	3
27	80.10	132.00	100.00	132.00	3
28	100.00	132.00	100.10	137.00	3
29	100.10	137.00	140.00	137.00	3
30	140.00	137.00	140.10	125.00	3
31	140.10	125.00	160.00	125.00	3
32	78.00	0.00	160.00	125.00	4
33	160.00	125.00	160.10	115.00	4
34	160.10	115.00	185.00	115.00	4
35	185.00	115.00	185.10	124.00	4
36	185.10	124.00	200.00	124.00	4
37	199.90	0.00	200.00	124.00	5
38	200.00	124.00	200.10	135.00	6
39	200.10	135.00	220.00	135.00	6
40	220.00	135.00	220.10	143.00	7
41	220.10	143.00	240.00	143.00	7

42	240.00	143.00	240.10	148.00	7
43	240.10	148.00	260.00	148.00	7
44	260.00	148.00	260.10	155.00	7
45	260.10	155.00	280.00	155.00	7
46	220.00	135.00	270.00	0.00	6
47	200.00	124.00	235.00	0.00	5
48	200.00	124.00	235.00	0.00	5
49	280.00	155.00	280.10	163.00	7
50	280.10	163.00	300.00	163.00	2
51	300.00	163.00	300.10	171.00	2
52	300.10	171.00	322.00	171.00	2
53	322.00	171.00	322.10	182.00	2
54	280.10	163.00	460.00	0.00	7

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
7 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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	410.0	40.5	0.00	0.0	0
4	119.0	119.0	410.0	40.5	0.00	0.0	0
5	119.0	119.0	410.0	40.5	0.00	0.0	0
6	119.0	119.0	410.0	40.5	0.00	0.0	0
7	119.0	119.0	410.0	40.5	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
6 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	29.0	410.00	40.50
2	31.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-35.0	410.00	40.50
2	-33.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 4 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	-19.0	410.00	40.50
2	-17.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 5 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	4.0	410.00	40.50
2	6.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	13.0	410.00	40.50
2	15.0	410.00	40.50
3	90.0	410.00	40.50

Soil Type 7 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	25.0	410.00	40.50
2	27.0	410.00	40.50
3	90.0	410.00	40.50

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.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
1000 Surface(s) Initiate(s) From Each Of 1 Points Equally Spaced
Along The Ground Surface Between X = 322.00(ft)
and X = 322.00(ft)
Each Surface Terminates Between X = 350.00(ft)
and X =1023.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
15.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 7.477 FS Min = 2.130 FS Ave = 4.469
Standard Deviation = 1.407 Coefficient of Variation = 31.48 %
Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	322.00	182.01
2	336.90	180.29
3	351.89	179.83
4	366.87	180.65
5	381.73	182.74
6	396.35	186.08
7	410.64	190.64
8	424.49	196.40
9	437.80	203.31
10	450.48	211.33
11	462.43	220.39
12	473.57	230.44
13	483.82	241.39
14	493.11	253.17
15	501.36	265.70
16	508.52	278.88
17	514.25	291.96

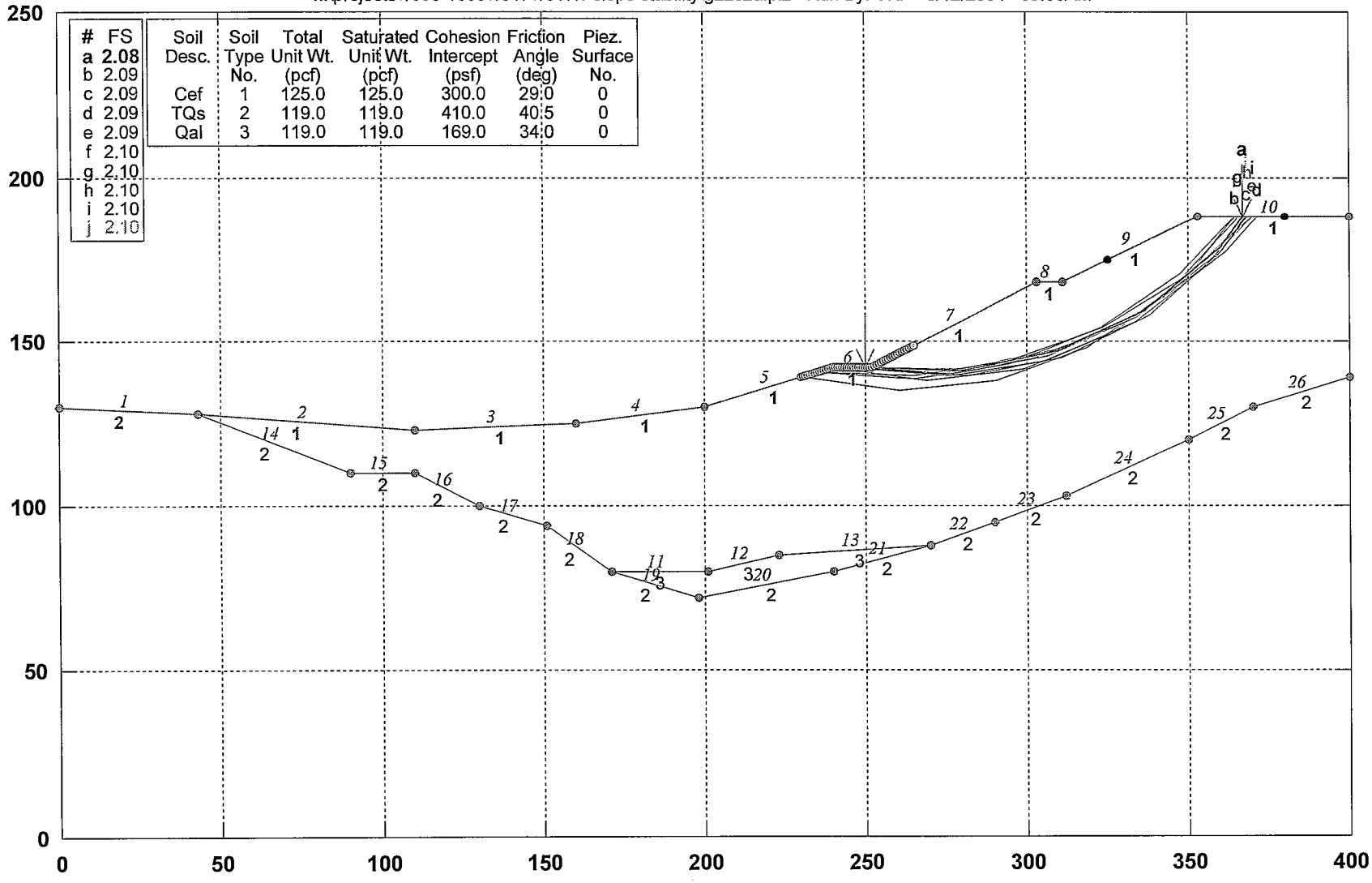
Circle Center At X = 349.74 ; Y = 356.60 ; and Radius = 176.78
Factor of Safety
*** 2.130 ***
Individual data on the 19 slices

Water Force	Water Force	Tie Force	Tie Force	Earthquake Force	Surcharge

Slice No.	Width (ft)	Weight (lbs)	Top (lbs)	Bot (lbs)	Norm (lbs)	Tan (lbs)	Hor (lbs)	Ver (lbs)	Load (lbs)
1	0.1	0.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	14.8	8326.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	15.0	24263.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	15.0	37877.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	1.1	3353.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	13.7	47275.9	0.0	0.0	0.	0.	0.0	0.0	0.0
7	14.6	62747.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.3	71487.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	13.8	76726.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	7.5	43861.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.8	34280.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	12.7	73727.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	12.0	66299.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	11.1	56944.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	10.2	46239.0	0.0	0.0	0.	0.	0.0	0.0	0.0
16	9.3	34831.4	0.0	0.0	0.	0.	0.0	0.0	0.0
17	8.3	23417.2	0.0	0.0	0.	0.	0.0	0.0	0.0
18	7.2	12717.5	0.0	0.0	0.	0.	0.0	0.0	0.0
19	5.7	3464.6	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 22-22' circular

n:\projects\1600-1699\1617\1617lv slope stability\g22s2a.pl2 Run By: VKP 8/12/2004 09:36AM



#	FS
a	2.08
b	2.09
c	2.09
d	2.09
e	2.09
f	2.10
g	2.10
h	2.10
i	2.10
j	2.10

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	410.0	40.5	0
Qal	3	119.0	119.0	169.0	34.0	0

GSTABL7 v.2 FSmin=2.08

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. 58

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/12/2004
Time of Run: 09:36AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g22s2a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g22s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g22s2a.PLT
PROBLEM DESCRIPTION: G P R, T52584, 22-22' circular

BOUNDARY COORDINATES
10 Top Boundaries
26 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	130.00	43.00	128.00	2
2	43.00	128.00	110.00	123.00	1
3	110.00	123.00	160.00	125.00	1
4	160.00	125.00	200.00	130.00	1
5	200.00	130.00	240.00	142.00	1
6	240.00	142.00	252.00	142.00	1
7	252.00	142.00	303.00	168.00	1
8	303.00	168.00	311.00	168.00	1
9	311.00	168.00	353.00	188.00	1
10	353.00	188.00	400.00	188.00	1
11	171.00	80.00	201.00	80.00	3
12	201.00	80.00	223.00	85.00	3
13	223.00	85.00	270.00	88.00	3
14	43.00	128.00	90.00	110.00	2
15	90.00	110.00	110.00	110.00	2
16	110.00	110.00	130.00	100.00	2
17	130.00	100.00	151.00	94.00	2
18	151.00	94.00	171.00	80.00	2
19	171.00	80.00	198.00	72.00	2
20	198.00	72.00	240.00	80.00	2
21	240.00	80.00	270.00	88.00	2
22	270.00	88.00	290.00	95.00	2
23	290.00	95.00	312.00	103.00	2
24	312.00	103.00	350.00	120.00	2
25	350.00	120.00	370.00	130.00	2
26	370.00	130.00	400.00	139.00	2

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 230.00(ft)
and X = 265.00(ft)
Each Surface Terminates Between X = 325.00(ft)

and X = 380.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.096 FS Min = 2.076 FS Ave = 2.642
Standard Deviation = 0.403 Coefficient of Variation = 15.24 %
Failure Surface Specified By 6 Coordinate Points

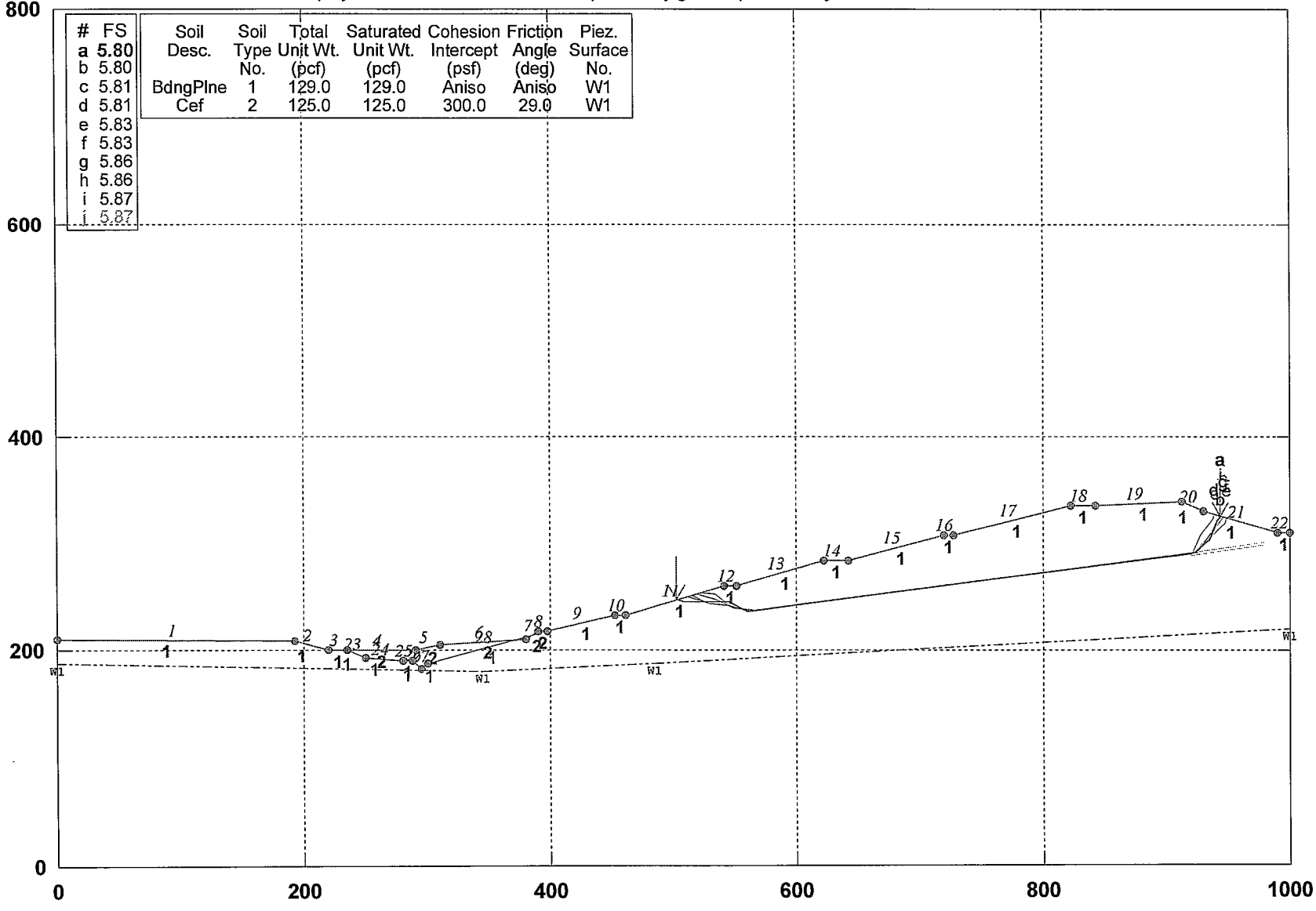
Point No.	X-Surf (ft)	Y-Surf (ft)
1	250.00	142.00
2	279.98	140.89
3	309.37	146.91
4	336.49	159.74
5	359.79	178.64
6	366.90	188.00

Circle Center At X = 269.86 ; Y = 263.06 ; and Radius = 122.68
Factor of Safety
*** 2.076 ***
Individual data on the 9 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	2.0	9.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	28.0	27021.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	23.0	54343.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	6.4	17301.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	1.6	4225.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	25.5	64838.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	16.5	36390.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.8	10276.8	0.0	0.0	0.	0.	0.0	0.0	0.0
9	7.1	4162.9	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Section 27-27', C S30 Static (Qls and Qal Removal), Bedding Se

n:\projects\1600-1699\1617\1617lv slope stability\g27s1a.pl2 Run By: VKP 8/9/2004 09:52AM



#	FS
a	5.80
b	5.80
c	5.81
d	5.81
e	5.83
f	5.83
g	5.86
h	5.86
i	5.87
j	5.87

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
BdngPlne	1	129.0	129.0	Aniso	Aniso	W1
Cef	2	125.0	125.0	300.0	29.0	W1

GSTABL7 v.2 FSmin=5.80

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. - 59

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                    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:        8/9/2004
Time of Run:              09:52AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g27s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g27s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g27s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 27-27', C S30
                      Static (Qls and Qal Removal), Bedding Se
BOUNDARY COORDINATES
   22 Top   Boundaries
   28 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     210.00     192.00     209.00        1
    2       192.00     209.00     220.00     200.00        1
    3       220.00     200.00     235.00     200.00        1
    4       235.00     200.00     290.00     200.00        2
    5       290.00     200.00     310.00     205.00        2
    6       310.00     205.00     380.00     210.00        2
    7       380.00     210.00     390.00     218.00        2
    8       390.00     218.00     398.00     218.00        2
    9       398.00     218.00     453.00     233.00        1
   10       453.00     233.00     461.00     233.00        1
   11       461.00     233.00     541.00     260.00        1
   12       541.00     260.00     551.00     260.00        1
   13       551.00     260.00     622.00     284.00        1
   14       622.00     284.00     642.00     284.00        1
   15       642.00     284.00     720.00     307.00        1
   16       720.00     307.00     728.00     307.00        1
   17       728.00     307.00     822.00     335.00        1
   18       822.00     335.00     842.00     335.00        1
   19       842.00     335.00     913.00     339.00        1
   20       913.00     339.00     930.00     330.00        1
   21       930.00     330.00     990.00     310.00        1
   22       990.00     310.00    1000.00     310.00        1
   23       235.00     200.00     250.00     193.00        1
   24       250.00     193.00     280.00     190.00        1
   25       280.00     190.00     288.00     190.00        1
   26       288.00     190.00     295.00     183.00        1
   27       295.00     183.00     300.00     187.00        1
   28       300.00     187.00     398.00     218.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   129.0    129.0     347.0     22.0    0.00      0.0       1
  2   125.0    125.0     300.0     29.0    0.00      0.0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
```

Range No.	Direction Limit (deg)	Intercept (psf)	Angle (deg)
1	10.0	410.00	40.50
2	12.0	347.00	22.00
3	90.0	410.00	40.50

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 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	188.00
2	345.00	180.00
3	485.00	188.00
4	1000.00	220.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	560.00	236.00	570.00	238.00	0.00
2	920.00	290.00	980.00	300.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 7.292 FS Min = 5.798 FS Ave = 6.561
Standard Deviation = 0.334 Coefficient of Variation = 5.08 %
Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	502.62	247.05
2	508.38	244.73
3	526.38	244.68
4	544.38	244.38
5	560.35	236.07
6	922.53	291.31
7	935.08	304.22
8	941.67	320.97
9	943.31	325.56

Factor of Safety
*** 5.798 ***

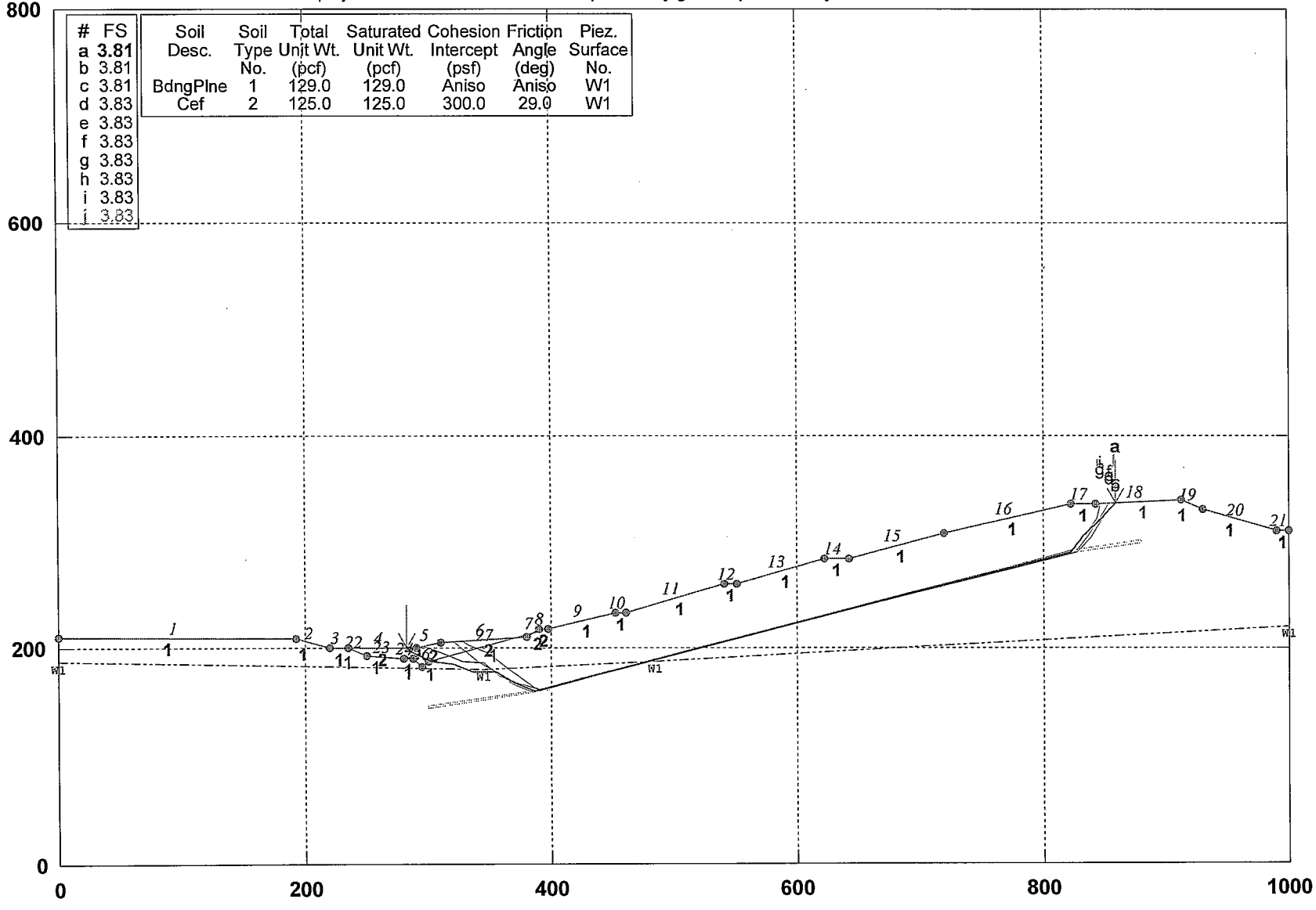
Individual data on the 18 slices

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	5.8	1584.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	18.0	17000.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	14.6	24461.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.4	6801.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	6.6	14807.2	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.3	27830.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	61.7	260928.5	0.0	0.0	0.	0.	0.0	0.0	0.0

8	20.0	95464.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	78.0	412823.8	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.0	47440.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	94.0	632864.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	20.0	148341.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	71.0	481369.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	9.5	56422.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	7.5	35481.8	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.1	18039.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	6.6	12440.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.6	543.2	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Section 27-27', C S30 Static (Qls and Qal Removal), Bedding Se

n:\projects\1600-1699\1617\1617lv slope stability\g27s1b.pl2 Run By: VKP 8/9/2004 09:58AM



#	FS
a	3.81
b	3.81
c	3.81
d	3.83
e	3.83
f	3.83
g	3.83
h	3.83
i	3.83
j	3.83

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
BdngPlne	1	129.0	129.0	Aniso	Aniso	W1
Cef	2	125.0	125.0	300.0	29.0	W1

GSTABL7 v.2 FSmin=3.81

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN No. 1-60

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/9/2004
Time of Run:              09:58AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g27s1b.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g27s1b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g27s1b.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 27-27', C S30
                      Static (Qls and Qal Removal), Bedding Se
BOUNDARY COORDINATES
   21 Top   Boundaries
   27 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     210.00     192.00     209.00        1
    2       192.00     209.00     220.00     200.00        1
    3       220.00     200.00     235.00     200.00        1
    4       235.00     200.00     290.00     200.00        2
    5       290.00     200.00     310.00     205.00        2
    6       310.00     205.00     380.00     210.00        2
    7       380.00     210.00     390.00     218.00        2
    8       390.00     218.00     398.00     218.00        2
    9       398.00     218.00     453.00     233.00        1
   10       453.00     233.00     461.00     233.00        1
   11       461.00     233.00     541.00     260.00        1
   12       541.00     260.00     551.00     260.00        1
   13       551.00     260.00     622.00     284.00        1
   14       622.00     284.00     642.00     284.00        1
   15       642.00     284.00     720.00     307.00        1
   16       720.00     307.00     822.00     335.00        1
   17       822.00     335.00     842.00     335.00        1
   18       842.00     335.00     913.00     339.00        1
   19       913.00     339.00     930.00     330.00        1
   20       930.00     330.00     990.00     310.00        1
   21       990.00     310.00    1000.00     310.00        1
   22       235.00     200.00     250.00     193.00        1
   23       250.00     193.00     280.00     190.00        1
   24       280.00     190.00     288.00     190.00        1
   25       288.00     190.00     295.00     183.00        1
   26       295.00     183.00     300.00     187.00        1
   27       300.00     187.00     398.00     218.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)    (deg)   Param.   (psf)     No.
  1   129.0    129.0     347.0    22.0    0.00      0.0      1
  2   125.0    125.0     300.0    29.0    0.00      0.0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
```

No.	(deg)	(psf)	(deg)
1	10.0	410.00	40.50
2	12.0	347.00	22.00
3	90.0	410.00	40.50

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 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	188.00
2	345.00	180.00
3	485.00	188.00
4	1000.00	220.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 18.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	300.00	145.00	400.00	162.00	2.00
2	820.00	290.00	880.00	300.00	2.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.740 FS Min = 3.805 FS Ave = 4.144
Standard Deviation = 0.174 Coefficient of Variation = 4.20 %
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	282.36	200.00
2	286.53	196.05
3	302.20	187.20
4	320.00	184.48
5	336.75	177.89
6	354.72	176.92
7	369.77	167.05
8	386.10	159.47
9	822.41	290.12
10	832.98	304.69
11	844.78	318.28
12	855.82	332.50
13	858.27	335.92

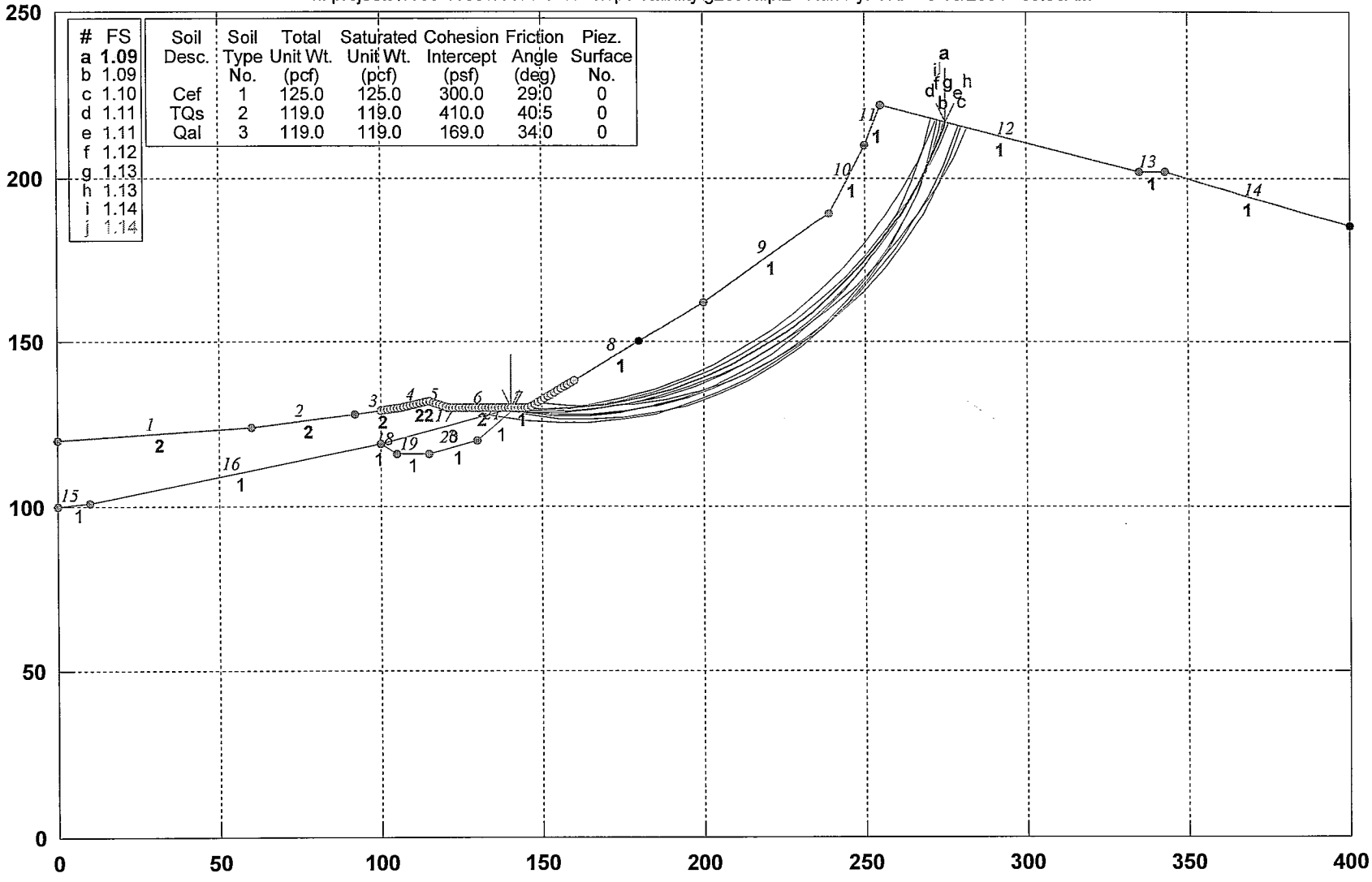
Factor of Safety
*** 3.805 ***
Individual data on the 30 slices

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	4.2	1028.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.5	2136.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	11.6	15497.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	0.6	1097.7	0.0	0.0	0.	0.	0.0	0.0	0.0

5	7.8	17045.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	25395.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	10.5	31718.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	6.2	21885.1	0.0	479.3	0.	0.	0.0	0.0	0.0
9	8.3	31200.7	0.0	1251.6	0.	0.	0.0	0.0	0.0
10	9.7	38262.2	0.0	1877.7	0.	0.	0.0	0.0	0.0
11	15.1	71226.5	0.0	10095.2	0.	0.	0.0	0.0	0.0
12	10.2	59357.5	0.0	11962.4	0.	0.	0.0	0.0	0.0
13	6.1	40602.3	0.0	8920.1	0.	0.	0.0	0.0	0.0
14	3.9	28325.4	0.0	5678.6	0.	0.	0.0	0.0	0.0
15	8.0	57918.7	0.0	10905.5	0.	0.	0.0	0.0	0.0
16	55.0	384762.6	0.0	47678.0	0.	0.	0.0	0.0	0.0
17	8.0	53971.7	0.0	2964.5	0.	0.	0.0	0.0	0.0
18	19.5	129602.6	0.0	3001.4	0.	0.	0.0	0.0	0.0
19	60.5	413471.5	0.0	0.0	0.	0.	0.0	0.0	0.0
20	10.0	67917.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	71.0	481054.2	0.0	0.0	0.	0.	0.0	0.0	0.0
22	20.0	131318.6	0.0	0.0	0.	0.	0.0	0.0	0.0
23	78.0	480227.3	0.0	0.0	0.	0.	0.0	0.0	0.0
24	102.0	608932.6	0.0	0.0	0.	0.	0.0	0.0	0.0
25	0.4	2396.5	0.0	0.0	0.	0.	0.0	0.0	0.0
26	10.6	51241.9	0.0	0.0	0.	0.	0.0	0.0	0.0
27	9.0	29228.4	0.0	0.0	0.	0.	0.0	0.0	0.0
28	2.8	6595.1	0.0	0.0	0.	0.	0.0	0.0	0.0
29	11.0	14348.7	0.0	0.0	0.	0.	0.0	0.0	0.0
30	2.5	518.7	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 28-28' circular steep nat. sl. w/ neutral bedding

n:\projects\1600-1699\1617\1617lv slope stability\g28s1a.pl2 Run By: VKP 8/10/2004 09:50AM



#	FS
a	1.09
b	1.09
c	1.10
d	1.11
e	1.11
f	1.12
g	1.13
h	1.13
i	1.14
j	1.14

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	410.0	40.5	0
Qal	3	119.0	119.0	169.0	34.0	0

GSTABL7 v.2 FSmin=1.09

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 61

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************
                  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:        8/10/2004
Time of Run:              09:50AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g28s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g28s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g28s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 28-28' circular
                      steep nat. sl. w/ neutral bedding
BOUNDARY COORDINATES
   14 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	120.00	60.00	124.00	2
2	60.00	124.00	92.00	128.00	2
3	92.00	128.00	106.00	130.00	2
4	106.00	130.00	115.00	132.00	2
5	115.00	132.00	121.00	130.00	2
6	121.00	130.00	142.00	130.00	2
7	142.00	130.00	146.00	130.00	1
8	146.00	130.00	200.00	162.00	1
9	200.00	162.00	239.00	189.00	1
10	239.00	189.00	250.00	210.00	1
11	250.00	210.00	255.00	222.00	1
12	255.00	222.00	335.00	202.00	1
13	335.00	202.00	343.00	202.00	1
14	343.00	202.00	400.00	185.00	1
15	0.00	100.00	10.00	101.00	1
16	10.00	101.00	100.00	119.00	1
17	100.00	119.00	142.00	130.00	3
18	100.00	119.00	105.00	116.00	1
19	105.00	116.00	115.00	116.00	1
20	115.00	116.00	130.00	120.00	1
21	130.00	120.00	142.00	130.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

```
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1200 Trial Surfaces Have Been Generated.
  20 Surface(s) Initiate(s) From Each Of    60 Points Equally Spaced
Along The Ground Surface Between  X = 100.00(ft)
                             and  X = 160.00(ft)
Each Surface Terminates Between   X = 180.00(ft)
                            and   X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
```

At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1200
Statistical Data On All Valid FS Values:
FS Max = 4.385 FS Min = 1.087 FS Ave = 2.354
Standard Deviation = 0.632 Coefficient of Variation = 26.86 %
Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	140.68	130.00
2	150.67	129.65
3	160.66	130.05
4	170.60	131.21
5	180.42	133.10
6	190.06	135.73
7	199.49	139.08
8	208.63	143.12
9	217.45	147.85
10	225.88	153.22
11	233.89	159.21
12	241.42	165.78
13	248.44	172.91
14	254.91	180.54
15	260.78	188.63
16	266.02	197.14
17	270.61	206.03
18	274.53	215.23
19	275.11	216.97

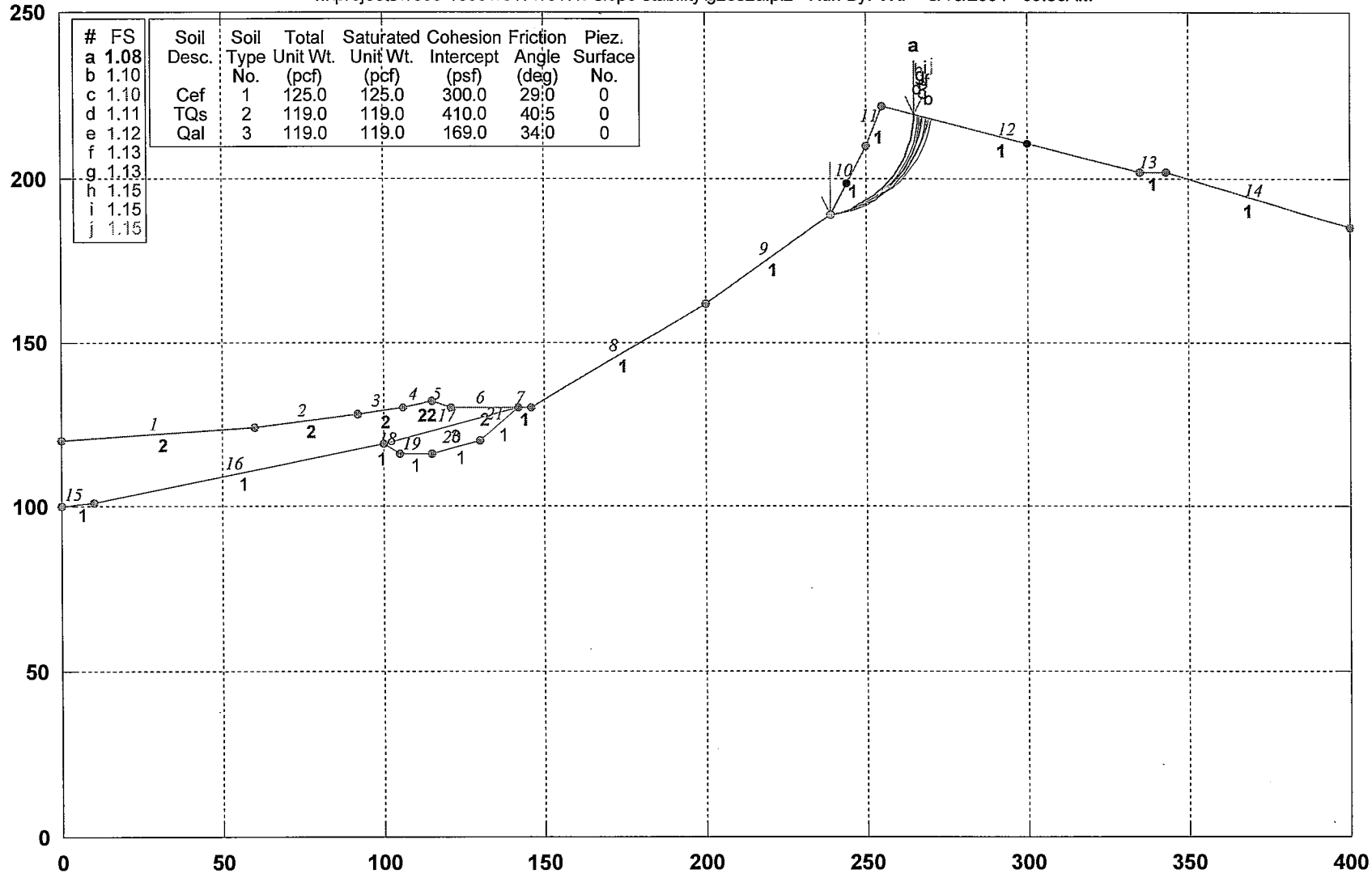
Factor of Safety
*** 1.087 ***
Individual data on the 26 slices

