GEOTECHNICAL STUDY FOR THE PROPOSED SUNSET RIDGE PARK PROJECT FOR THE ENVIRONMENTAL IMPACT REPORT (EIR), SUPERIOR AVENUE AND PACIFIC COAST HIGHWAY, CITY OF NEWPORT BEACH, CALIFORNIA

Prepared for:

CITY OF NEWPORT BEACH

3300 Newport Boulevard
Newport Beach, California 92663

Project No. 602089-001

August 19, 2009

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A LEIGHTON GROUP COMPANY

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To: City of Newport Beach
3300 Newport Boulevard
Newport Beach, California 92663

Attention: Mr. Michael Sinacori, PE

Subject: Geotechnical Study for the Proposed Sunset Ridge Park Project for the Environmental Impact Report (EIR), Superior Avenue and Pacific Coast Highway, City of Newport Beach, California

Leighton Consulting, Inc. is pleased to submit this geotechnical study for the proposed Sunset Ridge Park project located north of Superior Avenue and Pacific Coast Highway in the city of Newport Beach, California. This report presents the results of our exploration and provides preliminary recommendations to support the Environmental Impact Report (EIR) and to aid in the planning and final design of the project. This report also incorporates the review comments on the Geotechnical Report Review Checklist, dated July 14, 2009, by The City of Newport Beach Building Department.

Our exploration showed that the site is underlain by marine terrace deposits over bedrock. The subsurface materials at the site were found to consist of medium dense to dense silty sand and stiff to very stiff clay. Groundwater was encountered within two of our borings during our exploration. Seepage was noted within all borings along a sand and clay layer interface. The seepage was very likely generated from surface runoffs within the site and from the residential developments north of the site.

It is our understanding that access to the site will be via a road to be constructed starting from Pacific Coast Highway trending north and east through the Banning Ranch property west of the site. We performed a site reconnaissance of the proposed entry road alignment as part of this study. A subsurface exploration was not performed as it is not within the current scope of work.

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Based on our observation of the exposed surficial soils, the materials in this area are expected to be similar to those encountered within the proposed Sunset Ridge Park. A geotechnical exploration should be performed to confirm the geologic conditions of the proposed entry road when the final grading plans are made available.

Based upon the results of this study, the proposed project is considered feasible from a geotechnical standpoint. Specific recommendations for site grading, foundation design and other geotechnical aspects of the project are presented in this report. We recommend that a final design level geotechnical exploration be performed after the final grading plans are made available.

We appreciate the opportunity to be of service to you on this project. Please call the undersigned if you have any questions or if we can be of further assistance.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

List of Illustrations

Appendices

1.0 INTRODUCTION

1.1 Site Description

The project site is located north of the intersection of Superior Avenue and Pacific Coast Highway (PCH) east of the Banning Ranch property in the city of Newport Beach, California, as shown on Figure 1. The proposed park encompasses an area of approximately 12 acres. The site consists of a "lower pad" and an "upper pad" that occupy the site at a proportion of approximately 2/3 and 1/3, respectively, as shown on Figure 2. The "lower pad" has an elevation ranging from 40 to 45 feet above mean sea level (msl), which is approximately 25 to 30 feet above PCH. The "upper pad", at an elevation of approximately 70 to 75 feet msl, is approximately 30 feet above the "lower pad". Slopes at the site generally have a gradient of 1.5H:1V (horizontal to vertical) or flatter. Based on our review of a publication by the Association of Engineering Geologists (AEG, 1989), the site was once used as a borrow area for nearby road construction and was heavily graded. Vegetation growth was observed on the slope at the southeastern portion of the site adjacent to Superior Avenue and PCH. During our site visit, we noted that drains near the toe of the slope along Superior Avenue and PCH were installed coming out of the slope face. A V-ditch is present along the toe of the slopes in which seepage from the drains was collected. Signs of seepage were also noted on the slope face.

The portion of the Banning Ranch property where the proposed access road is located consists of relatively "undeveloped" terrain with features resulting from oil field related grading activities, such as access roads and drill pads. Slopes in this area range from near vertical (along access roads) or flatter. Vegetation, consisting of grasses, shrubs and small trees, is scattered across the site.

1.2 Project Description

The proposed Sunset Ridge Park will be designated as an open space active park in the City's General Plan. Based on the conceptual plan, the park may consist of sports fields, tot lots, skate parks, natural and passive park areas, restroom buildings, and parking lots. Grading and drainage improvements will be included as part of this project. A final grading plan is not available at this time; however, we understand from the project team that the slopes along PCH and Superior Avenue and the slope between the "upper" and "lower" pads are planned to be graded to a gradient of 2H:1V or flatter. An access road is also planned. It is our understanding that the access road will start from PCH, trending

north, east, and then southeast through the Banning Ranch property and entering the park along its western boundary (see Figure 2). Design cuts ranging from 12 to 30 feet and fills ranging from 12 to 19 feet are planned for the road and associated grading.

1.3 Scope of Work

The purpose of our geotechnical study was to explore the subsurface conditions at the site and to provide preliminary geotechnical recommendations for use in the EIR study and to aid in the planning and final design of the project. This exploration was performed based on the conceptual site plan prepared by Urban Resource and our site reconnaissance. This report also incorporates comments by the City of Newport Beach Building Department. The review sheet is attached in Appendix F.

Our scope of work consisted of the following tasks:

- Review readily available, geotechnical and geological literature pertinent to the site.
- Review "Earthworks Exhibit Entry Option EIR-1 and EIR-2" prepared by Urban Resource, dated April 24, 2009.
- Perform subsurface exploration to collect soil samples for testing.
- Conduct laboratory testing of soil samples obtained from the site.
- Conduct engineering analyses based on the collected data and results of laboratory testing.
- Perform site reconnaissance along the future access road.
- Prepare this report to present our findings, conclusion and recommendations.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Prior to the field exploration, we coordinated with the City staff and performed a site reconnaissance. Underground Service Alert (USA) was notified to locate and mark existing underground utilities.

Our field exploration was performed on December 13, 2007. The exploration consisted of excavating, logging and sampling eleven (11) hollow-stem auger borings (B-1 through B-11) at the site. The borings were drilled using a limited access drill rig and a truck-mounted CME-75 drill rig to depths ranging from 16.5 to 61.5 feet below the existing ground surface. The borings were logged by a member of our technical staff. Relatively undisturbed soil samples were obtained from the hollow-stem auger borings at selected intervals using a California Ring sampler. Standard Penetration Tests (SPT) were also conducted at selected intervals within the borings. Bulk samples of representative soil types were also collected.

Logs of the hollow-stem borings are presented in Appendix A. The boring locations are shown on Figure 2, Boring Location Map.

2.2 Laboratory Testing

Laboratory tests were performed on selected soil samples obtained during our field investigation. The laboratory testing program was designed to evaluate the physical and engineering characteristics of the onsite soil. Tests performed during this investigation include:

- In situ moisture content and dry density;
- Grain size analysis;
- Atterberg Limits;
- Direct shear;
- R-Value;
- Water-soluble sulfate concentration; and
- Resistivity, chloride content, and pH.

The results of the in-situ moisture and density tests are shown on the boring logs in Appendix A. Results of other laboratory tests are presented in Appendix B.

3.0 GEOLOGIC AND SUBSURFACE CONDITIONS

3.1 Geologic Setting

The project site is located within the Newport Mesa area. The Mesa is characterized by nearly horizontal alluvial and terrace deposits (ancient near shore marine and terrestrial deposits), which are underlain by sediments of the Quaternary-aged San Pedro Formation and the Tertiary-aged Monterey Formation.

The Newport-Inglewood fault zone forms an important element of the regional geologic structure. This fault zone results in the broad up-arching and disruption of the subsurface formations, extending as a southeast trending band from south-central Los Angeles Basin through Signal Hill in the Long Beach area, to the Huntington Beach and Newport-Costa Mesa area, then trends offshore.

The site is within the Newport-Inglewood Zone of deformation. The North Branch Splay fault, which is part of the Newport-Inglewood zone of deformation, is inferred to underlie the subject site. Based on work by others (AEG, 1989), the North Branch Splay fault is not active according to the criteria by the State of California for Alquist-Priolo (AP) Special Studies Zones for evaluating surface faulting potential. As such, the site is not located within an AP Earthquake Fault Zone.

3.2 Subsurface Soil Conditions

Based on the results of our exploration, the site is underlain by marine terrace deposits over bedrock. The elevated upper pad was found to be comprised of sandy clay, clay and silty sand. A layer of silty sand was encountered within the upper 10 to 15 feet on the lower pad. This silty sand layer was found to be relatively continuous along the same elevation across the site. Underneath this silty sand layer is a continuous layer of sandy clay and clay, which is underlain by claystone as encountered in Boring B-2. Cross-sections across the site were presented on Figures 3, 4 and 5.

The consistency of the soils at the site was medium dense for granular soils and medium stiff to stiff for cohesive soils. Detail descriptions of the soils are included on the Boring Logs in Appendix A.

3.3 Groundwater Condition

Groundwater was encountered in two of the borings during our field exploration. The groundwater level was found to be between Elevation 0 and -10 feet msl during drilling. Seepage was encountered in all borings during the exploration. Seepage was observed along the sand and clay interface at approximately 5 to 15 feet below the current ground surface on the lower pad as shown on Figures 2, 3, 4, and 5. Seepage was also observed coming out from the drains near the toe of slope along Superior Avenue and PCH as well as on the slope itself. Based on the seepage profile obtained during our exploration, possible sources of seepage may include the residential developments north of the site and site specific surface infiltrations from precipitation. The direction of seepage flow is generally from north to south.

Based on the report prepared by the California Department of Mines and Geology (CDMG, 1997, Revised 2001), the historically high groundwater depth in the vicinity of the site was on the order of 30 feet below ground surface.

Based on the current conceptual plan, groundwater is not expected to be encountered during construction. However, there is a high possibility that seepage or perched water may be encountered during construction. The water level is also expected to fluctuate seasonally.

4.0 SEISMIC AND GEOLOGIC HAZARDS

4.1 Faulting

Based on our review of available literature, no known active or potentially active faults traverse the site, and the site is not located within an Alquist-Priolo Earthquake Fault Zone. As such, the potential for fault rupture at the site is considered low.

The closest fault to the site is the Newport Inglewood (LA Basin) which is less than ½ mile from the site. The San Andreas Fault is the largest fault in the region and is located approximately 52 miles (84 km) from the site. Both active and potentially active faults found within a 62-mile (100 km) radius search from the project site are listed in Appendix C.

4.2 Earthquake Ground Motion

Seismic hazards that could affect the site include ground shaking resulting from an earthquake occurring along one of several major active faults in the region. The magnitude of ground shaking is generally characterized by using the Peak Horizontal Ground Acceleration (PHGA). To take into consideration the impact of regional faults, a probabilistic seismic hazard analysis was performed using the computer program FRISKSP (Blake, 2000) to estimate the PHGA that could occur at the site. Three attenuation relationships (Abrahamson et al., 1997, Bozorgnia et al., 1999, and Sadigh et al., 1997) were used in the analysis. The results of the analyses suggest that the PHGA with a 2 percent probability of exceedance in 50 years is approximately 0.71g (recurrence interval of 2,500 years). This level of ground motion is considered the Maximum Considered Earthquake (MCE) per 2007 California Building Code (CBC). Results of the analyses are included in Appendix C.

4.3 Liquefaction and Lateral Spreading

Liquefaction is the loss of soil strength or stiffness due to a build up of pore-water pressure during severe ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine- to medium-grained, cohesionless soils. Effects of severe liquefaction can include sand boils, excessive settlement, bearing capacity failures, and lateral spreading.

A review of the Seismic Hazard Zone Map for the Newport Beach Quadrangle indicates that the site is not in an area potentially susceptible to liquefaction (CDMG, 1998). The materials at the site consist of medium dense to dense soils and bedrock. Due to the consistency of the onsite soils, the potential of the site being susceptible to liquefaction is considered low.