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	1.2	2.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.1	0.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.1	0.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.0	58.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	4.7	964.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	7341.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	9.9	13663.0	0.0	0.0	0.	0.	0.0	0.0	0.0
8	9.8	18816.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.6	22718.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	9.4	25325.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.5	1451.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.6	25653.4	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.8	28145.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.4	27907.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	8.0	26502.9	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.1	16477.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	2.4	8056.7	0.0	0.0	0.	0.	0.0	0.0	0.0
18	7.0	27183.2	0.0	0.0	0.	0.	0.0	0.0	0.0
19	1.6	6752.7	0.0	0.0	0.	0.	0.0	0.0	0.0
20	4.9	23455.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	0.1	484.9	0.0	0.0	0.	0.	0.0	0.0	0.0
22	5.8	26453.3	0.0	0.0	0.	0.	0.0	0.0	0.0
23	5.2	17714.2	0.0	0.0	0.	0.	0.0	0.0	0.0
24	4.6	9805.0	0.0	0.0	0.	0.	0.0	0.0	0.0
25	3.9	3410.9	0.0	0.0	0.	0.	0.0	0.0	0.0

26	0.6	69.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 28-28' circular steep nat. sl. w/ neutral bedding

n:\projects\1600-1699\1617\1617lv slope stability\g28s2a.pl2 Run By: VKP 8/10/2004 09:56AM



GSTABL7 v.2 FSmin=1.08

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 62

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*********************************************************************
                  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:        8/10/2004
Time of Run:              09:56AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g28s2a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g28s2a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g28s2a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 28-28' circular
                      steep nat. sl. w/ neutral bedding
BOUNDARY COORDINATES
   14 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	120.00	60.00	124.00	2
2	60.00	124.00	92.00	128.00	2
3	92.00	128.00	106.00	130.00	2
4	106.00	130.00	115.00	132.00	2
5	115.00	132.00	121.00	130.00	2
6	121.00	130.00	142.00	130.00	2
7	142.00	130.00	146.00	130.00	1
8	146.00	130.00	200.00	162.00	1
9	200.00	162.00	239.00	189.00	1
10	239.00	189.00	250.00	210.00	1
11	250.00	210.00	255.00	222.00	1
12	255.00	222.00	335.00	202.00	1
13	335.00	202.00	343.00	202.00	1
14	343.00	202.00	400.00	185.00	1
15	0.00	100.00	10.00	101.00	1
16	10.00	101.00	100.00	119.00	1
17	100.00	119.00	142.00	130.00	3
18	100.00	119.00	105.00	116.00	1
19	105.00	116.00	115.00	116.00	1
20	115.00	116.00	130.00	120.00	1
21	130.00	120.00	142.00	130.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

```
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
 100 Surface(s) Initiate(s) From Each Of    10 Points Equally Spaced
Along The Ground Surface Between  X = 239.00(ft)
                              and  X = 239.00(ft)
Each Surface Terminates Between   X = 244.00(ft)
                              and  X = 300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
```

At Which A Surface Extends Is Y = 0.00(ft)
3.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.449 FS Min = 1.075 FS Ave = 3.003
Standard Deviation = 0.976 Coefficient of Variation = 32.51 %
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	239.00	189.00
2	241.92	189.70
3	244.76	190.67
4	247.49	191.90
5	250.10	193.37
6	252.57	195.09
7	254.86	197.02
8	256.96	199.17
9	258.85	201.49
10	260.52	203.99
11	261.95	206.63
12	263.12	209.39
13	264.04	212.24
14	264.68	215.17
15	265.05	218.15
16	265.09	219.48

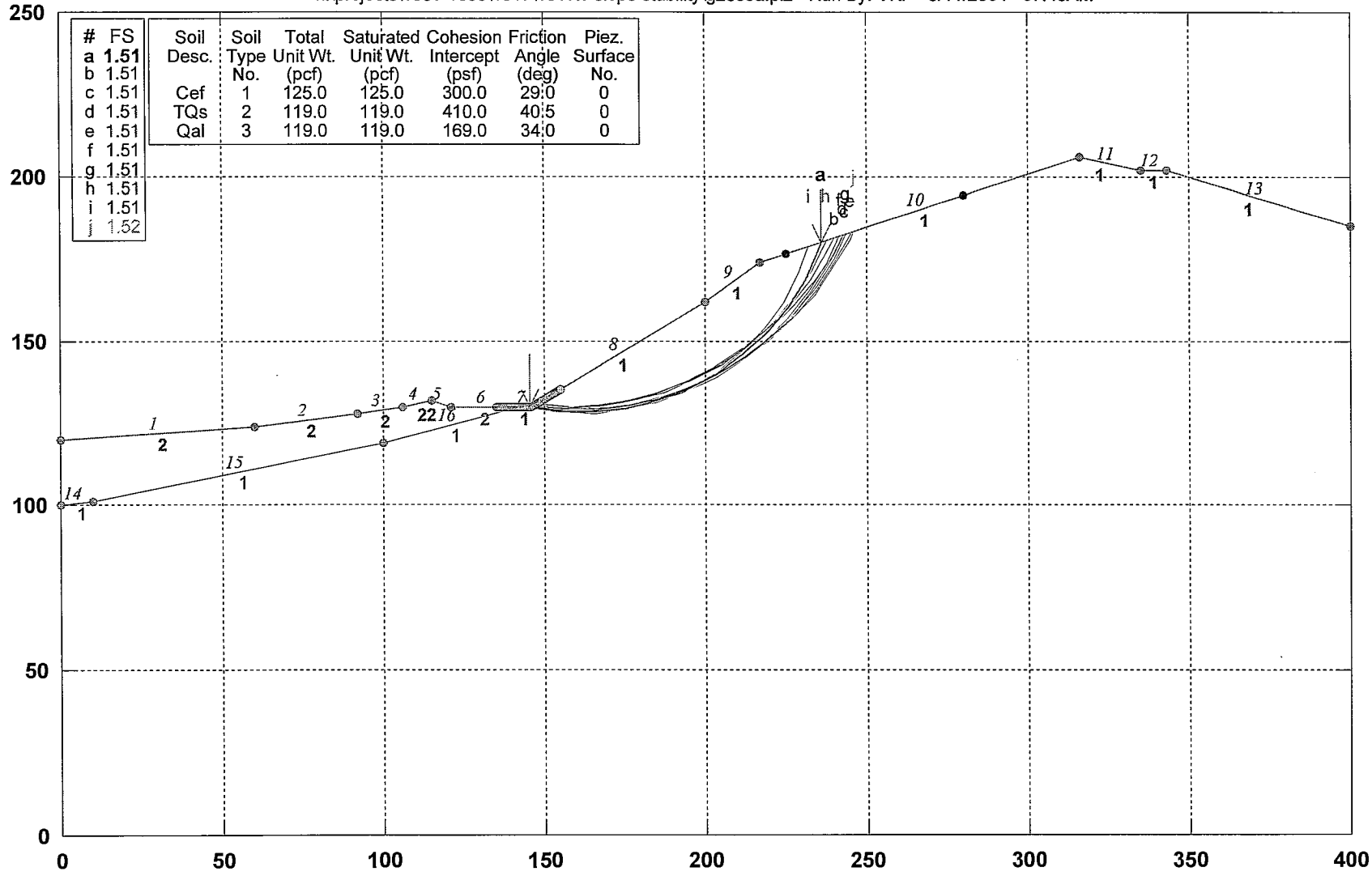
Factor of Safety
*** 1.075 ***

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	2.9	888.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	2.8	2519.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	2.7	3873.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.5	4699.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	0.1	219.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	2.5	5839.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	2.3	6545.9	0.0	0.0	0.	0.	0.0	0.0	0.0
8	0.1	439.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	2.0	5776.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	1.9	4954.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	1.7	3770.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	1.4	2701.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.2	1780.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	0.9	1032.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	0.6	479.0	0.0	0.0	0.	0.	0.0	0.0	0.0
16	0.4	132.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.0	3.3	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 28-28' circular steep nat. sl. w/ neutral bedding

n:\projects\1600-1699\1617\1617lv slope stability\g28s3a.pl2 Run By: VKP 8/11/2004 07:48AM



GSTABL7 v.2 FSmin=1.51

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. 1-63

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                   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:        8/11/2004
Time of Run:              07:48AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g28s3a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g28s3a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g28s3a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 28-28' circular
                      steep nat. sl. w/ neutral bedding
BOUNDARY COORDINATES
   13 Top   Boundaries
   16 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)        (ft)       (ft)        (ft)      Below Bnd
    1         0.00      120.00      60.00      124.00         2
    2        60.00      124.00      92.00      128.00         2
    3        92.00      128.00     106.00      130.00         2
    4       106.00      130.00     115.00      132.00         2
    5       115.00      132.00     121.00      130.00         2
    6       121.00      130.00     142.00      130.00         2
    7       142.00      130.00     146.00      130.00         1
    8       146.00      130.00     200.00      162.00         1
    9       200.00      162.00     217.00      174.00         1
   10       217.00      174.00     316.00      206.00         1
   11       316.00      206.00     335.00      202.00         1
   12       335.00      202.00     343.00      202.00         1
   13       343.00      202.00     400.00      185.00         1
   14         0.00      100.00      10.00      101.00         1
   15        10.00      101.00     100.00      119.00         1
   16       100.00      119.00     142.00      130.00         1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      0
  2   119.0    119.0     410.0     40.5    0.00       0.0      0
  3   119.0    119.0     169.0     34.0    0.00       0.0      0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1200 Trial Surfaces Have Been Generated.
  20 Surface(s) Initiate(s) From Each Of    60 Points Equally Spaced
Along The Ground Surface Between  X = 135.00(ft)
                             and  X = 155.00(ft)
Each Surface Terminates Between   X = 225.00(ft)
                             and  X = 280.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And   0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
```

Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1200
Statistical Data On All Valid FS Values:
FS Max = 1.985 FS Min = 1.508 FS Ave = 1.691
Standard Deviation = 0.114 Coefficient of Variation = 6.75 %
Failure Surface Specified By 13 Coordinate Points

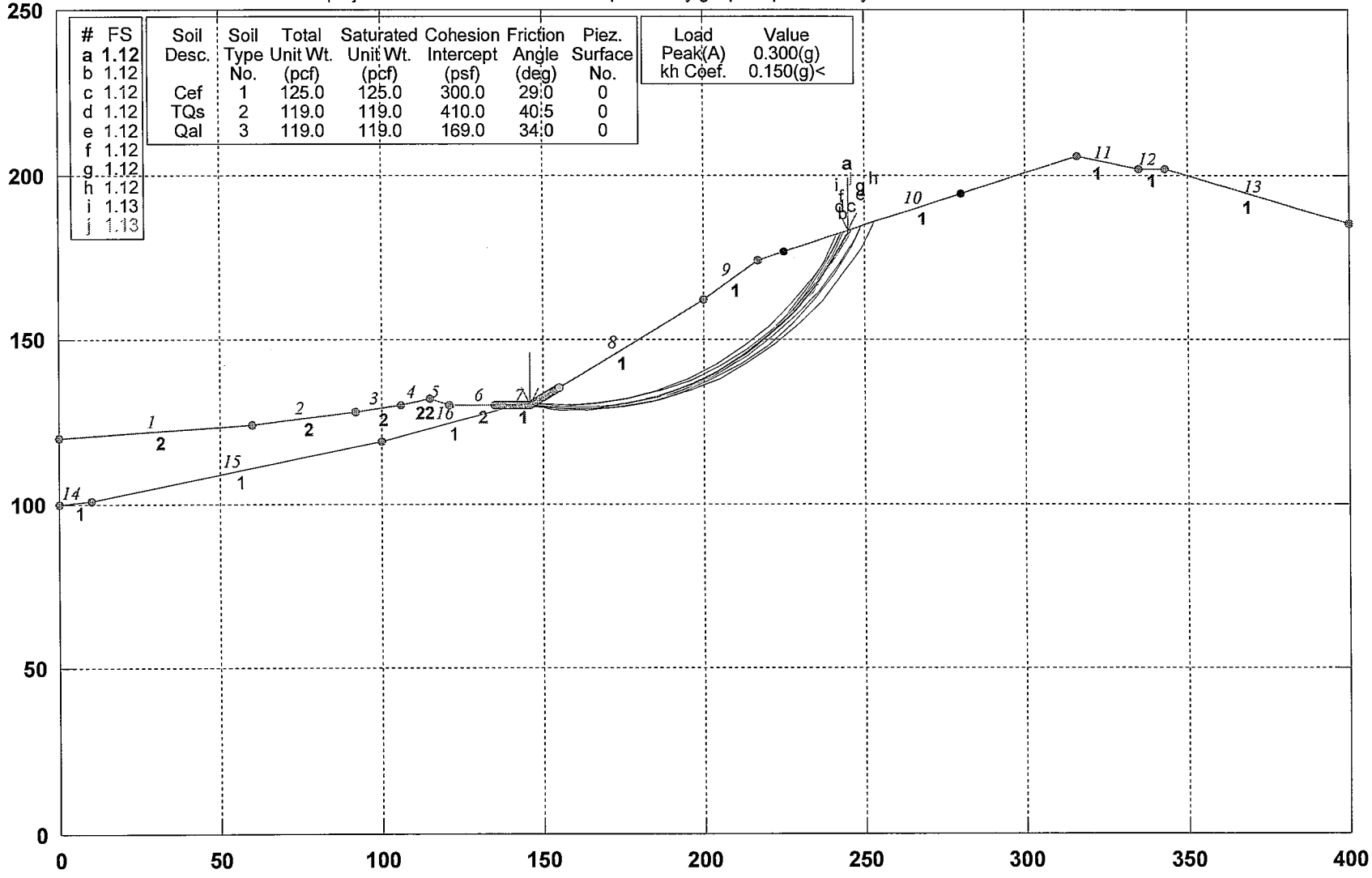
Point No.	X-Surf (ft)	Y-Surf (ft)
1	145.51	130.00
2	155.41	128.57
3	165.40	128.40
4	175.35	129.48
5	185.07	131.80
6	194.43	135.33
7	203.27	140.01
8	211.45	145.75
9	218.85	152.49
10	225.34	160.09
11	230.82	168.45
12	235.21	177.44
13	236.15	180.19

Factor of Safety
*** 1.508 ***
Individual data on the 15 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	0.5	2.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.4	4158.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.0	12563.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	9.9	19268.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.7	23865.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.4	26152.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	5.6	16395.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.3	9813.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	8.2	24870.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	5.5	16479.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	1.8	5232.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.5	15707.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	5.5	9124.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	4.4	3420.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	0.9	143.7	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 28-28' circular steep nat. sl. w/ neutral bedding

n:\projects\1600-1699\1617\1617lv slope stability\g28ps3a.pl2 Run By: VKP 8/11/2004 03:13PM



GSTABL7 v.2 FSmin=1.12

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No.-64

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/11/2004
Time of Run:              03:13PM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g28ps3a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g28ps3a.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g28ps3a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 28-28' circular
                      steep nat. sl. w/ neutral bedding
BOUNDARY COORDINATES
   13 Top   Boundaries
   16 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	120.00	60.00	124.00	2
2	60.00	124.00	92.00	128.00	2
3	92.00	128.00	106.00	130.00	2
4	106.00	130.00	115.00	132.00	2
5	115.00	132.00	121.00	130.00	2
6	121.00	130.00	142.00	130.00	2
7	142.00	130.00	146.00	130.00	1
8	146.00	130.00	200.00	162.00	1
9	200.00	162.00	217.00	174.00	1
10	217.00	174.00	316.00	206.00	1
11	316.00	206.00	335.00	202.00	1
12	335.00	202.00	343.00	202.00	1
13	343.00	202.00	400.00	185.00	1
14	0.00	100.00	10.00	101.00	1
15	10.00	101.00	100.00	119.00	1
16	100.00	119.00	142.00	130.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

```
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1200 Trial Surfaces Have Been Generated.
  20 Surface(s) Initiate(s) From Each Of    60 Points Equally Spaced
Along The Ground Surface Between  X = 135.00(ft)
                              and  X = 155.00(ft)
Each Surface Terminates Between   X = 225.00(ft)
                              and  X = 280.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
```

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1200
Statistical Data On All Valid FS Values:
FS Max = 1.412 FS Min = 1.121 FS Ave = 1.229
Standard Deviation = 0.070 Coefficient of Variation = 5.68 %
Failure Surface Specified By 14 Coordinate Points

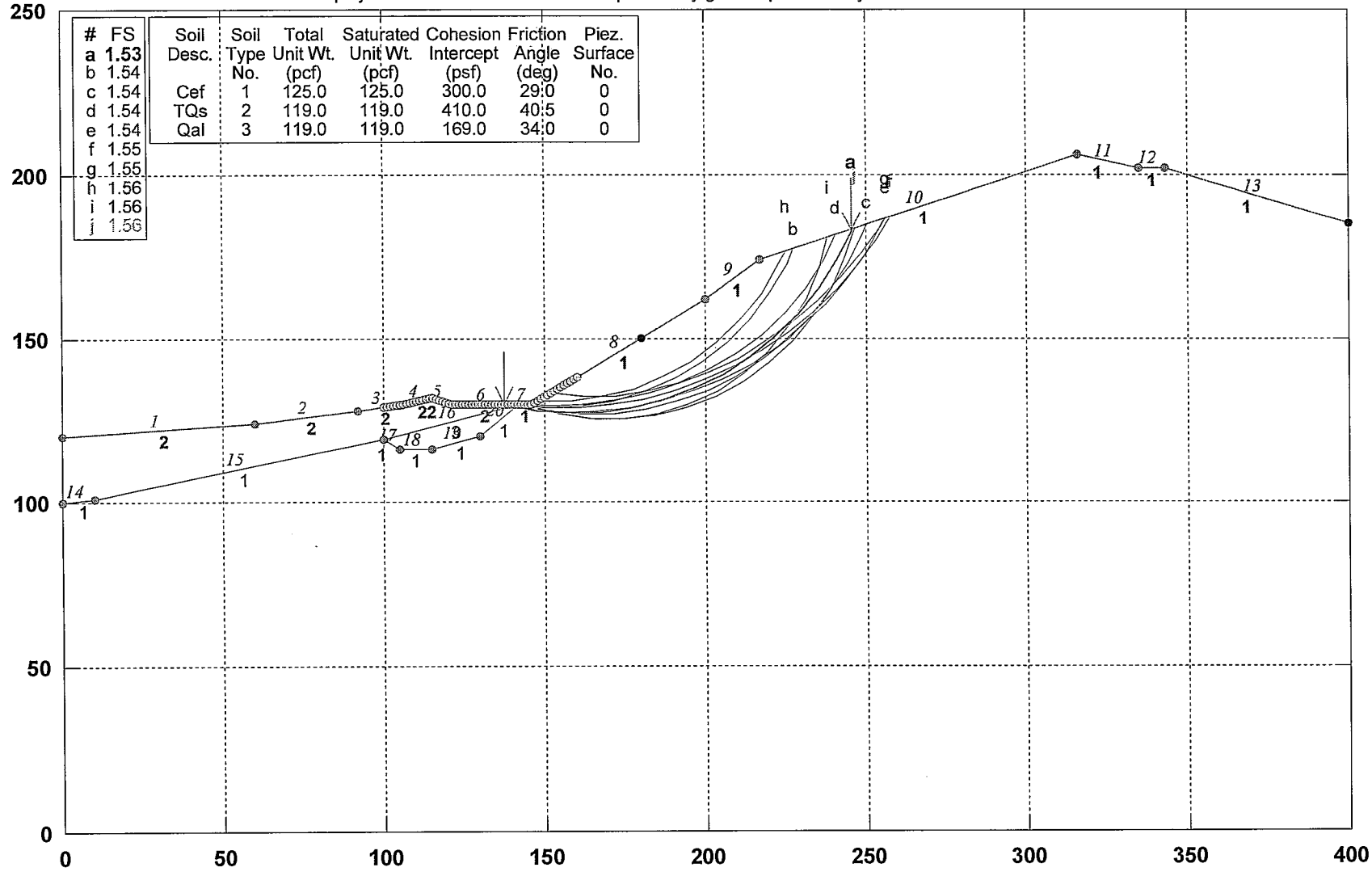
Point No.	X-Surf (ft)	Y-Surf (ft)
1	145.85	130.00
2	155.81	129.08
3	165.80	129.21
4	175.73	130.40
5	185.48	132.63
6	194.94	135.88
7	204.00	140.10
8	212.57	145.26
9	220.55	151.29
10	227.85	158.13
11	234.38	165.70
12	240.08	173.92
13	244.88	182.69
14	245.04	183.06

Factor of Safety
*** 1.121 ***
Individual data on the 16 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	0.2	0.1	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.8	4133.4	0.0	0.0	0.	0.	620.0	0.0	0.0
3	10.0	12031.2	0.0	0.0	0.	0.	1804.7	0.0	0.0
4	9.9	18453.9	0.0	0.0	0.	0.	2768.1	0.0	0.0
5	9.7	23140.1	0.0	0.0	0.	0.	3471.0	0.0	0.0
6	9.5	25945.8	0.0	0.0	0.	0.	3891.9	0.0	0.0
7	5.1	14826.5	0.0	0.0	0.	0.	2224.0	0.0	0.0
8	4.0	12136.6	0.0	0.0	0.	0.	1820.5	0.0	0.0
9	8.6	26957.8	0.0	0.0	0.	0.	4043.7	0.0	0.0
10	4.4	14114.9	0.0	0.0	0.	0.	2117.2	0.0	0.0
11	3.5	10925.0	0.0	0.0	0.	0.	1638.7	0.0	0.0
12	7.3	19714.7	0.0	0.0	0.	0.	2957.2	0.0	0.0
13	6.5	13597.3	0.0	0.0	0.	0.	2039.6	0.0	0.0
14	5.7	7645.3	0.0	0.0	0.	0.	1146.8	0.0	0.0
15	4.8	2360.9	0.0	0.0	0.	0.	354.1	0.0	0.0
16	0.2	3.2	0.0	0.0	0.	0.	0.5	0.0	0.0

G P R, T52584, 28-28', circular Revised Mitigation Measure

n:\projects\1600-1699\1617\1617lv slope stability\g28s3d.pl2 Run By: VKP 8/11/2004 08:00AM



GSTABL7 v.2 FSmin=1.53

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 65

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/11/2004
Time of Run: 08:00AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g28s3d.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g28s3d.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g28s3d.PLT
PROBLEM DESCRIPTION: G P R, T52584, 28-28', circular
Revised Mitigation Measure

BOUNDARY COORDINATES
13 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	120.00	60.00	124.00	2
2	60.00	124.00	92.00	128.00	2
3	92.00	128.00	106.00	130.00	2
4	106.00	130.00	115.00	132.00	2
5	115.00	132.00	121.00	130.00	2
6	121.00	130.00	142.00	130.00	2
7	142.00	130.00	146.00	130.00	1
8	146.00	130.00	200.00	162.00	1
9	200.00	162.00	217.00	174.00	1
10	217.00	174.00	316.00	206.00	1
11	316.00	206.00	335.00	202.00	1
12	335.00	202.00	343.00	202.00	1
13	343.00	202.00	400.00	185.00	1
14	0.00	100.00	10.00	101.00	1
15	10.00	101.00	100.00	119.00	1
16	100.00	119.00	142.00	130.00	3
17	100.00	119.00	105.00	116.00	1
18	105.00	116.00	115.00	116.00	1
19	115.00	116.00	130.00	120.00	1
20	130.00	120.00	142.00	130.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1200 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 100.00(ft)
and X = 160.00(ft)
Each Surface Terminates Between X = 180.00(ft)
and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.

The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1200
Statistical Data On All Valid FS Values:
FS Max = 4.385 FS Min = 1.530 FS Ave = 2.364
Standard Deviation = 0.543 Coefficient of Variation = 22.98 %
Failure Surface Specified By 15 Coordinate Points

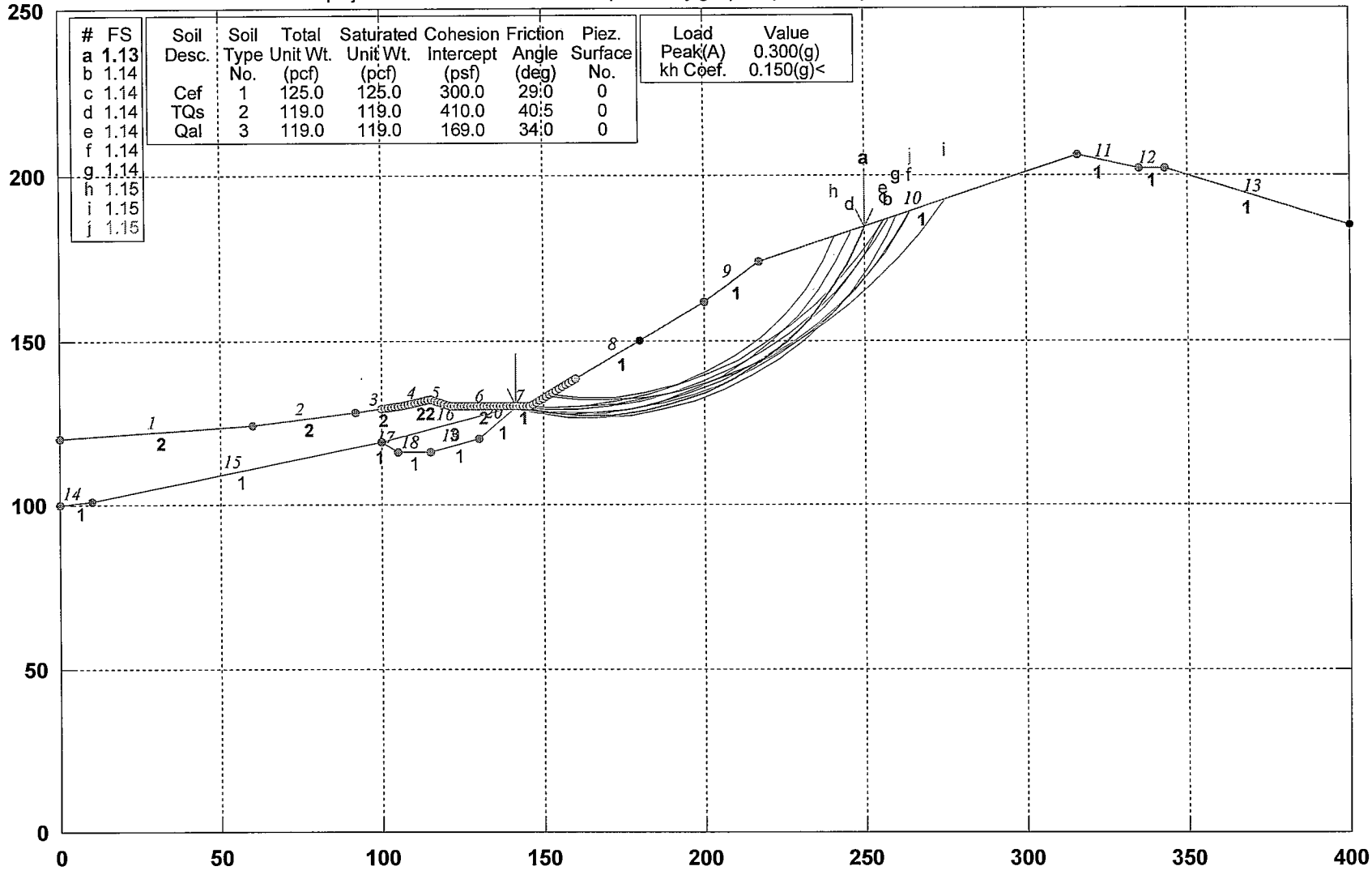
Point No.	X-Surf (ft)	Y-Surf (ft)
1	137.63	130.00
2	147.46	128.17
3	157.43	127.39
4	167.42	127.67
5	177.33	129.02
6	187.04	131.41
7	196.44	134.82
8	205.43	139.21
9	213.90	144.53
10	221.75	150.72
11	228.90	157.71
12	235.27	165.42
13	240.78	173.76
14	245.38	182.64
15	245.61	183.25

Factor of Safety
*** 1.530 ***
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	2.6	72.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	1.0	69.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.8	72.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.0	594.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	1.5	388.1	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	7529.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	10.0	15249.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	9.9	21412.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	9.7	25769.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	9.4	28194.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	3.6	11231.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	5.4	17662.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.5	28526.5	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.1	10538.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	4.7	15387.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	7.2	20094.1	0.0	0.0	0.	0.	0.0	0.0	0.0
17	6.4	13781.4	0.0	0.0	0.	0.	0.0	0.0	0.0
18	5.5	7721.9	0.0	0.0	0.	0.	0.0	0.0	0.0
19	4.6	2427.6	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.2	7.8	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 28-28', circular Revised Mitigation Measure, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g28ps3d.pl2 Run By: VKP 8/11/2004 08:03AM



#	FS
a	1.13
b	1.14
c	1.14
d	1.14
e	1.14
f	1.14
g	1.14
h	1.15
i	1.15
j	1.15

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Cef	1	125.0	125.0	300.0	29.0	0
TQs	2	119.0	119.0	410.0	40.5	0
Qal	3	119.0	119.0	169.0	34.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.13

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN No.- 66

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/11/2004
Time of Run: 08:03AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g28ps3d.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g28ps3d.OU

T

Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g28ps3d.PLT
PROBLEM DESCRIPTION: G P R, T52584, 28-28', circular
Revised Mitigation Measure, Pseudostatic

BOUNDARY COORDINATES
13 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	120.00	60.00	124.00	2
2	60.00	124.00	92.00	128.00	2
3	92.00	128.00	106.00	130.00	2
4	106.00	130.00	115.00	132.00	2
5	115.00	132.00	121.00	130.00	2
6	121.00	130.00	142.00	130.00	2
7	142.00	130.00	146.00	130.00	1
8	146.00	130.00	200.00	162.00	1
9	200.00	162.00	217.00	174.00	1
10	217.00	174.00	316.00	206.00	1
11	316.00	206.00	335.00	202.00	1
12	335.00	202.00	343.00	202.00	1
13	343.00	202.00	400.00	185.00	1
14	0.00	100.00	10.00	101.00	1
15	10.00	101.00	100.00	119.00	1
16	100.00	119.00	142.00	130.00	3
17	100.00	119.00	105.00	116.00	1
18	105.00	116.00	115.00	116.00	1
19	115.00	116.00	130.00	120.00	1
20	130.00	120.00	142.00	130.00	1

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

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	125.0	125.0	300.0	29.0	0.00	0.0	0
2	119.0	119.0	410.0	40.5	0.00	0.0	0
3	119.0	119.0	169.0	34.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1200 Trial Surfaces Have Been Generated.
20 Surface(s) Initiate(s) From Each Of 60 Points Equally Spaced
Along The Ground Surface Between X = 100.00(ft)
and X = 160.00(ft)
Each Surface Terminates Between X = 180.00(ft)

and X = 400.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1200
Statistical Data On All Valid FS Values:
FS Max = 2.943 FS Min = 1.133 FS Ave = 1.570
Standard Deviation = 0.267 Coefficient of Variation = 17.01 %
Failure Surface Specified By 15 Coordinate Points

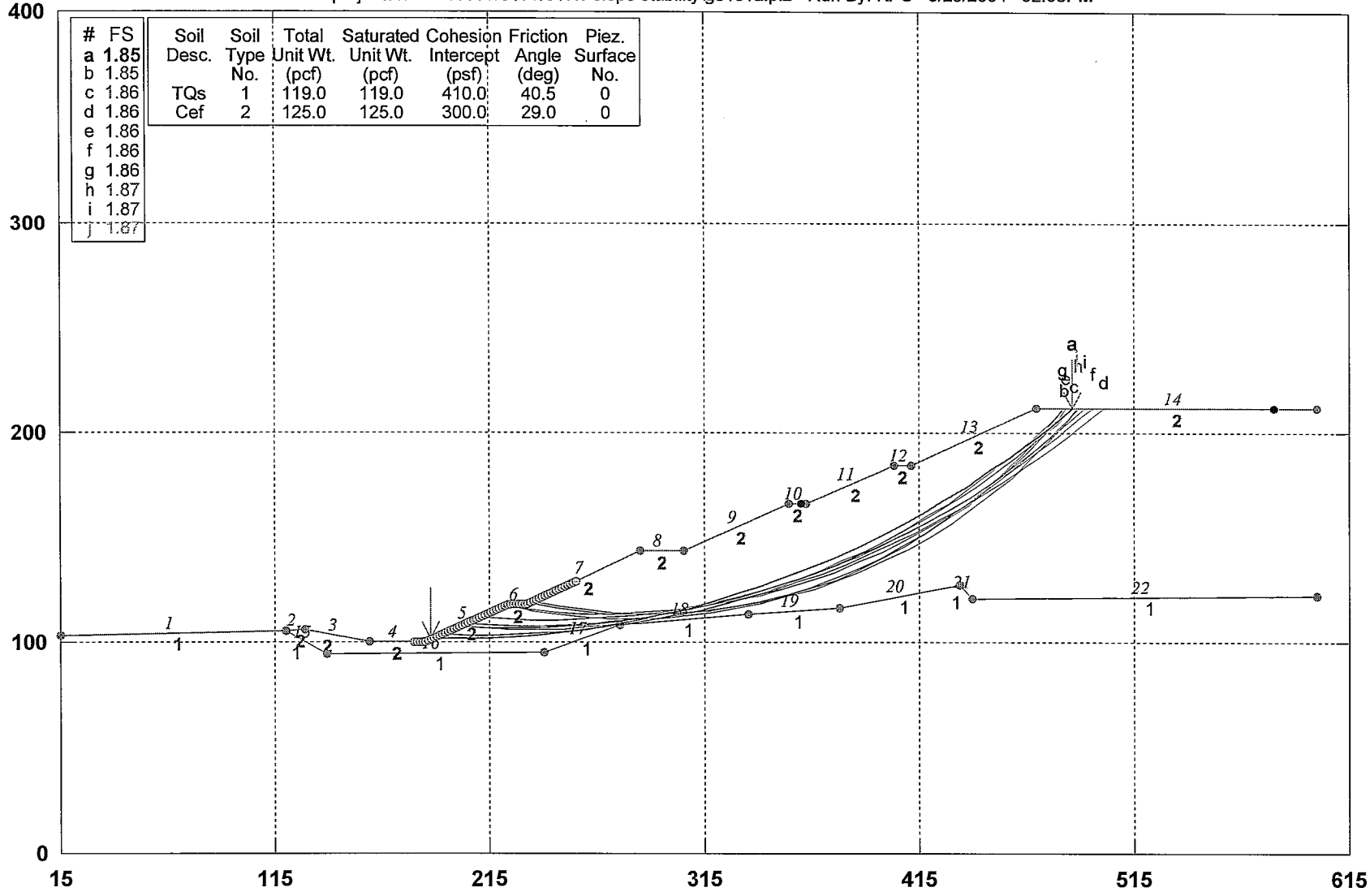
Point No.	X-Surf (ft)	Y-Surf (ft)
1	141.70	130.00
2	151.49	127.99
3	161.45	127.05
4	171.45	127.20
5	181.37	128.45
6	191.10	130.76
7	200.51	134.12
8	209.51	138.49
9	217.98	143.81
10	225.81	150.02
11	232.93	157.05
12	239.23	164.81
13	244.66	173.21
14	249.13	182.16
15	250.07	184.69

Factor of Safety
*** 1.133 ***
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	0.2	0.4	0.0	0.0	0.	0.	0.1	0.0	0.0
2	0.1	0.4	0.0	0.0	0.	0.	0.1	0.0	0.0
3	0.1	0.4	0.0	0.0	0.	0.	0.1	0.0	0.0
4	4.0	237.0	0.0	0.0	0.	0.	35.5	0.0	0.0
5	5.5	2111.2	0.0	0.0	0.	0.	316.7	0.0	0.0
6	10.0	10809.0	0.0	0.0	0.	0.	1621.3	0.0	0.0
7	10.0	18733.2	0.0	0.0	0.	0.	2810.0	0.0	0.0
8	9.9	25045.0	0.0	0.0	0.	0.	3756.8	0.0	0.0
9	9.7	29471.3	0.0	0.0	0.	0.	4420.7	0.0	0.0
10	8.9	30062.5	0.0	0.0	0.	0.	4509.4	0.0	0.0
11	0.5	1808.1	0.0	0.0	0.	0.	271.2	0.0	0.0
12	9.0	32868.8	0.0	0.0	0.	0.	4930.3	0.0	0.0
13	7.5	28566.6	0.0	0.0	0.	0.	4285.0	0.0	0.0
14	1.0	3742.4	0.0	0.0	0.	0.	561.4	0.0	0.0
15	7.8	28080.1	0.0	0.0	0.	0.	4212.0	0.0	0.0
16	7.1	21751.4	0.0	0.0	0.	0.	3262.7	0.0	0.0
17	6.3	15162.6	0.0	0.0	0.	0.	2274.4	0.0	0.0
18	5.4	8846.8	0.0	0.0	0.	0.	1327.0	0.0	0.0
19	4.5	3344.7	0.0	0.0	0.	0.	501.7	0.0	0.0
20	0.9	130.9	0.0	0.0	0.	0.	19.6	0.0	0.0

G P R, T52584, Sec. 31-31' - Critical Fill Slope-Static

n:\projects\1600-1699\1617\1617lv slope stability\g31s1a.pl2 Run By: KPC 8/20/2004 02:03PM



GSTABL7 v.2 FSmin=1.85

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO.-67

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                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                  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:        8/20/2004
Time of Run:              02:03PM
Run By:                   KPC
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g31s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g31s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g31s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 31-31'
                    - Critical Fill Slope-Static
BOUNDARY COORDINATES
   14 Top   Boundaries
   22 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	15.00	103.00	120.00	105.00	1
2	120.00	105.00	129.00	106.00	2
3	129.00	106.00	159.00	100.00	2
4	159.00	100.00	185.00	100.00	2
5	185.00	100.00	224.00	118.00	2
6	224.00	118.00	232.00	118.00	2
7	232.00	118.00	285.00	143.00	2
8	285.00	143.00	305.00	143.00	2
9	305.00	143.00	354.00	166.00	2
10	354.00	166.00	362.00	166.00	2
11	362.00	166.00	403.00	184.00	2
12	403.00	184.00	411.00	184.00	2
13	411.00	184.00	470.00	212.00	2
14	470.00	212.00	600.00	212.00	2
15	120.00	105.00	139.00	94.00	1
16	139.00	94.00	240.00	95.00	1
17	240.00	95.00	275.00	108.00	1
18	275.00	108.00	335.00	113.00	1
19	335.00	113.00	378.00	116.00	1
20	378.00	116.00	434.00	127.00	1
21	434.00	127.00	440.00	121.00	1
22	440.00	121.00	600.00	122.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	119.0	119.0	410.0	40.5	0.00	0.0	0
2	125.0	125.0	300.0	29.0	0.00	0.0	0

```
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4600 Trial Surfaces Have Been Generated.
  40 Surface(s) Initiate(s) From Each Of   115 Points Equally Spaced
Along The Ground Surface Between  X = 180.00(ft)
                              and  X = 255.00(ft)
Each Surface Terminates Between   X = 360.00(ft)
                              and  X = 580.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
```

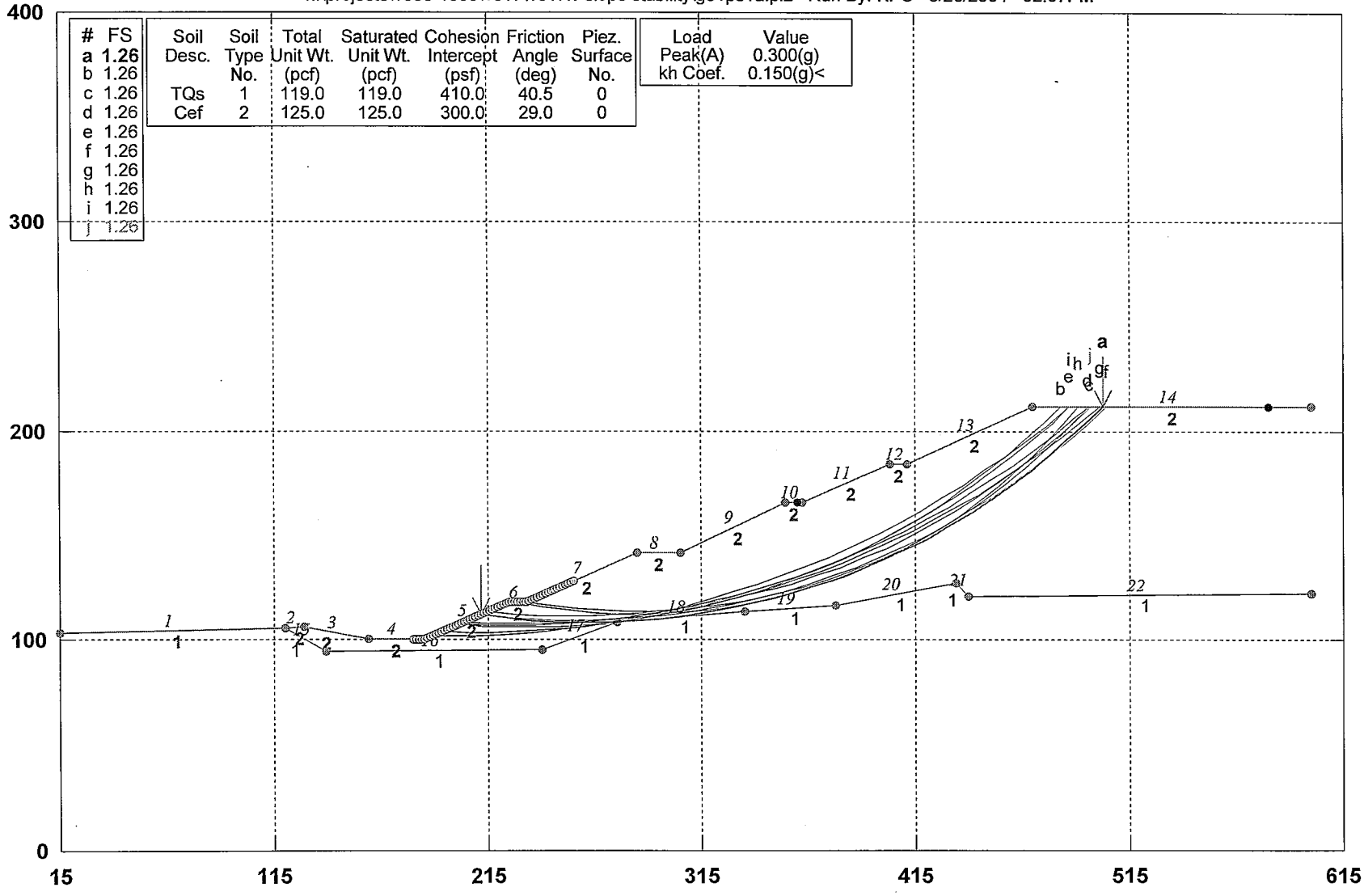
At Which A Surface Extends Is Y = 0.00(ft)
12.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 4600
Statistical Data On All Valid FS Values:
FS Max = 4.025 FS Min = 1.854 FS Ave = 2.875
Standard Deviation = 0.529 Coefficient of Variation = 18.40 %
Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	187.89	101.34
2	199.89	101.34
3	211.89	101.67
4	223.87	102.32
5	235.83	103.30
6	247.76	104.60
7	259.65	106.22
8	271.49	108.16
9	283.28	110.42
10	295.00	113.00
11	306.64	115.90
12	318.21	119.11
13	329.68	122.63
14	341.05	126.46
15	352.31	130.60
16	363.46	135.04
17	374.49	139.78
18	385.38	144.82
19	396.13	150.14
20	406.73	155.76
21	417.18	161.66
22	427.47	167.85
23	437.58	174.31
24	447.52	181.03
25	457.27	188.03
26	466.82	195.29
27	476.18	202.80
28	485.33	210.56
29	486.93	212.00

Factor of Safety
*** 1.854 ***

G P R, T52584, Sec. 31-31' - Critical Fill Slope-Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g31ps1a.pl2 Run By: KPC 8/20/2004 02:07PM



GSTABL7 v.2 FSmin=1.26

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 168

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                    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:        8/20/2004
Time of Run:              02:07PM
Run By:                   KPC
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g31ps1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g31ps1a.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g31ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 31-31'
                    - Critical Fill Slope-Pseudostatic
BOUNDARY COORDINATES
   14 Top   Boundaries
   22 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1        15.00     103.00     120.00     105.00        1
    2       120.00     105.00     129.00     106.00        2
    3       129.00     106.00     159.00     100.00        2
    4       159.00     100.00     185.00     100.00        2
    5       185.00     100.00     225.00     118.00        2
    6       225.00     118.00     233.00     118.00        2
    7       233.00     118.00     285.00     142.00        2
    8       285.00     142.00     305.00     142.00        2
    9       305.00     142.00     354.00     166.00        2
   10       354.00     166.00     362.00     166.00        2
   11       362.00     166.00     403.00     184.00        2
   12       403.00     184.00     411.00     184.00        2
   13       411.00     184.00     470.00     212.00        2
   14       470.00     212.00     600.00     212.00        2
   15       120.00     105.00     139.00      94.00        1
   16       139.00      94.00     240.00      95.00        1
   17       240.00      95.00     275.00     108.00        1
   18       275.00     108.00     335.00     113.00        1
   19       335.00     113.00     378.00     116.00        1
   20       378.00     116.00     434.00     127.00        1
   21       434.00     127.00     440.00     121.00        1
   22       440.00     121.00     600.00     122.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
  2   125.0    125.0     300.0     29.0    0.00       0.0      0
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4600 Trial Surfaces Have Been Generated.
  40 Surface(s) Initiate(s) From Each Of   115 Points Equally Spaced
```

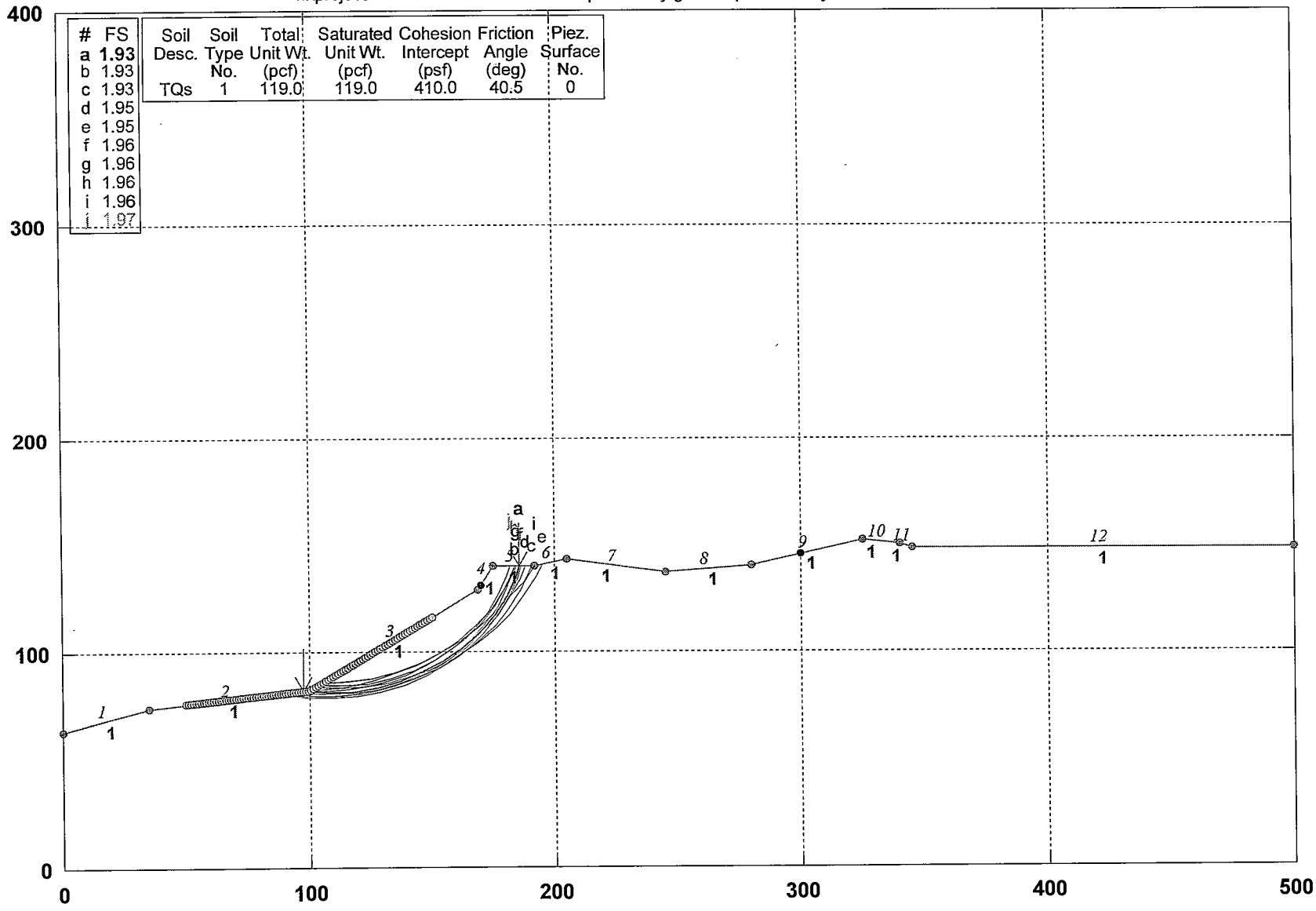
Along The Ground Surface Between X = 180.00(ft)
and X = 255.00(ft)
Each Surface Terminates Between X = 360.00(ft)
and X = 580.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
12.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 10.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 4600
Statistical Data On All Valid FS Values:
FS Max = 2.522 FS Min = 1.261 FS Ave = 1.925
Standard Deviation = 0.341 Coefficient of Variation = 17.71 %
Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	211.58	111.96
2	223.47	110.37
3	235.42	109.22
4	247.40	108.49
5	259.39	108.20
6	271.39	108.35
7	283.38	108.92
8	295.34	109.93
9	307.25	111.37
10	319.10	113.24
11	330.88	115.54
12	342.57	118.26
13	354.15	121.40
14	365.61	124.96
15	376.93	128.93
16	388.11	133.30
17	399.12	138.08
18	409.95	143.25
19	420.58	148.81
20	431.01	154.75
21	441.21	161.06
22	451.19	167.73
23	460.91	174.77
24	470.37	182.15
25	479.56	189.86
26	488.47	197.90
27	497.08	206.26
28	502.57	212.00

Factor of Safety
*** 1.261 ***

G P R, T52584, Sec. 32, Mitigation measu2:1 (H:V) Static, Upper area

n:\projects\1600-1699\1617\1617lv slope stability\g32s1e.pl2 Run By: VKP 8/10/2004 10:44AM