Liquefaction may also cause lateral spreading. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along a gently sloping surface toward an unconfined area. Since the potential of liquefaction at the site is low, the potential for lateral spreading to occur at the site is also considered low.

4.4 Landslides

The northeastern portion of the project site is within an area mapped as potentially susceptible to seismically-induced landslides (CDMG, 1998). However, the topography of the site has changed as the site was once used as a borrow site for nearby road construction and was heavily graded (AEG, 1989). The current topography of the site is relatively flat. Slope stability analyses of the existing slopes at the site show the slopes under the current grade cut (1.5:1 horizontal to vertical) have a factor of safety of 1.5 or higher under static conditions. We have also performed slope stability analyses of the existing slopes under seismic conditions. The results show the slopes exhibit a factor of safety greater than 1.0, but in some cases less than 1.2. As the slopes are expected to be graded to a flatter gradient (2:1) in the final design, the factor of safety is anticipated to be higher than those obtained with the current gradients. Slope stability analyses should be performed when the final slope configuration is available. Results of the slope stability analyses are included in Appendix D. Direct shear test results that correspond to the material strengths used in the analyses are also summarized in Appendix D.

A portion of the Banning Ranch property in the area of the proposed access road has also been mapped as potentially susceptible to seismically induced landslides. However, it appears that proposed grading will remediate these areas as they relate to the proposed development. Further study and exploration should be performed when grading plan is available for this area.

4.5 Earthquake Induced Flooding

Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of an earthquake. Due to the absence of such structures near the site, the potential for earthquake-induced flooding at the site is considered low.

4.6 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Based on the lack of nearby enclosed water bodies, the potential of seiches at the site is considered low.

Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the location and distance between the site and the Pacific Ocean, tsunami risk at the site is considered moderate.

5.0 FINDINGS AND CONCLUSIONS

Presented below is a summary of findings based upon the results of our evaluation of the site:

- The park site is covered with native soils over bedrock. The consistencies of the native soils were medium dense to dense in granular soils and stiff to very stiff in cohesive soils. The bedrock consists of hard claystone.
- Groundwater was encountered within two borings. However, seepage and perched water was encountered in all the borings between the sand and clay interface at approximately 5 to 15 feet below the current ground surface at the lower pad.
- Based on our visual observation during the site reconnaissance, the exposed surficial soils along the proposed access road appear to consist of similar materials within the proposed Sunset Ridge Park.
- The site is not located within an area shown as potentially susceptible to liquefaction on the California Seismic Hazard Zones Map for the Newport Beach Quadrangle.
- Our slope stability analyses show that the existing 1.5:1 slopes within the property exhibit a factor of safety of 1.5 or higher under static conditions and 1.0 or higher under seismic conditions.
- Based on the laboratory testing, the onsite near surface soils are expected to have a low expansion potential.
- Concrete in contact with the near surface onsite soil is expected to have negligible exposure to water-soluble sulfates and low exposure to chloride in the soil. The onsite soil, however, is considered severely corrosive to ferrous metal.
- The subsurface soils are anticipated to be readily excavated using conventional earthmoving equipment in good working condition.

Based upon the results of our preliminary geotechnical evaluation of the site, the proposed project is considered feasible from a geotechnical standpoint. The proposed construction is not anticipated to have adverse impact to adjoining properties.

6.0 RECOMMENDATIONS

The following preliminary recommendations have been developed based on the exhibited engineering properties of the onsite soils and their anticipated behavior both during and after construction. The geotechnical engineer should review the final grading plan, foundation plans, and specifications when they are available to verify that the recommendations presented in this report have been properly interpreted and incorporated. We recommend that a final design level geotechnical exploration be performed after the final grading plans are made available.

6.1 Seismic Design Considerations

This site is not located within a designated Alquist-Priolo Earthquake Fault Zone. However, strong ground shaking due to seismic activity is anticipated at the site. The following values may be used for the seismic design based on 2007 CBC. These parameters should be considered as the minimum for the seismic analysis. Additional seismic analyses may be necessary based on structural requirements.

CBC 2007 Seismic Design Parameters	
Soil Site Class	D
Mapped Acceleration for Short (0.2 Second) Period, S_s	1.829
Mapped Acceleration for 1 Second Period, S_1	0.687
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.5
Spectral Response Acceleration for Short Period, S_{MS}	1.829
Spectral Response Acceleration for 1 Second Period, S_{M1}	1.030
Design Spectral Response Acceleration for Short Period, S_{DS}	1.220
Design Spectral Response Acceleration for 1 Second Period, S_{D1}	0.687

6.2 Site Grading

The recommendations for earthwork and site preparation are based upon the assumptions that minor grading will be required to achieve planned grades.

Site Preparation - Prior to construction, the site should be cleared of vegetation, trash, and debris, which should be disposed of offsite. Unsuitable materials at the site should be completely removed. Efforts should be made to locate any existing or abandoned utility lines in the area. Existing utility conduits should be removed or rerouted if they

interfere with the proposed construction, and the resulting cavities should be properly backfilled and compacted.

Overexcavation and Recompaction – For building areas, such as restrooms, we recommend that any fill or loose materials be removed and replaced with engineered fill. Buildings or structures should be supported on either 18 inches of compacted fill or competent native soils. The lateral extent of the overexcavation should be a minimum of 3 feet beyond the footprint of any buildings, wherever possible.

Areas that are planned for incidental structures or other improvements, such as shade structures, free-standing walls, parking lots, access roads or concrete flatwork and areas to receive fill, if any, should be founded on competent native soils or underlain by a minimum of 18 inches of compacted fill below the proposed finish subgrade. The removal should extend laterally at least 3 feet from the proposed improvements, where possible.

The actual depth and extent of overexcavation should be evaluated at the time of construction by a representative of the geotechnical consultant.

Subgrade Preparation – Prior to placement of fill or other improvements, the exposed subgrade soil surfaces, including all excavation or removal bottoms, should be observed by the geotechnical consultant to verify that suitable competent soil is exposed. Subgrade surfaces suitable for fill placement or other improvements should be scarified to a depth of 8 inches, moisture-conditioned to 2 to 3 percent above optimum-moisture content and compacted to minimum 90 percent maximum dry density in accordance to ASTM Test Method D1557.

General Fill Placement and Compaction – The onsite soil, free of organic material, debris, cobbles, boulders, or rock 6 inches or larger, is suitable to be used as general fill. Any import soil should be evaluated and tested by the geotechnical consultant before delivery to the site. In general, import fill material should be low in expansion potential, non-organic and free of debris or other deleterious materials. All fill soil should be placed in thin, loose lifts less than 8 inches thick, moisture-conditioned as necessary to approximately 2 to 3 percent above optimum moisture content, and compacted using appropriate equipment to the minimum standard as noted below:

- Fill soil should be moisture-conditioned and recompacted to a minimum of 90 percent relative compaction as determined by ASTM Test Method D1557.

- Aggregate base should be compacted to a minimum of 95 percent relative compaction.
- Utility trench backfill is discussed in Section 6.8 and 6.9.

6.3 Slope Stability

The existing gradient of the slopes at the site is approximately 1.5H:1V or flatter. We understand from the project team that the slopes along Superior Avenue, PCH and between the "upper" and the "lower pads" will be graded to 2H:1V or flatter. We have performed slope stability analyses to evaluate the existing conditions of the slopes. Based on the results of our analysis, the slopes exhibit a factor of safety of 1.5 or higher under static conditions and 1.0 or higher under seismic conditions. Therefore, we are of the opinion that the current condition of the slopes is stable under static conditions and grading of the slopes to a flatter gradient will improve the factor of safety under seismic conditions. Therefore, flatter the slope is feasible and can be performed without posing a slope stability hazard at the site. Additional slope stability analyses should be performed when the final grading plan is made available.

We understand that the access road to the site will be constructed starting from PCH trending north and east through the Banning Ranch property to the future park entrance. Grading for construction of the access road is anticipated to consist of design cuts ranging from 12 to 30 feet and fills ranging from 12 to 19 feet. A subsurface exploration was not done for this area as part of this study. However, we performed a site reconnissance of the proposed entry road alignment. Based on our observation of the exposed surficial soils, the materials in this area are expected to be similar to those encountered within the proposed Sunset Ridge Park. As such, we anticipate that the proposed cut slopes which are designed at a gradient of 2H:1V or flatter will likely be feasible. A geotechnical exploration and slope stability analyses should be performed to confirm the geologic conditions along the proposed access road when the final grading plans are made available. Structures should have setback distance that complies with Section 1805.3 in the latest California Building Code (CBC).

We have also performed surficial slope stability analysis (see Appendix D). Surficial slope stability can be maintained by using soils that have at least a friction of 30 degrees and cohesion of 200 psf within the outer 5 feet of the slope face. Soils with other strength parameters should be evaluated by the soils engineer. Cut slopes that expose granular soils should be protected with a fill blanket constructed of the soils with the shear strength parameters mentioned above.

6.4 Conventional Shallow Foundations

Buildings that are proposed at the site may be supported on a shallow foundation system. The foundation may be designed using an allowable bearing capacity of 2,000 pounds per square foot (psf) for isolated square footings and continuous footings founded on competent native soils. The footings should have minimum widths of 2 feet and 1.5 feet for isolated square pad and continuous strip footings, respectively, with an embedded depth of at least 18 inches below the lowest adjacent grade. The soil bearing pressure may be increased by one-third for transient loads such as wind and seismic forces.

The static settlement of footings is estimated to be on the order of ½ inch or less. Differential settlement may be taken half of the total settlement over a horizontal distance of 30 feet. Since settlement is a function of footing size and contact bearing pressure, differential settlement should be expected between adjacent columns or walls where a large differential loading condition exists. The settlement estimates should be reviewed by Leighton Consulting when final grading plan, foundation plans and loads for the proposed structures become available.

Resistance to lateral loads will be provided by a combination of friction between the soil and foundation interface and passive pressure acting against the vertical portion of the footings. For calculating lateral resistance, a passive pressure of 300 psf per foot of depth to a maximum of 3,000 psf and a frictional coefficient of 0.30 may be used provided the foundations are supported within competent native soils or structural compacted fill as previously described. When combining frictional and passive resistance, the passive resistance should be reduced by one-third. No safety factor has been incorporated in the recommended values for frictional and passive resistance.

The above lateral resistance can also be used to design backstops at ball fields by using the "pole equation" in Section 1805.7 of the 2007 CBC.

6.5 Slab-on-Grade

Building Floor Slabs: Upon completion of the recommended building pad preparation, the at-grade floor slabs of the proposed structures may be designed and constructed as a slab-on-grade. The structural engineer should design the slab and determine the required thickness and reinforcement based on structural load requirements. The location and the finish grade of the proposed on-site structures are not known at this time. The building slabs should be designed in accordance with Section 1805.8.2 of the 2007 CBC. Additional subsurface exploration will be performed to determine the Expansion Index of

the soil when the final grading plan is available. The floor slab should be supported by competent native soils or a minimum of 18 inches of compacted fill.

In areas where moisture-sensitive floor coverings are planned, a vapor barrier is recommended. The vapor barrier should be at least a 10-mil Visqueen sandwiched between two 2-inch thick layers of clean medium-grained sand. It should be noted that the vapor barrier will retard but not eliminate moisture vapor migration through the slab. "Breathable" floor coverings or special slab sealants should be considered if the vapor migration rates are high. Floor covering manufacturers should be consulted for specific recommendations.

Concrete Flatwork: Subgrade preparation for concrete flatwork should be performed as described in this report for incidental structures. The exposed subgrade should be scarified to a depth of at least 8 inches, moisture-conditioned to approximately 2 to 3 percentage points above optimum moisture, and compacted to 90 percent of the ASTM Test Method D1557 laboratory maximum density prior to concrete placement.

Cracking of concrete is normal as it cures due to drying and shrinkage, and should be expected. However, cracking is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low slump concrete can reduce the potential for shrinkage cracking. To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or weakened plane joints at frequent intervals.

Concrete placement during hot weather should be minimized due to the potential for slab curling. Slabs should be designed and constructed as promulgated by the Portland Cement Association.