GSTABL7 v.2 FSmin=1.93

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO. - 69

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                  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:        8/10/2004
Time of Run:              10:44AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g32s1e.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g32s1e.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g32s1e.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Sec. 32, Mitigation measu
                      2:1 (H:V) Static, Upper area
BOUNDARY COORDINATES
   12 Top   Boundaries
   12 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      63.00      35.00      74.00        1
    2        35.00      74.00     100.00      82.00        1
    3       100.00      82.00     169.00     129.00        1
    4       169.00     129.00     175.00     140.00        1
    5       175.00     140.00     192.00     140.00        1
    6       192.00     140.00     205.00     143.00        1
    7       205.00     143.00     245.00     137.00        1
    8       245.00     137.00     280.00     140.00        1
    9       280.00     140.00     325.00     152.00        1
   10       325.00     152.00     340.00     150.00        1
   11       340.00     150.00     345.00     148.00        1
   12       345.00     148.00     500.00     148.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
  20 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X =  50.00(ft)
                              and  X = 150.00(ft)
Each Surface Terminates Between   X = 170.00(ft)
                            and   X = 300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -20.0
And  20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Evaluated =  2000
```

Statistical Data On All Valid FS Values:
FS Max = 8.962 FS Min = 1.926 FS Ave = 3.075
Standard Deviation = 1.044 Coefficient of Variation = 33.96 %

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.47	81.69
2	107.45	81.00
3	117.44	81.55
4	127.28	83.33
5	136.82	86.31
6	145.93	90.44
7	154.46	95.66
8	162.28	101.89
9	169.27	109.04
10	175.33	117.00
11	180.36	125.64
12	184.29	134.83
13	185.77	140.00

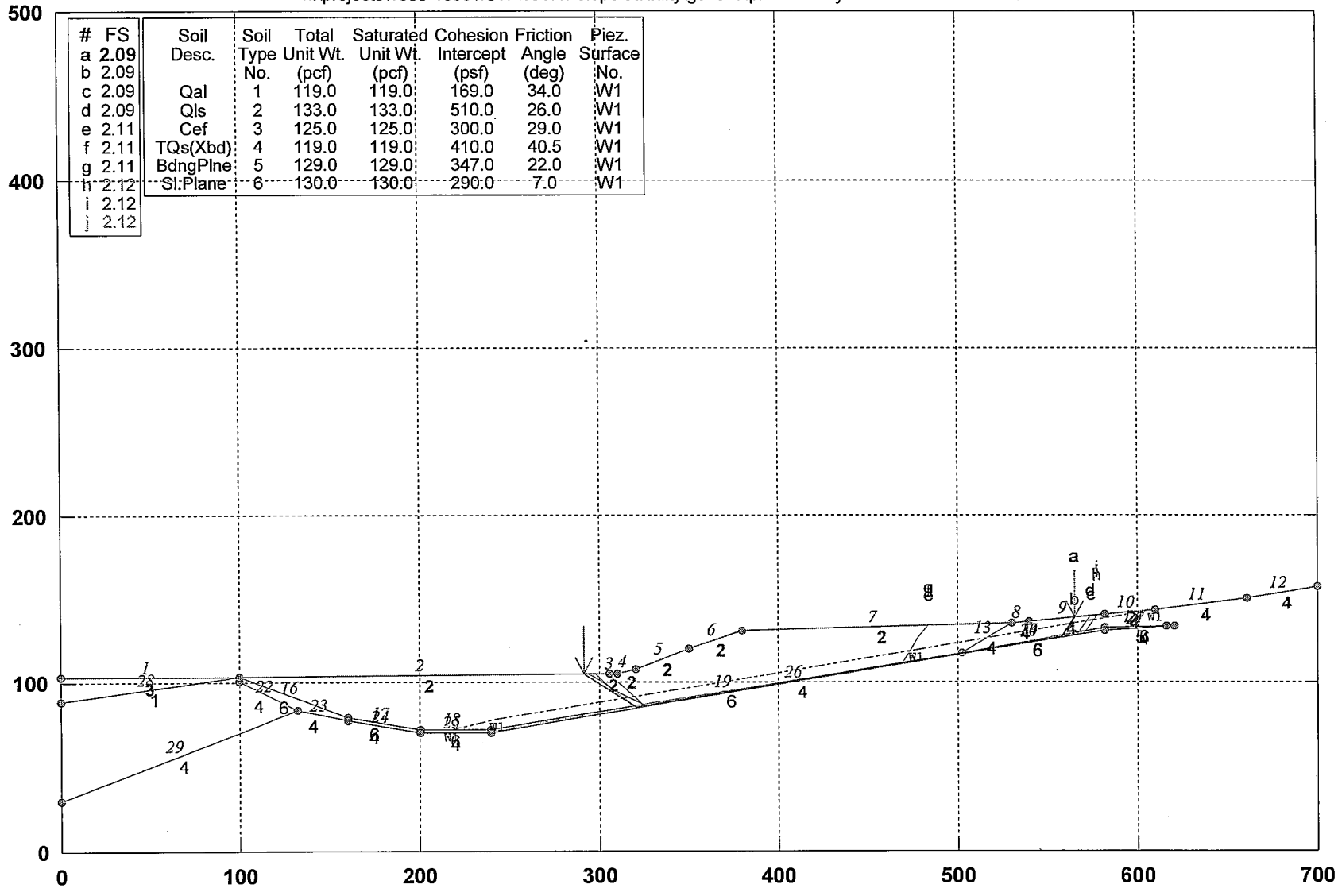
Factor of Safety
*** 1.926 ***

Individual data on the 15 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	2.5	72.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.5	2906.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	10.0	10928.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	9.8	17315.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.5	21600.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	9.1	23640.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	8.5	23489.5	0.0	0.0	0.	0.	0.0	0.0	0.0
8	7.8	21390.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.7	17101.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.3	659.7	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.7	14960.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.3	912.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	5.0	11184.9	0.0	0.0	0.	0.	0.0	0.0	0.0
14	3.9	4562.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	1.5	456.5	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584 Sec.34, Existing Cut Slope-Static (proposed condition)

n:\projects\1600-1699\1617\1617lv slope stability\g34s1a.pl2 Run By: VKP 8/10/2004 08:40AM



#	FS
a	2.09
b	2.09
c	2.09
d	2.09
e	2.11
f	2.11
g	2.11
h	2.12
i	2.12
j	2.12

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	119.0	119.0	169.0	34.0	W1
Qls	2	133.0	133.0	510.0	26.0	W1
Cef	3	125.0	125.0	300.0	29.0	W1
TQs(Xbd)	4	119.0	119.0	410.0	40.5	W1
BdngPlne	5	129.0	129.0	347.0	22.0	W1
Sl:Plane	6	130.0	130.0	290.0	7.0	W1

GSTABL7 v.2 FSmin=2.09

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No.-70

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/10/2004
Time of Run: 08:40AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s1a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s1a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g34s1a.PLT
PROBLEM DESCRIPTION: G P R, T52584 Sec.34, Existing Cut
Slope-Static (proposed condition)

BOUNDARY COORDINATES
12 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	103.00	100.00	103.00	3
2	100.00	103.00	305.00	105.00	2
3	305.00	105.00	310.00	105.00	2
4	310.00	105.00	320.00	108.00	2
5	320.00	108.00	350.00	120.00	2
6	350.00	120.00	380.00	130.00	2
7	380.00	130.00	530.00	135.00	2
8	530.00	135.00	540.00	136.00	4
9	540.00	136.00	582.00	140.00	4
10	582.00	140.00	610.00	143.00	4
11	610.00	143.00	661.00	150.00	4
12	661.00	150.00	700.00	157.00	4
13	502.00	117.00	530.00	135.00	4
14	502.00	117.00	582.00	132.00	5
15	582.00	132.00	616.00	133.00	5
16	100.00	103.00	160.00	79.00	6
17	160.00	79.00	200.00	72.00	6
18	200.00	72.00	240.00	72.00	6
19	240.00	72.00	502.00	117.00	6
20	502.00	117.00	582.00	132.00	6
21	582.00	132.00	620.00	133.00	6
22	100.00	101.00	132.00	83.00	4
23	132.00	83.00	160.00	77.00	4
24	160.00	77.00	200.00	70.00	4
25	200.00	70.00	240.00	70.00	4
26	240.00	70.00	582.00	130.00	4
27	582.00	130.00	620.00	133.00	4
28	0.00	88.00	100.00	103.00	1
29	0.00	30.00	132.00	83.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 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	119.0	119.0	169.0	34.0	0.00	0.0	1
2	133.0	133.0	510.0	26.0	0.00	0.0	1
3	125.0	125.0	300.0	29.0	0.00	0.0	1
4	119.0	119.0	410.0	40.5	0.00	0.0	1
5	129.0	129.0	347.0	22.0	0.00	0.0	1
6	130.0	130.0	290.0	7.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	218.00	72.00
2	243.00	78.00
3	477.00	119.00
4	610.00	143.00

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
1000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 17.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	240.00	71.00	360.00	92.10	0.00
2	361.00	92.20	582.00	131.00	0.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 10.914 FS Min = 2.085 FS Ave = 2.911
Standard Deviation = 0.754 Coefficient of Variation = 25.89 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	291.33	104.87
2	292.03	104.43
3	305.94	94.66
4	319.97	85.06
5	557.81	126.75
6	564.95	138.38

Factor of Safety
*** 2.085 ***
Individual data on the 19 slices

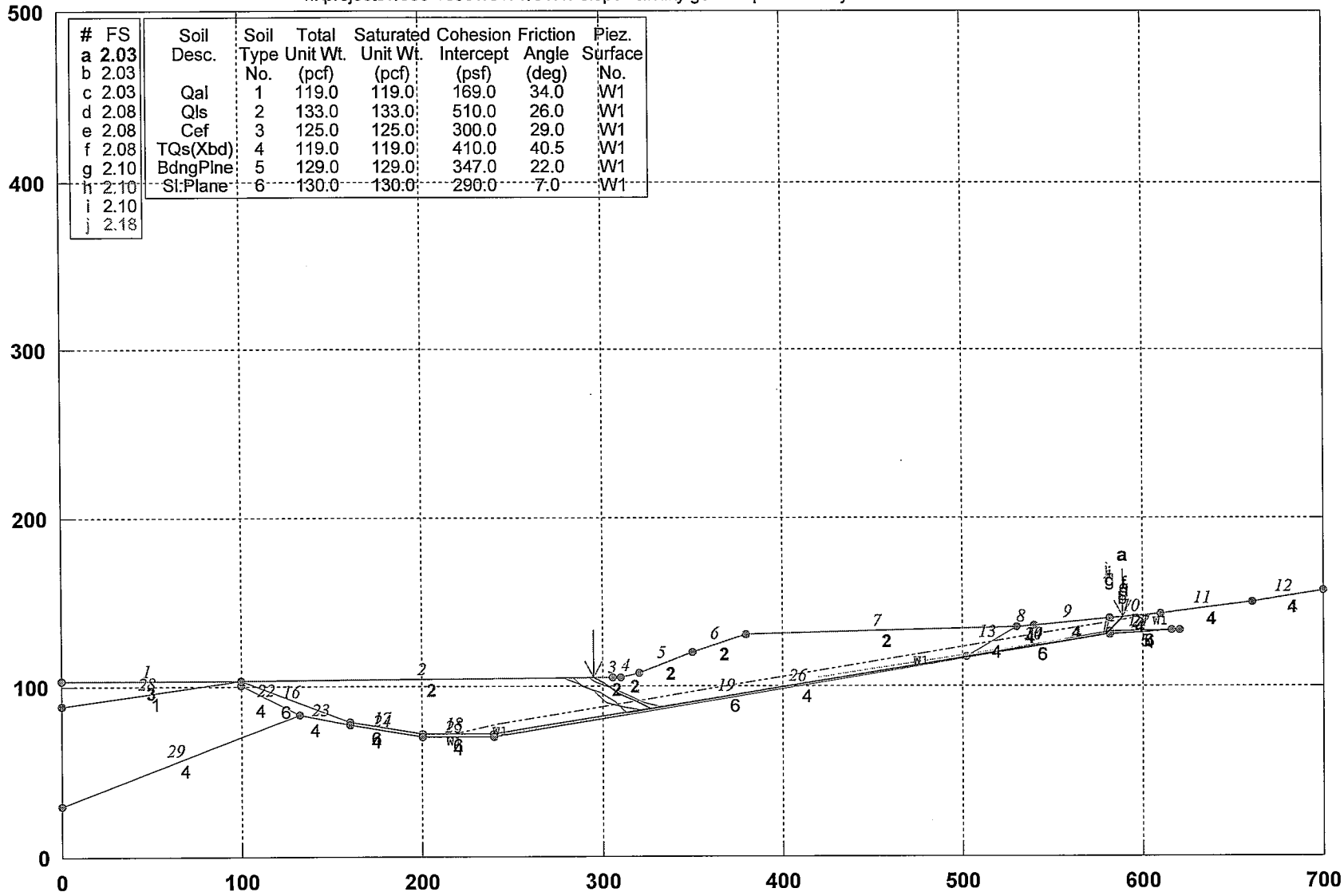
Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.7	20.7	0.0	0.0	0.	0.	0.0	0.0	0.0
2	13.0	8724.4	0.0	0.0	0.	0.	0.0	0.0	0.0
3	0.9	1255.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.1	6327.3	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.5	4764.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.7	16780.1	0.0	1431.8	0.	0.	0.0	0.0	0.0
7	0.8	2359.6	0.0	356.9	0.	0.	0.0	0.0	0.0
8	0.0	81.9	0.0	10.8	0.	0.	0.0	0.0	0.0
9	30.0	104896.9	0.0	12026.5	0.	0.	0.0	0.0	0.0
10	30.0	127813.9	0.0	12022.1	0.	0.	0.0	0.0	0.0
11	97.0	355089.6	0.0	38841.0	0.	0.	0.0	0.0	0.0
12	25.0	62741.1	0.0	10096.2	0.	0.	0.0	0.0	0.0
13	14.1	29510.1	0.0	5775.2	0.	0.	0.0	0.0	0.0
14	13.9	24240.9	0.0	5771.2	0.	0.	0.0	0.0	0.0
15	10.0	15214.6	0.0	4184.8	0.	0.	0.0	0.0	0.0
16	17.8	24827.7	0.0	7534.8	0.	0.	0.0	0.0	0.0
17	0.5	622.0	0.0	374.9	0.	0.	0.0	0.0	0.0
18	4.2	3488.7	0.0	1514.6	0.	0.	0.0	0.0	0.0
19	2.4	534.3	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 34, Existing Cut Slope-Static

n:\projects\1600-1699\1617\1617lv slope stability\g34s2a.pl2 Run By: VKP 8/10/2004 08:45AM

#	FS
a	2.03
b	2.03
c	2.03
d	2.08
e	2.08
f	2.08
g	2.10
h	2.10
i	2.10
j	2.18

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	119.0	119.0	169.0	34.0	W1
Qls	2	133.0	133.0	510.0	26.0	W1
Cef	3	125.0	125.0	300.0	29.0	W1
TQs(Xbd)	4	119.0	119.0	410.0	40.5	W1
BdngPlne	5	129.0	129.0	347.0	22.0	W1
Sl:Plane	6	130.0	130.0	290.0	7.0	W1



GSTABL7 v.2 FSmin=2.03

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. - 71

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/10/2004
Time of Run: 08:45AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s2a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s2a.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g34s2a.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec. 34, Existing Cut Slope-Static

BOUNDARY COORDINATES
12 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	103.00	100.00	103.00	3
2	100.00	103.00	305.00	105.00	2
3	305.00	105.00	310.00	105.00	2
4	310.00	105.00	320.00	108.00	2
5	320.00	108.00	350.00	120.00	2
6	350.00	120.00	380.00	130.00	2
7	380.00	130.00	530.00	135.00	2
8	530.00	135.00	540.00	136.00	4
9	540.00	136.00	582.00	140.00	4
10	582.00	140.00	610.00	143.00	4
11	610.00	143.00	661.00	150.00	4
12	661.00	150.00	700.00	157.00	4
13	502.00	117.00	530.00	135.00	4
14	502.00	117.00	582.00	132.00	5
15	582.00	132.00	616.00	133.00	5
16	100.00	103.00	160.00	79.00	6
17	160.00	79.00	200.00	72.00	6
18	200.00	72.00	240.00	72.00	6
19	240.00	72.00	502.00	117.00	6
20	502.00	117.00	582.00	132.00	6
21	582.00	132.00	620.00	133.00	6
22	100.00	101.00	132.00	83.00	4
23	132.00	83.00	160.00	77.00	4
24	160.00	77.00	200.00	70.00	4
25	200.00	70.00	240.00	70.00	4
26	240.00	70.00	582.00	130.00	4
27	582.00	130.00	620.00	133.00	4
28	0.00	88.00	100.00	103.00	1
29	0.00	30.00	132.00	83.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 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	119.0	119.0	169.0	34.0	0.00	0.0	1
2	133.0	133.0	510.0	26.0	0.00	0.0	1
3	125.0	125.0	300.0	29.0	0.00	0.0	1
4	119.0	119.0	410.0	40.5	0.00	0.0	1
5	129.0	129.0	347.0	22.0	0.00	0.0	1
6	130.0	130.0	290.0	7.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	218.00	72.00
2	243.00	78.00
3	477.00	119.00
4	610.00	143.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 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	240.00	71.00	360.00	92.10	0.00
2	420.00	105.00	582.00	131.00	0.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 6.316 FS Min = 2.028 FS Ave = 3.906
Standard Deviation = 0.769 Coefficient of Variation = 19.68 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	295.17	104.90
2	301.15	101.77
3	308.96	95.53
4	318.07	91.42
5	326.62	86.23
6	580.53	130.76
7	587.41	138.01
8	588.61	140.71

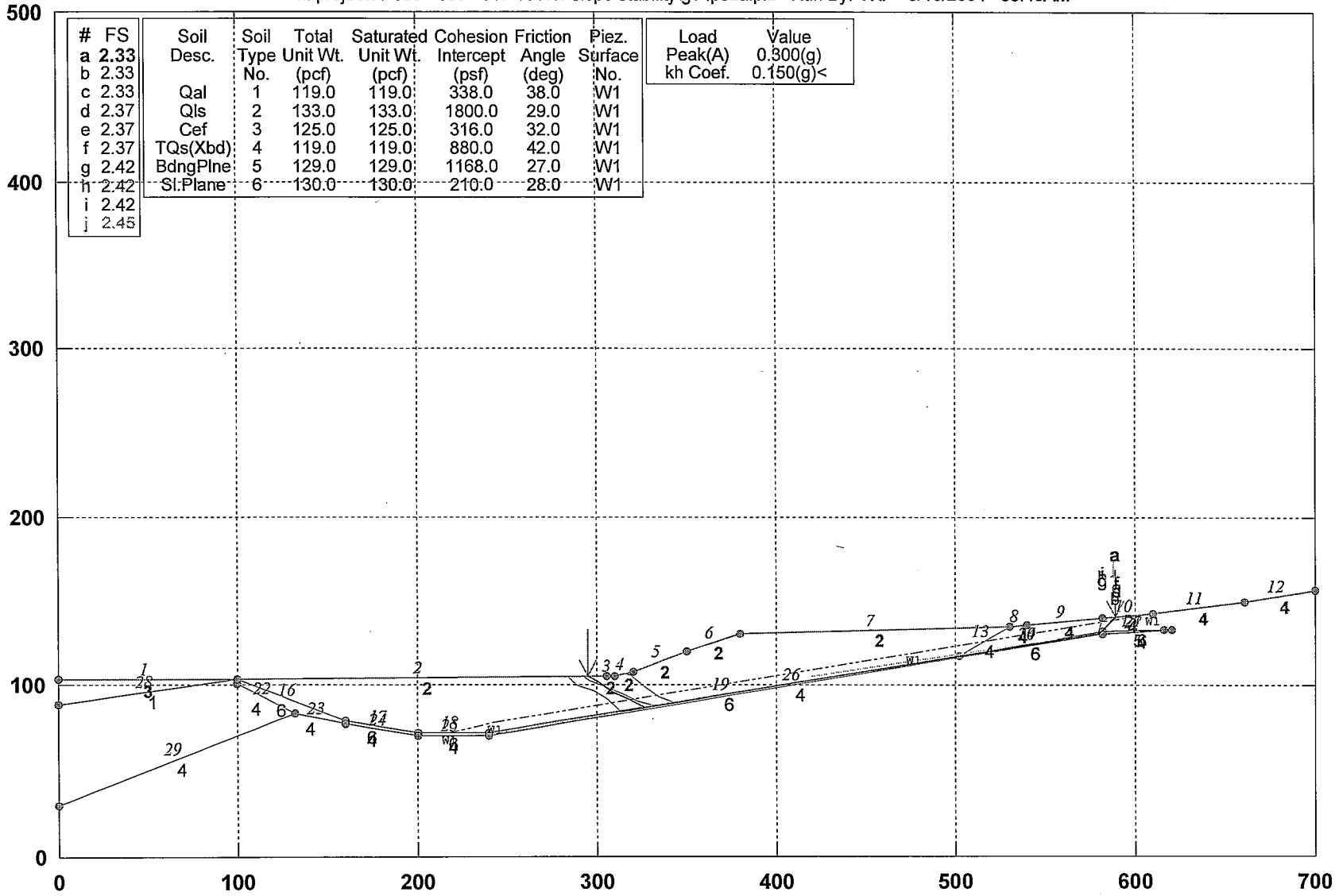
Factor of Safety
*** 2.028 ***
Individual data on the 22 slices

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	1266.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	3.9	2432.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	4.0	4152.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.0	1341.8	0.0	0.0	0.	0.	0.0	0.0	0.0
5	8.1	13927.3	0.0	0.0	0.	0.	0.0	0.0	0.0
6	0.3	725.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	1.6	3598.2	0.0	70.9	0.	0.	0.0	0.0	0.0
8	5.8	15921.5	0.0	1460.4	0.	0.	0.0	0.0	0.0
9	0.8	2651.5	0.0	364.2	0.	0.	0.0	0.0	0.0
10	23.4	84037.5	0.0	9364.1	0.	0.	0.0	0.0	0.0
11	30.0	127785.3	0.0	12008.5	0.	0.	0.0	0.0	0.0
12	97.0	354918.8	0.0	38759.6	0.	0.	0.0	0.0	0.0
13	25.0	62677.7	0.0	10065.9	0.	0.	0.0	0.0	0.0
14	14.1	29471.0	0.0	5756.5	0.	0.	0.0	0.0	0.0
15	13.9	24199.7	0.0	5751.5	0.	0.	0.0	0.0	0.0
16	10.0	15183.5	0.0	4169.9	0.	0.	0.0	0.0	0.0
17	40.5	52019.3	0.0	17222.5	0.	0.	0.0	0.0	0.0
18	1.1	1136.9	0.0	636.7	0.	0.	0.0	0.0	0.0
19	0.4	340.0	0.0	187.7	0.	0.	0.0	0.0	0.0
20	5.4	3302.3	0.0	1579.5	0.	0.	0.0	0.0	0.0

21	0.4	109.2	0.0	30.3	0.	0.	0.0	0.0	0.0
22	0.8	72.9	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 34, Existing Cut Slope-Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g34ps2a.pl2 Run By: VKP 8/10/2004 08:49AM



#	FS
a	2.33
b	2.33
c	2.33
d	2.37
e	2.37
f	2.37
g	2.42
h	2.42
i	2.42
j	2.45

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	119.0	119.0	338.0	38.0	W1
Qls	2	133.0	133.0	1800.0	29.0	W1
Cef	3	125.0	125.0	316.0	32.0	W1
TQs(Xbd)	4	119.0	119.0	880.0	42.0	W1
BdngPlne	5	129.0	129.0	1168.0	27.0	W1
Sl.Plane	6	130.0	130.0	210.0	28.0	W1

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=2.33

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN No.-72

*** **GSTABL7** ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/10/2004
Time of Run: 08:49AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34ps2a.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34ps2a.OU
T

Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g34ps2a.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec. 34, Existing Cut
Slope-Pseudostatic

BOUNDARY COORDINATES
12 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	103.00	100.00	103.00	3
2	100.00	103.00	305.00	105.00	2
3	305.00	105.00	310.00	105.00	2
4	310.00	105.00	320.00	108.00	2
5	320.00	108.00	350.00	120.00	2
6	350.00	120.00	380.00	130.00	2
7	380.00	130.00	530.00	135.00	2
8	530.00	135.00	540.00	136.00	4
9	540.00	136.00	582.00	140.00	4
10	582.00	140.00	610.00	143.00	4
11	610.00	143.00	661.00	150.00	4
12	661.00	150.00	700.00	157.00	4
13	502.00	117.00	530.00	135.00	4
14	502.00	117.00	582.00	132.00	5
15	582.00	132.00	616.00	133.00	5
16	100.00	103.00	160.00	79.00	6
17	160.00	79.00	200.00	72.00	6
18	200.00	72.00	240.00	72.00	6
19	240.00	72.00	502.00	117.00	6
20	502.00	117.00	582.00	132.00	6
21	582.00	132.00	620.00	133.00	6
22	100.00	101.00	132.00	83.00	4
23	132.00	83.00	160.00	77.00	4
24	160.00	77.00	200.00	70.00	4
25	200.00	70.00	240.00	70.00	4
26	240.00	70.00	582.00	130.00	4
27	582.00	130.00	620.00	133.00	4
28	0.00	88.00	100.00	103.00	1
29	0.00	30.00	132.00	83.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 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	119.0	119.0	338.0	38.0	0.00	0.0	1
2	133.0	133.0	1800.0	29.0	0.00	0.0	1
3	125.0	125.0	316.0	32.0	0.00	0.0	1
4	119.0	119.0	880.0	42.0	0.00	0.0	1
5	129.0	129.0	1168.0	27.0	0.00	0.0	1

6 130.0 130.0 210.0 28.0 0.00 0.0 1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	218.00	72.00
2	243.00	78.00
3	477.00	119.00
4	610.00	143.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 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	240.00	71.00	360.00	92.10	0.00
2	420.00	105.00	582.00	131.00	0.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 6.040 FS Min = 2.333 FS Ave = 3.659
Standard Deviation = 0.557 Coefficient of Variation = 15.23 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	295.17	104.90
2	301.15	101.77
3	308.96	95.53
4	318.07	91.42
5	326.62	86.23
6	580.53	130.76
7	587.41	138.01
8	588.61	140.71

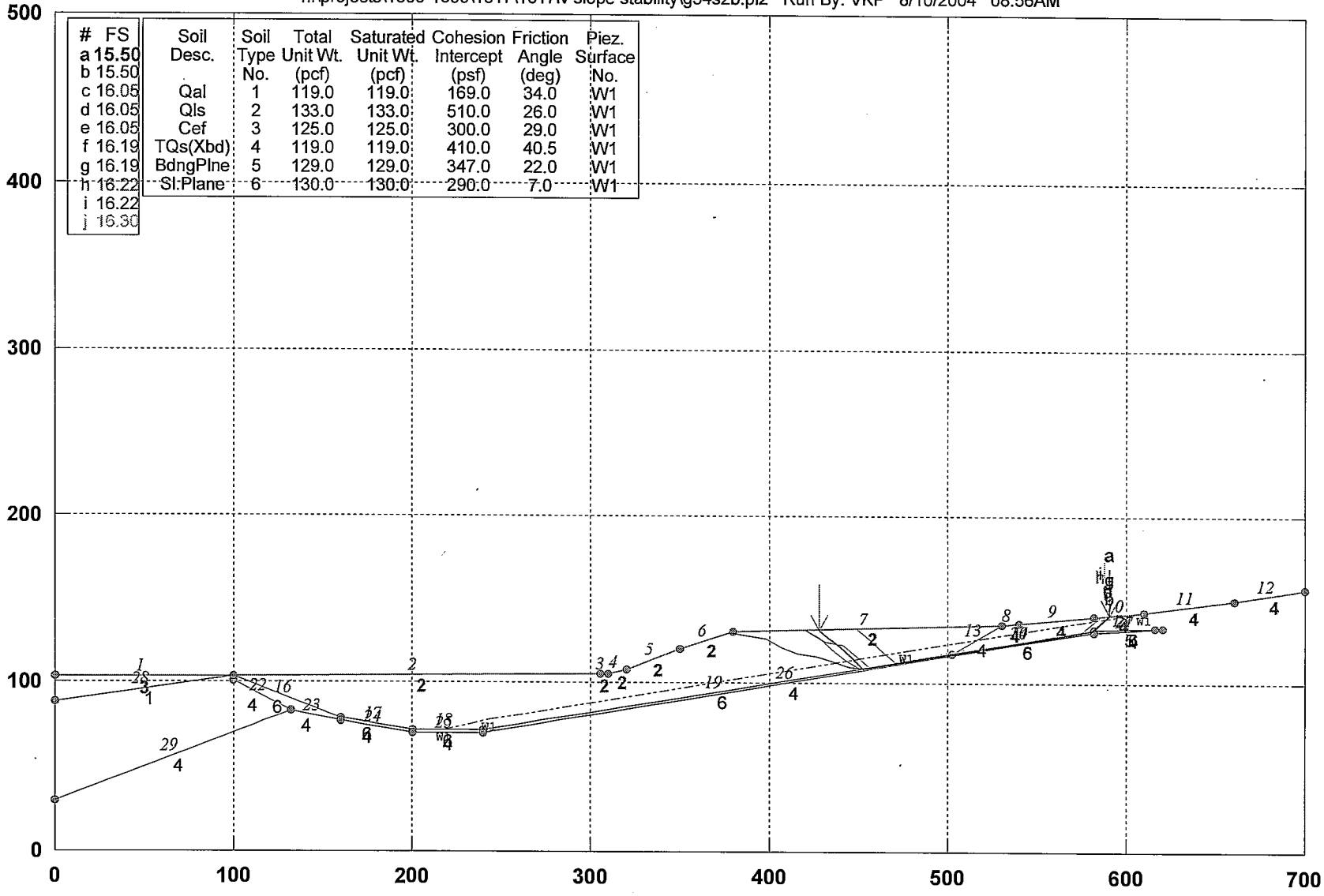
Factor of Safety
*** 2.333 ***
Individual data on the 22 slices

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	1266.5	0.0	0.0	0.	0.	190.0	0.0	0.0
2	3.9	2432.0	0.0	0.0	0.	0.	364.8	0.0	0.0
3	4.0	4152.8	0.0	0.0	0.	0.	622.9	0.0	0.0
4	1.0	1341.8	0.0	0.0	0.	0.	201.3	0.0	0.0
5	8.1	13927.3	0.0	0.0	0.	0.	2089.1	0.0	0.0
6	0.3	725.6	0.0	0.0	0.	0.	108.8	0.0	0.0
7	1.6	3598.2	0.0	70.9	0.	0.	539.7	0.0	0.0
8	5.8	15921.5	0.0	1460.4	0.	0.	2388.2	0.0	0.0
9	0.8	2651.5	0.0	364.2	0.	0.	397.7	0.0	0.0
10	23.4	84037.5	0.0	9364.1	0.	0.	12605.6	0.0	0.0
11	30.0	127785.3	0.0	12008.5	0.	0.	19167.8	0.0	0.0
12	97.0	354918.8	0.0	38759.6	0.	0.	53237.8	0.0	0.0
13	25.0	62677.7	0.0	10065.9	0.	0.	9401.7	0.0	0.0
14	14.1	29471.0	0.0	5756.5	0.	0.	4420.6	0.0	0.0
15	13.9	24199.7	0.0	5751.5	0.	0.	3629.9	0.0	0.0

16	10.0	15183.5	0.0	4169.9	0.	0.	2277.5	0.0	0.0
17	40.5	52019.3	0.0	17222.5	0.	0.	7802.9	0.0	0.0
18	1.1	1136.9	0.0	636.7	0.	0.	170.5	0.0	0.0
19	0.4	340.0	0.0	187.7	0.	0.	51.0	0.0	0.0
20	5.4	3302.3	0.0	1579.5	0.	0.	495.4	0.0	0.0
21	0.4	109.2	0.0	30.3	0.	0.	16.4	0.0	0.0
22	0.8	72.9	0.0	0.0	0.	0.	10.9	0.0	0.0

G P R, T52584, Sec. 34, Existing Cut Slope-Static

n:\projects\1600-1699\1617\1617lv slope stability\g34s2b.pl2 Run By: VKP 8/10/2004 08:56AM



#	FS
a	15.50
b	15.50
c	16.05
d	16.05
e	16.05
f	16.19
g	16.19
h	16.22
i	16.22
j	16.30

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	119.0	119.0	169.0	34.0	W1
Qls	2	133.0	133.0	510.0	26.0	W1
Cef	3	125.0	125.0	300.0	29.0	W1
TQs(Xbd)	4	119.0	119.0	410.0	40.5	W1
BdngPlne	5	129.0	129.0	347.0	22.0	W1
Sl:Plane	6	130.0	130.0	290.0	7.0	W1

GSTABL7 v.2 FSmin=15.50

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN No.- 73

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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****
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: 8/10/2004
Time of Run: 08:56AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s2b.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s2b.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g34s2b.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec. 34, Existing Cut
Slope-Static

BOUNDARY COORDINATES
12 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	103.00	100.00	103.00	3
2	100.00	103.00	305.00	105.00	2
3	305.00	105.00	310.00	105.00	2
4	310.00	105.00	320.00	108.00	2
5	320.00	108.00	350.00	120.00	2
6	350.00	120.00	380.00	130.00	2
7	380.00	130.00	530.00	135.00	2
8	530.00	135.00	540.00	136.00	4
9	540.00	136.00	582.00	140.00	4
10	582.00	140.00	610.00	143.00	4
11	610.00	143.00	661.00	150.00	4
12	661.00	150.00	700.00	157.00	4
13	502.00	117.00	530.00	135.00	4
14	502.00	117.00	582.00	132.00	5
15	582.00	132.00	616.00	133.00	5
16	100.00	103.00	160.00	79.00	6
17	160.00	79.00	200.00	72.00	6
18	200.00	72.00	240.00	72.00	6
19	240.00	72.00	502.00	117.00	6
20	502.00	117.00	582.00	132.00	6
21	582.00	132.00	620.00	133.00	6
22	100.00	101.00	132.00	83.00	4
23	132.00	83.00	160.00	77.00	4
24	160.00	77.00	200.00	70.00	4
25	200.00	70.00	240.00	70.00	4
26	240.00	70.00	582.00	130.00	4
27	582.00	130.00	620.00	133.00	4
28	0.00	88.00	100.00	103.00	1
29	0.00	30.00	132.00	83.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 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	119.0	119.0	169.0	34.0	0.00	0.0	1
2	133.0	133.0	510.0	26.0	0.00	0.0	1
3	125.0	125.0	300.0	29.0	0.00	0.0	1
4	119.0	119.0	410.0	40.5	0.00	0.0	1
5	129.0	129.0	347.0	22.0	0.00	0.0	1
6	130.0	130.0	290.0	7.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	218.00	72.00
2	243.00	78.00
3	477.00	119.00
4	610.00	143.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
2 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	450.00	108.00	510.00	120.00	0.00
2	550.00	127.00	582.00	131.00	0.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 185.521 FS Min = 15.496 FS Ave = 24.314
Standard Deviation = 10.384 Coefficient of Variation = 42.71 %
Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	427.85	131.60
2	430.58	128.88
3	438.29	122.51
4	445.40	115.48
5	452.57	108.51
6	581.42	130.93
7	588.23	138.25
8	590.52	140.91

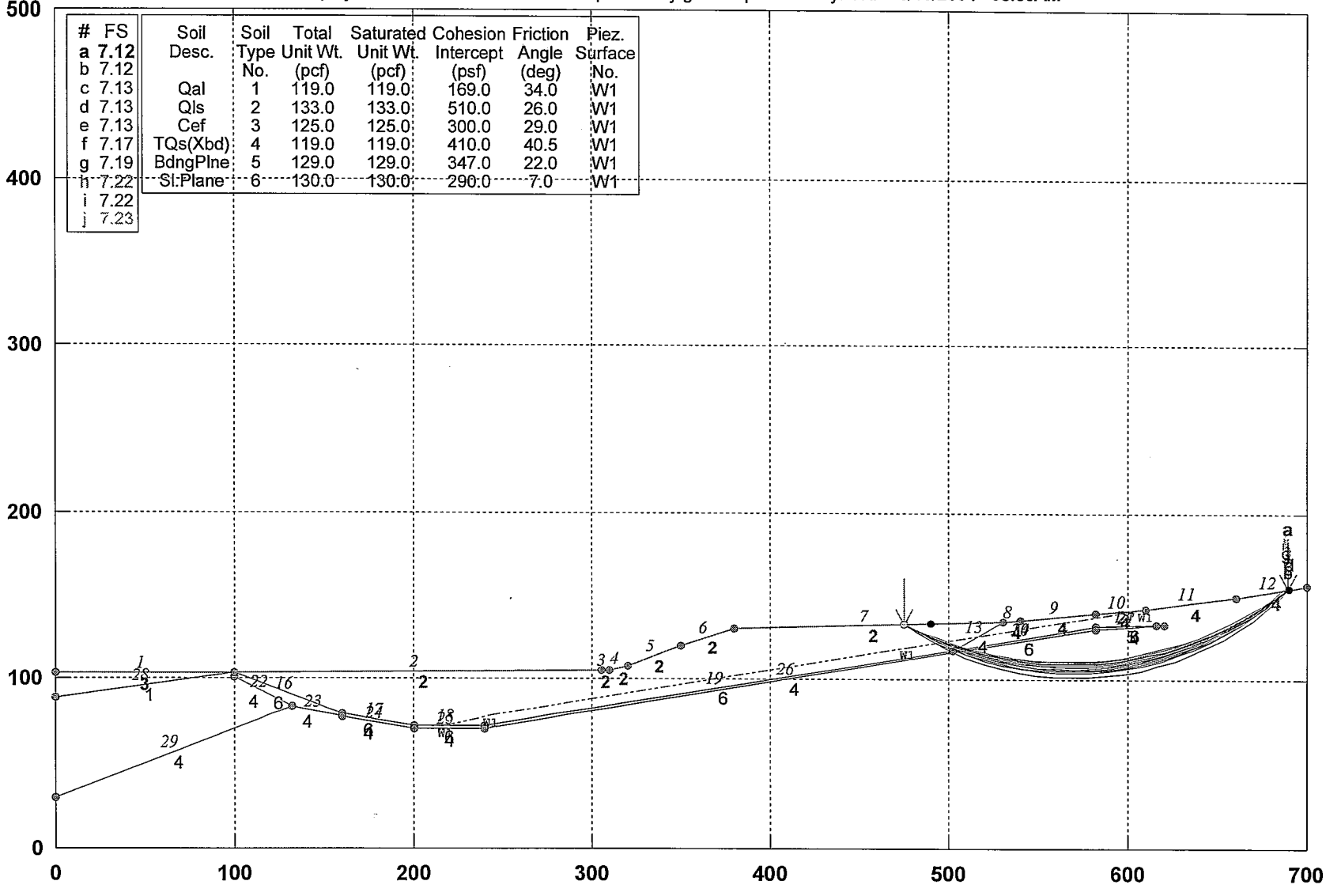
Factor of Safety
*** 15.496 ***

Individual data on the 18 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	2.7	508.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	7.7	6278.3	0.0	0.0	0.	0.	0.0	0.0	0.0
3	7.1	12365.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	1.8	4118.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	5.4	15247.9	0.0	1439.0	0.	0.	0.0	0.0	0.0
6	24.4	72076.4	0.0	9480.6	0.	0.	0.0	0.0	0.0
7	25.2	62757.3	0.0	9941.3	0.	0.	0.0	0.0	0.0
8	8.1	17313.4	0.0	3228.2	0.	0.	0.0	0.0	0.0
9	5.8	11418.0	0.0	2333.3	0.	0.	0.0	0.0	0.0
10	13.9	24034.2	0.0	5670.8	0.	0.	0.0	0.0	0.0
11	10.0	15087.0	0.0	4122.7	0.	0.	0.0	0.0	0.0
12	41.4	52791.9	0.0	17507.7	0.	0.	0.0	0.0	0.0
13	0.6	607.4	0.0	348.0	0.	0.	0.0	0.0	0.0
14	0.4	422.0	0.0	240.0	0.	0.	0.0	0.0	0.0
15	0.0	1.2	0.0	0.7	0.	0.	0.0	0.0	0.0
16	5.8	3611.1	0.0	1788.8	0.	0.	0.0	0.0	0.0
17	0.8	197.6	0.0	32.7	0.	0.	0.0	0.0	0.0
18	1.4	132.3	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Sec. 34, Existing Cut Slope-Static

n:\projects\1600-1699\1617\1617lv slope stability\g34s2c.pl2 Run By: VKP 8/10/2004 08:59AM



#	FS
a	7.12
b	7.12
c	7.13
d	7.13
e	7.13
f	7.17
g	7.19
h	7.22
i	7.22
j	7.23

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	119.0	119.0	169.0	34.0	W1
Qls	2	133.0	133.0	510.0	26.0	W1
Cef	3	125.0	125.0	300.0	29.0	W1
TQs(Xbd)	4	119.0	119.0	410.0	40.5	W1
BdngPlne	5	129.0	129.0	347.0	22.0	W1
Sl:Plane	6	130.0	130.0	290.0	7.0	W1

GSTABL7 v.2 FSmin=7.12

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

Run No. - 74

*** **GSTABL7** ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **

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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: 8/10/2004
Time of Run: 08:59AM
Run By: VKP
Input Data Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s2c.in
Output Filename: N:\Projects\1600-1699\1617\1617LV slope stability\g34s2c.OUT
Unit System: English
Plotted Output Filename: N:\Projects\1600-1699\1617\1617Lope stability\g34s2c.PLT
PROBLEM DESCRIPTION: G P R, T52584, Sec. 34, Existing Cut Slope-Static

BOUNDARY COORDINATES
12 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	103.00	100.00	103.00	3
2	100.00	103.00	305.00	105.00	2
3	305.00	105.00	310.00	105.00	2
4	310.00	105.00	320.00	108.00	2
5	320.00	108.00	350.00	120.00	2
6	350.00	120.00	380.00	130.00	2
7	380.00	130.00	530.00	135.00	2
8	530.00	135.00	540.00	136.00	4
9	540.00	136.00	582.00	140.00	4
10	582.00	140.00	610.00	143.00	4
11	610.00	143.00	661.00	150.00	4
12	661.00	150.00	700.00	157.00	4
13	502.00	117.00	530.00	135.00	4
14	502.00	117.00	582.00	132.00	5
15	582.00	132.00	616.00	133.00	5
16	100.00	103.00	160.00	79.00	6
17	160.00	79.00	200.00	72.00	6
18	200.00	72.00	240.00	72.00	6
19	240.00	72.00	502.00	117.00	6
20	502.00	117.00	582.00	132.00	6
21	582.00	132.00	620.00	133.00	6
22	100.00	101.00	132.00	83.00	4
23	132.00	83.00	160.00	77.00	4
24	160.00	77.00	200.00	70.00	4
25	200.00	70.00	240.00	70.00	4
26	240.00	70.00	582.00	130.00	4
27	582.00	130.00	620.00	133.00	4
28	0.00	88.00	100.00	103.00	1
29	0.00	30.00	132.00	83.00	4

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
6 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	119.0	119.0	169.0	34.0	0.00	0.0	1
2	133.0	133.0	510.0	26.0	0.00	0.0	1
3	125.0	125.0	300.0	29.0	0.00	0.0	1
4	119.0	119.0	410.0	40.5	0.00	0.0	1
5	129.0	129.0	347.0	22.0	0.00	0.0	1
6	130.0	130.0	290.0	7.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	218.00	72.00
2	243.00	78.00
3	477.00	119.00
4	610.00	143.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
2000 Surface(s) Initiate(s) From Each Of 1 Points Equally Spaced
Along The Ground Surface Between X = 475.00(ft)
and X = 475.00(ft)
Each Surface Terminates Between X = 490.00(ft)
and X = 690.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 2000
Statistical Data On All Valid FS Values:
FS Max = 487.307 FS Min = 7.121 FS Ave = 57.941
Standard Deviation = 58.642 Coefficient of Variation = 101.21 %
Failure Surface Specified By 25 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	133.17
2	483.84	128.49
3	492.92	124.30
4	502.21	120.59
5	511.68	117.39
6	521.31	114.70
7	531.07	112.53
8	540.94	110.88
9	550.87	109.76
10	560.85	109.17
11	570.85	109.11
12	580.84	109.59
13	590.79	110.60
14	600.67	112.15
15	610.46	114.21
16	620.12	116.80
17	629.62	119.90
18	638.95	123.50
19	648.07	127.60
20	656.97	132.18
21	665.60	137.22
22	673.95	142.72
23	682.00	148.66
24	689.72	155.01
25	689.91	155.19

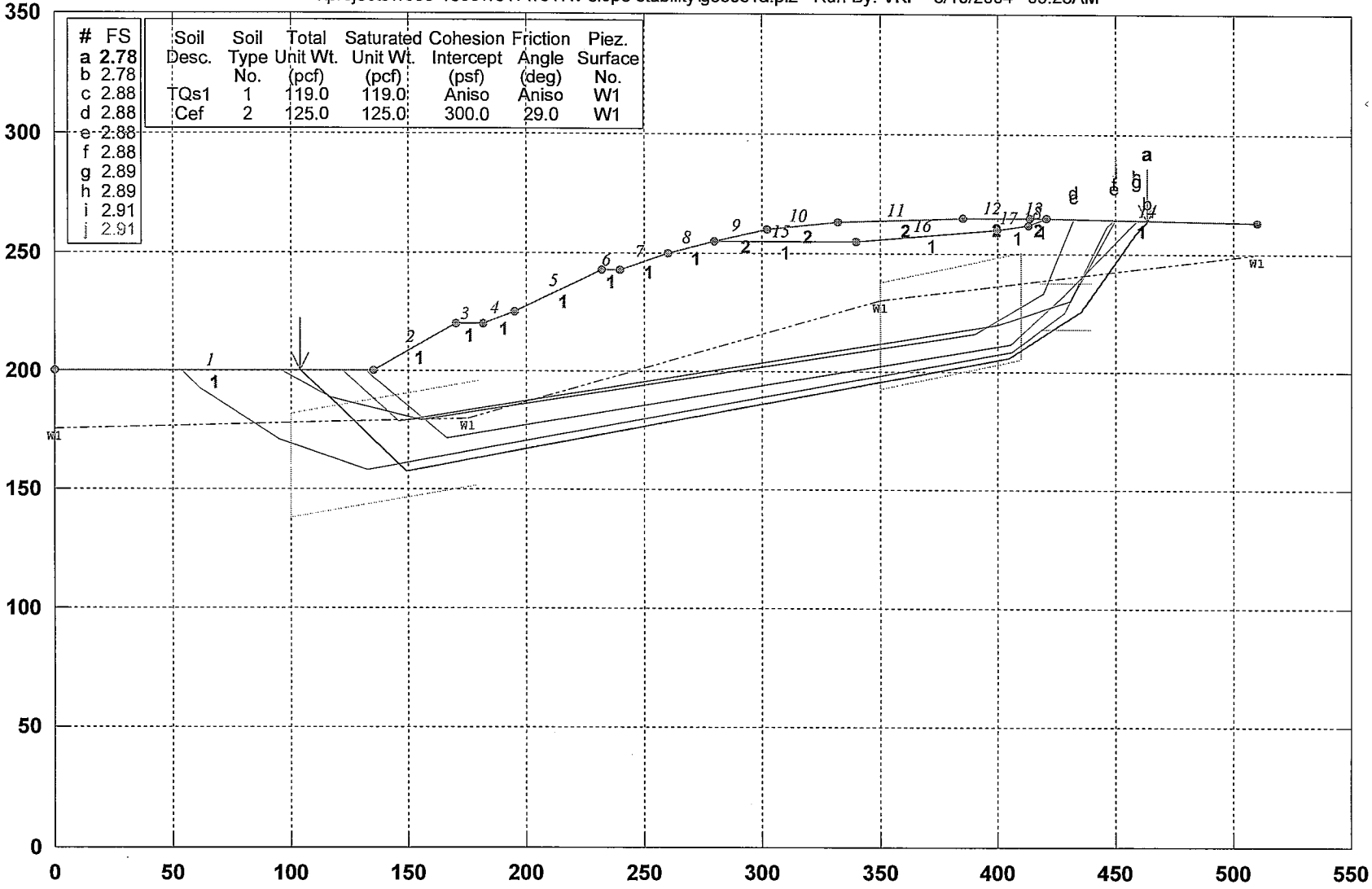
Circle Center At X = 566.87 ; Y = 296.27 ; and Radius = 187.20
Factor of Safety
*** 7.121 ***
Individual data on the 36 slices

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	8.8	2920.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.1	8713.0	0.0	0.0	0.	0.	0.0	0.0	0.0
3	4.2	5777.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.1	8395.6	0.0	498.1	0.	0.	0.0	0.0	0.0
5	3.5	6633.6	0.0	885.1	0.	0.	0.0	0.0	0.0
6	3.2	6553.8	0.0	1180.0	0.	0.	0.0	0.0	0.0
7	2.2	4637.1	0.0	992.9	0.	0.	0.0	0.0	0.0
8	0.5	1152.5	0.0	264.6	0.	0.	0.0	0.0	0.0
9	4.4	9924.3	0.0	2491.6	0.	0.	0.0	0.0	0.0
10	5.2	12520.4	0.0	3699.8	0.	0.	0.0	0.0	0.0
11	8.7	22288.3	0.0	7679.9	0.	0.	0.0	0.0	0.0
12	1.1	2875.2	0.0	1080.4	0.	0.	0.0	0.0	0.0
13	8.9	25399.6	0.0	9886.5	0.	0.	0.0	0.0	0.0
14	0.9	2807.4	0.0	1135.4	0.	0.	0.0	0.0	0.0
15	9.9	31207.5	0.0	12969.8	0.	0.	0.0	0.0	0.0
16	10.0	33506.0	0.0	14598.4	0.	0.	0.0	0.0	0.0
17	10.0	35091.9	0.0	15903.1	0.	0.	0.0	0.0	0.0
18	10.0	35943.8	0.0	16880.1	0.	0.	0.0	0.0	0.0
19	1.2	4195.8	0.0	2013.4	0.	0.	0.0	0.0	0.0
20	8.8	31887.0	0.0	15513.4	0.	0.	0.0	0.0	0.0
21	9.9	35528.4	0.0	17841.2	0.	0.	0.0	0.0	0.0
22	9.3	32685.0	0.0	16995.8	0.	0.	0.0	0.0	0.0
23	0.5	1569.5	0.0	826.6	0.	0.	0.0	0.0	0.0
24	5.5	18820.5	0.0	10090.3	0.	0.	0.0	0.0	0.0
25	4.0	13267.6	0.0	7174.2	0.	0.	0.0	0.0	0.0
26	0.1	379.6	0.0	206.0	0.	0.	0.0	0.0	0.0
27	9.5	30197.3	126.6	16786.5	0.	0.	0.0	0.0	0.0
28	9.3	27343.8	378.5	15772.3	0.	0.	0.0	0.0	0.0
29	9.1	23937.0	618.9	14430.8	0.	0.	0.0	0.0	0.0
30	8.9	20049.2	845.0	12765.9	0.	0.	0.0	0.0	0.0
31	4.0	7858.3	463.6	5304.5	0.	0.	0.0	0.0	0.0
32	4.6	7957.1	566.1	5477.9	0.	0.	0.0	0.0	0.0
33	8.4	11534.9	1055.6	8485.8	0.	0.	0.0	0.0	0.0
34	8.0	7046.7	1055.1	5882.7	0.	0.	0.0	0.0	0.0
35	7.7	2412.0	1052.3	2980.6	0.	0.	0.0	0.0	0.0
36	0.2	1.6	26.3	36.3	0.	0.	0.0	0.0	0.0

G P R, T52584, Section 35-35' Existing Cut Slope 2, 2:1, static

n:\projects\1600-1699\1617\1617lv slope stability\g350s1a.pl2 Run By: VKP 8/10/2004 09:23AM



#	FS
a	2.78
b	2.78
c	2.88
d	2.88
e	2.88
f	2.88
g	2.89
h	2.89
i	2.91
j	2.91

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs1	1	119.0	119.0	Aniso	Aniso	W1
Cef	2	125.0	125.0	300.0	29.0	W1

GSTABL7 v.2 FSmin=2.78

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

RUN NO.-75

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*******************************************************************************
                  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:        8/10/2004
Time of Run:              09:23AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g350sla.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g350sla.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g350sla.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 35-35'
                      Existing Cut Slope 2, 2:1, static
BOUNDARY COORDINATES
   14 Top   Boundaries
   18 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     200.00     135.00     200.00        1
    2       135.00     200.00     170.00     220.00        1
    3       170.00     220.00     182.00     220.00        1
    4       182.00     220.00     195.00     225.00        1
    5       195.00     225.00     232.00     243.00        1
    6       232.00     243.00     240.00     243.00        1
    7       240.00     243.00     260.00     250.00        1
    8       260.00     250.00     280.00     255.00        1
    9       280.00     255.00     302.00     260.00        2
   10       302.00     260.00     332.00     263.00        2
   11       332.00     263.00     385.00     265.00        2
   12       385.00     265.00     414.00     265.00        2
   13       414.00     265.00     421.00     265.00        2
   14       421.00     265.00     510.00     263.00        1
   15       280.00     255.00     340.00     255.00        1
   16       340.00     255.00     400.00     260.00        1
   17       400.00     260.00     413.00     262.00        1
   18       413.00     262.00     421.00     265.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      1
  2   125.0    125.0     300.0     29.0    0.00       0.0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1              9.0             410.00        40.50
    2             11.0             347.00        22.00
    3             90.0             410.00        40.50
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 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	175.00
2	175.00	180.00
3	350.00	230.00
4	510.00	250.00

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 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	160.00	180.00	174.00	44.00
2	350.00	215.00	410.00	228.00	45.00
3	418.00	228.00	440.00	228.00	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 The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 7.401 FS Min = 2.776 FS Ave = 4.839
Standard Deviation = 0.759 Coefficient of Variation = 15.68 %
Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	104.04	200.00
2	120.30	185.14
3	148.90	157.18
4	404.58	206.20
5	435.55	225.70
6	458.56	258.42
7	463.32	264.05

Factor of Safety
*** 2.776 ***

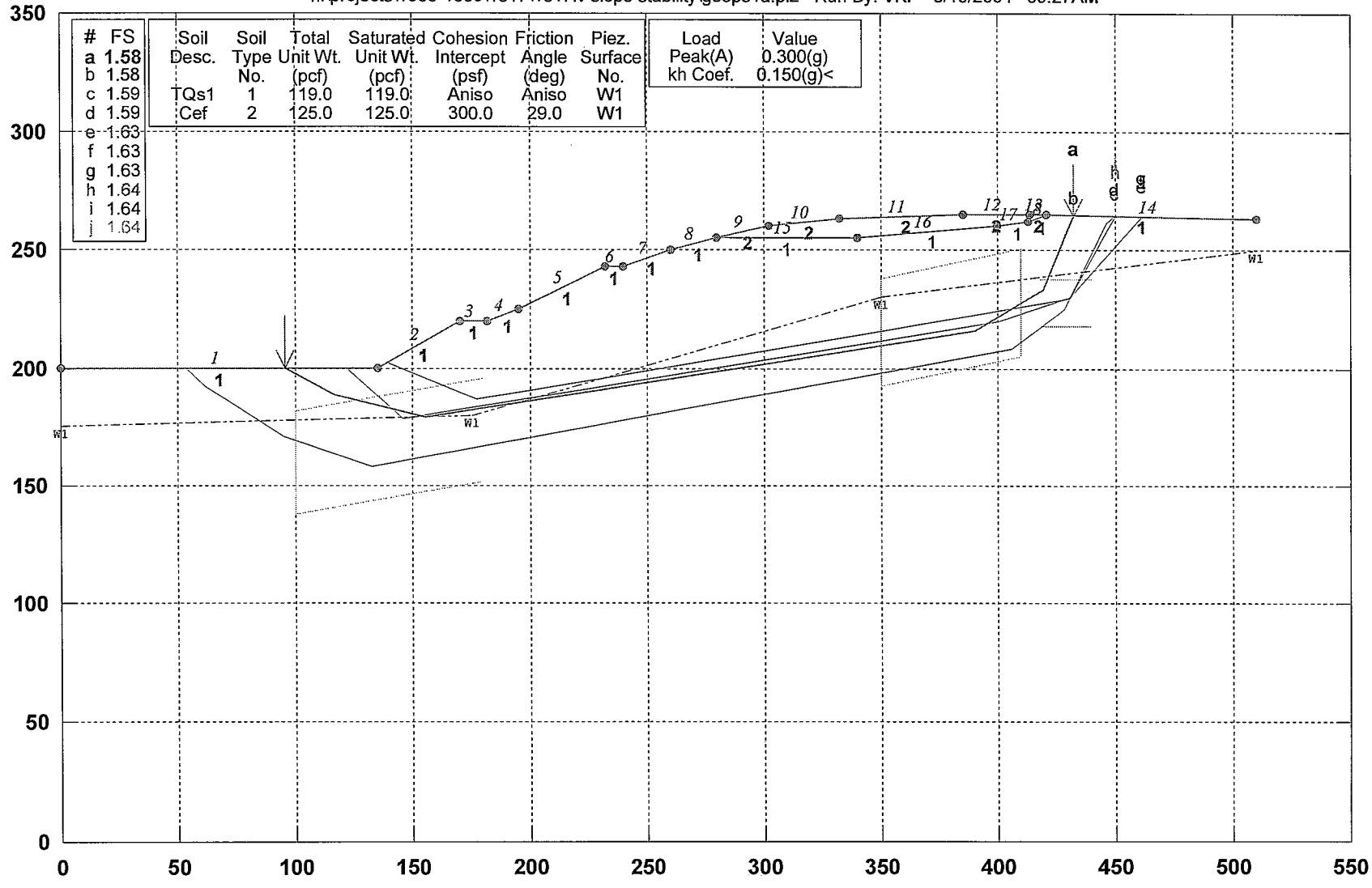
Individual data on the 26 slices

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	16.3	14376.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.7	14365.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.0	24189.2	0.0	2833.5	0.	0.	0.0	0.0	0.0
4	13.9	66164.6	0.0	18288.1	0.	0.	0.0	0.0	0.0
5	21.1	137513.2	0.0	27274.1	0.	0.	0.0	0.0	0.0
6	5.0	34686.3	0.0	5787.4	0.	0.	0.0	0.0	0.0
7	7.0	47602.5	0.0	7765.9	0.	0.	0.0	0.0	0.0
8	13.0	89306.0	0.0	15169.4	0.	0.	0.0	0.0	0.0
9	37.0	283707.9	0.0	48489.4	0.	0.	0.0	0.0	0.0
10	8.0	65803.3	0.0	11518.4	0.	0.	0.0	0.0	0.0
11	20.0	166449.7	0.0	30404.9	0.	0.	0.0	0.0	0.0
12	20.0	171603.1	0.0	32703.3	0.	0.	0.0	0.0	0.0
13	22.0	191642.2	0.0	38628.1	0.	0.	0.0	0.0	0.0
14	30.0	258533.5	0.0	57156.5	0.	0.	0.0	0.0	0.0
15	8.0	67125.1	0.0	16115.1	0.	0.	0.0	0.0	0.0

16	10.0	82252.4	0.0	20661.0	0.	0.	0.0	0.0	0.0
17	35.0	273236.5	0.0	73031.1	0.	0.	0.0	0.0	0.0
18	15.0	109595.9	0.0	29721.2	0.	0.	0.0	0.0	0.0
19	4.6	32388.2	0.0	8879.3	0.	0.	0.0	0.0	0.0
20	8.4	56467.4	0.0	17563.1	0.	0.	0.0	0.0	0.0
21	1.0	6345.5	0.0	1911.1	0.	0.	0.0	0.0	0.0
22	7.0	42258.3	0.0	12344.0	0.	0.	0.0	0.0	0.0
23	14.6	75701.8	0.0	19872.6	0.	0.	0.0	0.0	0.0
24	11.6	42130.1	0.0	9330.3	0.	0.	0.0	0.0	0.0
25	11.4	19080.1	0.0	0.0	0.	0.	0.0	0.0	0.0
26	4.8	1626.1	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, Section 35-35' Existing Cut Slope 2, 2:1, Pseudostatic

n:\projects\1600-1699\1617\1617lv slope stability\g35ps1a.pl2 Run By: VKP 8/10/2004 09:27AM



GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By The Simplified Janbu Method

GSTABL7

Run No. 76

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                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
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*****************************************************************************
                  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:        8/10/2004
Time of Run:              09:27AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g35ps1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g35ps1a.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g35ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 35-35'
                      Existing Cut Slope 2, 2:1, Pseudostatic
BOUNDARY COORDINATES
   14 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	200.00	135.00	200.00	1
2	135.00	200.00	170.00	220.00	1
3	170.00	220.00	182.00	220.00	1
4	182.00	220.00	195.00	225.00	1
5	195.00	225.00	232.00	243.00	1
6	232.00	243.00	240.00	243.00	1
7	240.00	243.00	260.00	250.00	1
8	260.00	250.00	280.00	255.00	1
9	280.00	255.00	302.00	260.00	2
10	302.00	260.00	332.00	263.00	2
11	332.00	263.00	385.00	265.00	2
12	385.00	265.00	414.00	265.00	2
13	414.00	265.00	421.00	265.00	2
14	421.00	265.00	510.00	263.00	1
15	280.00	255.00	340.00	255.00	1
16	340.00	255.00	400.00	260.00	1
17	400.00	260.00	413.00	262.00	1
18	413.00	262.00	421.00	265.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	119.0	119.0	410.0	40.5	0.00	0.0	1
2	125.0	125.0	300.0	29.0	0.00	0.0	1

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	9.0	410.00	40.50
2	11.0	347.00	22.00
3	90.0	410.00	40.50

```
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 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 4 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	175.00
2	175.00	180.00
3	350.00	230.00
4	510.00	250.00

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
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 40.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	100.00	160.00	180.00	174.00	44.00
2	350.00	215.00	410.00	228.00	45.00
3	418.00	228.00	440.00	228.00	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 The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 4.143 FS Min = 1.582 FS Ave = 2.655
Standard Deviation = 0.382 Coefficient of Variation = 14.40 %
Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.91	200.00
2	116.57	188.63
3	155.41	179.04
4	389.88	216.21
5	419.21	233.32
6	431.94	264.75

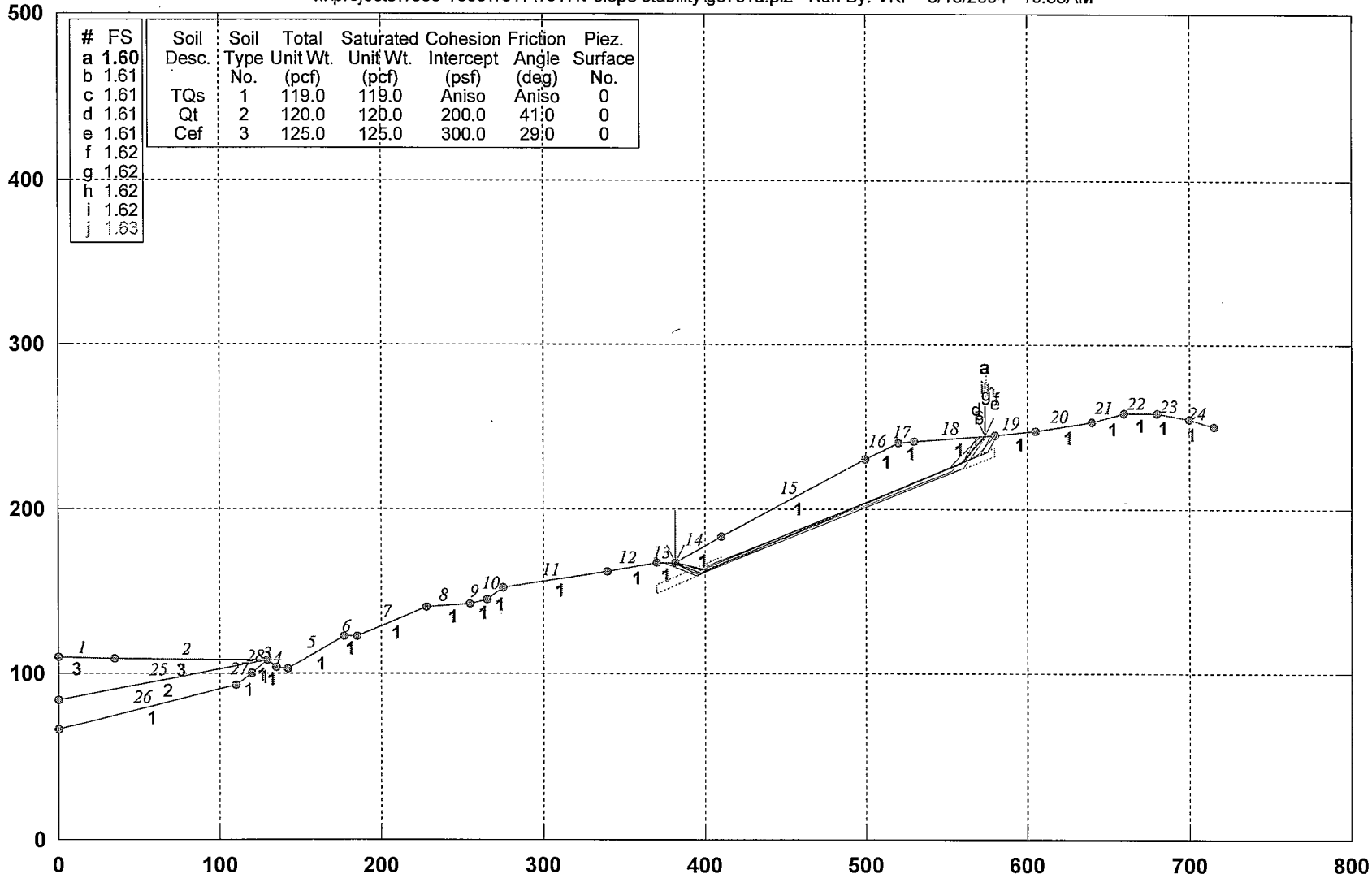
Factor of Safety
*** 1.582 ***
Individual data on the 26 slices

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	20.7	13982.4	0.0	0.0	0.	0.	2097.4	0.0	0.0
2	18.4	29927.9	0.0	0.0	0.	0.	4489.2	0.0	0.0
3	18.9	53387.5	0.0	0.0	0.	0.	8008.1	0.0	0.0
4	1.5	5550.0	0.0	18.8	0.	0.	832.5	0.0	0.0
5	3.1	12218.0	0.0	39.1	0.	0.	1832.7	0.0	0.0
6	11.5	49670.6	0.0	0.0	0.	0.	7450.6	0.0	0.0
7	12.0	53830.0	0.0	0.0	0.	0.	8074.5	0.0	0.0
8	9.9	44463.9	0.0	0.0	0.	0.	6669.6	0.0	0.0
9	3.1	14653.8	0.0	37.9	0.	0.	2198.1	0.0	0.0
10	37.0	201441.7	0.0	6188.2	0.	0.	30216.3	0.0	0.0
11	8.0	48727.1	0.0	2729.7	0.	0.	7309.1	0.0	0.0
12	20.0	124865.5	0.0	8989.2	0.	0.	18729.8	0.0	0.0

13	20.0	131599.2	0.0	12082.0	0.	0.	19739.9	0.0	0.0
14	22.0	149463.2	0.0	16862.3	0.	0.	22419.5	0.0	0.0
15	30.0	204098.2	0.0	29025.0	0.	0.	30614.7	0.0	0.0
16	8.0	53209.6	0.0	8915.2	0.	0.	7981.4	0.0	0.0
17	10.0	65213.6	0.0	11839.9	0.	0.	9782.0	0.0	0.0
18	35.0	216711.7	0.0	42841.1	0.	0.	32506.8	0.0	0.0
19	4.9	28757.8	0.0	5773.4	0.	0.	4313.7	0.0	0.0
20	10.1	55507.4	0.0	11932.9	0.	0.	8326.1	0.0	0.0
21	13.0	60789.1	0.0	10396.6	0.	0.	9118.4	0.0	0.0
22	1.0	4182.9	0.0	569.7	0.	0.	627.4	0.0	0.0
23	5.2	20622.7	0.0	2435.2	0.	0.	3093.4	0.0	0.0
24	1.8	6290.2	0.0	954.7	0.	0.	943.5	0.0	0.0
25	0.5	1528.2	0.0	44.8	0.	0.	229.2	0.0	0.0
26	10.5	16216.6	0.0	0.0	0.	0.	2432.5	0.0	0.0

G P R, T52584, 37-37' bedding plane search

n:\projects\1600-1699\1617\1617lv slope stability\g37s1a.pl2 Run By: VKP 8/16/2004 10:55AM



#	FS
a	1.60
b	1.61
c	1.61
d	1.61
e	1.61
f	1.62
g	1.62
h	1.62
i	1.62
j	1.63

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	119.0	119.0	Aniso	Aniso	0
Qt	2	120.0	120.0	200.0	41.0	0
Cef	3	125.0	125.0	300.0	29.0	0

GSTABL7 v.2 FSmin=1.60

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. 77

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                  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:        8/16/2004
Time of Run:              10:55AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g37s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g37s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g37s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 37-37'
                      bedding plane search
BOUNDARY COORDINATES
   24 Top   Boundaries
   28 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     110.00      35.00     109.00        3
    2        35.00     109.00     130.00     108.00        3
    3       130.00     108.00     135.00     104.00        1
    4       135.00     104.00     142.00     103.00        1
    5       142.00     103.00     177.00     122.00        1
    6       177.00     122.00     185.00     122.00        1
    7       185.00     122.00     228.00     140.00        1
    8       228.00     140.00     255.00     142.00        1
    9       255.00     142.00     265.00     145.00        1
   10       265.00     145.00     275.00     152.00        1
   11       275.00     152.00     340.00     162.00        1
   12       340.00     162.00     370.00     167.00        1
   13       370.00     167.00     382.00     167.00        1
   14       382.00     167.00     410.00     183.00        1
   15       410.00     183.00     500.00     231.00        1
   16       500.00     231.00     520.00     240.00        1
   17       520.00     240.00     530.00     241.00        1
   18       530.00     241.00     580.00     245.00        1
   19       580.00     245.00     605.00     248.00        1
   20       605.00     248.00     640.00     253.00        1
   21       640.00     253.00     660.00     258.00        1
   22       660.00     258.00     680.00     258.00        1
   23       680.00     258.00     700.00     255.00        1
   24       700.00     255.00     715.00     250.00        1
   25         0.00      84.00     130.00     108.00        2
   26         0.00      66.00     110.00      93.00        1
   27       110.00      93.00     120.00     100.00        1
   28       120.00     100.00     130.00     108.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
  2   120.0    120.0     200.0     41.0    0.00       0.0      0
  3   125.0    125.0     300.0     29.0    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	20.5	410.00	40.50
2	23.5	347.00	22.00
3	90.0	410.00	40.50

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.

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	370.00	151.00	410.00	168.00	5.00
2	550.00	223.00	580.00	235.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.374 FS Min = 1.601 FS Ave = 1.787
Standard Deviation = 0.205 Coefficient of Variation = 11.48 %
Failure Surface Specified By 4 Coordinate Points

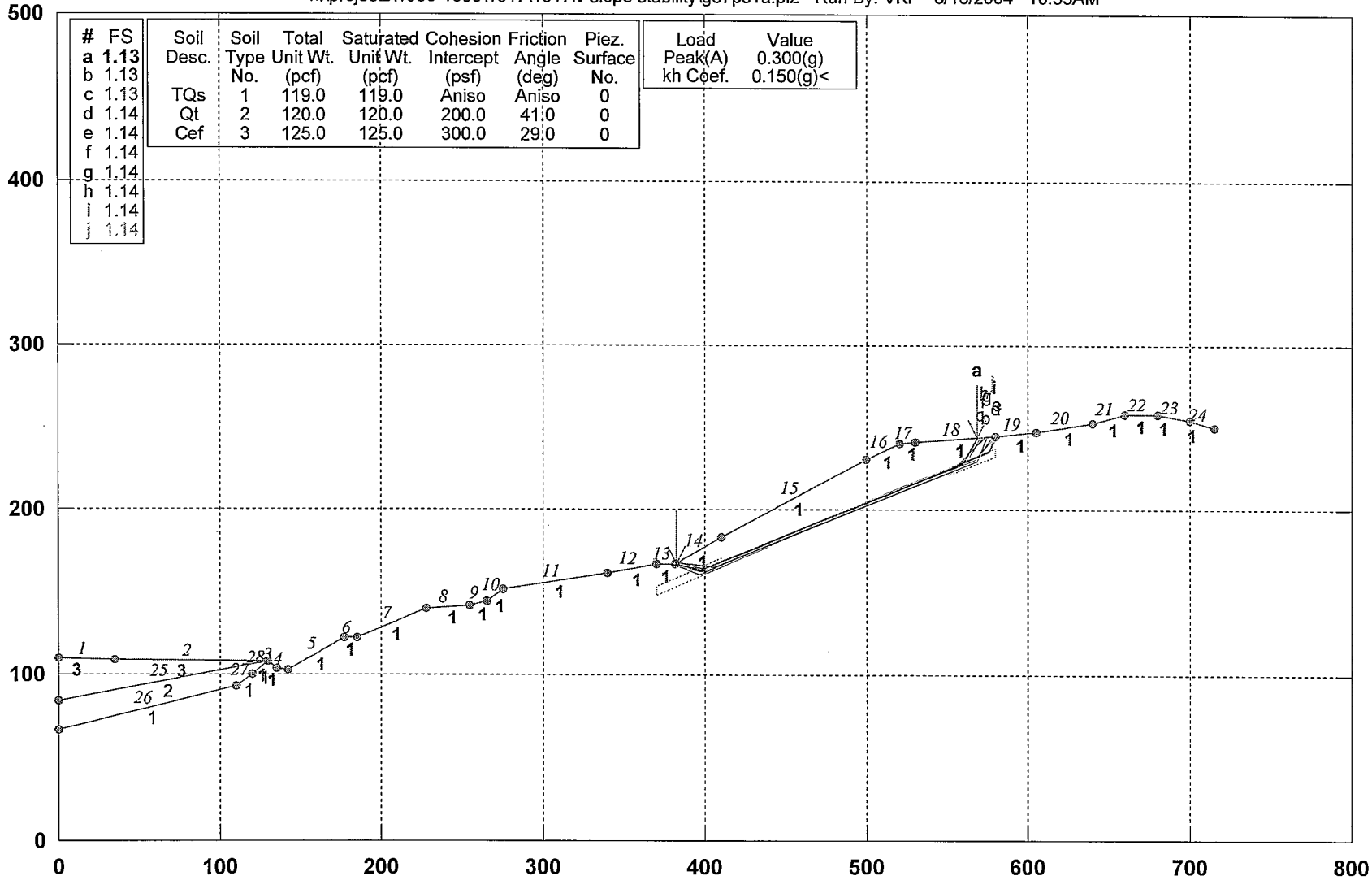
Point No.	X-Surf (ft)	Y-Surf (ft)
1	381.53	167.00
2	401.35	162.81
3	559.44	229.05
4	573.51	244.48

Factor of Safety
*** 1.601 ***
Individual data on the 8 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	0.5	2.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	19.4	17680.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.6	16369.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	90.0	232543.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	20.0	64651.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	30795.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	29.4	67587.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	14.1	11971.7	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 37-37' bedding plane search; pseudo

n:\projects\1600-1699\1617\1617lv slope stability\g37ps1a.pl2 Run By: VKP 8/16/2004 10:55AM



#	FS
a	1.13
b	1.13
c	1.13
d	1.14
e	1.14
f	1.14
g	1.14
h	1.14
i	1.14
j	1.14

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	119.0	119.0	Aniso	Aniso	0
Qt	2	120.0	120.0	200.0	41.0	0
Cef	3	125.0	125.0	300.0	29.0	0

Load	Value
Peak(A)	0.300(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.13

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-78

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/16/2004
Time of Run:              10:55AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g37ps1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g37ps1a.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g37ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 37-37'
                      bedding plane search; pseudo
BOUNDARY COORDINATES
   24 Top   Boundaries
   28 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	110.00	35.00	109.00	3
2	35.00	109.00	130.00	108.00	3
3	130.00	108.00	135.00	104.00	1
4	135.00	104.00	142.00	103.00	1
5	142.00	103.00	177.00	122.00	1
6	177.00	122.00	185.00	122.00	1
7	185.00	122.00	228.00	140.00	1
8	228.00	140.00	255.00	142.00	1
9	255.00	142.00	265.00	145.00	1
10	265.00	145.00	275.00	152.00	1
11	275.00	152.00	340.00	162.00	1
12	340.00	162.00	370.00	167.00	1
13	370.00	167.00	382.00	167.00	1
14	382.00	167.00	410.00	183.00	1
15	410.00	183.00	500.00	231.00	1
16	500.00	231.00	520.00	240.00	1
17	520.00	240.00	530.00	241.00	1
18	530.00	241.00	580.00	245.00	1
19	580.00	245.00	605.00	248.00	1
20	605.00	248.00	640.00	253.00	1
21	640.00	253.00	660.00	258.00	1
22	660.00	258.00	680.00	258.00	1
23	680.00	258.00	700.00	255.00	1
24	700.00	255.00	715.00	250.00	1
25	0.00	84.00	130.00	108.00	2
26	0.00	66.00	110.00	93.00	1
27	110.00	93.00	120.00	100.00	1
28	120.00	100.00	130.00	108.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	119.0	119.0	410.0	40.5	0.00	0.0	0
2	120.0	120.0	200.0	41.0	0.00	0.0	0
3	125.0	125.0	300.0	29.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
```

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	20.5	410.00	40.50
2	23.5	347.00	22.00
3	90.0	410.00	40.50

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.

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	370.00	151.00	410.00	168.00	5.00
2	550.00	223.00	580.00	235.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.250 FS Min = 1.130 FS Ave = 1.282
Standard Deviation = 0.140 Coefficient of Variation = 10.91 %
Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	382.09	167.05
2	398.08	163.33
3	559.62	228.31
4	568.03	244.04

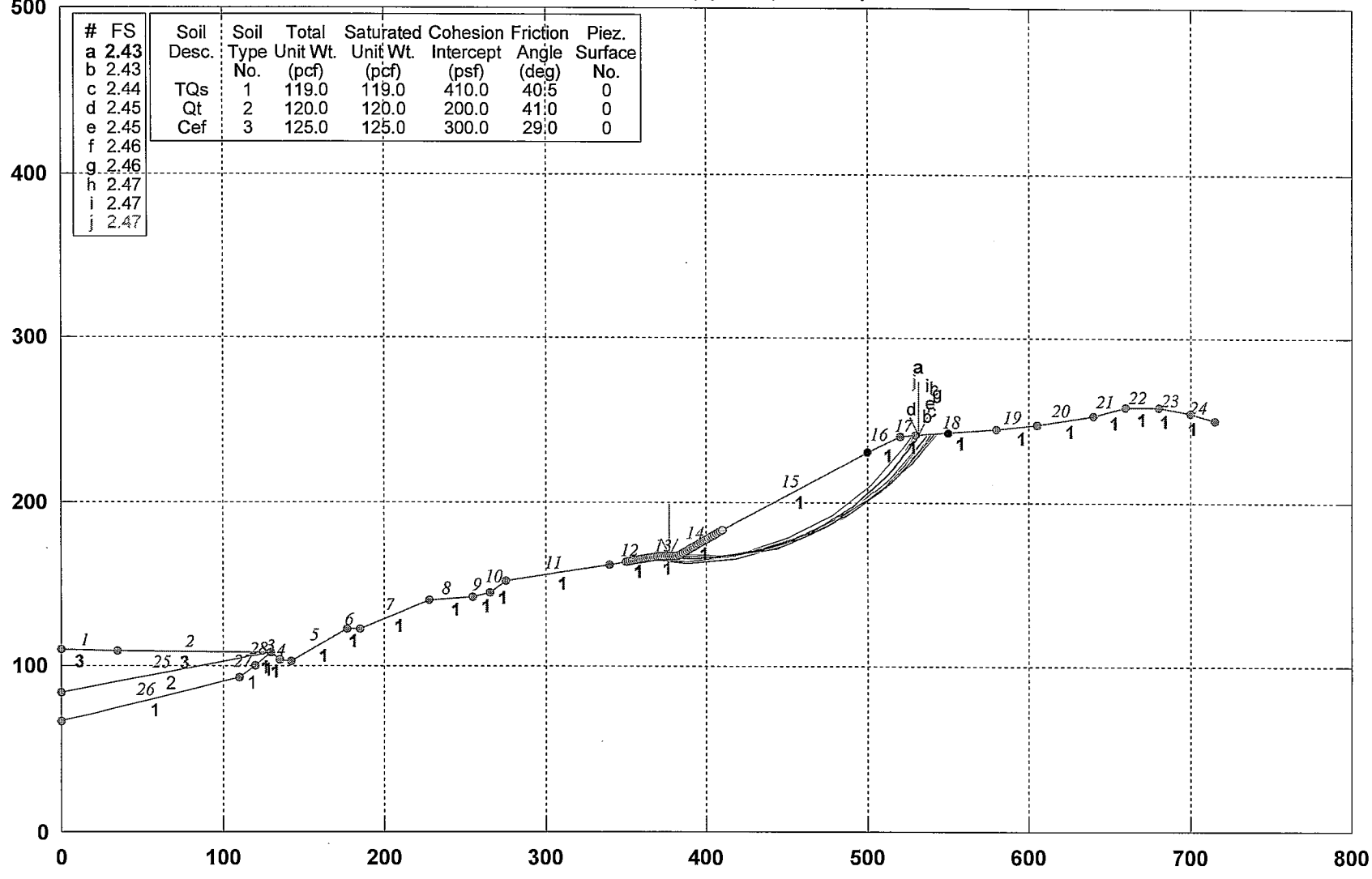
Factor of Safety
*** 1.130 ***

Individual data on the 7 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	16.0	12239.0	0.0	0.0	0.	0.	1835.8	0.0	0.0
2	11.9	19670.4	0.0	0.0	0.	0.	2950.6	0.0	0.0
3	90.0	222512.3	0.0	0.0	0.	0.	33376.8	0.0	0.0
4	20.0	64617.6	0.0	0.0	0.	0.	9692.6	0.0	0.0
5	10.0	31077.9	0.0	0.0	0.	0.	4661.7	0.0	0.0
6	29.6	69905.2	0.0	0.0	0.	0.	10485.8	0.0	0.0
7	8.4	7530.8	0.0	0.0	0.	0.	1129.6	0.0	0.0

G P R, T52584, 37-37' bedding plane search; circular

n:\projects\1600-1699\1617\1617lv slope stability\g37s1b.pl2 Run By: VKP 8/17/2004 10:31AM



#	FS
a	2.43
b	2.43
c	2.44
d	2.45
e	2.45
f	2.46
g	2.46
h	2.47
i	2.47
j	2.47

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs	1	119.0	119.0	410.0	40.5	0
Qt	2	120.0	120.0	200.0	41.0	0
Cef	3	125.0	125.0	300.0	29.0	0

GSTABL7 v.2 FSmin=2.43

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO-79

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/17/2004
Time of Run:              10:31AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g37s1b.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g37s1b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g37s1b.PLT
PROBLEM DESCRIPTION:  G P R, T52584, 37-37'
                      bedding plane search; circular
BOUNDARY COORDINATES
   24 Top   Boundaries
   28 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	110.00	35.00	109.00	3
2	35.00	109.00	130.00	108.00	3
3	130.00	108.00	135.00	104.00	1
4	135.00	104.00	142.00	103.00	1
5	142.00	103.00	177.00	122.00	1
6	177.00	122.00	185.00	122.00	1
7	185.00	122.00	228.00	140.00	1
8	228.00	140.00	255.00	142.00	1
9	255.00	142.00	265.00	145.00	1
10	265.00	145.00	275.00	152.00	1
11	275.00	152.00	340.00	162.00	1
12	340.00	162.00	370.00	167.00	1
13	370.00	167.00	382.00	167.00	1
14	382.00	167.00	410.00	183.00	1
15	410.00	183.00	500.00	231.00	1
16	500.00	231.00	520.00	240.00	1
17	520.00	240.00	530.00	241.00	1
18	530.00	241.00	580.00	245.00	1
19	580.00	245.00	605.00	248.00	1
20	605.00	248.00	640.00	253.00	1
21	640.00	253.00	660.00	258.00	1
22	660.00	258.00	680.00	258.00	1
23	680.00	258.00	700.00	255.00	1
24	700.00	255.00	715.00	250.00	1
25	0.00	84.00	130.00	108.00	2
26	0.00	66.00	110.00	93.00	1
27	110.00	93.00	120.00	100.00	1
28	120.00	100.00	130.00	108.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
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	119.0	119.0	410.0	40.5	0.00	0.0	0
2	120.0	120.0	200.0	41.0	0.00	0.0	0
3	125.0	125.0	300.0	29.0	0.00	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  1 Is Anisotropic
 Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	20.5	410.00	40.50
2	23.5	347.00	22.00
3	90.0	410.00	40.50

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.

ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 350.00(ft)
and X = 410.00(ft)
Each Surface Terminates Between X = 500.00(ft)
and X = 550.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 0.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.236 FS Min = 2.429 FS Ave = 3.051
Standard Deviation = 0.380 Coefficient of Variation = 12.47 %
Failure Surface Specified By 8 Coordinate Points

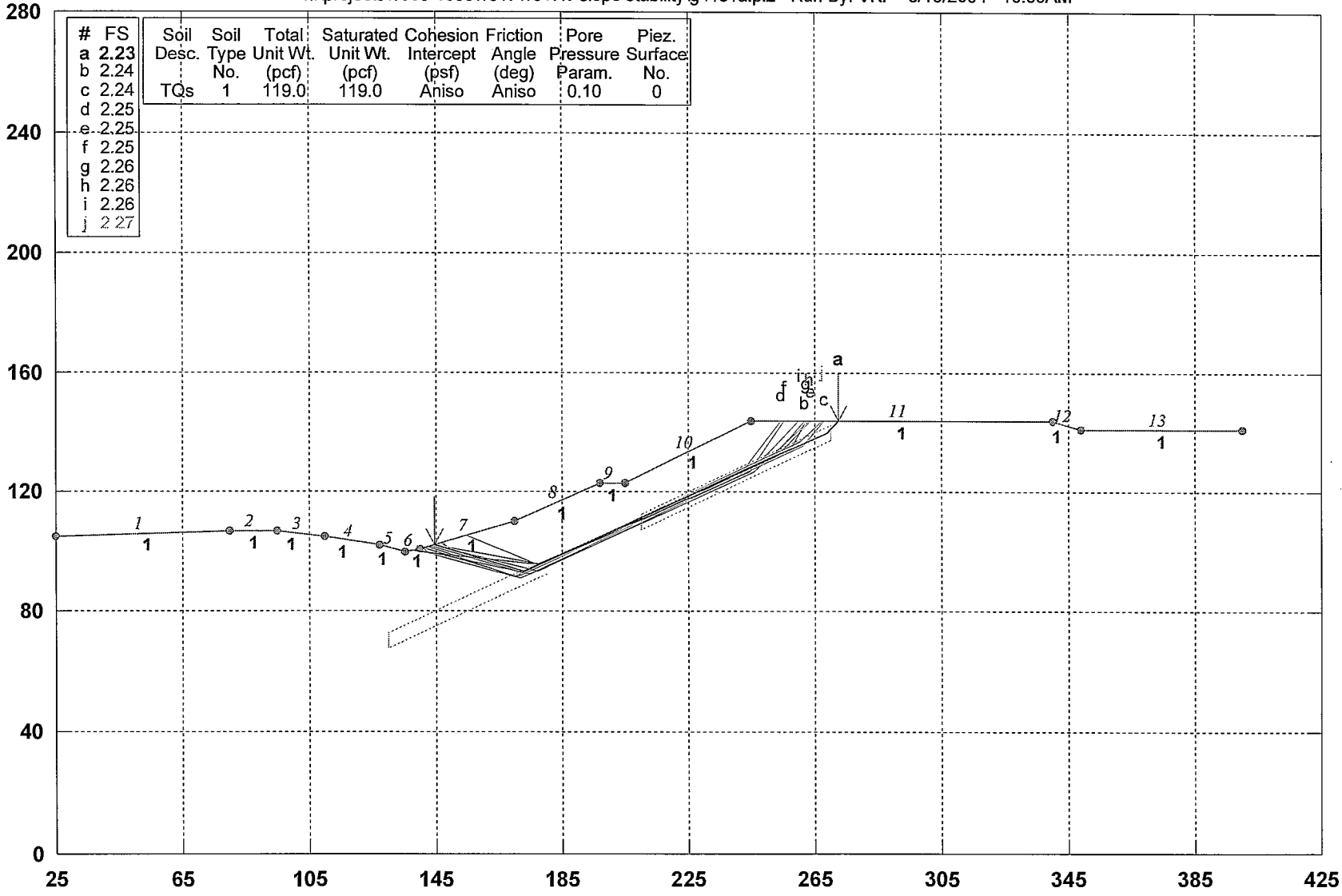
Point No.	X-Surf (ft)	Y-Surf (ft)
1	376.94	167.00
2	406.93	166.43
3	436.52	171.40
4	464.68	181.74
5	490.44	197.11
6	512.93	216.97
7	531.37	240.63
8	531.62	241.13

Circle Center At X = 395.05 ; Y = 327.66 ; and Radius = 161.68
Factor of Safety
*** 2.429 ***
Individual data on the 12 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	5.1	29.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	24.9	22132.8	0.0	0.0	0.	0.	0.0	0.0	0.0
3	3.1	5635.0	0.0	0.0	0.	0.	0.0	0.0	0.0
4	26.5	65963.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	28.2	94103.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	25.8	90778.7	0.0	0.0	0.	0.	0.0	0.0	0.0
7	9.6	30844.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	12.9	34859.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	7.1	14220.9	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.0	9569.3	0.0	0.0	0.	0.	0.0	0.0	0.0
11	1.4	211.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	0.3	7.3	0.0	0.0	0.	0.	0.0	0.0	0.0

G P R, T52584, 41-41' bedding plane search

n:\projects\1600-1699\1617\1617lv slope stability\g41s1a.pl2 Run By: VKP 8/16/2004 10:59AM



GSTABL7 v.2 FSmin=2.23

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN No. - 80

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                   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:        8/16/2004
Time of Run:              10:59AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g41sla.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g41sla.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g41sla.PLT
PROBLEM DESCRIPTION:  G P R, T52584,  41-41'
                      bedding plane search
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 25.00 to X-values and 0.00 to Y-values listed.

   13 Top   Boundaries
   13 Total Boundaries
```

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	25.00	105.00	80.00	107.00	1
2	80.00	107.00	95.00	107.00	1
3	95.00	107.00	110.00	105.00	1
4	110.00	105.00	127.00	102.00	1
5	127.00	102.00	135.00	100.00	1
6	135.00	100.00	140.00	101.00	1
7	140.00	101.00	170.00	110.00	1
8	170.00	110.00	197.00	123.00	1
9	197.00	123.00	205.00	123.00	1
10	205.00	123.00	245.00	144.00	1
11	245.00	144.00	340.00	144.00	1
12	340.00	144.00	349.00	141.00	1
13	349.00	141.00	400.00	141.00	1

```
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 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	119.0	119.0	410.0	40.5	0.10	0.0	0

```
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
```

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	24.5	410.00	40.50
2	27.5	347.00	22.00
3	90.0	410.00	40.50

```
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.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
```

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	70.00	180.00	95.00	5.00
2	210.00	110.00	270.00	140.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 14.306 FS Min = 2.232 FS Ave = 3.856
Standard Deviation = 1.534 Coefficient of Variation = 39.79 %
Failure Surface Specified By 4 Coordinate Points

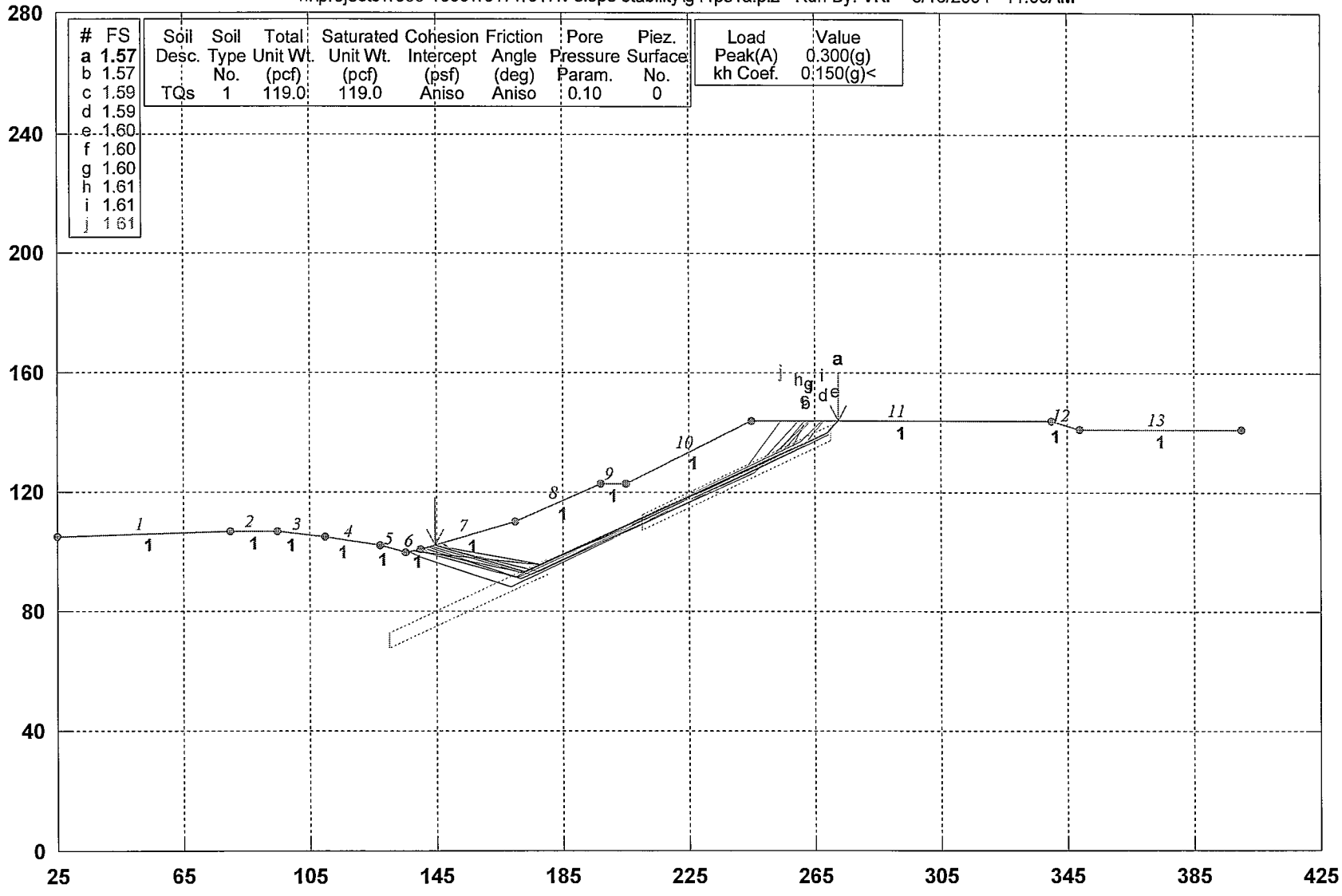
Point No.	X-Surf (ft)	Y-Surf (ft)
1	144.65	102.40
2	172.64	93.41
3	268.87	139.80
4	272.56	144.00

Factor of Safety
*** 2.232 ***
Individual data on the 7 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	25.3	23735.3	0.0	2492.8	0.	0.	0.0	0.0	0.0
2	2.6	5269.1	0.0	553.4	0.	0.	0.0	0.0	0.0
3	24.4	51746.3	0.0	5744.4	0.	0.	0.0	0.0	0.0
4	8.0	15149.5	0.0	1681.8	0.	0.	0.0	0.0	0.0
5	40.0	70662.3	0.0	7844.3	0.	0.	0.0	0.0	0.0
6	23.9	28268.0	0.0	3138.1	0.	0.	0.0	0.0	0.0
7	3.7	923.0	0.0	139.8	0.	0.	0.0	0.0	0.0

G P R, T52584, 41-41' bedding plane search; pseudo

n:\projects\1600-1699\1617\1617lv slope stability\g41ps1a.pl2 Run By: VKP 8/16/2004 11:00AM



GSTABL7 v.2 FSmin=1.57

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO.-81

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/16/2004
Time of Run:              11:00AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g41ps1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g41ps1a.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g41ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584,  41-41'
                      bedding plane search; pseudo
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 25.00 to X-values and 0.00 to Y-values listed.

   13 Top   Boundaries
   13 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1        25.00     105.00      80.00     107.00        1
    2        80.00     107.00      95.00     107.00        1
    3        95.00     107.00     110.00     105.00        1
    4       110.00     105.00     127.00     102.00        1
    5       127.00     102.00     135.00     100.00        1
    6       135.00     100.00     140.00     101.00        1
    7       140.00     101.00     170.00     110.00        1
    8       170.00     110.00     197.00     123.00        1
    9       197.00     123.00     205.00     123.00        1
   10       205.00     123.00     245.00     144.00        1
   11       245.00     144.00     340.00     144.00        1
   12       340.00     144.00     349.00     141.00        1
   13       349.00     141.00     400.00     141.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.10      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             24.5             410.00        40.50
    2             27.5             347.00        22.00
    3             90.0             410.00        40.50
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.
```

Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	130.00	70.00	180.00	95.00	5.00
2	210.00	110.00	270.00	140.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.888 FS Min = 1.571 FS Ave = 2.507
Standard Deviation = 0.642 Coefficient of Variation = 25.60 %
Failure Surface Specified By 4 Coordinate Points

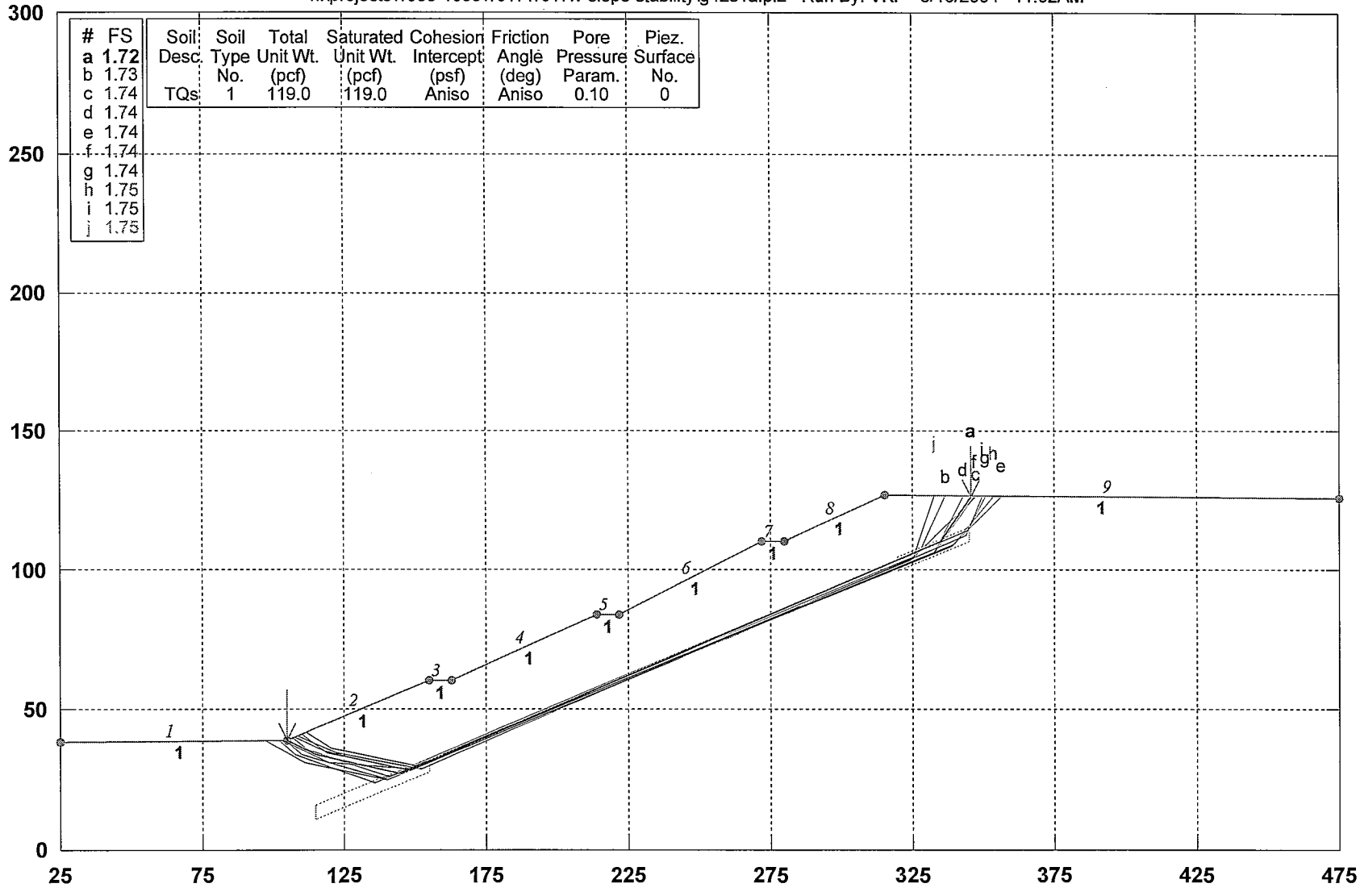
Point No.	X-Surf (ft)	Y-Surf (ft)
1	144.65	102.40
2	172.64	93.41
3	268.87	139.80
4	272.56	144.00