If utility trenches are planned around some of the proposed improvements, they should be placed outside an 1H:1V (horizontal to vertical) influence zone measure from the bottom of the foundation on the outer edge.

6.6 Earth Retaining Structures

Backfill for the retaining structures should be granular, very low expansive soil and be constructed with a backdrain in accordance with the recommendations provided on Figure 6. The backdrain should be sloped at a minimum of 1 percent towards an

approved non-erosive outlet. The following parameters may be used for the design of conventional retaining structures:

Condition	Equivalent Fluid Unit Weight for Granular Backfill (psf/ft)
Active	38 (Level Backfill) 58 (2H:1V Backfill)
At-Rest	58 (Level Backfill) 88 (2H:1V Backfill)
Seismic*	18 (Level Backfill) 55 (2H:1V Backfill)
Passive	300 with a maximum of 3,000 psf
Coefficient of Friction	0.30

* Inverted triangular distribution

Unrestrained walls that are free to rotate or deflect may be designed using the active earth pressure. For restrained walls that are fixed against rotation, the at-rest condition should be used. The lateral passive resistance should be taken into account only if it is ensured that the soil providing passive resistance, embedded against the foundation elements, will remain intact with time. We also recommend using the at-rest pressure for design of walls supporting settlement-sensitive structures, such as adjacent buildings, if any. The above-recommended lateral pressures are based on a soil total unit weight of 125 pcf. No factor of safety was applied to the above values.

Backfill for retaining walls should be compacted to a minimum of 90 percent relative compaction based on ASTM Test Method D1557. Relatively light construction equipment should be used to backfill the retaining walls.

Lateral pressures from other surcharge and superimposed loads (for example, from vehicle traffic and adjacent structures) should be added to the above recommended lateral earth pressures if the loads fall within a projected area of an imaginary line extended at an angle of 45 degrees from the wall foundation. Thirty percent of the surcharge load may be used for unrestrained walls and 47 percent of the surcharge may be used for restrained walls.

The foundations for retaining walls may be designed for a maximum net allowable soil bearing pressure of 2,000 psf supported by at least 18 inches of compacted fill. The footings are recommended to be embedded at least 18 inches below the lowest adjacent exterior grade. The post-construction settlement of retaining wall foundations designed

in accordance with the recommendations of this report is estimated to be less than ½ inch.

6.7 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations, and other excavations should be performed in accordance with project plans, specifications and all Occupational Safety and Health Administration (OSHA) requirements.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the slope, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structures.

Temporary excavations should be treated in accordance with the State of California version of OSHA excavation regulations. The sides of excavations should be shored or sloped in accordance with OSHA regulations. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾H:1V slope for Type A soils, 1H:1V for Type B soils, and 1½H:1V for Type C soils. Shoring can be designed using the appropriate lateral earth pressures provided in Section 6.6.

The onsite soils within the proposed structural depths generally conform to OSHA soil Type B. OSHA regulations are applicable in areas with no restriction of surrounding ground deformations. Shoring should be designed for areas with deformation restrictions. The soil type should be verified or revised based on geotechnical observation and testing during construction, as soil classifications may vary over short horizontal distances. Heavy construction loads, such as those resulting from stockpiles and heavy machinery, should be kept a minimum distance equivalent to the excavation height or 5 feet, whichever is greater, from the excavation unless the excavation is shored and these surcharges are considered in the design of the shoring system.

6.8 Pipe Bedding

Any proposed pipe should be placed on properly placed bedding materials. Pipe bedding should extend to a depth in accordance to the pipe manufacturer's specification. The pipe bedding should extend to least 12 inches over the top of the pipeline. The bedding

material may consist of compacted free-draining sand, gravel, or crushed rock. If sand is used, the sand should have a sand equivalent of 30 or greater.

6.9 Trench Backfill

Trench excavations above the pipe bedding may be backfilled with onsite soils under the observation of the geotechnical consultant. All fill soils should be placed in loose lifts, moisture-conditioned to 2 to 3 percent above optimum-moisture content, and compacted to a minimum of 90 percent relative compaction, as determined by ASTM Test Method D1557. Lift thickness will be dependent on the equipment used as suggested in the latest edition of the *Standard Specifications for Public Works Construction* (SSPWC). The fill soils should extend to the bottom of the aggregate base for the new pavement, if any. Aggregate base should be moisture-conditioned between optimum and 2 percent above optimum-moisture and compacted to a minimum of 95 percent relative compaction based on ASTM D1557. All compaction should be performed by mechanical means.

6.10 Corrosion Protection Measures

The chemical analysis test results for the near-surface soils are included in Appendix C of this report. The test results are also summarized in the following table.

Test	Results	General Classification of Hazard
Water-Soluble Sulfate in Soil (percent)	0.0223 to 0.0993	Negligible Sulfate Exposure on Concrete
Water-Soluble Chloride in Soil (ppm)	74 to 254	Low Chloride Exposure on Concrete
pH	7.4 to 8.3	Slightly Alkaline Soil
Minimum Resistivity (saturated, ohm-cm)	665 to 1,110	Severely Corrosive to Buried Metals

Based on the test results, concrete structures in contact with the onsite soil is expected to have negligible exposure to water-soluble sulfates in the soil. Common Type II cement may be used for onsite concrete construction and the concrete may be designed for negligible sulfate exposure.

The soil is considered severely corrosive to ferrous metal. The corrosion information presented in this report should be provided to the underground subcontractors for additional remedial recommendations.

6.11 Site Drainage

Our exploration showed that a perched water and seepage condition are present at the site along the interface between the sand and clay layer at approximately 5 to 10 feet below the lower pad elevation. Vegetation growth observed along the slope on Superior Avenue and PCH also suggests that the seepage is present along the slope face.

We understand that the City would like to reduce seepage and nuisance water along the slope face on Superior Avenue and PCH. A drain curtain installed along the slope is a feasible mitigation measure to intercept the seepage. The drain should have at least 1 percent slope and connect to a positive non-erosive drainage device. Based on our preliminary investigation, the invert of the drain should be at Elevation +20 to +30 feet msl.

Irrigation of landscaping should be also controlled to maintain, as much as possible, a consistent moisture content sufficient to provide healthy plant growth without overwatering and inducing excessive runoff water.

6.12 Pavement Design

Based on the laboratory test result of the onsite near surface soil, the following flexible pavement sections may be used for various Traffic Indices.

Traffic Index	Asphalt Concrete (inches)	Aggregate Base (inches)
4.0 or less	3.0	4.0
5.0	3.0	7.5
6.0	4.0	9.0
7.0	4.0	13.0

Areas that may be subject to heavy traffic loads such as trash enclosure areas, reinforced Portland cement concrete pavement may be used. The portland cement pavement section

should consist of a minimum 6 inches of reinforced concrete cement over 4 inches of aggregate base.

Concrete pavement is recommended to be a minimum of 4 inches in thickness. In areas where concrete pavement will be subjected to light traffic load, such as maintenance vehicles, the concrete pavement is recommended to be underlain by a minimum 4 inches of aggregate base course.

All pavement construction should be performed in accordance with the SSPWC. Field observation and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled. Prior to pouring of concrete or placement of aggregate base, the subgrade soil should be processed to a minimum depth of 8 inches, moisture-conditioned to 2 to 3 percent above optimum moisture content, and recompacted to a minimum of 90 percent relative compaction. Aggregate base should be placed in thin lifts, moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

6.13 Additional Geotechnical Services

The preliminary geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing.

Leighton Consulting should review the grading and foundation plans and specifications, when available, to comment on the geotechnical aspects. Our recommendations should be revised, as necessary, based on future plans and incorporated into the final design plans and specifications. We recommend that a final design level exploration be performed after the grading plans are made available.

7.0 LIMITATIONS

The conclusions and recommendations presented in this report have been based upon the generally accepted principles and practices of geotechnical engineering utilized by other competent engineers at this time and place. No other warranty is either expressed or implied.

The conclusions and recommendations presented in this report have been based upon the subsurface conditions encountered at discrete and widely spaced locations and at specific intervals below the ground surface. Due to the inherent variance in soils conditions, variability may be encountered during construction. Where encountered during construction, such variances should be brought to our attention to determine the impact upon the recommendations presented in this report.

This report has been prepared for the expressed use of our client. The report may not be used by others or for other projects without the expressed written consent of our client and our firm.

8.0 REFERENCES

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Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH
8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

IIGER06085.0MRP

Proposed Sunset Ridge Park
City of Newport Beach, California

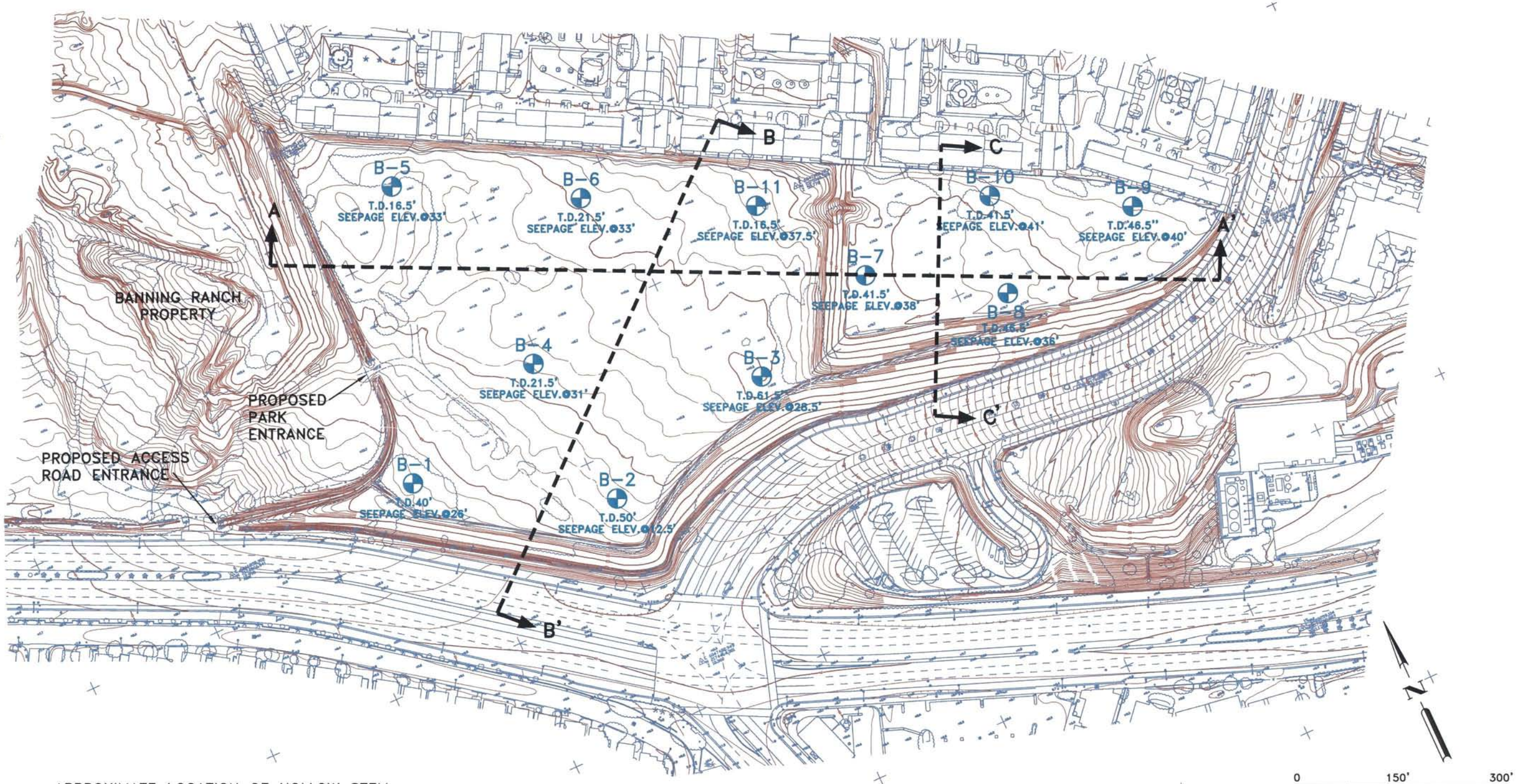
SITE LOCATION MAP

Project No.
602089-001

Date
June 2009

Figure 1

\\GIS\Drafting\602089\001\OF_2008-01-02\fig1sitelocation.mxd



LEGEND

B-11
T.D.16.5'
SEEPAGE ELEV.@37.5'

APPROXIMATE LOCATION OF HOLLOW STEM AUGER BORING, SHOWING TOTAL DEPTH (T.D.) AND SEEPAGE ELEVATION

FIGURE 2

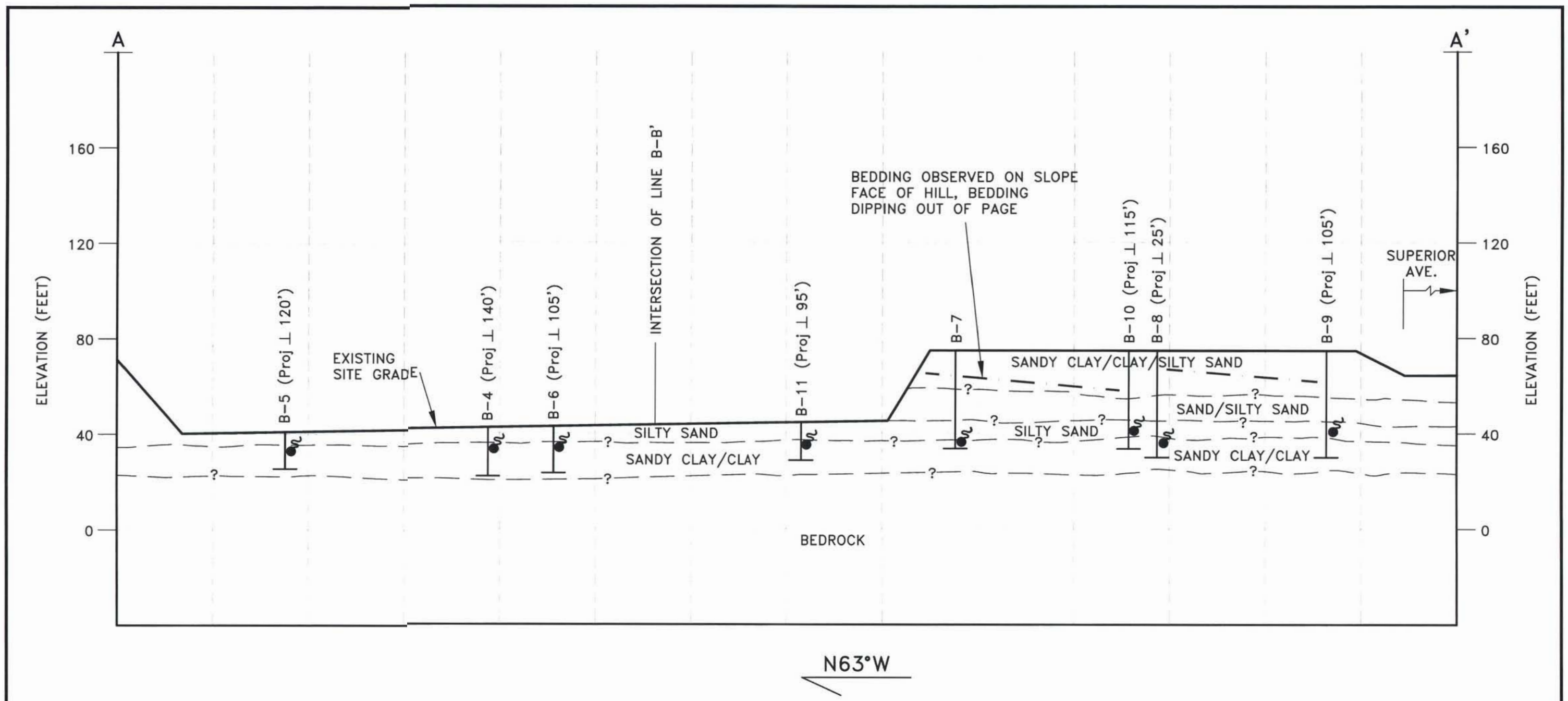
Proj. No: 602089-001	Eng/Geol: VMC/ELB
Scale: 1"=150'	Date: 6/09

Drafted By: RB | Checked By: BQT | P:\DRAFTING\602089\001\OF_2008-01-02\FIGURE 2.DWG (06-18-09 8:18:44AM) Plotted by: btran

BORING LOCATION MAP
PROPOSED SUNSET RIDGE PARK

CITY OF NEWPORT BEACH, CALIFORNIA

Leighton



LEGEND

SEEPAGE

OBSERVED BEDDING (QUERIED WHERE UNCERTAIN)

SOIL UNIT/GEOLOGIC CONTACT (QUERIED WHERE UNCERTAIN)

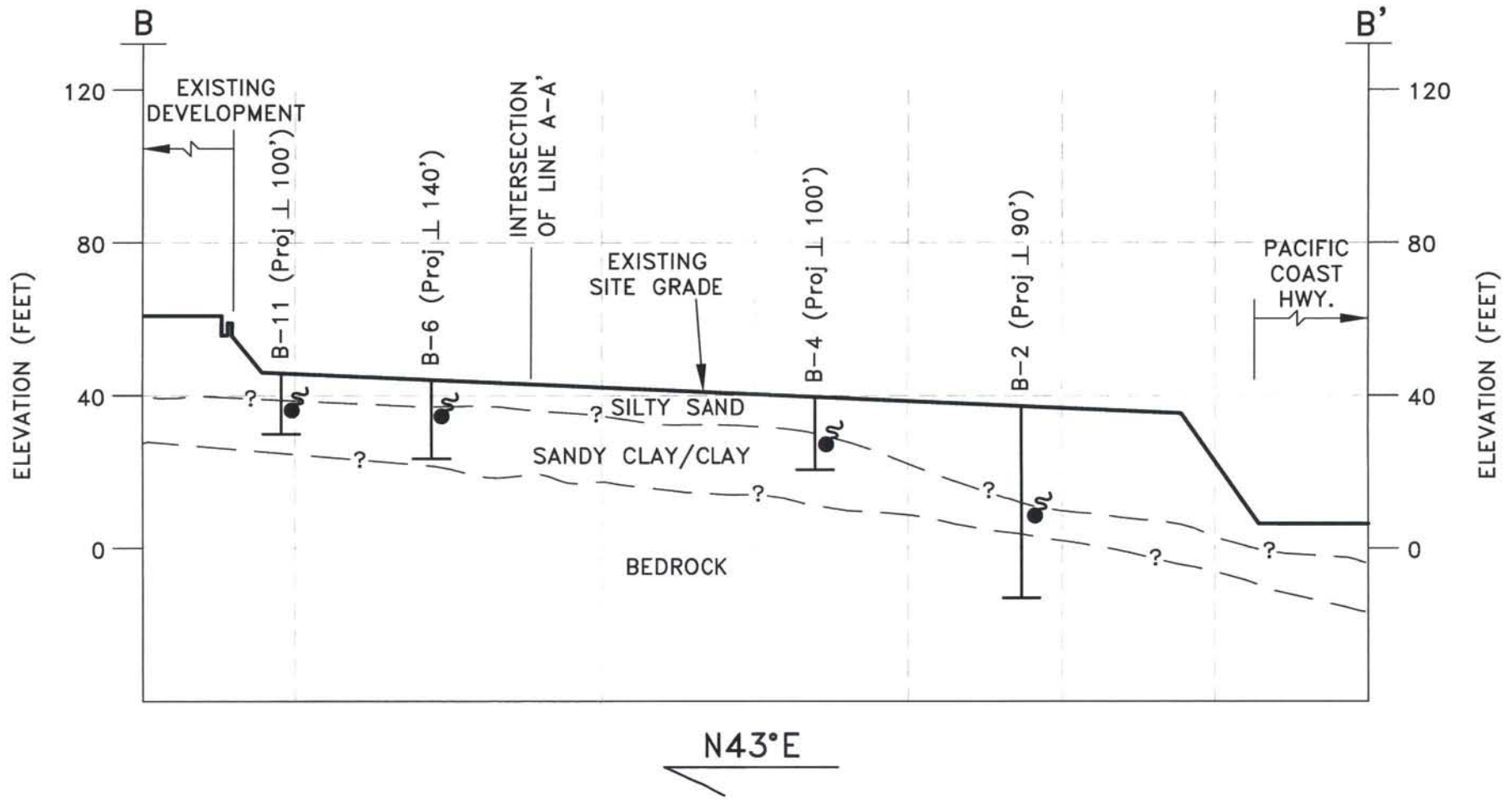
Figure 3

CROSS SECTION A–A'
PROPOSED SUNSET RIDGE PARK
CITY OF NEWPORT BEACH, CALIFORNIA

Proj No: 602089-001	Scale: H: 1"=100' V: 1"=40'	Date: 6/09
Eng./Geol.: VMC/ELB	Drafted By: RB	CP By: BQT

P:\DRAFTING\602089\001\OF_2008-02-08\FIGURE 3.DWG (06-18-09 9:36:35AM) Plotted by: btran

Leighton



LEGEND

- SEEPAGE
- OBSERVED BEDDING (QUERIED WHERE UNCERTAIN)
- SOIL UNIT/GEOLOGIC CONTACT (QUERIED WHERE UNCERTAIN)

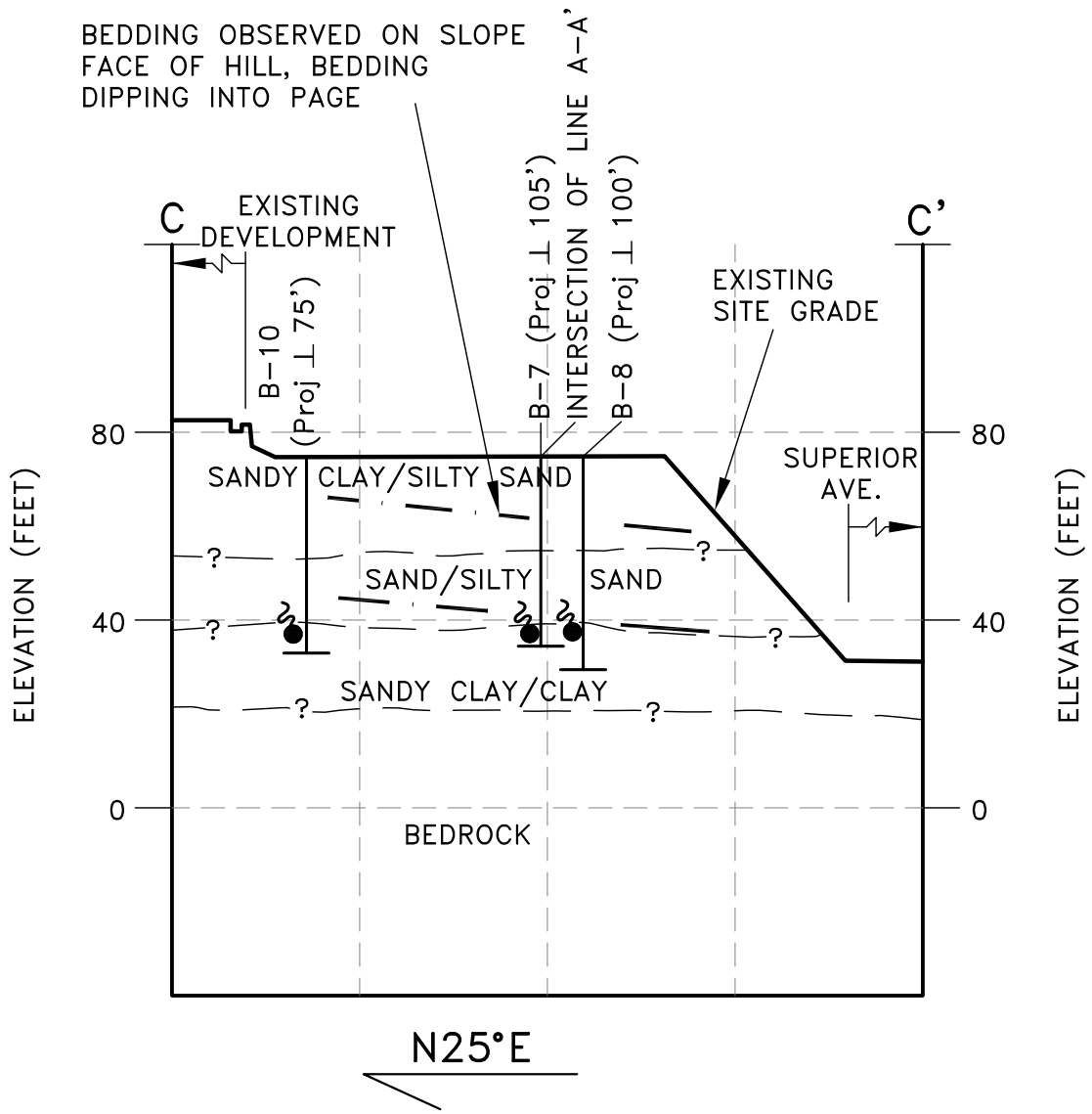
Figure 4

CROSS SECTION B–B'
PROPOSED SUNSET RIDGE PARK
CITY OF NEWPORT BEACH, CALIFORNIA

Proj No: 602089-001	Scale: H: 1"=100' V: 1"=40'	Date: 6/09
Eng./Geol.: VMC/ELB	Drafted By: RB	CP By: BQT