Factor of Safety
*** 1.571 ***
Individual data on the 7 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	25.3	23735.3	0.0	2492.8	0.	0.	3560.3	0.0	0.0
2	2.6	5269.1	0.0	553.4	0.	0.	790.4	0.0	0.0
3	24.4	51746.3	0.0	5744.4	0.	0.	7762.0	0.0	0.0
4	8.0	15149.5	0.0	1681.8	0.	0.	2272.4	0.0	0.0
5	40.0	70662.3	0.0	7844.3	0.	0.	10599.3	0.0	0.0
6	23.9	28268.0	0.0	3138.1	0.	0.	4240.2	0.0	0.0
7	3.7	923.0	0.0	139.8	0.	0.	138.4	0.0	0.0

G P R, T52584, 42-42' bedding plane search

n:\projects\1600-1699\1617\1617lv slope stability\g42s1a.pl2 Run By: VKP 8/16/2004 11:02AM



GSTABL7 v.2 FSmin=1.72

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No.-82

```
                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/16/2004
Time of Run:              11:02AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g42s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g42sla.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g42sla.PLT
PROBLEM DESCRIPTION:  G P R, T52584,  42-42'
                      bedding plane search
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 25.00 to X-values and 0.00 to Y-values listed.

    9 Top   Boundaries
    9 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      38.00      80.00      39.00        1
    2        80.00      39.00     130.00      60.00        1
    3       130.00      60.00     138.00      60.00        1
    4       138.00      60.00     189.00      84.00        1
    5       189.00      84.00     197.00      84.00        1
    6       197.00      84.00     247.00     110.00        1
    7       247.00     110.00     255.00     110.00        1
    8       255.00     110.00     290.00     127.00        1
    9       290.00     127.00     450.00     126.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.10       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             22.5             410.00        40.50
    2             25.5             347.00        22.00
    3             90.0             410.00        40.50
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.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
 500 Trial Surfaces Have Been Generated.
```

2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	90.00	13.00	130.00	30.00	5.00
2	295.00	102.00	320.00	113.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.211 FS Min = 1.722 FS Ave = 1.921
Standard Deviation = 0.151 Coefficient of Variation = 7.88 %
Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	79.85	39.00
2	90.27	33.60
3	119.58	27.18
4	309.67	110.05
5	320.79	126.81

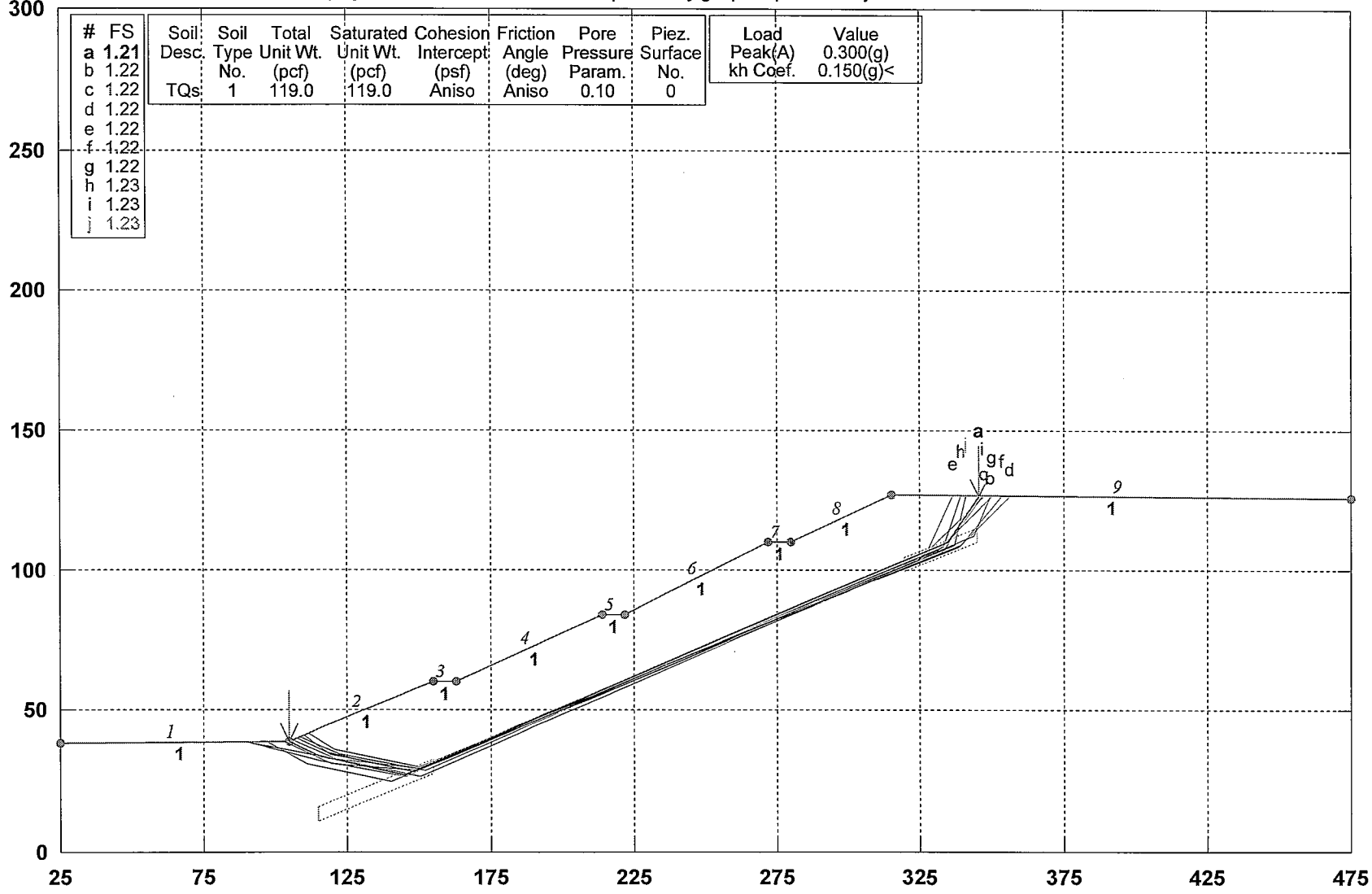
Factor of Safety
*** 1.722 ***

Individual data on the 12 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	0.1	0.7	0.0	0.1	0.	0.	0.0	0.0	0.0
2	10.3	5986.8	0.0	674.3	0.	0.	0.0	0.0	0.0
3	29.3	66539.0	0.0	6811.6	0.	0.	0.0	0.0	0.0
4	10.4	35174.3	0.0	3837.2	0.	0.	0.0	0.0	0.0
5	8.0	25259.8	0.0	2755.6	0.	0.	0.0	0.0	0.0
6	51.0	155807.4	0.0	16997.0	0.	0.	0.0	0.0	0.0
7	8.0	23621.0	0.0	2576.8	0.	0.	0.0	0.0	0.0
8	50.0	149756.7	0.0	16336.9	0.	0.	0.0	0.0	0.0
9	8.0	24301.2	0.0	2651.0	0.	0.	0.0	0.0	0.0
10	35.0	102681.3	0.0	11201.5	0.	0.	0.0	0.0	0.0
11	19.7	49555.4	0.0	5406.0	0.	0.	0.0	0.0	0.0
12	11.1	11143.1	0.0	2014.3	0.	0.	0.0	0.0	0.0

G P R, T52584, 42-42' bedding plane search; pseudo

n:\projects\1600-1699\1617\1617lv slope stability\g42ps1a.pl2 Run By: VKP 8/16/2004 11:03AM



GSTABL7 v.2 FSmin=1.21

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. - 83

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                    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:        8/16/2004
Time of Run:              11:03AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g42ps1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g42ps1a.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g42ps1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584,  42-42'
                      bedding plane search; pseudo
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 25.00 to X-values and 0.00 to Y-values listed.

    9 Top   Boundaries
    9 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      38.00      80.00      39.00        1
    2        80.00      39.00     130.00      60.00        1
    3       130.00      60.00     138.00      60.00        1
    4       138.00      60.00     189.00      84.00        1
    5       189.00      84.00     197.00      84.00        1
    6       197.00      84.00     247.00     110.00        1
    7       247.00     110.00     255.00     110.00        1
    8       255.00     110.00     290.00     127.00        1
    9       290.00     127.00     450.00     126.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.10       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             22.5             410.00        40.50
    2             25.5             347.00        22.00
    3             90.0             410.00        40.50
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.
Specified Peak Ground Acceleration Coefficient (A) =   0.300(g)
Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
Specified Seismic Pore-Pressure Factor =   0.000
```

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	90.00	13.00	130.00	30.00	5.00
2	295.00	102.00	320.00	113.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 2.201 FS Min = 1.208 FS Ave = 1.405
Standard Deviation = 0.121 Coefficient of Variation = 8.61 %
Failure Surface Specified By 5 Coordinate Points

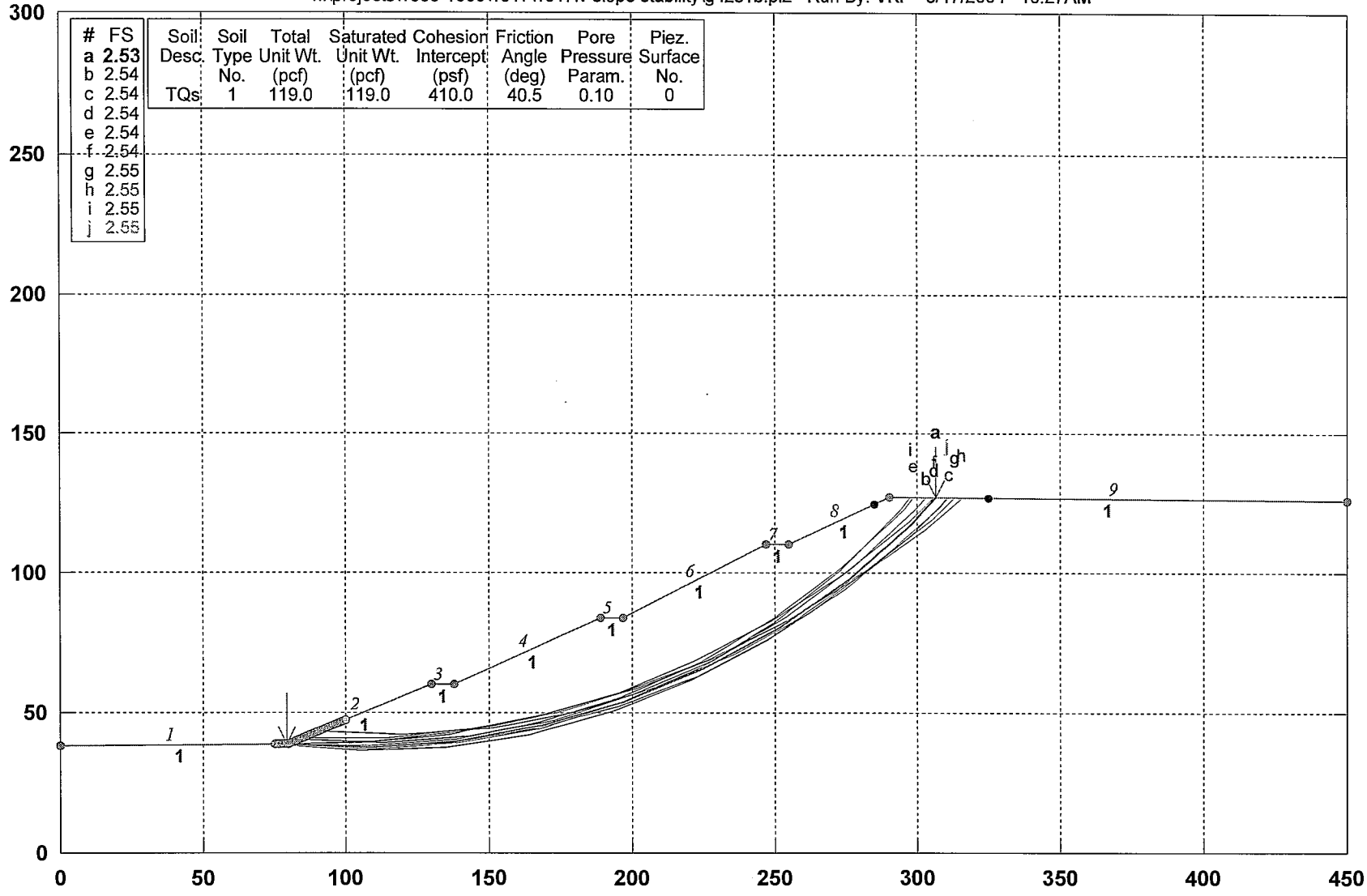
Point No.	X-Surf (ft)	Y-Surf (ft)
1	79.85	39.00
2	90.27	33.60
3	119.58	27.18
4	309.67	110.05
5	320.79	126.81

Factor of Safety
*** 1.208 ***
Individual data on the 12 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	0.1	0.7	0.0	0.1	0.	0.	0.1	0.0	0.0
2	10.3	5986.8	0.0	674.3	0.	0.	898.0	0.0	0.0
3	29.3	66539.0	0.0	6811.6	0.	0.	9980.9	0.0	0.0
4	10.4	35174.3	0.0	3837.2	0.	0.	5276.1	0.0	0.0
5	8.0	25259.8	0.0	2755.6	0.	0.	3789.0	0.0	0.0
6	51.0	155807.4	0.0	16997.0	0.	0.	23371.1	0.0	0.0
7	8.0	23621.0	0.0	2576.8	0.	0.	3543.1	0.0	0.0
8	50.0	149756.7	0.0	16336.9	0.	0.	22463.5	0.0	0.0
9	8.0	24301.2	0.0	2651.0	0.	0.	3645.2	0.0	0.0
10	35.0	102681.3	0.0	11201.5	0.	0.	15402.2	0.0	0.0
11	19.7	49555.4	0.0	5406.0	0.	0.	7433.3	0.0	0.0
12	11.1	11143.1	0.0	2014.3	0.	0.	1671.5	0.0	0.0

G P R, T52584, 42-42' bedding plane search; circular

n:\projects\1600-1699\1617\1617lv slope stability\g42s1b.pl2 Run By: VKP 8/17/2004 10:27AM



GSTABL7 v.2 FSmin=2.53

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO. - 84

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                    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:        8/17/2004
Time of Run:              10:27AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g42slb.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g42slb.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g42slb.PLT
PROBLEM DESCRIPTION:  G P R, T52584,  42-42'
                      bedding plane search; circular
BOUNDARY COORDINATES
    9 Top   Boundaries
    9 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      38.00      80.00      39.00        1
    2        80.00      39.00     130.00      60.00        1
    3       130.00      60.00     138.00      60.00        1
    4       138.00      60.00     189.00      84.00        1
    5       189.00      84.00     197.00      84.00        1
    6       197.00      84.00     247.00     110.00        1
    7       247.00     110.00     255.00     110.00        1
    8       255.00     110.00     290.00     127.00        1
    9       290.00     127.00     450.00     126.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.10       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             22.5             410.00        40.50
    2             25.5             347.00        22.00
    3             90.0             410.00        40.50
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.
ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
 500 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of    50 Points Equally Spaced
Along The Ground Surface Between  X =  75.00(ft)
                              and  X = 100.00(ft)
Each Surface Terminates Between   X = 285.00(ft)
```

and X = 325.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.325 FS Min = 2.531 FS Ave = 3.128
Standard Deviation = 0.472 Coefficient of Variation = 15.07 %
Failure Surface Specified By 10 Coordinate Points

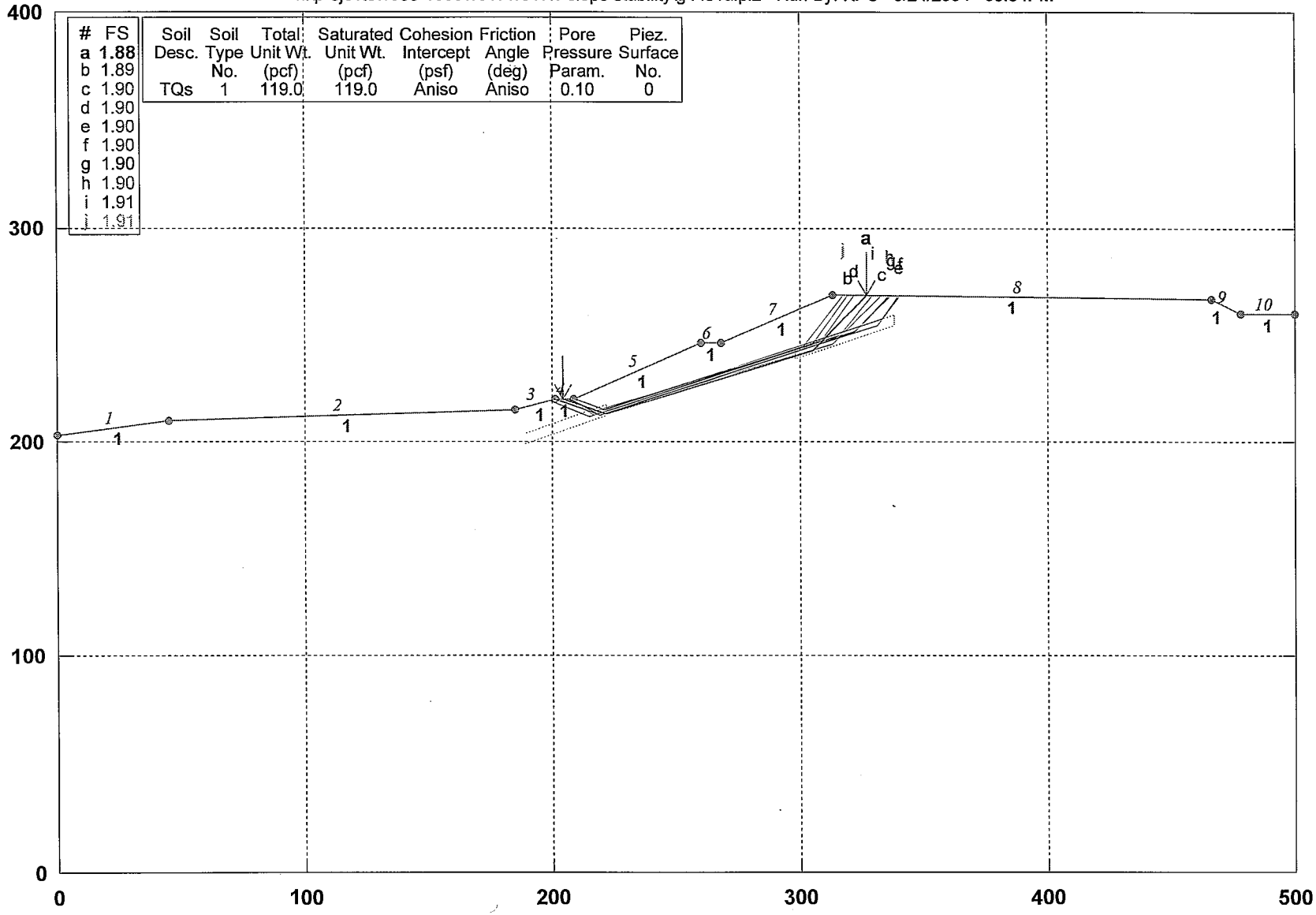
Point No.	X-Surf (ft)	Y-Surf (ft)
1	79.08	38.99
2	109.06	37.87
3	138.98	40.01
4	168.50	45.38
5	197.25	53.93
6	224.91	65.55
7	251.14	80.11
8	275.64	97.43
9	298.11	117.30
10	306.83	126.89

Circle Center At X = 104.61 ; Y = 311.84 ; and Radius = 274.04
Factor of Safety
*** 2.531 ***
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	0.9	2.5	0.0	0.3	0.	0.	0.0	0.0	0.0
2	29.1	23143.3	0.0	2316.0	0.	0.	0.0	0.0	0.0
3	20.9	42328.4	0.0	4243.7	0.	0.	0.0	0.0	0.0
4	8.0	19372.8	0.0	1942.2	0.	0.	0.0	0.0	0.0
5	1.0	2372.8	0.0	237.9	0.	0.	0.0	0.0	0.0
6	29.5	86795.2	0.0	8822.4	0.	0.	0.0	0.0	0.0
7	20.5	75007.8	0.0	7825.3	0.	0.	0.0	0.0	0.0
8	8.0	29827.9	0.0	3111.8	0.	0.	0.0	0.0	0.0
9	0.3	913.4	0.0	95.3	0.	0.	0.0	0.0	0.0
10	27.7	103935.8	0.0	11273.9	0.	0.	0.0	0.0	0.0
11	22.1	85620.9	0.0	9791.9	0.	0.	0.0	0.0	0.0
12	4.1	15307.0	0.0	1750.6	0.	0.	0.0	0.0	0.0
13	3.9	13089.4	0.0	1603.0	0.	0.	0.0	0.0	0.0
14	20.6	61111.4	0.0	7484.1	0.	0.	0.0	0.0	0.0
15	14.4	33720.1	0.0	4501.8	0.	0.	0.0	0.0	0.0
16	8.1	12797.7	0.0	1708.5	0.	0.	0.0	0.0	0.0
17	8.7	5003.3	0.0	743.8	0.	0.	0.0	0.0	0.0

G P R, T52584, Section 44-44' bedding plane search

n:\projects\1600-1699\1617\1617lv slope stability\g44s1a.pl2 Run By: KPC 8/24/2004 03:54PM



GSTABL7 v.2 FSmin=1.88

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

RUN NO. - 85

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/24/2004
Time of Run:              03:54PM
Run By:                   KPC
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g44s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g44s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g44s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 44-44'
                      bedding plane search
BOUNDARY COORDINATES
   10 Top   Boundaries
   10 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00     203.00      45.00     210.00        1
    2        45.00     210.00     185.00     215.00        1
    3       185.00     215.00     201.00     220.00        1
    4       201.00     220.00     209.00     220.00        1
    5       209.00     220.00     260.00     246.00        1
    6       260.00     246.00     268.00     246.00        1
    7       268.00     246.00     313.00     269.00        1
    8       313.00     269.00     466.00     267.00        1
    9       466.00     267.00     478.00     260.00        1
   10       478.00     260.00     500.00     260.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.10       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             18.5            410.00        40.50
    2             21.5            347.00        22.00
    3             90.0            410.00        40.50
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.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
```

500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	189.00	201.00	222.00	215.00	5.00
2	298.00	241.00	338.00	257.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.012 FS Min = 1.877 FS Ave = 2.261
Standard Deviation = 0.388 Coefficient of Variation = 17.16 %
Failure Surface Specified By 5 Coordinate Points

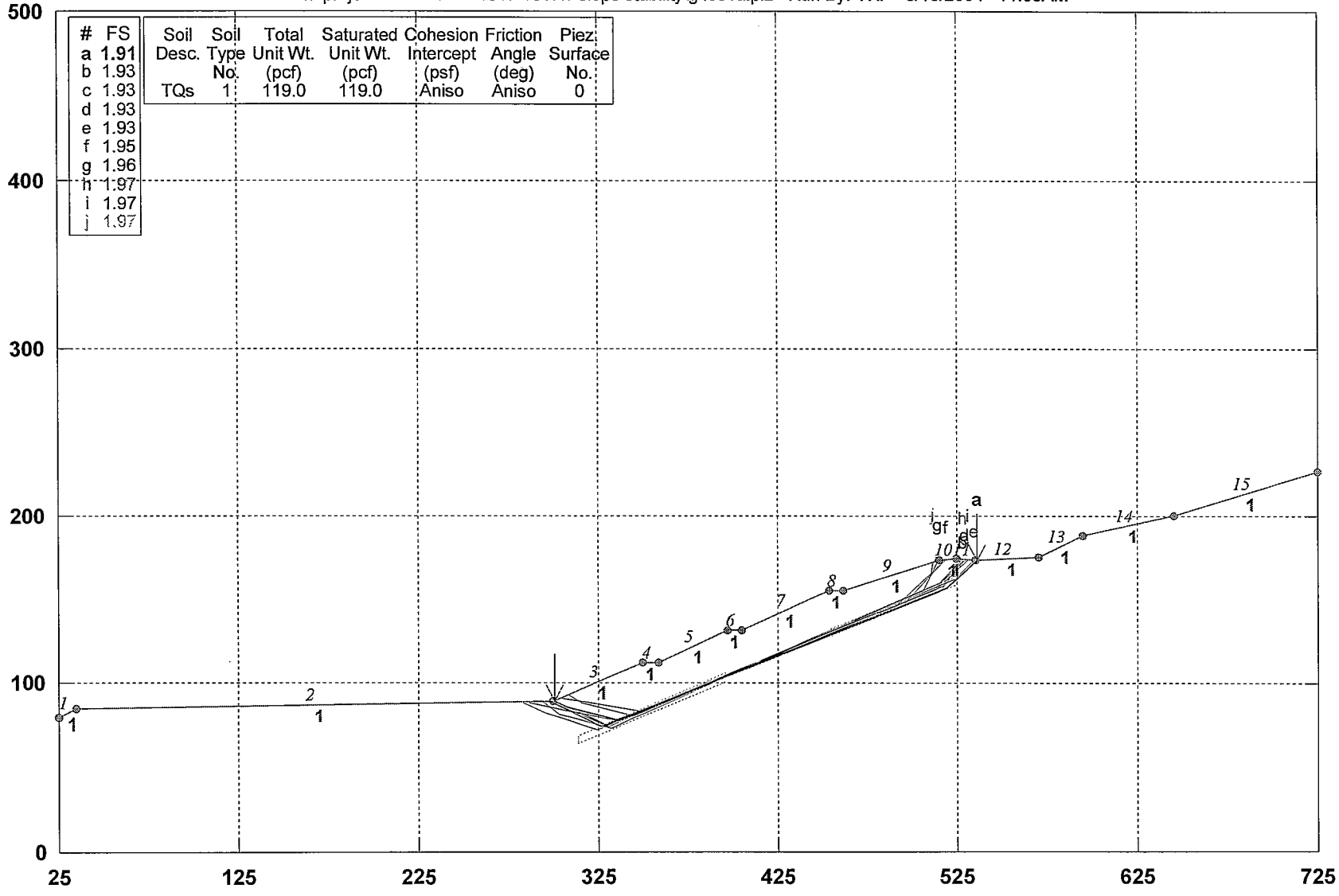
Point No.	X-Surf (ft)	Y-Surf (ft)
1	204.62	220.00
2	221.88	213.09
3	305.18	242.59
4	324.19	265.80
5	327.18	268.81

Factor of Safety
*** 1.877 ***
Individual data on the 8 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	4.4	457.5	0.0	49.3	0.	0.	0.0	0.0	0.0
2	12.9	11664.6	0.0	1256.3	0.	0.	0.0	0.0	0.0
3	38.1	74573.8	0.0	7911.1	0.	0.	0.0	0.0	0.0
4	8.0	17126.2	0.0	1816.8	0.	0.	0.0	0.0	0.0
5	37.2	86228.8	0.0	9147.5	0.	0.	0.0	0.0	0.0
6	7.8	18283.2	0.0	2884.7	0.	0.	0.0	0.0	0.0
7	11.2	13261.3	0.0	2092.3	0.	0.	0.0	0.0	0.0
8	3.0	543.9	0.0	77.3	0.	0.	0.0	0.0	0.0

G P R, T52584, Section 45-45' bedding plane search

n:\projects\1600-1699\1617\1617lv slope stability\g45s1a.pl2 Run By: VKP 8/16/2004 11:06AM



GSTABL7 v.2 FSmin=1.91

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

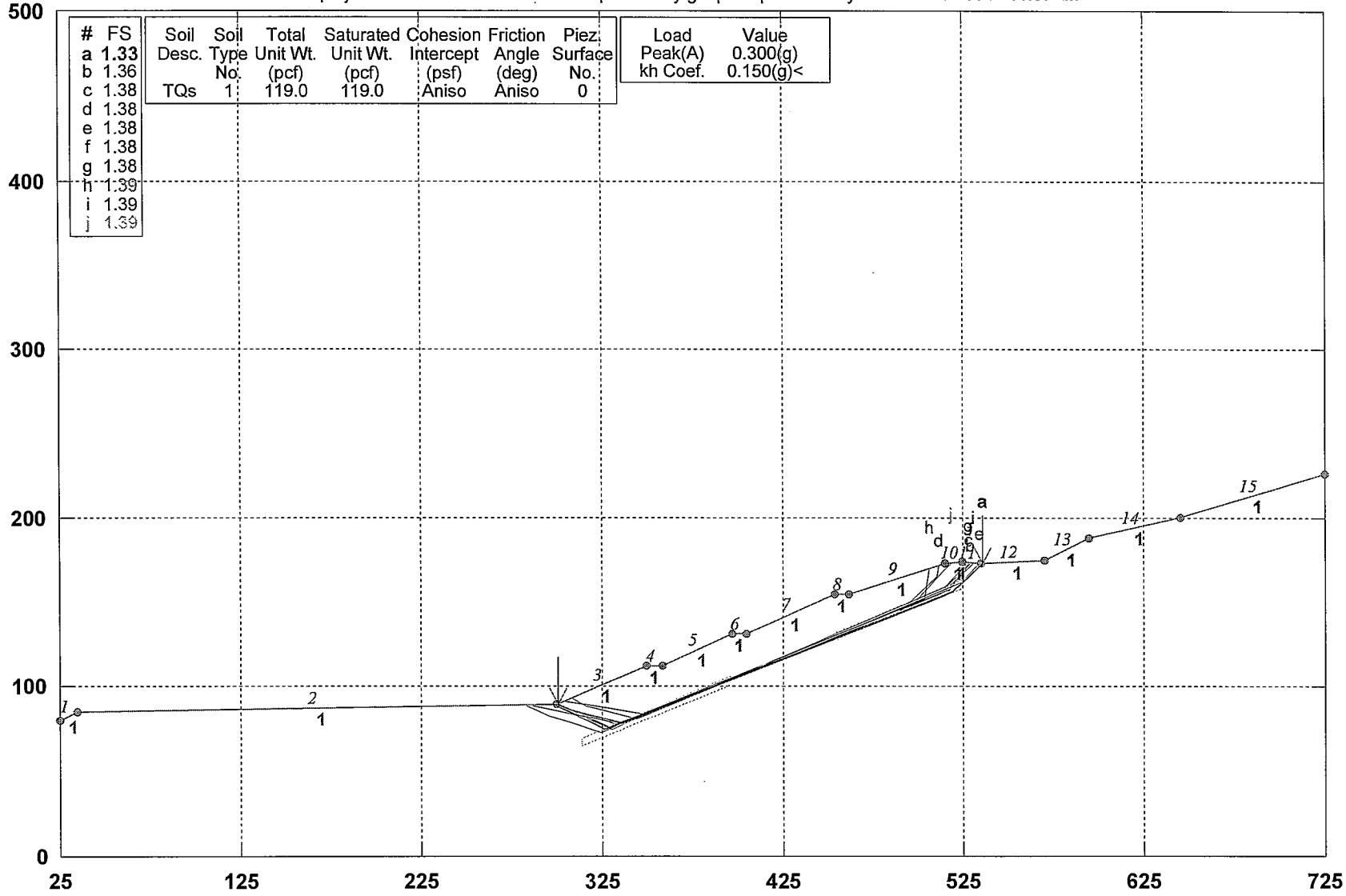
RUN No.-86

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*************************************************************************
                  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:        8/16/2004
Time of Run:              11:06AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g45s1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g45s1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g45s1a.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 45-45'
                      bedding plane search
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 25.00 to X-values and 0.00 to Y-values listed.

   15 Top   Boundaries
   15 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      80.00      10.00      85.00        1
    2        10.00      85.00     275.00      89.00        1
    3       275.00      89.00     325.00     112.00        1
    4       325.00     112.00     333.00     112.00        1
    5       333.00     112.00     372.00     131.00        1
    6       372.00     131.00     380.00     131.00        1
    7       380.00     131.00     429.00     155.00        1
    8       429.00     155.00     437.00     155.00        1
    9       437.00     155.00     490.00     173.00        1
   10       490.00     173.00     500.00     174.00        1
   11       500.00     174.00     510.00     173.00        1
   12       510.00     173.00     545.00     175.00        1
   13       545.00     175.00     570.00     188.00        1
   14       570.00     188.00     620.00     200.00        1
   15       620.00     200.00     700.00     227.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
   No.            (deg)             (psf)         (deg)
    1             22.5             410.00         40.50
    2             25.5             347.00         22.00
    3             90.0             410.00         40.50
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
```

G P R, T52584, Section 45-45' bedding plane search; pseudo

n:\projects\1600-1699\1617\1617lv slope stability\g45ps1a.pl2 Run By: VKP 8/16/2004 11:07AM



GSTABL7 v.2 FSmin=1.33

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

GSTABL7

Run No. -87

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                    ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*****************************************************************************
                   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:        8/16/2004
Time of Run:              11:07AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g45psla.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g45psla.OU
T
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g45psla.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 45-45'
                      bedding plane search; pseudo
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 25.00 to X-values and 0.00 to Y-values listed.