P:\DRAFTING\602089\001\OF_2008-02-08\FIGURE 4.DWG (06-18-09 9:38:20AM) Plotted by: btran

Leighton



LEGEND

SEEPAGE

OBSERVED BEDDING (QUERIED WHERE UNCERTAIN)

SOIL UNIT/GEOLOGIC CONTACT (QUERIED WHERE UNCERTAIN)

Figure 5

CROSS SECTION C–C'
PROPOSED SUNSET RIDGE PARK
CITY OF NEWPORT BEACH, CALIFORNIA

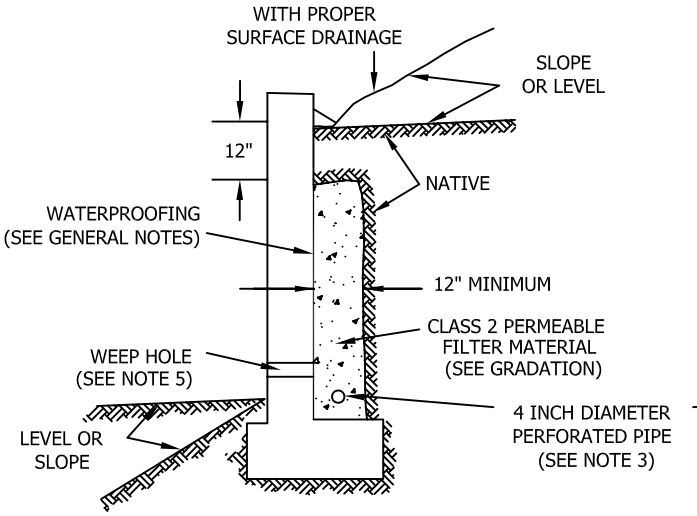
Proj No: 602089-001	Scale: H: 1"=100' V: 1"=40'	Date: 6/09
Eng./Geol.: VMC/ELB	Drafted By: RB	CP By: BQT

P:\DRAFTING\602089\001\OF_2008-02-08\FIGURE 5.DWG (08-18-09 2:48:59PM) Plotted by: btran

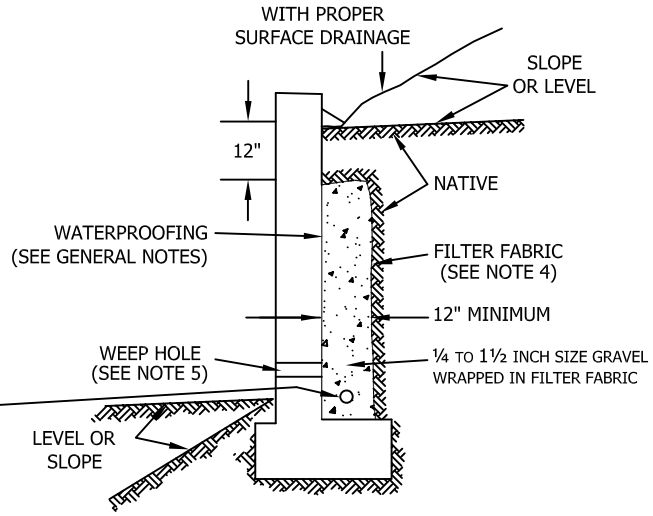
Leighton

SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

OPTION 1: PIPE SURROUNDED WITH CLASS 2 PERMEABLE MATERIAL



OPTION 2: GRAVEL WRAPPED IN FILTER FABRIC



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS 6 FEET OR LESS IN HEIGHT

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

Leighton

P:\Drafting\templates\details\retain-wall-backfill-and subdrain.dwg (7/00)

APPENDIX A

GEOTECHNICAL BORING LOG B-1

Date 12-13-07 **Sheet** 1 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 33.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION Logged By CDL Sampled By CDL	Type of Tests
30	0			B1					**Marine Terrace Deposits**	CR, RV
				R-1	10 15 21			SM	@ 2': Silty SAND, light brown, damp, medium dense, fine grained sand, color changes to a light turquoise grey with depth.	
25	5			R-2	9 14 17	94.2	18.2	SM	@ 5': Silty SAND, light turquoise, moist, medium dense, fine grained sand, laminated bedding, with 2mm thick brown silt bed.	
				R-3	8 13 21			CL	@ 7': Sandy CLAY, light turqouis, moist, stiff, pockets of fine grained sand, bottom of sampler is wet.	
									Perched water encountered.	
20	10			R-4	8 13 22	92.8	12.8	SM	@10': Silty SAND, light turquoise, moist, medium dense, fine to medium grained sand, silt is brown and mottled with sand matrix, severely bioturbated.	
15	15								Samples were not taken from 10 feet to 40 feet.	
10	20									
5	25								@ 25': Sandy CLAY, brown to dark brown, moist, pockets of fine grained sand.	
	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-1

Date 12-13-07 **Sheet** 2 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 33.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	30								**Logged By** CDL **Sampled By** CDL	
0									@ 30': CLAY, dark brown, moist, fine grained micaceous sand with pockets of medium grained sand.	
	35								@ 35': Groundwater encountered.	
-5										
	40									
-10									Total depth of boring: 40 feet below groundsurface (bgs). Perched water encountered at 7 feet bgs. Groundwater encountered at 35 feet bgs. Boring was backfilled with soil cuttings.	
	45									
-15										
	50									
-20										
	55									
-25										
	60									

SAMPLE TYPES:

S	SPLIT SPOON	G	GRAB SAMPLE
R	RING SAMPLE	C	CORE SAMPLE
B	BULK SAMPLE		
T	TUBE SAMPLE		

TYPE OF TESTS:

DS	DIRECT SHEAR	CS	CORROSION SUITE	AL	ATTERBERG LIMITS
MD	MAXIMUM DENSITY	COL	COLLAPSE POTENTIAL	EI	EXPANSION INDEX
CN	CONSOLIDATION	-200	200 WASH	RV	R-VALUE
SU	SULFATE CONTENT				

GEOTECHNICAL BORING LOG B-2

Date 12-13-07 **Sheet** 1 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 38.5' **Location** See Boring Location Map

Logged By CDL

Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
35	0			B1					**Marine Terrace Deposits**	
				R-1	17 21 32			SM	@ 2': Silty SAND, tan brown, damp, dense, fine to medium grained sand, medium angular gravel composed of coarse grained concreted sand.	
	5			R-2	11 16 20	88.8	5.3	SP	@ 5': SAND, light grey white, damp, medium dense, fine grained sand.	
				R-3	7 12 18			SP	@ 7': SAND, light grey white, damp, medium dense, fine grained sand.	
30									@ 8.3': Silty SAND, tan, damp, medium dense, fine grained sand.	
				B2				SM		
	10			R-4	7 11 16	90.4	8.7	SM	@ 10': Silty SAND, light grey white to tan, moist, fine grained sand.	
25										
	15									
20										
	20							SM	@ 20': Silty SAND, orange brown, very moist, fine grained sand.	
15										
	25									
								CL	@ 26': Sandy CLAY, dark grey, wet, fine grained sand.	
10									Perched water encountered.	
	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-2

Date 12-13-07 **Sheet** 2 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 38.5' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
									Logged By CDL **Sampled By** CDL	
	30			S-1	3 5 8			ML	@ 30': Clayey SILT, dark grey, moist, stiff, with fine grained micaceous sand, strong organic odor, 2 laminated beds of sand.	AL, SA
5										
	35			S-2	4 6 9		41.7	CL	@ 35': CLAY, dark grey, moist, stiff, with fine grained micaceous sand, strong organic odor.	
0										
	40			S-3	4 6 4			CL	@ 40': CLAY grades with depth to CLAYSTONE, moist, mottled with small nodules of fine grained sandstone.	
-5										
	45			S-4	4 50/2"				**Bedrock:** @ 45': Gravelly CLAYSTONE, dark brown, wet, gravel is composed of fractured claystone.	
-10										
	50								@ 47': Groundwater encountered.	
-15									Total depth of boring: 50 feet bgs. Perched water at 26 feet bgs. Groundwater encountered at 47 feet bgs. Boring was backfilled with soil cuttings.	
	55									
-20										
	60									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-3

Date 12-13-07 **Sheet** 1 **of** 3

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 45.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
									Logged By CDL **Sampled By** CDL	
45	0								**Marine Terrace Deposits**	
				R-1	14 18 26			SM	@ 2': Silty SAND, light grey white, damp, medium dense, fine grained sand.	
40	5			R-2	7 11 19	91.7	5.5	SM	@ 5': Silty SAND, light grey white, damp, medium dense, fine grained sand.	
				R-3	9 16 22			SM	@ 7': Silty SAND, light grey, damp, medium dense, fine grained sand, slightly oxidized.	
35	10			S-1	5 9 10			SM	@ 10': Silty SAND, light grey, very moist, medium dense, fine grained sand.	
30	15			R-4	13 18 25	96.5	26.3	SM	@ 15': Silty SAND, orange brown, very moist, medium dense, fine grained sand. @ 16.5': Perched water encountered.	DS
25	20							CL	@ 20': Sandy CLAY, turquoise grey, wet, fine grained sand.	
20	25									
15	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-3

Date 12-13-07 **Sheet** 2 **of** 3

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 45.0' **Location** See Boring Location Map

Logged By CDL

Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
15	30								Samples were not taken from 20 feet to 50 feet.	
10	35									
5	40									
0	45								@ 47': Encountered hard zone.	
-5	50			R-5	7 15 26	72.5	49.1	CL	@ 50': Sandy CLAY, dark brown, moist, very stiff, fine grained sand, strong organic odor.	
-10	55			R-6	6 10 17	95.3	59.1	MH	@ 55': SILT, dark brown, moist, stiff, high plastic, strong organic odor.	AL, DS
-15	60									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-3

Date 12-13-07 **Sheet** 3 **of** 3

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 45.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
-15	60			R-7	7 8 10			CL	Logged By CDL Sampled By CDL @ 60': CLAY, dark brown, moist, stiff, strong organic odor.	
									Total depth of boring: 61.5 feet bgs. Perched water at 16.5 feet bgs. Boring was backfilled with soil cuttings.	
-20	65									
-25	70									
-30	75									
-35	80									
-40	85									
-45	90									

SAMPLE TYPES:

S SPLIT SPOON
R RING SAMPLE
B BULK SAMPLE
T TUBE SAMPLE
G GRAB SAMPLE
C CORE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
SU SULFATE CONTENT
CS CORROSION SUITE
COL COLLAPSE POTENTIAL
-200 200 WASH
AL ATTERBERG LIMITS
EI EXPANSION INDEX
RV R-VALUE

GEOTECHNICAL BORING LOG B-4

Date 12-13-07 **Sheet** 1 **of** 1

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 41.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
									Logged By CDL **Sampled By** CDL	
40	0								**Marine Terrace Deposits**	
				B1						
	5				7					
35				R-1	13 17	99.0	12.6	SM	@ 5': Silty SAND, orange brown, moist, medium dense, fine grained sand.	
	10				9					
30				R-2	12 16			SM	@ 10': Silty SAND, light grey white, wet, medium dense, fine grained sand. Perched water encountered.	
	15				5					
25				R-3	12 21	90.9	30.3	SM	@ 15': Silty SAND, grey, very moist, medium dense, fine grained sand.	
	20				3					
20				S-1	4 6			ML/SM	@ 20': Interbedded SILT and SAND, grey, moist to very moist with depth, stiff/medium dense, fine grained sand.	
									Total depth of boring: 21.5 feet bgs. Perched water at 10 feet bgs. Boring was backfilled with soil cuttings.	
	25									
15										
	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-5

Date 12-13-07 **Sheet** 1 **of** 1

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 42.0' **Location** See Boring Location Map

Logged By CDL

Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
42	0								**Marine Terrace Deposits**	CR, RV
40				B1				SM		
	5			R-1	7 12 15	91.8	23.1	SM	@ 5': Silty SAND, orange brown to grey with depth, very moist to wet, medium dense, fine grained sand.	
35									@ 9': Perched water encountered.	
	10			R-2	7 13 23	96.2	29.0	ML	@ 10': Sandy SILT, turquoise grey, wet, stiff, fine grained sand.	DS
30										
	15			R-3	23 12 14	128.2	29.3	SM	@ 15': Gravelly sluff, not representative of insitu material.	
25									Total depth of boring: 16.5 feet bgs. Perched water at 9 feet bgs. Boring was backfilled with soil cuttings.	
	20									
20										
	25									
15										
	30									

SAMPLE TYPES:

S SPLIT SPOON
R RING SAMPLE
B BULK SAMPLE
T TUBE SAMPLE
G GRAB SAMPLE
C CORE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
SU SULFATE CONTENT
CS CORROSION SUITE
COL COLLAPSE POTENTIAL
-200 200 WASH
AL ATTERBERG LIMITS
EI EXPANSION INDEX
RV R-VALUE

GEOTECHNICAL BORING LOG B-6

Date 12-13-07 **Sheet** 1 **of** 1

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Martini Drilling Corp. **Type of Rig** CME-75

Hole Diameter 8" **Drive Weight** 140 lb Autohammer **Drop** 30"

Elevation Top of Hole 45.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By CDL; Sampled By CDL)	Type of Tests
45	0								**Marine Terrace Deposits**	
40	5			R-1	11 16 21	97.9	21.8	SM	@ 5': Silty SAND, brown, moist, medium dense, fine grained sand.	
35	10			R-2	7 11 16	94.8	22.9	SM	@ 10': Silty SAND, light grey, very moist to wet, medium dense, fine grained sand. @ 12': Perched water encountered.	
30	15			R-3	6 8 21	96.2	18.2	SM	@ 15': Silty SAND, grey, very moist to wet, medium dense, fine grained sand.	
25	20			R-4	5 7 8	93.1	30.8	SM	@ 20': Sandy SILT/Silty SAND, grey wet, medium stiff/loose, fine grained sand.	
20	25								Total depth of boring: 21.5 feet bgs. Perched water at 12 feet bgs. Boring was backfilled with soil cuttings.	
15	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-7

Date 12-18-07 **Sheet** 1 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 75.0' **Location** See Boring Location Map

Logged By CDL

Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
75	0								**Marine Terrace Deposits**	
				R-1	16 28 32			SC	@ 2': Sandy CLAY, brown, moist, hard, fine grained sand.	
70	5			R-2	16 50/6"	115.6	13.2	SC	@ 5': Sandy CLAY, brown, moist, hard, fine grained sand, poorly developed clay lined paleosol faces, highly decomposed rootlets, grades with depth to silty CLAY, mottled brown red and tan grey, moist, hard.	DS
				R-3	12 10 16			CL	@ 7': Silty CLAY, mottled brown red and tan grey, moist, stiff, .5mm porosity voids, mottled with fine grained silty sand.	
65	10			R-4	8 20 21	92.7	17.0	CL	@ 10': CLAY, tan grey, severely mottled, oxidized, moist, stiff, trace silt, severely bioturbated.	
				B1						
60	15									
55	20									
									@ 23': Encounter fossiliferous SAND, grey brown, medium grained sand, shell fragments.	
50	25									
45	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-7

Date 12-18-07 **Sheet** 2 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 75.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By CDL; Sampled By CDL)	Type of Tests
45	30			S-1	6 11 12			SP	@ 30': SAND, brown to white with depth, damp, medium dense, fine to medium grained sand.	
40	35			S-2	9 10 12		4.1	SM	@ 35': Silty SAND, brown, moist, medium dense, fine grained sand, some medium grained sand. @ 37': Perched water encountered.	
35	40			S-3	11 16 20			SM	@ 40': Silty SAND, brown, wet, medium dense, fine grained sand, grades to clayey SAND, grey turquoise, wet, fine grained sand.	
30	45								Total depth of boring: 41.5 feet bgs. Perched water at 37 feet bgs. Boring was backfilled with soil cuttings.	
25	50									
20	55									
15	60									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-8

Date 12-18-07 **Sheet** 1 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 73.0' **Location** See Boring Location Map

Logged By CDL

Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
73	0								**Marine Terrace Deposits**	CR, RV
70				B1				SC	@ 2.5': Sandy CLAY, brown, moist, fine grained sand.	
	5			R-1	13 16 20	106.9	16.2	CL-ML	@ 5': Silty CLAY, brown, moist, stiff, trace fine grained sand, 0.5mm porosity voids, some highly decomposed rootlets, grades in tip of sampler to silty CLAY and light grey CLAY.	
65										
	10			R-2	13 15 19	94.9	13.6	ML	@ 10': Sandy SILT, mottled brown and light grey, moist, stiff, fine grained sand.	DS
60										
	15			R-3	14 17 18	103.7	5.9	SM	@ 15': Silty SAND, mottled brown and grey, moist, medium dense, medium grained sand, trace mottling of grey clay, oxidized.	
55										
	20									
50										
	25								@ 25': Encounter medium to coarse grained SAND.	
45										
	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-8

Date 12-18-07 **Sheet** 2 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 73.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By CDL; Sampled By CDL)	Type of Tests
	30			S-1	9 14 19			SM	@ 30': Silty SAND, mottled tan brown and light grey, damp, medium dense. fine grained sand.	
40										
	35			S-2	18 22 26		18.7	SM	@ 35': Silty SAND, grey, wet, medium dense, fine grained sand.	
35									@ 37': Perched water encountered.	
	40			S-3	10 15 21			SM	@ 40': Silty SAND/Sandy SILT, grey, wet, medium dense/stiff, fine grained sand.	
30										
	45			S-4	16 19 21		36.5	SC	@ 45': Sandy CLAY, turquoise grey, very moist to wet, stiff, fine grained sand.	
25									Total depth of boring: 46.5 feet bgs. Perched water at 37 feet bgs. Boring was backfilled with soil cuttings.	
	50									
20										
	55									
15										
	60									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-9

Date 12-18-07 **Sheet** 1 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 78.0' **Location** See Boring Location Map

Logged By CDL

Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	0								**Marine Terrace Deposits**	
75				R-1	33 50/6"			SC	@ 2': Sandy CLAY, brown red, damp to moist, hard, fine to medium grained sand, 0.5mm porosity voids.	
	5			R-2	14 21 37	118.7	12.4	SC	@ 5': Sandy CLAY, dark red brown, damp to moist, hard, fine grained sand.	
70				R-3	9 19 24			CL	@ 7': Silty CLAY, brown grey, very moist, stiff, laminated bedding, thick interbed of bioturbated clay, moist, stiff.	
				B1						
	10			R-4	6 14 20	95.4	24.1	CL	@ 10': CLAY with silt, grey, moist, stiff, grades in tip to silty SAND, light grey brown, moist, medium dense, fine grained sand.	
65										
	15									
60										
	20									
									@ 22': Encountered SAND.	
55										
	25			S-1	12 15 20			SP	@ 25': SAND, light grey white with oxidized beds, damp to moist, medium dense, medium grained sand.	
50										
	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-9

Date 12-18-07 **Sheet** 2 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 78.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By CDL; Sampled By CDL)	Type of Tests
	30			S-2	15 18 20		8.6	SP	@ 30': SAND, tan brown, moist, medium dense, fine to medium grained sand, some coarse grained sand, 3-inch tick bed of brown red clay.	
45										
	35			S-3	14 20 23			SM	@ 35': Silty SAND, light grey, moist, medium dense, fine grained sand, laminated oxidized bedding.	
40									@ 38': Perched water encountered.	
	40			S-4	12 14 15		30.3	SM	@ 40': Silty SAND, brown, very moist, medium dense, fine grained micaceous sand.	
35										
	45			S-5				SC	@ 45': Clayey SAND, mottled brown and grey, wet, medium dense, fine grained sand, grades in tip to sandy CLAY, turquoise grey, wet, fined grained sand.	
30									Total depth of boring: 46.5 feet bgs. Perched water at 38 feet bgs. Boring was backfilled with soil cuttings.	
	50									
25										
	55									
20										
	60									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-10

Date 12-18-07 **Sheet** 1 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 76.0' **Location** See Boring Location Map

Logged By CDL

Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
75	0								**Marine Terrace Deposits**	
70	5			R-1	50/6"			SC	@ 5': Sandy CLAY, brown, damp, hard, fine grained sand, 0.5mm porosity voids.	
65	10			R-2	11 14 18	104.9	8.6	SM	@ 10': Silty SAND, brown, moist, medium dense, fine grained sand, grades with depth to silty CLAY, bedded grey and brown, very moist, trace fine grained sand, cuttings are very moist to 20 feet bgs.	
				B1						
60	15			R-3	12 17 22	97.6	18.9	ML	@ 15': Sandy SILT, grey mottled with brown, very moist, stiff, fine grained micaceous sand, grades with depth to grey CLAY mottled with brown sand, moist.	
55	20			R-4	12 12 18	108.2	18.1	SC	@ 20': Clayey SAND, mottled grey, red brown, and brown, moist to very moist with depth, medium dense, fine grained sand, some medium and coarse grained sand. @ 22': Encountered SAND.	DS
50	25			R-5	10 22 25	96.3	1.9	SP	@ 25': SAND, light tan white, damp, medium dense, fine to coarse grained sand.	
	30									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-10

Date 12-18-07 **Sheet** 2 **of** 2

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 76.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By CDL; Sampled By CDL)	Type of Tests
45	30			S-1	8 15 16			SP	@ 30': SAND, orange brown, damp, medium dense, fine to coarse grained sand.	
40	35			S-2	9 9 13		24.3	SM	@ 35': Silty SAND, grey brown, wet, medium dense, fine grained micaceous sand. Perched water encountered.	
35	40			S-3	12 12 15			SM	@ 40': Silty SAND, grey, wet, medium dense, fine grained micaceous sand.	
30	45								Total depth of boring: 41.5 feet Perched groundwater at 35 feet The boring was backfilled with soil cuttings	
25	50									
20	55									
	60									

SAMPLE TYPES:

S SPLIT SPOON G GRAB SAMPLE
R RING SAMPLE C CORE SAMPLE
B BULK SAMPLE
T TUBE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR CS CORROSION SUITE AL ATTERBERG LIMITS
MD MAXIMUM DENSITY COL COLLAPSE POTENTIAL EI EXPANSION INDEX
CN CONSOLIDATION -200 200 WASH RV R-VALUE
SU SULFATE CONTENT