   15 Top   Boundaries
   15 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      80.00      10.00      85.00        1
    2        10.00      85.00     275.00      89.00        1
    3       275.00      89.00     325.00     112.00        1
    4       325.00     112.00     333.00     112.00        1
    5       333.00     112.00     372.00     131.00        1
    6       372.00     131.00     380.00     131.00        1
    7       380.00     131.00     429.00     155.00        1
    8       429.00     155.00     437.00     155.00        1
    9       437.00     155.00     490.00     173.00        1
   10       490.00     173.00     500.00     174.00        1
   11       500.00     174.00     510.00     173.00        1
   12       510.00     173.00     545.00     175.00        1
   13       545.00     175.00     570.00     188.00        1
   14       570.00     188.00     620.00     200.00        1
   15       620.00     200.00     700.00     227.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00      0.0      0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit    Intercept      Angle
   No.             (deg)            (psf)         (deg)
    1              22.5             410.00        40.50
    2              25.5             347.00        22.00
    3              90.0             410.00        40.50
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.
Specified Peak Ground Acceleration Coefficient (A) = 0.300(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	289.00	67.00	371.00	103.00	5.00
2	430.00	130.00	500.00	161.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 3.030 FS Min = 1.334 FS Ave = 1.691
Standard Deviation = 0.255 Coefficient of Variation = 15.08 %
Failure Surface Specified By 5 Coordinate Points

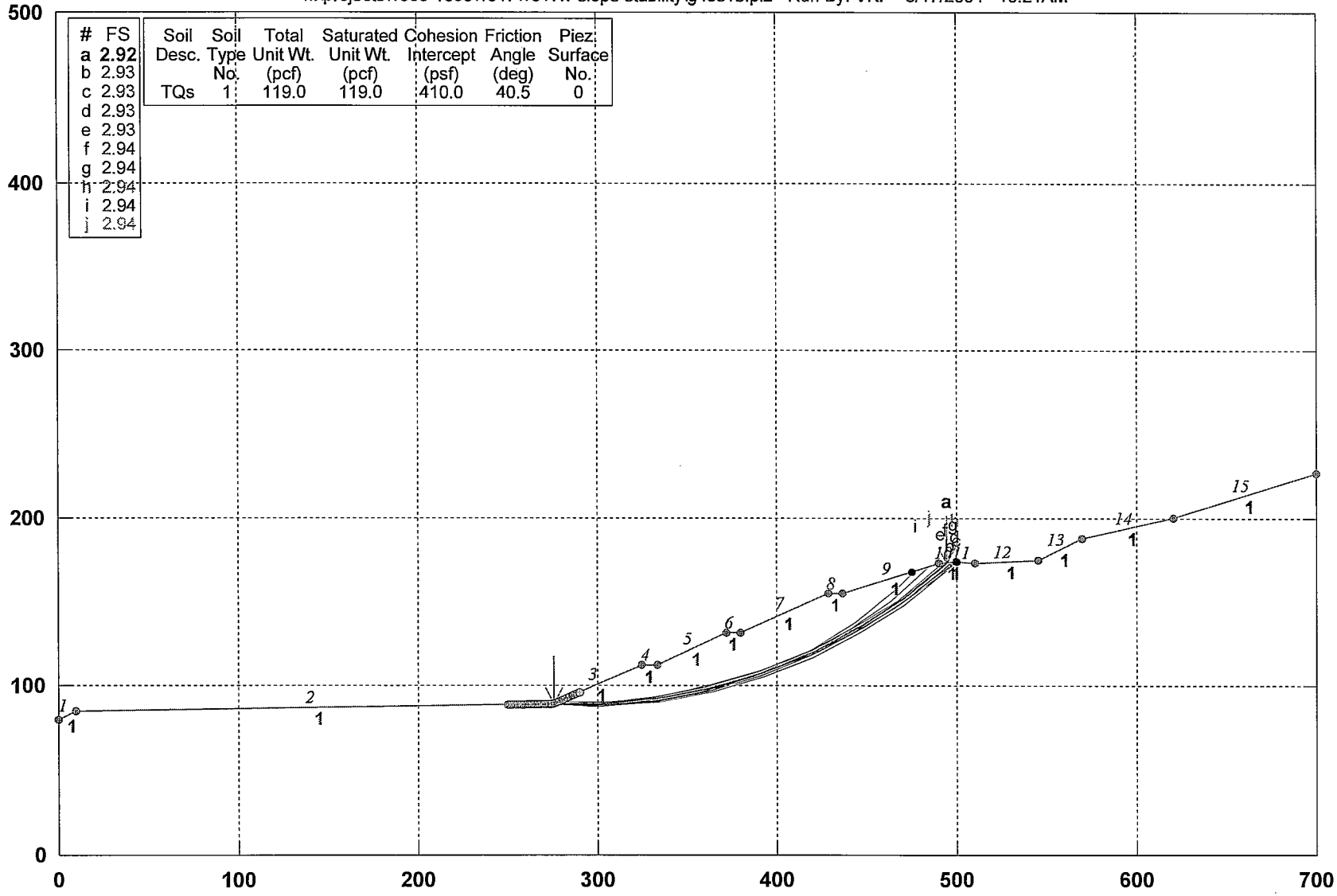
Point No.	X-Surf (ft)	Y-Surf (ft)
1	275.42	89.20
2	282.52	85.71
3	311.46	77.78
4	494.39	156.66
5	510.73	173.04

Factor of Safety
*** 1.334 ***
Individual data on the 13 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	7.1	2852.9	0.0	0.0	0.	0.	427.9	0.0	0.0
2	28.9	59816.5	0.0	0.0	0.	0.	8972.5	0.0	0.0
3	13.5	45431.2	0.0	0.0	0.	0.	6814.7	0.0	0.0
4	8.0	25380.2	0.0	0.0	0.	0.	3807.0	0.0	0.0
5	39.0	120789.9	0.0	0.0	0.	0.	18118.5	0.0	0.0
6	8.0	24174.6	0.0	0.0	0.	0.	3626.2	0.0	0.0
7	49.0	146383.4	0.0	0.0	0.	0.	21957.5	0.0	0.0
8	8.0	23624.0	0.0	0.0	0.	0.	3543.6	0.0	0.0
9	53.0	130325.4	0.0	0.0	0.	0.	19548.8	0.0	0.0
10	4.4	9147.8	0.0	0.0	0.	0.	1372.2	0.0	0.0
11	5.6	9512.6	0.0	0.0	0.	0.	1426.9	0.0	0.0
12	10.0	7380.2	0.0	0.0	0.	0.	1107.0	0.0	0.0
13	0.7	29.7	0.0	0.0	0.	0.	4.4	0.0	0.0

G P R, T52584, Section 45-45' bedding plane search

n:\projects\1600-1699\1617\1617lv slope stability\g45s1b.pl2 Run By: VKP 8/17/2004 10:21AM



GSTABL7 v.2 FSmin=2.92

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No.-88

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                  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:        8/17/2004
Time of Run:              10:21AM
Run By:                   VKP
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\g45s1b.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\g45s1b.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\g45s1b.PLT
PROBLEM DESCRIPTION:  G P R, T52584, Section 45-45'
                      bedding plane search
BOUNDARY COORDINATES
   15 Top   Boundaries
   15 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      80.00      10.00      85.00        1
    2        10.00      85.00     275.00      89.00        1
    3       275.00      89.00     325.00     112.00        1
    4       325.00     112.00     333.00     112.00        1
    5       333.00     112.00     372.00     131.00        1
    6       372.00     131.00     380.00     131.00        1
    7       380.00     131.00     429.00     155.00        1
    8       429.00     155.00     437.00     155.00        1
    9       437.00     155.00     490.00     173.00        1
   10       490.00     173.00     500.00     174.00        1
   11       500.00     174.00     510.00     173.00        1
   12       510.00     173.00     545.00     175.00        1
   13       545.00     175.00     570.00     188.00        1
   14       570.00     188.00     620.00     200.00        1
   15       620.00     200.00     700.00     227.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   119.0    119.0     410.0     40.5    0.00      0.0       0
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  1 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             22.5             410.00        40.50
    2             25.5             347.00        22.00
    3             90.0             410.00        40.50
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.
ANISOTROPIC STRENGTH DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random
```

Technique For Generating Circular Surfaces, Has Been Specified.
500 Trial Surfaces Have Been Generated.
10 Surface(s) Initiate(s) From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 250.00(ft)
and X = 290.00(ft)
Each Surface Terminates Between X = 475.00(ft)
and X = 500.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
30.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45.0
And 15.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 5.052 FS Min = 2.924 FS Ave = 3.696
Standard Deviation = 0.580 Coefficient of Variation = 15.69 %
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	275.31	89.14
2	305.31	89.24
3	335.14	92.42
4	364.48	98.66
5	393.03	107.88
6	420.48	119.99
7	446.54	134.85
8	470.93	152.31
9	493.40	172.20
10	494.55	173.46

Circle Center At X = 289.42 ; Y = 379.67 ; and Radius = 290.87
Factor of Safety
*** 2.924 ***
Individual data on the 16 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	30.0	24454.5	0.0	0.0	0.	0.	0.0	0.0	0.0
2	19.7	40260.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	8.0	19259.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.1	5137.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	29.3	86067.4	0.0	0.0	0.	0.	0.0	0.0	0.0
6	7.5	26211.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	8.0	27246.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	13.0	44059.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	27.4	98554.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	8.5	30926.6	0.0	0.0	0.	0.	0.0	0.0	0.0
11	8.0	26534.5	0.0	0.0	0.	0.	0.0	0.0	0.0
12	9.5	27793.7	0.0	0.0	0.	0.	0.0	0.0	0.0
13	24.4	54566.3	0.0	0.0	0.	0.	0.0	0.0	0.0
14	19.1	20444.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	3.4	1000.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	1.2	78.8	0.0	0.0	0.	0.	0.0	0.0	0.0

C equal to zero, with water weight in the tension crack.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
500 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	289.00	67.00	371.00	103.00	5.00
2	430.00	130.00	500.00	161.00	5.00

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated = 500
Statistical Data On All Valid FS Values:
FS Max = 4.751 FS Min = 1.906 FS Ave = 2.336
Standard Deviation = 0.367 Coefficient of Variation = 15.73 %
Failure Surface Specified By 5 Coordinate Points

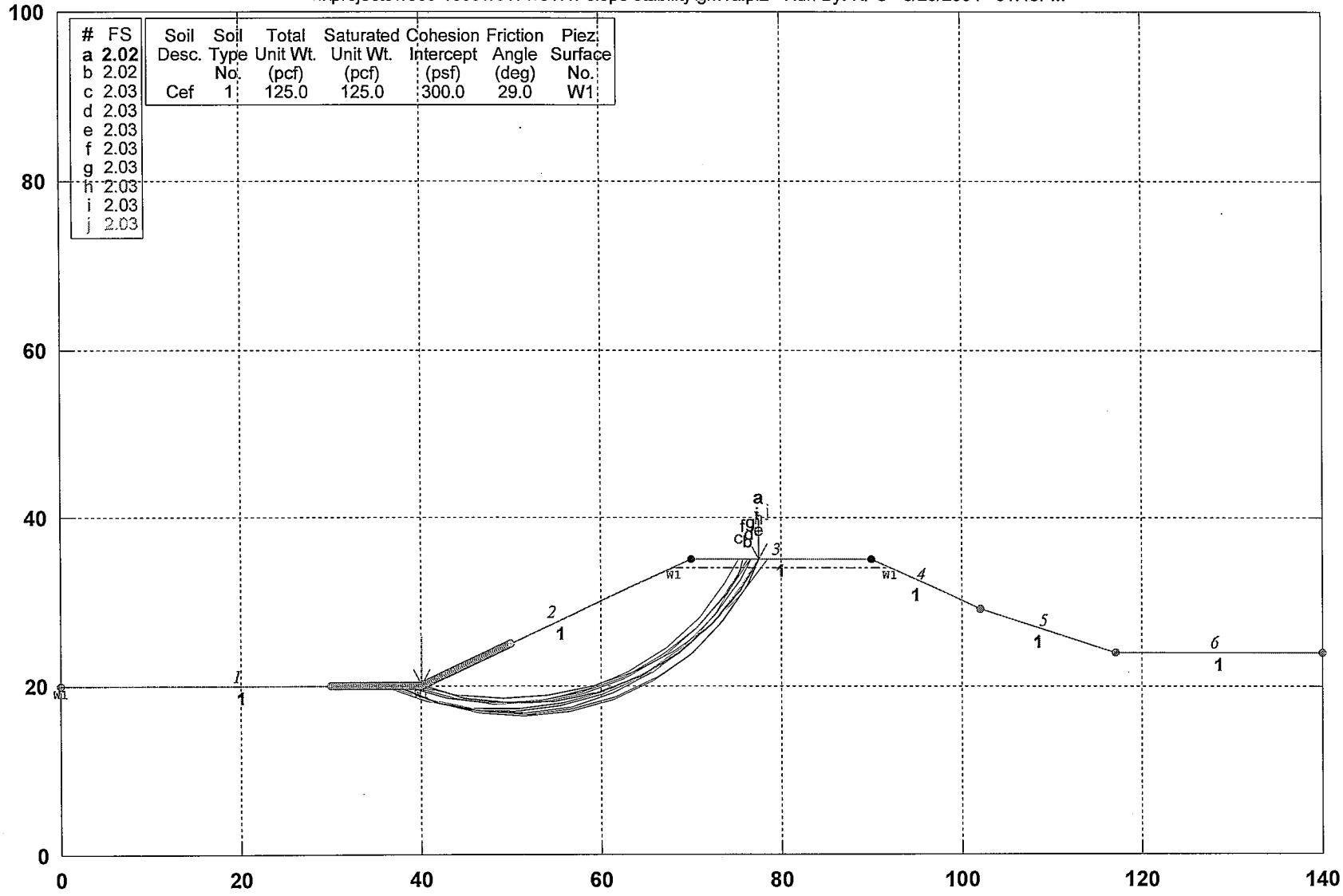
Point No.	X-Surf (ft)	Y-Surf (ft)
1	275.42	89.20
2	282.52	85.71
3	311.46	77.78
4	494.39	156.66
5	510.73	173.04

Factor of Safety
*** 1.906 ***
Individual data on the 13 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	7.1	2852.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	28.9	59816.5	0.0	0.0	0.	0.	0.0	0.0	0.0
3	13.5	45431.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	8.0	25380.2	0.0	0.0	0.	0.	0.0	0.0	0.0
5	39.0	120789.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.0	24174.6	0.0	0.0	0.	0.	0.0	0.0	0.0
7	49.0	146383.4	0.0	0.0	0.	0.	0.0	0.0	0.0
8	8.0	23624.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	53.0	130325.4	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.4	9147.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	5.6	9512.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	10.0	7380.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.7	29.7	0.0	0.0	0.	0.	0.0	0.0	0.0

GPR, T52584; Critical 2:1 dike fill slope w/ rapid drawdown conditions

n:\projects\1600-1699\1617\1617lv slope stability\gm1a.pl2 Run By: KPC 8/26/2004 01:45PM



GSTABL7 v.2 FSmin=2.02

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN NO.-89

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/26/2004
Time of Run:              01:45PM
Run By:                   KPC
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\gm1a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\gm1a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\gm1a.PLT
PROBLEM DESCRIPTION:  GPR, T52584; Critical 2:1 dike fill
                      slope w/ rapid drawdown conditions
BOUNDARY COORDINATES
    6 Top   Boundaries
    6 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      20.00      40.00      20.00        1
    2        40.00      20.00      70.00      35.00        1
    3        70.00      35.00      90.00      35.00        1
    4        90.00      35.00     102.00      29.00        1
    5       102.00      29.00     117.00      24.00        1
    6       117.00      24.00     140.00      24.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  4 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.        (ft)        (ft)
    1         0.00       20.00
    2        40.00       20.00
    3        68.00       34.00
    4        92.00       34.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X =  30.00(ft)
                                 and  X =  50.00(ft)
Each Surface Terminates Between   X =  70.00(ft)
                                 and  X =  90.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 5.00(ft) Line Segments Define Each Trial Failure Surface.
Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -30.0
And  20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
```

Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 8.804 FS Min = 2.020 FS Ave = 2.513
Standard Deviation = 0.633 Coefficient of Variation = 25.18 %
Failure Surface Specified By 10 Coordinate Points

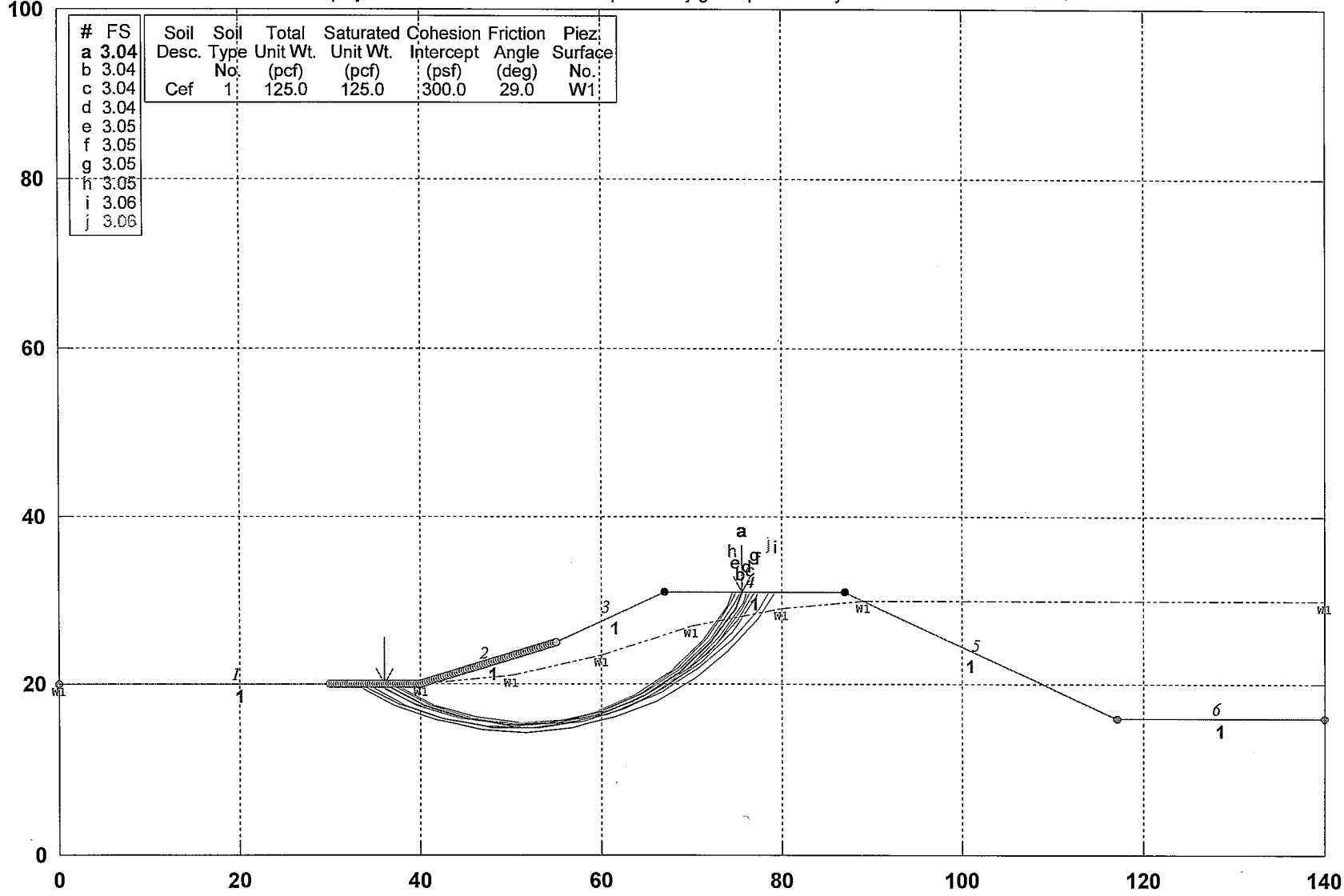
Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.10	20.05
2	44.89	18.60
3	49.85	17.99
4	54.84	18.23
5	59.72	19.32
6	64.35	21.23
7	68.58	23.89
8	72.29	27.24
9	75.38	31.17
10	77.45	35.00

Circle Center At X = 50.93 ; Y = 47.13 ; and Radius = 29.16
Factor of Safety
*** 2.020 ***
Individual data on the 12 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	4.8	1148.9	0.0	539.3	0.	0.	0.0	0.0	0.0
2	5.0	3341.9	0.0	1512.8	0.	0.	0.0	0.0	0.0
3	5.0	5032.3	0.0	2263.6	0.	0.	0.0	0.0	0.0
4	4.9	6016.5	0.0	2769.7	0.	0.	0.0	0.0	0.0
5	4.6	6207.3	0.0	3016.3	0.	0.	0.0	0.0	0.0
6	3.7	4891.0	0.0	2596.9	0.	0.	0.0	0.0	0.0
7	0.6	752.2	0.0	437.6	0.	0.	0.0	0.0	0.0
8	1.4	1798.8	0.0	1131.5	0.	0.	0.0	0.0	0.0
9	2.3	2519.1	0.0	1500.0	0.	0.	0.0	0.0	0.0
10	3.1	2239.3	0.0	1496.4	0.	0.	0.0	0.0	0.0
11	1.5	461.7	0.0	284.2	0.	0.	0.0	0.0	0.0
12	0.5	33.8	0.0	0.0	0.	0.	0.0	0.0	0.0

GPR, T52584; Downstream fill slope w/ steady state seepage conditions

n:\projects\1600-1699\1617\1617lv slope stability\gm2a.pl2 Run By: KPC 8/26/2004 02:06PM



GSTABL7 v.2 FSmin=3.04

Safety Factors Are Calculated By The Modified Bishop Method

GSTABL7

RUN No. - 90

```
                    *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
   ** Original Version 1.0, January 1996; Current Version 2.003, June 2002 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    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:        8/26/2004
Time of Run:              02:06PM
Run By:                   KPC
Input Data Filename:      N:\Projects\1600-1699\1617\1617LV slope stability\gm2a.in
Output Filename:          N:\Projects\1600-1699\1617\1617LV slope stability\gm2a.OUT
Unit System:              English
Plotted Output Filename:  N:\Projects\1600-1699\1617\1617Lope stability\gm2a.PLT
PROBLEM DESCRIPTION:  GPR, T52584; Downstream fill
                      slope w/ steady state seepage conditions
BOUNDARY COORDINATES
    6 Top   Boundaries
    6 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         0.00      20.00      40.00      20.00        1
    2        40.00      20.00      55.00      25.00        1
    3        55.00      25.00      67.00      31.00        1
    4        67.00      31.00      87.00      31.00        1
    5        87.00      31.00     117.00      16.00        1
    6       117.00      16.00     140.00      16.00        1
Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 1 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   125.0    125.0     300.0     29.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  8 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.        (ft)        (ft)
    1         0.00       20.00
    2        40.00       20.00
    3        50.00       21.00
    4        60.00       23.50
    5        70.00       27.00
    6        80.00       29.00
    7        89.00       30.00
    8       140.00       30.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
1000 Trial Surfaces Have Been Generated.
  10 Surface(s) Initiate(s) From Each Of   100 Points Equally Spaced
Along The Ground Surface Between  X =  30.00(ft)
                                 and  X =  55.00(ft)
Each Surface Terminates Between   X =  67.00(ft)
                                 and   X =  87.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 5.00(ft) Line Segments Define Each Trial Failure Surface.
```

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -30.0
And 20.0 deg.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 1000
Statistical Data On All Valid FS Values:
FS Max = 25.794 FS Min = 3.040 FS Ave = 4.420
Standard Deviation = 1.929 Coefficient of Variation = 43.64 %
Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	36.06	20.00
2	40.39	17.50
3	45.11	15.86
4	50.06	15.13
5	55.06	15.35
6	59.92	16.49
7	64.49	18.53
8	68.59	21.39
9	72.09	24.96
10	74.85	29.13
11	75.64	31.00

Circle Center At X = 51.43 ; Y = 41.65 ; and Radius = 26.56
Factor of Safety
*** 3.040 ***
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	3.9	559.3	0.0	322.3	0.	0.	0.0	0.0	0.0
2	0.4	120.1	0.0	67.6	0.	0.	0.0	0.0	0.0
3	4.7	2500.9	0.0	1115.7	0.	0.	0.0	0.0	0.0
4	4.9	4285.1	0.0	1610.8	0.	0.	0.0	0.0	0.0
5	0.1	63.3	0.0	22.2	0.	0.	0.0	0.0	0.0
6	4.9	5517.4	0.0	1914.1	0.	0.	0.0	0.0	0.0
7	0.1	69.1	0.0	24.0	0.	0.	0.0	0.0	0.0
8	4.9	6282.2	0.0	2105.7	0.	0.	0.0	0.0	0.0
9	0.1	103.9	0.0	35.1	0.	0.	0.0	0.0	0.0
10	4.5	6227.5	0.0	1960.4	0.	0.	0.0	0.0	0.0
11	2.5	3441.3	0.0	1102.0	0.	0.	0.0	0.0	0.0
12	1.6	2025.4	0.0	618.3	0.	0.	0.0	0.0	0.0
13	1.4	1563.7	0.0	551.7	0.	0.	0.0	0.0	0.0
14	2.1	1855.1	0.0	606.2	0.	0.	0.0	0.0	0.0
15	1.9	1084.4	0.0	255.2	0.	0.	0.0	0.0	0.0
16	0.9	281.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.8	91.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Appendix B

TRACT 44373-01

TRACT MAP 45084

GATEWAY TRIAL CENTER PM 20685

VTTM 52584 VICINITY MAP NO SCALE

SCALE: 1"=100'

NORTH

LEGEND
SEE PLATE III

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

Geologic/Geotechnical Map

Date: 08/27/04	Job No.: 04-1617LV-1
Scale: 1" = 100'	CAD File: Plates I & II Geologic Map
PLATE I	Geology by: Staff / Drawn by: GSD / Revised:

Owner:
LOS VALLES LAND & GOLF, LLC
233 WILSHIRE BOULEVARD, SUITE 800
SANTA MONICA, CA 90401
Ph. (310) 576-6700
Fax. (310) 576-0888

Legal Description:
PORTION OF THE NORTHWEST QUARTER OF SECTION 2 & THE NORTH EAST QUARTER OF SECTION 3, T4N, R17W, SBM IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA.

BASIS OF BEARING:
THE NORTHERLY LINE OF THE NW 1/4 SEC, T4N, R17W, SBM BEING N89°31'30"W PER RS 99/48, RECORDS OF LOS ANGELES COUNTY.

BENCH MARK:
NEWHALL 1995 L 5274
DESCRIPTION: DPW BM TAG IN TOP OF FLAT ROCK & CONC 19 M S/O C/L HASLEY CYN RD & 7M E/O C/L DEL VALLE RD 5.2 M N/O FIRE HYD.
ELEVATION: 1211.458

AMENDED VESTING TENTATIVE TRACT MAP NO.
52584
IN THE UNINCORPORATED TERRITORY OF LOS ANGELES COUNTY
COUNTY CASE NO. 98-034 (5)

NO.	DATE	REVISIONS
△		
△		
△		
△		
△		
△		

Prepared by:
ALLIANCE LAND PLANNING & ENGINEERING INC.
5962 LAPLACE COURT
SUITE 130
CARLSBAD, CA 92008
TEL: (760) 431-9896
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PAUL E. GAFF R.C.E. 53239 DATE

SHEET 1 OF 1

I:\CAD\0423\Tentative-Map\TMAP-sheet-01.

LOT AREA SUMMARY
RESIDENTIAL

LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)	LOT NO.	LOT AREA (S.F.)	PAD AREA (S.F.)
1	16056	14400	53	15852	15800	105	19155	15400	157	19066	19000
2	15906	14300	54	21713	21700	106	21379	17900	158	16472	15300
3	17206	14000	55	20031	20000	107	19664	17400	159	18092	15700
4	19363	15400	56	15888	15800	108	15033	15000	160	16885	14300
5	19045	15200	57	15608	15600	109	16324	14700	161	17420	14400
6	19172	15800	58	15057	15000	110	15957	13400	162	18307	15700
7	20121	15400	59	15025	15000	111	16030	13400	163	20121	17600
8	19849	15500	60	15013	15000	112	17415	13700	164	18612	15600
9	19796	15900	61	15511	15500	113	18206	13800	165	22648	16300
10	20085	16000	62	15389	15300	114	18796	13800	166	17293	16400
11	19810	15500	63	15151	15100	115	19679	14100	167	17557	16200
12	19608	15000	64	18218	16500	116	20102	15100	168	16749	16100
13	19523	15300	65	21568	15500	117	18674	14200	169	16820	16800
14	19243	15300	66	21158	14800	118	18839	15300	170	19426	19700
15	19992	15400	67	23066	15200	119	19021	15300	171	17811	16700
16	19905	15700	68	22547	15100	120	18673	15300	172	17766	15700
17	16453	15800	69	20456	13900	121	18101	14600	173	18243	14800
18	20292	15600	70	20613	13800	122	19772	15400	174	21708	15900
19	22077	16500	71	20610	13700	123	22202	17700	175	23150	15200
20	20763	15700	72	21203	14700	124	23482	17900	176	22728	15700
21	20656	16900	73	18249	13500	125	23963	18200	177	22185	15000
22	17660	15100	74	19688	15700	126	21221	17200	178	24587	20000
23	17758	14900	75	20534	15200	127	18451	16100	179	21924	19200
24	20733	20000	76	18466	13600	128	23820	18100	180	18443	17800
25	19944	16700	77	18319	12800	129	21914	18400	181	18978	18400
26	19535	17700	78	19767	13000	130	21094	17600	182	16526	16500
27	17500	17500	79	19171	13400	131	22538	17100	183	19671	19600
28	16312	16300	80	18364	12500	132	22674	18300	184	25251	25200
29	24241	16100	81	18427	13100	133	21027	18200	185	17035	16900
30	19568	13300	82	17599	13000	134	18894	18500	186	17526	17800
31	18494	13700	83	17646	13000	135	17885	18500	187	17126	17400
32	16103	13000	84	16543	13000	136	19632	13800	188	15659	15700
33	16308	15500	85	15063	14700	137	17943	14800	189	16139	16400
34	17043	16800	86	15044	13000	138	15718	15200	190	15472	15600
35	16935	15300	87	15348	13300	139	15038	15000	191	15037	15200
36	15264	14100	88	15946	13000	140	18701	15700	192	15432	15700
37	15849	15700	89	15355	12800	141	15033	14100	193	15946	16100
38	16920	14200	90	15036	12600	142	15000	14500	194	15733	16000
39	19472	15100	91	16056	13400	143	15000	14000	195	14747	15100
40	20541	15500	92	16292	13300	144	15005	14300	196	15747	16000
41	19461	14700	93	17192	14000	145	16660	13000	197	19450	19700
42	17962	14100	94	17818	14200	146	21269	15100	198	27320	22300
43	17405	14400	95	18099	14600	147	19975	15100	199	15356	15600
44	17793	15000	96	16877	14200	148	27616	15800	200	15030	15700
45	21769	18800	97	16609	14400	149	16310	16300	201	15170	15200
46	19927	16700	98	17876	17300	150	16226	15500	202	15739	16000
47	15008	15000	99	21604	22000	151	15417	15500	203	15438	15900
48	15006	15000	100	15768	16100	152	15147	15100	204	15016	15000
49	15193	15100	101	17431	15700	153	16268	16100	205	26290	16700
50	15645	15600	102	18980	16000	154	24885	18600	206	22586	16800
51	15799	15700	103	20597	16200	155	23537	23500	207	21007	16000
52	16128	16100	104	17635	15000	156	17710	17700	208	18641	13600
									209	22484	14200
								TOTAL S.F.=		3,864,883	3,227,100
								TOTAL A.C.=		88.72	74.08
								AVERAGE S.F.=		18,492	15,440

LOT AREA SUMMARY
NON-RESIDENTIAL

LOT. NO.	DESIGNATION	AREA (S.F.)
210	G.C. MAINT.	86,750
211	G.G. CLUBHOUSE	420,000
212	GOLF COURSE	1,000,500
213	GOLF COURSE	366,000
214	GOLF COURSE	1,862,000
215	GOLF COURSE	1,076,000
216	GOLF COURSE	522,800
217	GOLF COURSE	3,256,870
218	PRIVATE STREET	45,200
219	PRIVATE STREET	161,460
220	PRIVATE STREET	121,700
221	PRIVATE STREET	31,200
222	PRIVATE STREET	89,100
223	PRIVATE STREET	52,300
224	WATER TANK	26,500
225	OPEN SPACE	485,700
226	OPEN SPACE	277,400
227	OPEN SPACE	1,684,500
228	OPEN SPACE	4,700
229	OPEN SPACE	35,000
230	OPEN SPACE	854,100
231	OPEN SPACE	3,000
232	OPEN SPACE	895,200
233	OPEN SPACE	266,200
234	OPEN SPACE	4,500
235	OPEN SPACE	143,800
236	OPEN SPACE	2,730
237	PARK	23,800
238	PARK	116,800
239	PARK	21,000
240	ALT. G.C. MAINT.	65,750

LOTTING SUMMARY

DESIGNATION	LOT NO.	NO. OF LOTS	(S.F.)	(A.C.)
SINGLE FAMILY LOTS	1-209	209	3,864,880	88.7
GOLF MAINT. FACILITY	210	1	86,750	2.0
GOLF CLUBHOUSE	211	1	420,000	9.6
GOLF COURSE	212-217	6	8,084,170	185.6
PRIVATE STREETS	218-223	6	500,960	11.5
WATER TANK	224	1	26,500	0.6
OPEN SPACE	225-236	12	4,656,830	106.9
PARK	237-239	3	161,600	3.7
ALTERNATIVE GOLF MAINT.	240	1	65,750	1.5
PUBLIC STREETS			766,600	17.6
HASLEY CANYON ROAD			226,500	5.2
TOTAL	240	240	18,860,540	±433.0

LEGEND

- BOUNDARY
- ROAD RIGHT OF WAY
- CENTERLINE
- DAYLIGHT LINE
- SD — STORM DRAIN
- (1) GOLF HOLE
- LINE OF SIGHT EASEMENT PER L.A. PUBLIC WORKS SATISFACTION
- VEGETATIVE SWALES (PRIVATELY MAINTAINED)

LOT LEGEND

92' / 160' / (84) / PAD 1450 / 160' / 92'

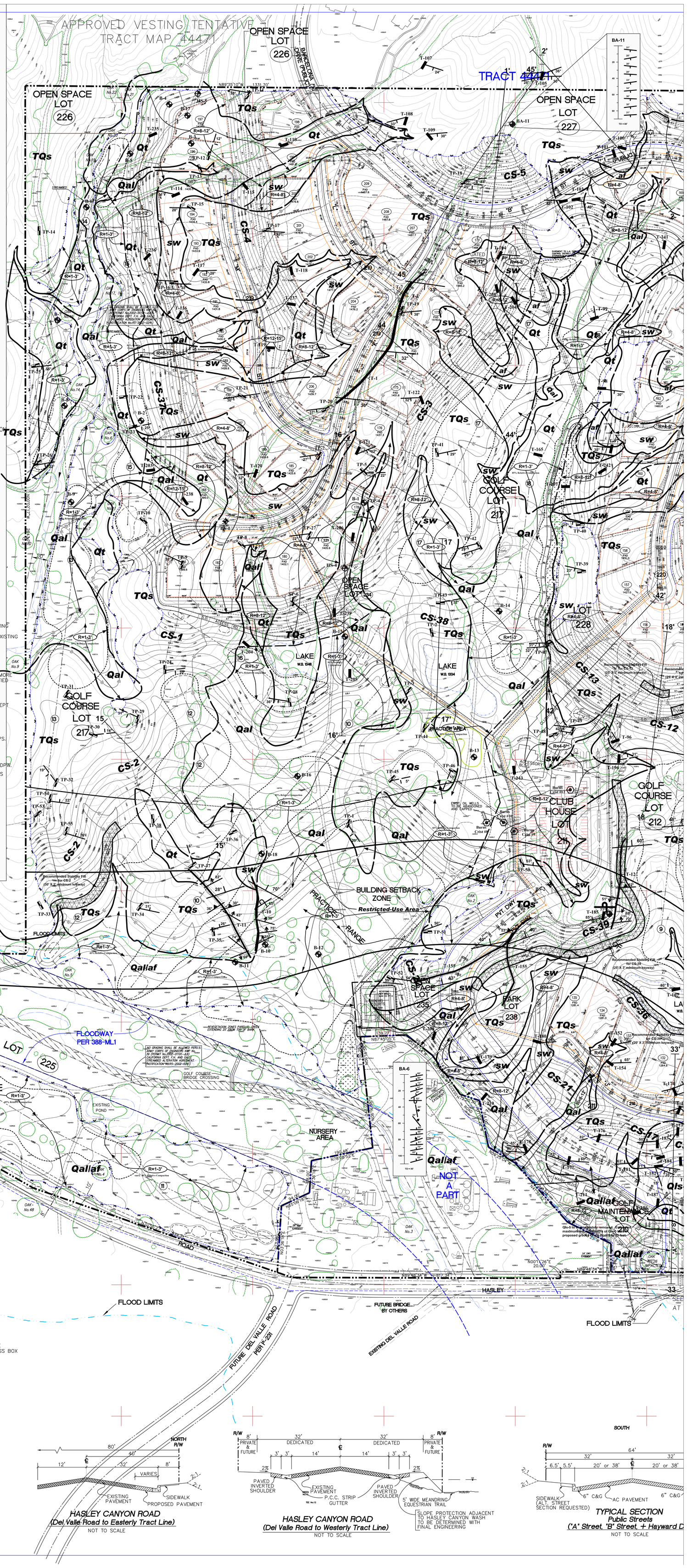
- LOT NUMBER
- LOT DIMENSION
- LOT LINE
- PAD ELEVATION
- RIGHT OF WAY

GENERAL NOTES:

1. AREA ..... ±428.58 ACRES
2. EXISTING ZONING A-2-2
3. PROPOSED ZONING A-2-2
4. EXISTING SITE USE ..... VACANT, ABANDONED GOLF COURSE SINGLE FAMILY HOUSE & OIL FACILITIES
5. DEVELOPMENT TYPE ..... GOLF COURSE AND RESIDENTIAL
6. TOTAL NUMBER OF SINGLE FAMILY LOTS 209
7. MINIMUM RESIDENTIAL LOT SIZE ..... 15,000 SQ. FT.
8. DEVELOPMENT IS LOCATED IN FIRE ZONE 4.
9. STREET, PRIVATE AND FUTURE STREET, PRIVATE DRIVEWAY AND FIRE LANE GRADES MIN. 0.5%, MAX. 12% ON HAYWARD DRIVE.
10. TOPOGRAPHY IS BASED ON CONTROLLED TOPO W/ CONTOUR INTERVALS 2 FEET.
11. PUBLIC STREETS "A" AND "B" ARE OFFERED FOR DEDICATION.
12. RESIDENTIAL STREETS "C" THROUGH "M" TO BE DESIGNATED AS "PRIVATE AND FUTURE STREETS". SUBDIVIDER RESERVES THE RIGHT TO CONSTRUCT GATES AND MEDIANS.
13. THE RIGHT IS RESERVED TO ADJUST STREET AND BUILDING PAD ELEVATIONS ON THE FINAL GRADING PLAN.
14. ALL SLOPES OVER 5 FEET IN HEIGHT ARE TO BE LANDSCAPED AND IRRIGATED WITH THE COUNTY APPROVED PLANTS AND GROUND COVER.
15. THE RIGHT IS RESERVED TO ADJUST LOT LINES AND MERGE LOTS ON THE FINAL MAP.
16. EXISTING AND PROPOSED COUNTYWIDE GENERAL PLAN ..... R
17. EXISTING SANTA CLARITA VALLEY AREAWIDE LOCAL PLAN ..... N2, HM
18. GROSS DENSITY ..... 0.5 DU/AC
19. OAK TREES EXISTING WITHIN PROJECT BOUNDARY ARE SUBJECT TO A LOS ANGELES COUNTY OAK TREE PERMIT.
20. BOUNDARY LINE DIMENSIONS ARE TAKEN FROM RECORD DATA LOT AREAS SHOWN IN TABLE HEREON ARE GROSS ACREAGE.
21. SUBDIVIDER REQUESTS ALTERNATE STREET SECTIONS PER SECTION 21.24.090 OF LOS ANGELES COUNTY SUBDIVISION CODE TITLE 21.
22. SUBDIVIDER RESERVES THE RIGHT TO FILE MULTIPLE FINAL MAPS PER SECTION 66456.1 OF THE STATE MAP ACT.
23. NUMBER AND TYPE OF LOTS PROPOSED:
    - 209 SINGLE FAMILY LOTS
    - 6 PRIVATE STREET LOT
    - 6 GOLF COURSE LOTS
    - 1 GOLF COURSE & ENTRY DRIVE LOT
    - 1 GOLF COURSE MAINTENANCE LOT
    - 12 OPEN SPACE LOTS
    - 3 PARK LOTS
    - 1 WATER TANK LOT
    - 1 ALT. GOLF MAINT. LOT
    - 240 TOTAL LOTS
24. TOTAL PARKING SPACES PROVIDED FOR GOLF COURSE AND CLUBHOUSE = 150
25. TOP & TOE OF SLOPES ARE SUBJECT TO CHANGE IN FINAL ENGINEERING.
26. A LANDSCAPE MAINTENANCE DISTRICT OR H.O.A. WILL BE ESTABLISHED FOR MAINTENANCE OF PRIVATE & FUTURE STREETS. OPEN SPACE SLOPES AND COMMON SLOPES OVER 5 FEET IN HEIGHT.
27. PERMISSION IS REQUESTED TO ABANDON ALL OF THE COUNTY EASEMENTS FOR DRAINAGE PURPOSES BY THE FINAL MAP PURSUANT TO SECTION 66499.20 OF THE STATE GOVERNMENT CODE (IF ANY).
28. TOTAL CUT: 7,100,000 C.Y. TOTAL FILL: 7,100,000 C.Y.
29. GRADE ELEVATIONS SHOWN IN THIS MAP AND ACCOMPANYING EXHIBIT 'A' ARE APPROXIMATE. THE ELEVATIONS MAY CHANGE BY 5 FEET. ELEVATION CHANGES MAY BE GREATER THAN 5 FEET BUT ONLY IF DETERMINED BY DPW AND DRP THAT THE REVISIONS ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION MAP APPROVAL.
30. ALIGNMENT AND GEOMETRICS OF STREETS ARE APPPROXIMATE. ADJUSTMENTS TO STREETS CAN BE MADE PROVIDED THE DEPARTMENT OF PUBLIC WORKS AND DRP DETERMINE THAT THE ADJUSTMENTS ARE CONSISTENT WITH THE INTENT OF THE SUBDIVISION APPROVAL.
31. BUILDING FOOTPRINTS THAT ARE SHOWN ON THE SUBDIVISION MAP OR ACCOMPANYING EXHIBIT MAP ARE ONLY FOR ILLUSTRATIVE PURPOSES. ACTUAL BUIDING LOCATIONS SHALL BE GRANTED PROVIDED THE PROPOSED BUILDING LOCATIONS SATISFY ALL EXISTING CODES AND ORDINANCES. THIS MINOR CHANGE DOES NOT, HOWEVER, INCLUDE THE CHANGE IN PROPOSED LAND USE OR RESIDENTIAL HOUSING PRODUCT.
32. LOT LINES CAN BE ADJUSTED PROVIDED NO ADDITIONAL LOTS ARE CREATED. THE DEGREE OF ADJUSTMENT SHALL BE CONSISTENT WITH THE INTENT OF THE SUBDIVISION MAP ACT.
33. PERMISSION IS REQUESTED TO FILE 'LARGE LOT" PARCEL MAPS OF 20 ACRES OR MORE (WITHOUT IMPROVEMENTS) OR 5 ACRES OR MORE (WITH IMPROVEMENTS) AS SPECIFIED IN THE COUNTY SUBDIVISION CODE.
34. THE RECORDATION OF A "LARGE LOT" PARCEL MAP SHALL NOT REQUIRE THE OBLIGATION OF FEES, DEDICATIONS (E.G., RIGHTS-OF-WAY OR PARKS), EXACTIONS, OR INFRASTRUCTURE AS MAY BE OTHERWISE REQUIRED FOR THE SUBDIVISION, EXCEPT AS MAY BE REQUIRED BY CHAPTER 21.32 OF THE SUBDIVISION CODE.
35. THE RECORDATION OF A "LARGE LOT" PARCEL MAP SHALL BE CONSIDERED THE FILING OF THE FIRST UNIT FOR THE PURPOSE OF TIME EXTENSIONS PURSUANT TO THE SUBDIVISION MAP ACT.
36. PERMISSION IS REQUESTED FOR UNIT PHASING AND FILING OF MULTIPLE FINAL MAPS.
37. PERMISSION IS REQUESTED TO COMBINE LOTS.
38. PERMISSION IS REQUESTED TO RECORD ADDITIONAL OPEN SPACE LOTS.
39. PERMISSION IS REQUESTED TO RECORD ADDITIONAL UTILITIES LOTS, PROVIDED MAINTENANCE EASEMENTS ARE GRANTED TO THE SATISFACTION OF THE DRP AND DPW.
40. PROPOSED STREET GRADING IS APPROXIMATE ONLY AND SUBJECT TO ADJUSTMENTS PENDING DETERMINATION OF FINAL DEVELOPMENT LAYOUT AND PLANS.
41. REQUEST PERMISSION TO MASS GRADE.
42. REFER TO PROJECT DRAINAGE CONCEPT FOR WATER QUALITY TREATMENT DESIGN

UTILITIES AND SERVICES

1. WATER ..... COUNTY WATER DISTRICT NO. 36
2. SEWER ..... LOS ANGELES SANITATION DISTRICT 32
3. GAS ..... SOUTHERN CALIFORNIA GAS COMPANY
4. ELECTRIC ..... SOUTHERN CALIFORNIA EDISON COMPANY
5. TELEPHONE ..... GENERAL TELEPHONE
6. CABLE TV ..... TBD
7. SCHOOL ..... CASTAIC SCHOOL DISTRICT & WILLIAM S. HART UNIFIED HIGH SCHOOL DISTRICT



LEGEND
SEE PLATE III

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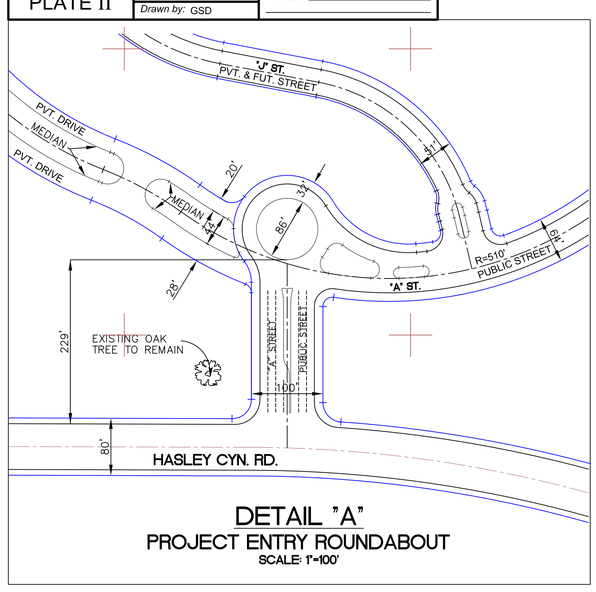
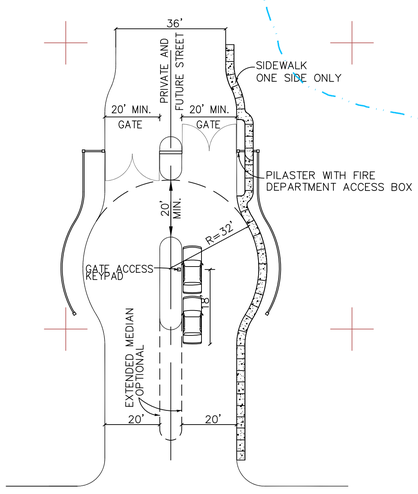
Geologic/Geotechnical Map

Date: 08/27/04	Job No.: 04-1617LV-1
Scale: 1" = 100'	CAD File: Plates I & II Geologic Map
PLATE II	Geology by: Staff / Drawn by: GSD / Revised:



DETAIL "A"
PROJECT ENTRY ROUNDABOUT
SCALE: 1"=100'



DETAIL 'B'
TYPICAL GATE ENTRY
Not to scale

HASLEY CANYON ROAD
(Del Valle Road to Easterly Tract Line)
NOT TO SCALE

HASLEY CANYON ROAD
(Del Valle Road to Westerly Tract Line)
NOT TO SCALE

TYPICAL SECTION
Public Streets
('A' Street, 'B' Street, + Hayward D
NOT TO SCALE

GEOLOGIC/GEOTECHNICAL MAP LEGEND

af	Artificial Fill
sw	Slopewash
Qal	Quaternary Alluvium
sf	Surficial Failure
Qls-8	Quaternary Landslide
Qt	Quaternary Terrace Deposits
TQs	Saugus Formation
	Geologic Contact; Dotted where concealed
	Trace of Anticline, showing direction of plunge; Dotted where concealed
	Trace of Syncline, showing direction of plunge; Dotted where concealed
70°	Average Strike and Dip of Bedding in Long Continuous Trenches
89°	Strike and Dip of Bedding
⊕	Horizontal Bedding in Qt Deposits
82°	Approximate Strike and Dip of Bedding
15°	Strike and Dip of Slide Plane
77°	Strike and Dip of Overturned Bedding
79°	Strike and Dip of Fault
46°	Strike and Dip of Shear
45 45'	Geologic Cross Section

RW-1	Approximate Location of Rotary Wash Boring
HA-1	Approximate Location of Exploratory Hand-Auger Boring
BA-11	Approximate Location of Exploratory Bucket-Auger Boring
B-18	Approximate Location of Exploratory Bucket-Auger Boring from AES Report dated 10/30/87
HS-5	Approximate Location of Exploratory Hollow-Stem-Auger Boring
BS-2	Approximate Location of Bulk Sample
Sadd #9	Approximate Location of Existing Oil/Gas Well
T-259	Approximate Location of Exploratory Trench
TP-55	Approximate Location of Test Pit from AES Report dated 10/30/87
ECS-3	Existing Cut Slope
CS-39	Cut Slope
R=12-15'	Estimated Removal Depth for Structural Fill
R=1-3' 85% Relative Compaction	Removal Depth in Golf Course Areas and Areas acceptable for 85% relative compaction
	Approximate Keyway Location for Stability Fill (20' x 3' min. keyway)
CUT FILL	Cut/Fill and daylight line shaded on Proposed Fill side
	Recommended Impact Wall

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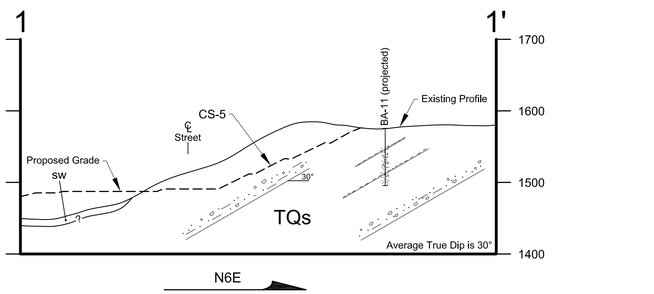
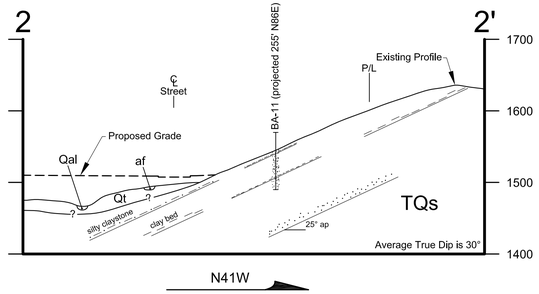
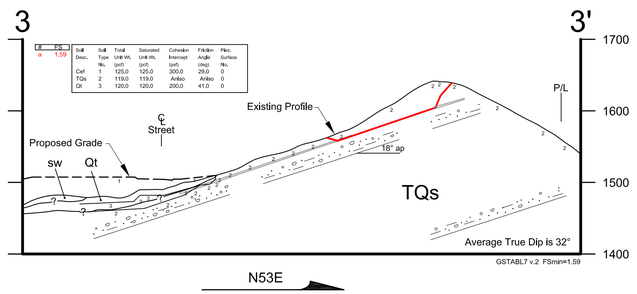
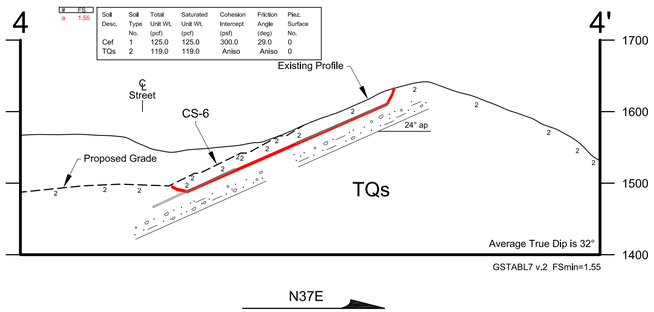
GEOLOGIC/GEOTECHNICAL MAP LEGEND

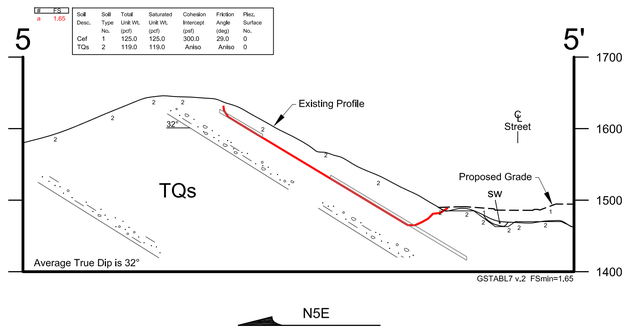
Date: 8/27/04		*Job No.:* 04-1617LV-1
Scale: N/A		*CAD File:* Plate III Legend
PLATE III	*Geology by:* Staff	*Revised:*
	Drawn by: GSD	

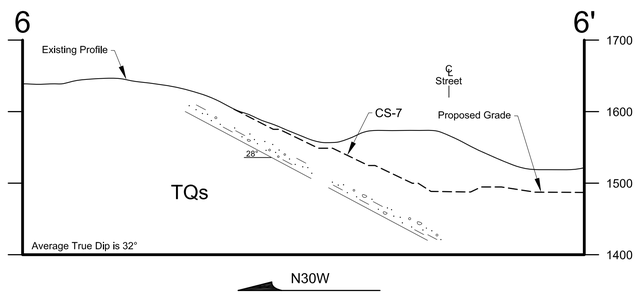


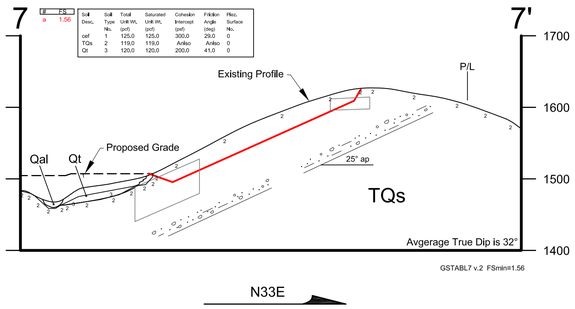


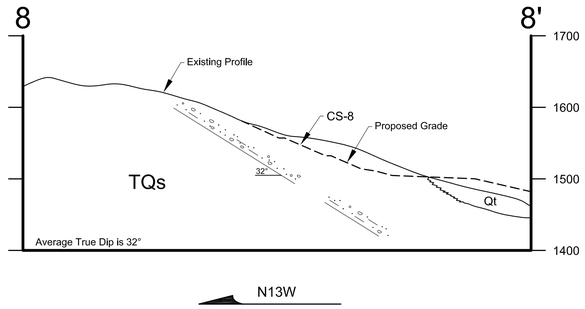


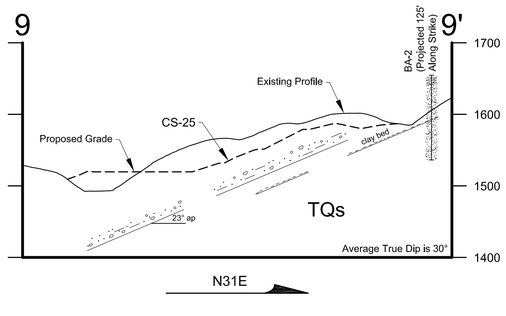


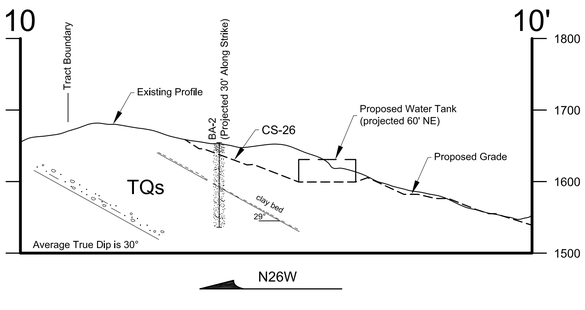


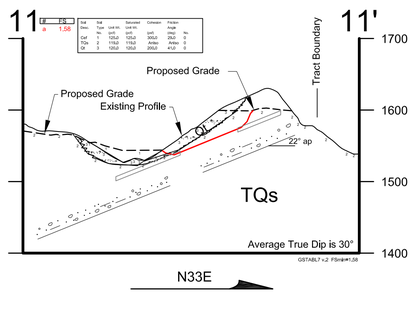


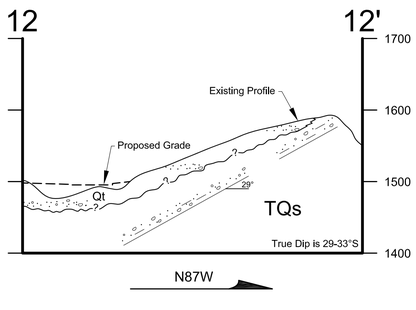












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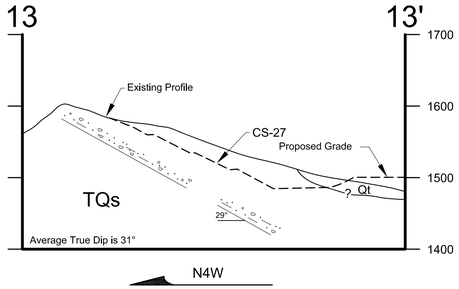
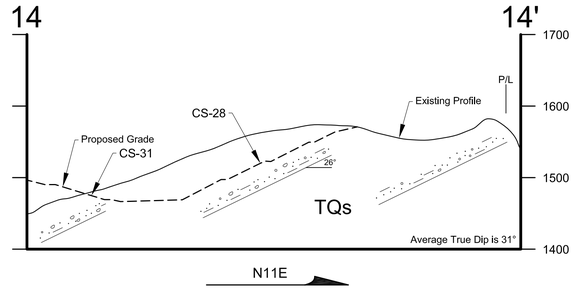
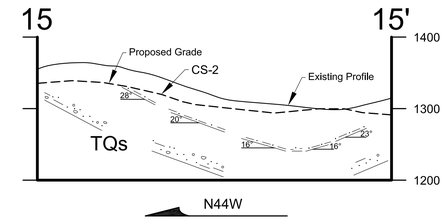
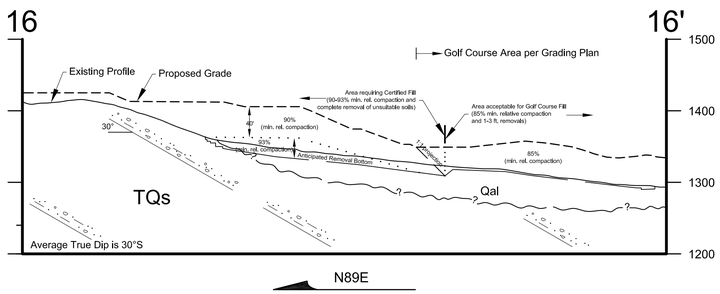
CROSS SECTIONS 1-12

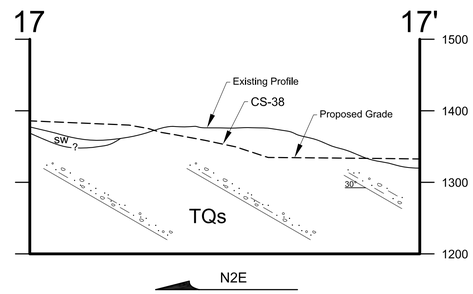
Date: 08-27-04	*Job No.:* 04-1617LV-4
Scale: 1" = 100' (Horizontal = Vertical)	*CAD File:* Plate IV Sections 1-12
PLATE IV	*Geology by:* Staff / *Drawn by:* GSD / *Revised:*

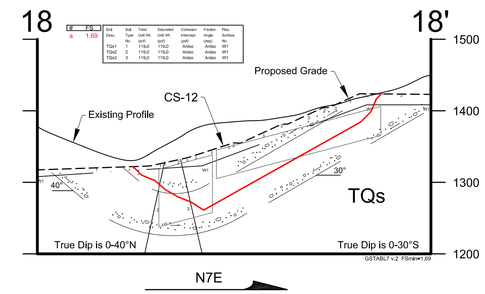


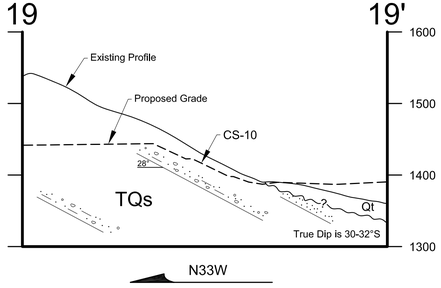


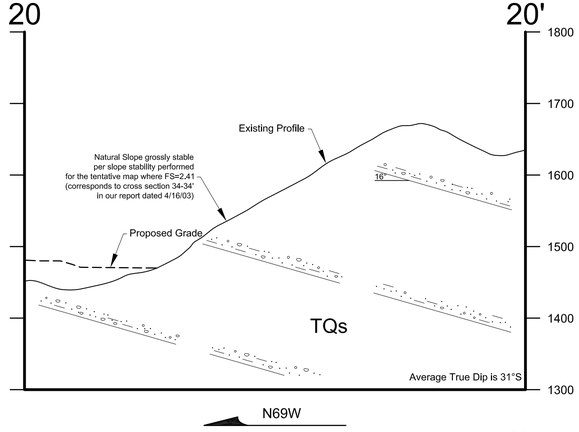


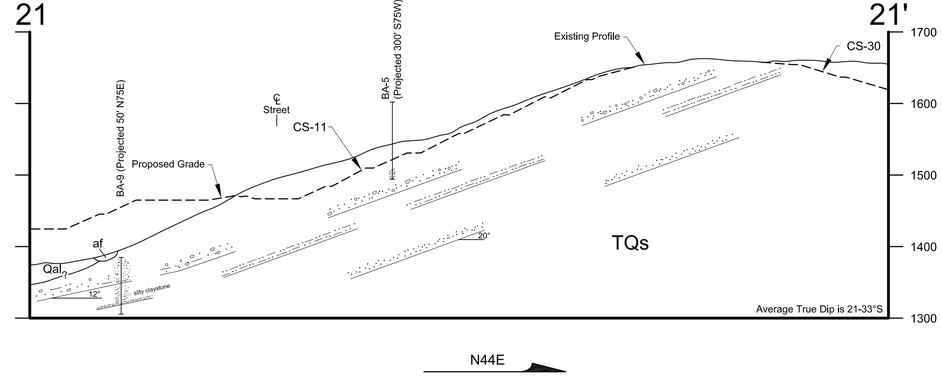


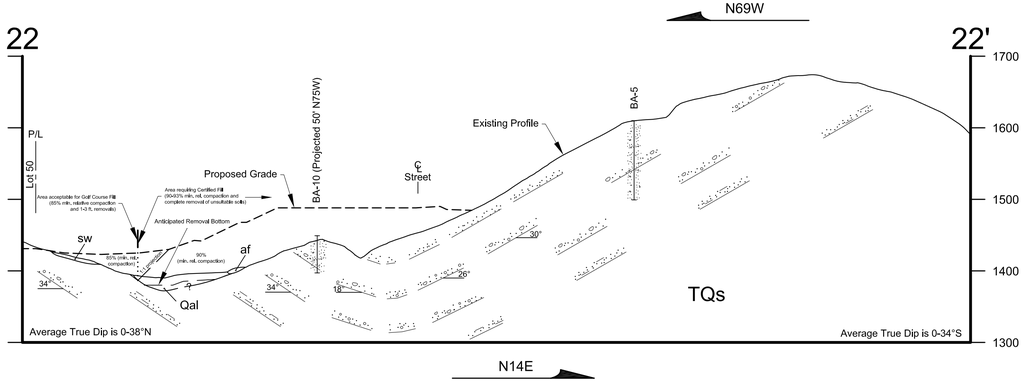


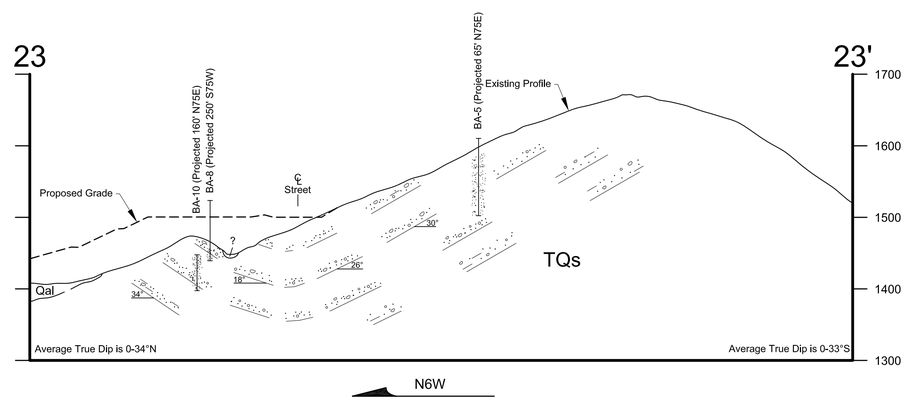












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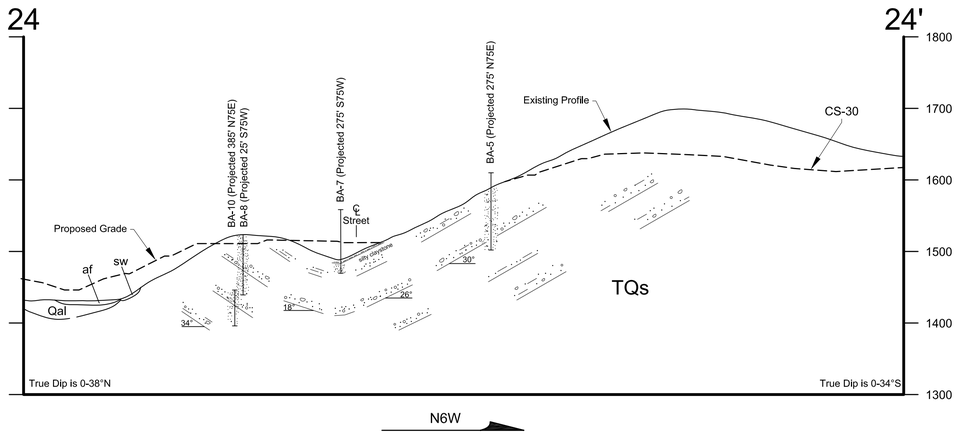
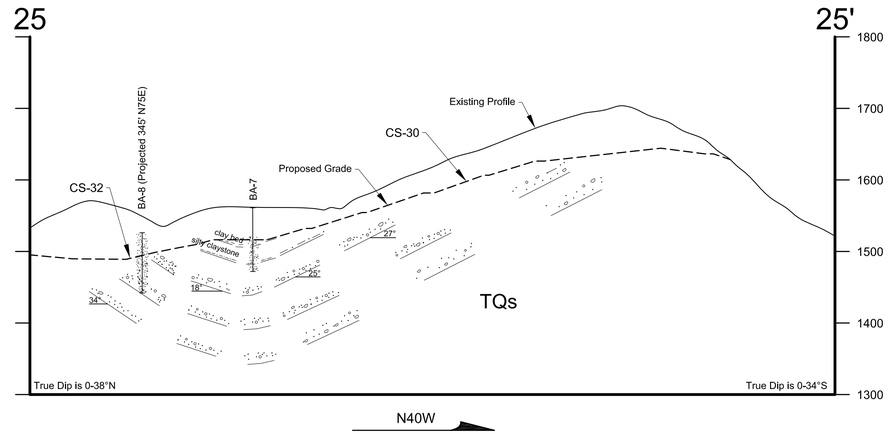
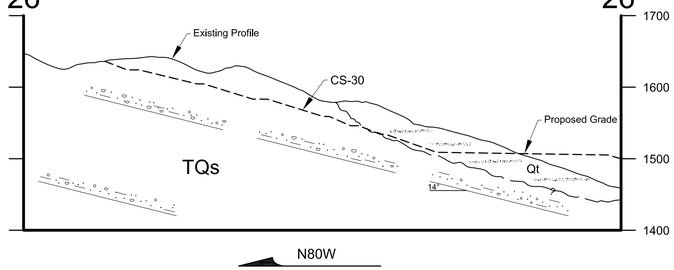
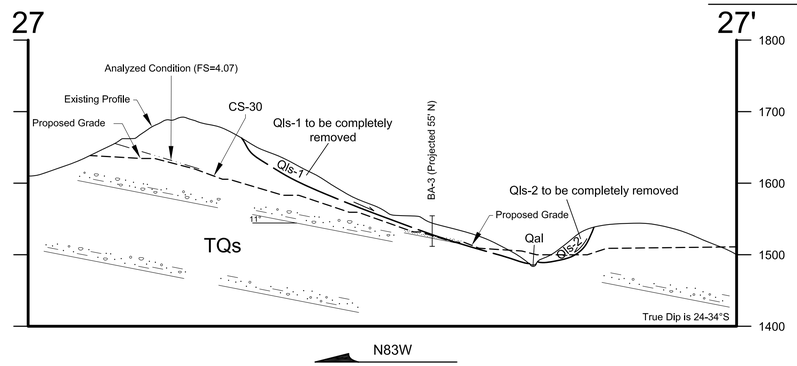
CROSS SECTIONS 13-23

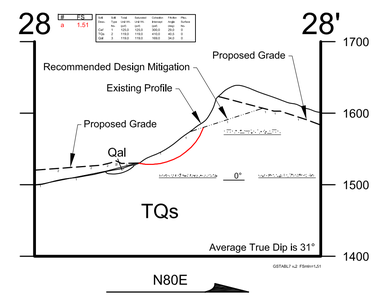
Date: 08-27-04	*Job No.:* 04-1617LV-4
Scale: 1" = 100' (Horizontal = Vertical)	*CAD File:* Plate V Sections 13-23
PLATE V	*Geology by:* Staff / *Drawn by:* GSD / *Revised:*

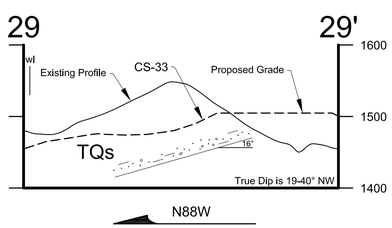


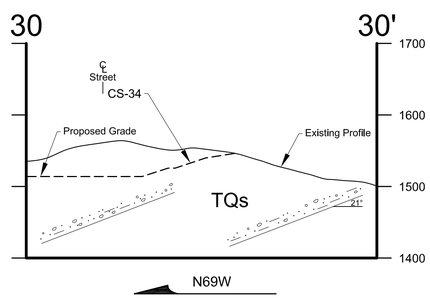


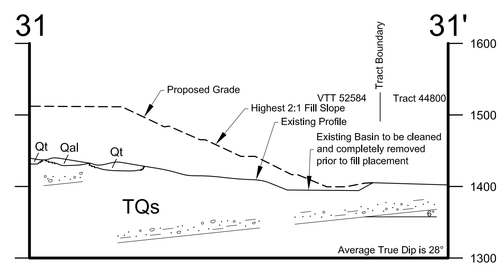


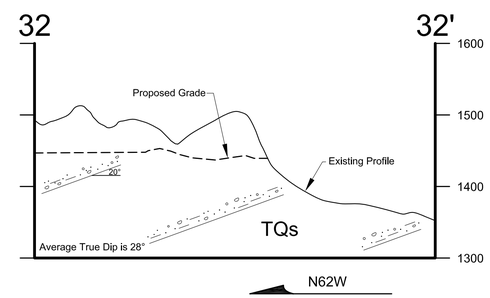


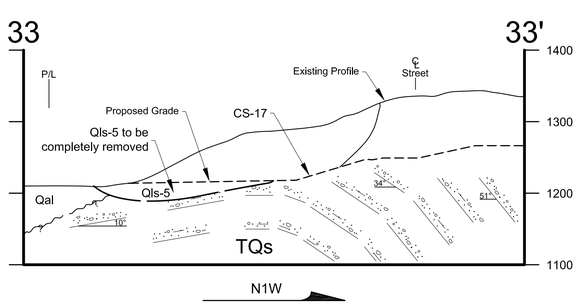


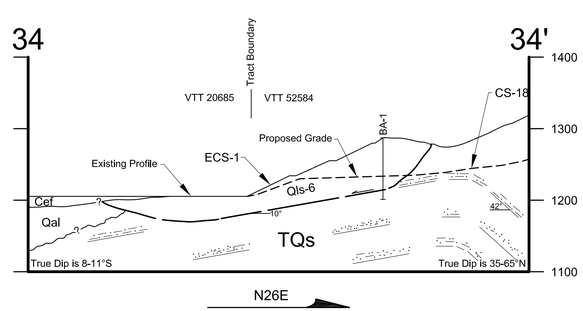


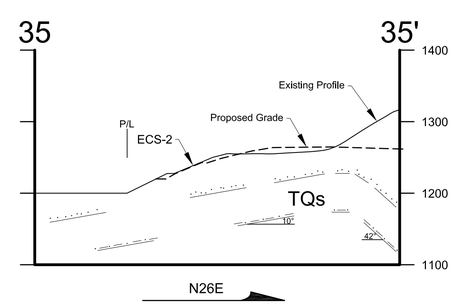












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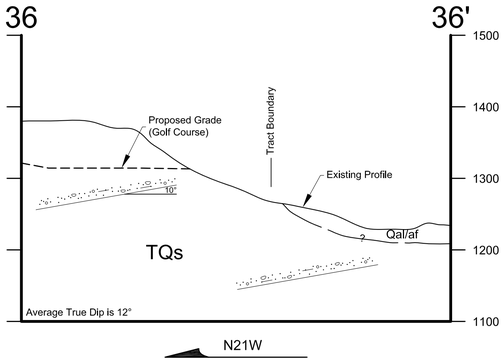
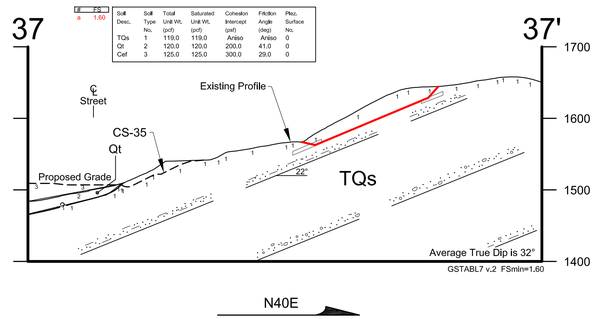
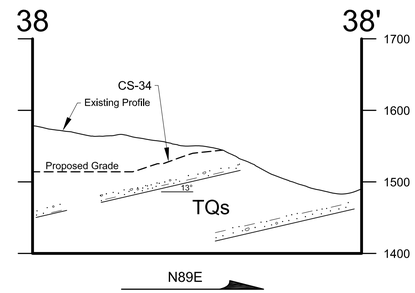
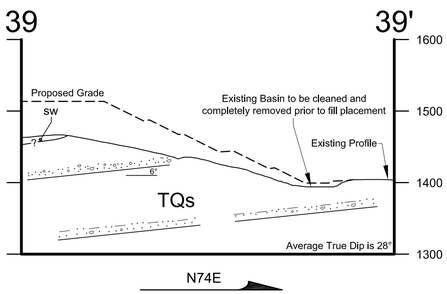
CROSS SECTIONS 24-35

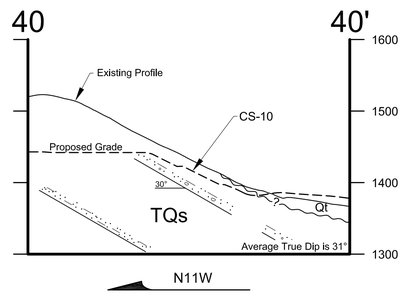
Date: 08-27-04	*Job No.:* 04-1617LV-4
Scale: 1" = 100' (Horizontal = Vertical)	*CAD File:* Plate VI Sections 24-35
PLATE VI	*Geology by:* Staff / *Drawn by:* GSD / *Revised:*

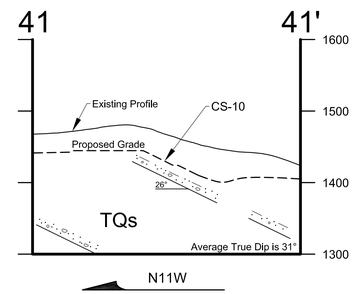


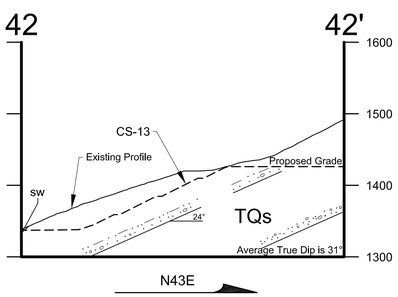


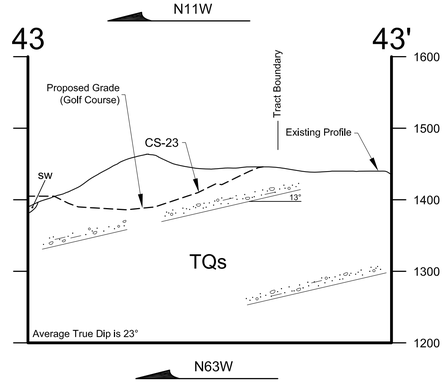


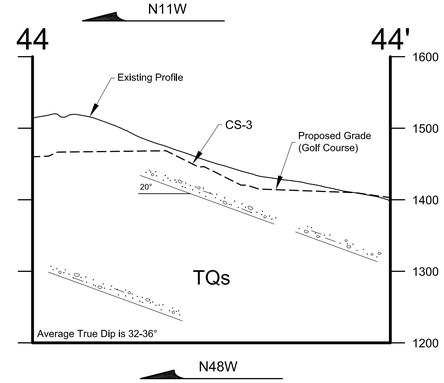


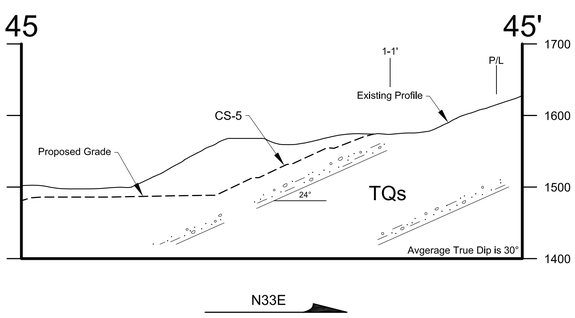












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CROSS SECTIONS 36-45

Date: 08-27-04	*Job No.:* 04-1617LV-4
Scale: 1" = 100' (Horizontal = Vertical)	*CAD File:* Plate VII Sections 36-45
PLATE VII	*Geology by:* Staff / *Drawn by:* GSD / *Revised:*