GEOTECHNICAL BORING LOG B-11

Date 12-18-07 **Sheet** 1 **of** 1

Project Sunset Ridge Park **Project No.** 602089-001

Drilling Co. Cascade Drilling **Type of Rig** LAR

Hole Diameter 8" **Drive Weight** 140 lb Downhole Hammer **Drop** 30"

Elevation Top of Hole 48.0' **Location** See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per Six Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By CDL; Sampled By CDL)	Type of Tests
48	0			B1				SM	**Marine Terrace Deposits**	CR, RV
45				R-1	15 21 40			SM	@ 2': Silty SAND, brown, moist, dense, fine grained sand, trace coarse grained sand, silt is mottled.	
	5			R-2	12 28 42	94.6	3.5	SM	@ 5': Silty SAND, tan brown, moist, dense, fine grained sand, grades with depth to SAND with silt, light grey white, fine to medium grained sand.	
40				R-3	19 22 23			SM	@ 7': Silty SAND, grey mottled with tan brown, very moist, medium dense, fine grained sand.	
	10			R-4	20 22 28	90.0	25.2	SM	@ 10': Silty SAND, grey, very moist to wet, dense, fine grained sand.	
35										
	15			R-5	18 28 30			SM	@ 15': Silty SAND, grey, wet, dense, fine grained sand.	
30									Total depth of boring: 16.5 feet bgs. Perched groundwater at 10.5 feet bgs. Boring was backfilled with soil cuttings.	
	20									
25										
	25									
20										
	30									

SAMPLE TYPES:

S SPLIT SPOON
R RING SAMPLE
B BULK SAMPLE
T TUBE SAMPLE
G GRAB SAMPLE
C CORE SAMPLE

TYPE OF TESTS:

DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
SU SULFATE CONTENT
CS CORROSION SUITE
COL COLLAPSE POTENTIAL
-200 200 WASH
AL ATTERBERG LIMITS
EI EXPANSION INDEX
RV R-VALUE

APPENDIX B

Boring No.	B-1	B-1	B-2	B-2	B-3	B-3	B-3	B-4
Sample No.	R-2	R-4	R-2	R-4	R-2	R-5	R-7	R-1
Depth (ft.)	5.0	10.0	5.0	10.0	5.0	50.0	60.0	5.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Pale olive (SM), damp, very dense	Light olive gray (SM), dense to very dense	Light gray (SP), dry, loose to dense	Pale olive (SP-SM), damp, dense	Pale olive (SP-SM), damp, dense	Dark olive (CL), damp, very stiff	Sample missing	Olive yellow (SM), damp, dense
Pocket Penetrometer (tons/ft^2)	>4.50	2.25 / 1.75	0.50 / 1.50	1.25 / 1.75	1.25 / 2.00	3.00 / 2.50		1.50 / 1.00
Weight Soil + Rings / Tube (g)	1070.90	1022.60	941.00	976.00	965.10	697.90		892.60
Weight of Rings / Tube (g)	266.40	266.40	266.40	266.40	266.40	177.60		222.00
Average Length (in.)	6.00	6.00	6.00	6.00	6.00	4.00		5.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416		2.416
Wet. Wt. of Soil + Cont. (g)	189.20	202.90	203.50	207.20	221.20	181.50		202.30
Dry Wt. of Soil + Cont. (g)	165.70	187.50	196.60	195.70	213.10	141.80		186.30
Weight of Container (g)	36.80	67.30	65.30	63.70	65.50	60.90		59.30
Container No.	522	480	455	424	368	333		336
Wet Density	111.4	104.7	93.4	98.3	96.8	108.1		111.4
Moisture Content (%)	**18.2**	**12.8**	**5.3**	**8.7**	**5.5**	**49.1**		**12.6**
Dry Density (pcf)	**94.2**	**92.8**	**88.8**	**90.4**	**91.7**	**72.5**		**99.0**
Degree of Saturation (%)	62.4	42.4	15.8	27.2	17.7	100.0		48.4

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Sunset Ridge
Project No.: 602089-001
Client Name: LCI / Irvine
Tested By: G. Berdy Date: 12/28/07

Boring No.	B-4	B-5	B-5	B-6	B-6	B-6	B-6	B-7
Sample No.	R-3	R-1	R-3	R-1	R-2	R-3	R-4	R-4
Depth (ft.)	15.0	5.0	15.0	5.0	10.0	15.0	20.0	10.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Gray (SM), damp, dense	Pale olive (top) olive yellow (bot) (SM), damp, dense to very dense	Olive (SM), wet, very loose	Yellowish brown (top) pale olive (bot) (SP-SM), damp, very dense	Pale olive s(ML), damp, medium stiff	Pale olive s(ML), damp, very stiff	Dark gray s(ML), moist, medium stiff to stiff	Pale olive s(ML), damp, stiff to very stiff
Pocket Penetrometer (tons/ft^2)	1.50 / 1.00	2.25 / 1.00	<0.50	4.25 / 2.25	1.00 / 0.75	2.00 / 2.25	0.75 / 1.50	1.00 / 3.25
Weight Soil + Rings / Tube (g)	934.60	1082.40	731.60	939.80	923.40	1087.80	1146.10	1049.80
Weight of Rings / Tube (g)	222.00	266.40	133.20	222.00	222.00	266.40	266.40	266.40
Average Length (in.)	5.00	6.00	3.00	5.00	5.00	6.00	6.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	218.90	232.80	210.70	206.60	206.70	208.30	221.40	210.90
Dry Wt. of Soil + Cont. (g)	176.40	199.80	176.30	180.30	178.80	184.70	184.90	188.90
Weight of Container (g)	36.10	57.20	58.90	59.90	57.10	55.20	66.50	59.60
Container No.	598	291	212	74	48	39	444	334
Wet Density	118.4	113.0	165.8	119.3	116.6	113.8	121.8	108.5
Moisture Content (%)	**30.3**	**23.1**	**29.3**	**21.8**	**22.9**	**18.2**	**30.8**	**17.0**
Dry Density (pcf)	**90.9**	**91.8**	**128.2**	**97.9**	**94.8**	**96.2**	**93.1**	**92.7**
Degree of Saturation (%)	95.7	74.7	251.2	81.7	79.6	65.5	102.8	56.2

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Sunset Ridge
Project No.: 602089-001
Client Name: LCI / Irvine
Tested By: G. Berdy Date: 12/28/07

Boring No.	B-8	B-8	B-9	B-9	B-10	B-10	B-10	B-11
Sample No.	R-1	R-3	R-2	R-4	R-1	R-3	R-5	R-2
Depth (ft.)	5.0	15.0	5.0	10.0	5.0	15.0	25.0	5.0
Sample Type	Drive	Drive	Drive	Drive	Drive	Drive	Drive	Drive
Soil Identification	Light olive brown s(CL), damp, very stiff to hard	Olive yellow (SM), damp, very dense	Olive brown s(CL), damp, hard	Olive (CL) (top) light yellowish brown s(ML) (bot), damp, very stiff to hard	Olive brown s(CL), damp, hard	Olive s(CL) (top) olive yellow s(ML) (bot), damp, very stiff	Pale yellow (SP), damp, very loose	Pale yellow (SP), damp, loose to medium dense
Pocket Penetrometer (tons/ft^2)	2.25 / 4.25	4.00 / 2.75	>4.50	4.00 / 2.50	>4.50	2.75 / 2.50	<0.50	1.00 / 0.50
Weight Soil + Rings / Tube (g)	1163.30	1059.30	1229.60	934.60	907.50	1104.20	974.80	973.70
Weight of Rings / Tube (g)	266.40	266.40	266.40	222.00	222.00	266.40	266.40	266.40
Average Length (in.)	6.00	6.00	6.00	5.00	5.00	6.00	6.00	6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
Wet. Wt. of Soil + Cont. (g)	215.00	270.60	193.40	207.70	209.60	234.70	243.00	245.70
Dry Wt. of Soil + Cont. (g)	192.90	259.30	178.90	179.80	197.40	207.90	239.50	239.20
Weight of Container (g)	56.10	67.10	61.50	64.00	55.90	66.40	57.20	55.60
Container No.	175	483	332	352	128	423	203	148
Wet Density	124.2	109.8	133.4	118.4	113.9	116.0	98.1	98.0
Moisture Content (%)	**16.2**	**5.9**	**12.4**	**24.1**	**8.6**	**18.9**	**1.9**	**3.5**
Dry Density (pcf)	**106.9**	**103.7**	**118.7**	**95.4**	**104.9**	**97.6**	**96.3**	**94.6**
Degree of Saturation (%)	75.7	25.4	79.5	84.9	38.3	70.3	6.9	12.2

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Sunset Ridge
Project No.: 602089-001
Client Name: LCI / Irvine
Tested By: G. Berdy Date: 12/28/07

Boring No.	B-11							
Sample No.	R-4							
Depth (ft.)	10.0							
Sample Type	Drive							
Soil Identification	Pale olive (SP-SM), dense							
Pocket Penetrometer (tons/ft^2)	1.25							
Weight Soil + Rings / Tube (g)	1079.40							
Weight of Rings / Tube (g)	266.40							
Average Length (in.)	6.00							
Average Diameter (in.)	2.416							
Wet. Wt. of Soil + Cont. (g)	209.40							
Dry Wt. of Soil + Cont. (g)	181.10							
Weight of Container (g)	68.60							
Container No.	37							
Wet Density	112.6							
Moisture Content (%)	**25.2**							
Dry Density (pcf)	**90.0**							
Degree of Saturation (%)	77.7							

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MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Sunset Ridge
Project No.: 602089-001
Client Name: LCI / Irvine
Tested By: G. Berdy Date: 12/28/07

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MOISTURE CONTENT

ASTM D 2216

Project Name: **Sunset Ridge**
Project No.: **602089-001**

Tested By: G. Berdy
Date: 12/28/07
Checked By: J. Ward
Date: 01/09/08

Boring No.	B-2	B-7	B-8	B-8	B-9
Sample No.	S-2	S-2	S-2	S-4	S-2
Depth (ft)	35	35	35	45	30
Sample Type	SPT	SPT	SPT	SPT	SPT
Sample Description	Dark olive (CL)	Olive (SP-SM)	Pale olive (SP-SM)	Dark olive (CL-ML)	Light olive brown (SP-SC)
Wt. wet soil + container (g)	195.50	245.10	224.30	212.10	247.60
Wt. dry soil + container (g)	148.80	237.10	194.70	165.10	231.10
Weight of container (g)	36.90	39.90	36.80	36.50	39.60
Moisture Content (%)	**41.7**	**4.1**	**18.7**	**36.5**	**8.6**

Boring No.	B-9	B-10			
Sample No.	S-4	S-2			
Depth (ft)	40	35			
Sample Type	SPT	SPT			
Sample Description	Olive brown (SM)	Olive yellow (SM)			
Wt. wet soil + container (g)	219.30	230.20			
Wt. dry soil + container (g)	177.60	192.90			
Weight of container (g)	40.10	39.60			
Moisture Content (%)	**30.3**	**24.3**			

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PARTICLE-SIZE ANALYSIS OF SOILS

ASTM D 422

Project Name: Sunset Ridge
Project No. : 602089-001
Exploration No.: B-2
Sample No.: S-1
Soil Identification: Dark olive gray silt with sand (ML)s

Tested By : G. Berdy Date: 12/28/07
Data Input By: J. Ward Date: 01/09/08
Depth (feet) : 30.0

% Gravel	0	Soil Type	
% Sand	24	(ML)s	
% Fines	76		

			Moisture Content of Total Air-Dry Soil	Moisture Content of Air-Dry Soil Passing #10	After Hydrometer & Wet Sieve ret. in #200 Sieve
Specific Gravity (Assumed)	2.70	Wt.of Air-Dry Soil + Cont.(g)	0.00	0.00	
Correction for Specific Gravity	0.99	Dry Wt. of Soil + Cont. (g)	0.00	0.00	94.28
Wt.of Air-Dry Soil + Cont. (g)	441.60	Wt. of Container No.___ (g)	1.00	1.00	76.82
Wt. of Container	76.80	Moisture Content (%)	0.00	0.00	
Dry Wt. of Soil (g)	364.80	Wt. of Dry Soil (g)			17.46

Coarse Sieve

U.S. Sieve	Cumulative Wt. Of Dry Soil Retained (g)	% Passing
3"	0.00	100.0
1½"	0.00	100.0
3/4"	0.00	100.0
3/8"	0.00	100.0
No. 4	0.20	99.9
No. 10	0.50	99.9
Pan		

Sieve after Hydrometer & Wet Sieve

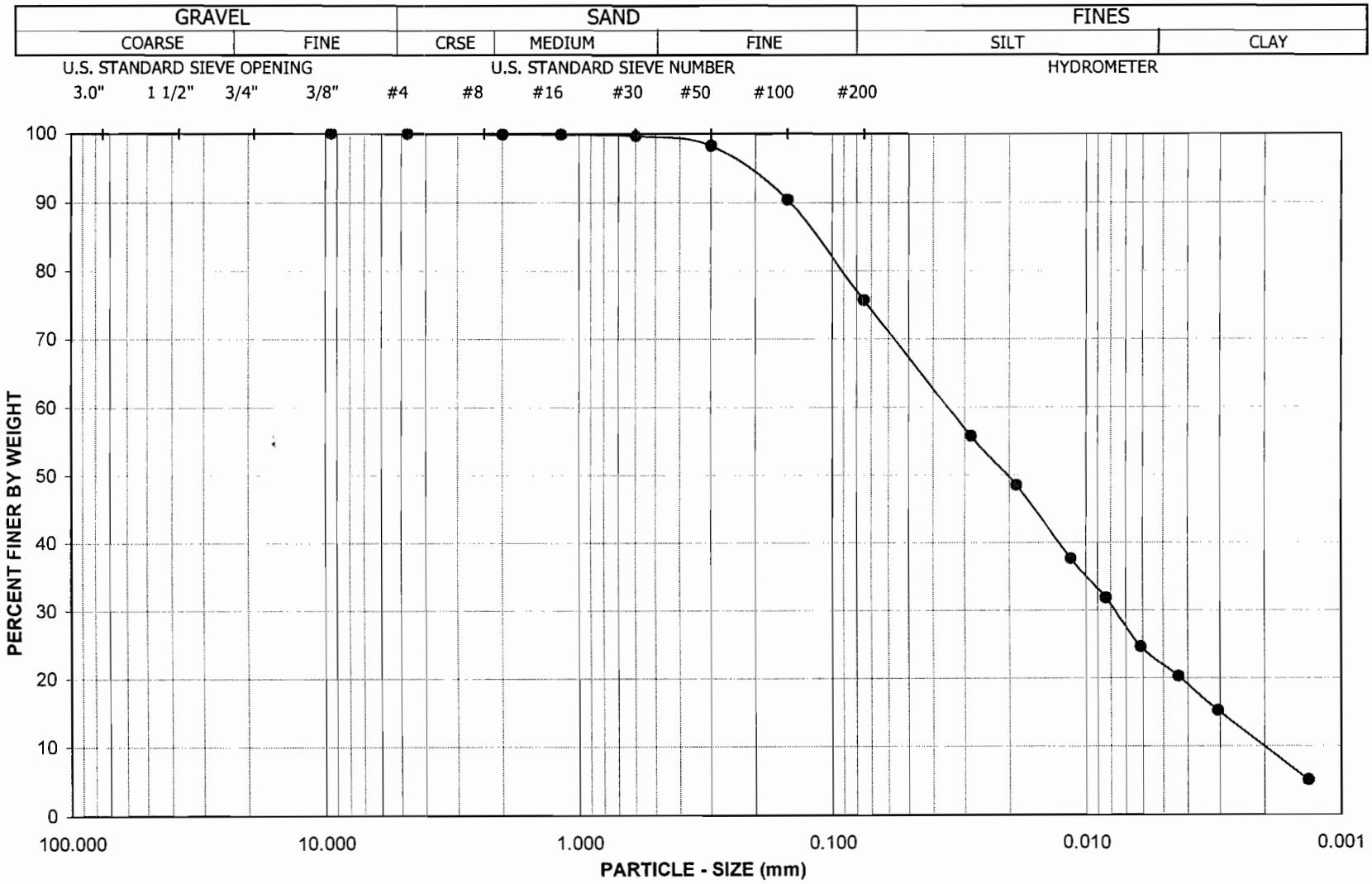
U.S. Sieve Size	Cumulative Wt. Of Dry Soil Retained (g)	% Passing	% Total Sample
No. 10	0.00	100.0	99.9
No. 16	0.02	100.0	99.8
No. 30	0.15	99.8	99.6
No. 50	1.12	98.4	98.2
No. 100	6.53	90.5	90.3
No. 200	16.59	75.8	75.7
Pan			

Hydrometer

Wt. of Air-Dry Soil (g) 68.50 Wt. of Dry Soil (g) 68.50

Deflocculant 125 cc of 4% Solution

Date	Time	Elapsed Time (min)	Water Temperature (°C)	Composite Correction 152H	Actual Hydrometer Readings	% Total Sample (%)	Soil Particle Diameter (mm)
31-Dec-07	9:02	0		8.0			
	9:04	2	19.2	8.0	46.5	55.7	0.0284
	9:07	5	19.2	8.0	41.5	48.4	0.0188
	9:17	15	19.3	8.0	34.0	37.6	0.0115
	9:32	30	19.4	8.0	30.0	31.8	0.0084
	10:02	60	19.7	8.0	25.0	24.6	0.0061
	11:02	120	20.0	8.0	22.0	20.2	0.0044
	13:12	250	21.1	8.0	18.5	15.2	0.0031
01-Jan-08	9:02	1440	20.5	8.0	11.5	5.1	0.0013



Project Name: Sunset Ridge

Project No.: 602089-001

Exploration No.: B-2 Sample No.: S-1

Depth (feet) : 30.0 Soil Type : (ML)s

Soil Identification: Dark olive gray silt with sand (ML)s

GR:SA:FI : (%) 0 : 24 : 76

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PARTICLE - SIZE DISTRIBUTION ASTM D 422

Jan-08

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ATTERBERG LIMITS

ASTM D 4318

Project Name:	Sunset Ridge	Tested By:	G. Bathala	Date:	01/08/08
Project No. :	602089-001	Input By:	J. Ward	Date:	01/09/07
Boring No.:	B-2	Checked By:	J. Ward		
Sample No.:	S-1	Depth (ft.)	30.0		
Soil Identification:	Dark olive gray silt with sand (ML)s				

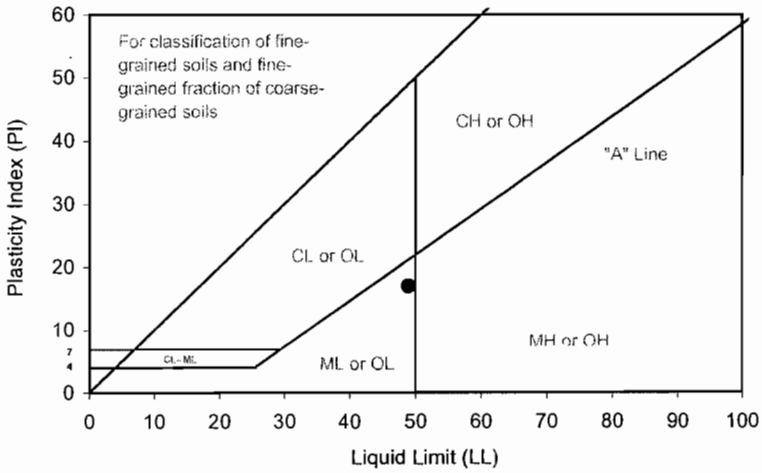
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			15	22	29	35
Wet Wt. of Soil + Cont. (g)	11.96	12.78	11.55	10.61	11.01	11.45
Dry Wt. of Soil + Cont. (g)	9.32	9.92	8.01	7.47	7.76	8.07
Wt. of Container (g)	1.04	1.04	1.07	1.12	1.07	1.03
Moisture Content (%) [Wn]	31.88	32.21	51.01	49.45	48.58	48.01

Liquid Limit	**49**
Plastic Limit	**32**
Plasticity Index	**17**
Classification	**ML**

PI at "A" - Line = 0.73(LL-20) 21.17

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.12}$



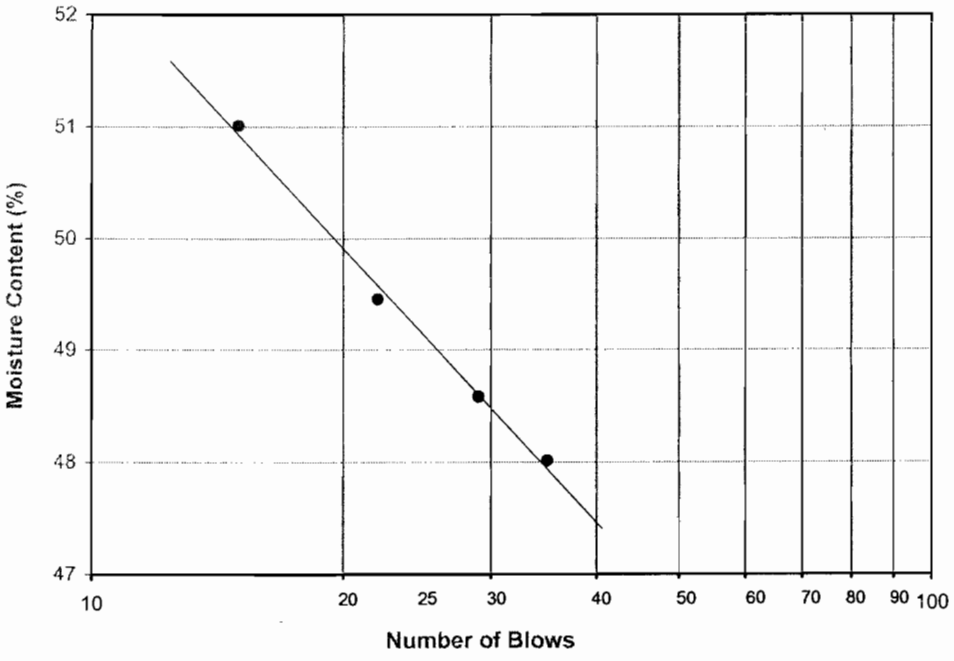
PROCEDURES USED

☐ Wet Preparation
Multipoint - Wet

☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test



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ATTERBERG LIMITS

ASTM D 4318

Project Name:	Sunset Ridge	Tested By:	G. Bathala	Date:	01/08/08
Project No. :	602089-001	Input By:	J. Ward	Date:	01/09/07
Boring No.:	B-3	Checked By:	J. Ward		
Sample No.:	R-6	Depth (ft.)	55.0		
Soil Identification:	Dark olive gray elastic silt (MH)				

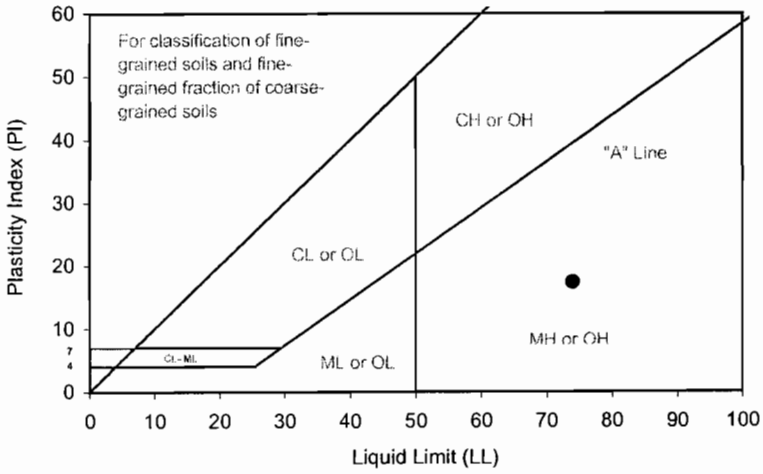
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			18	23	28	35
Wet Wt. of Soil + Cont. (g)	10.82	10.01	10.57	8.94	8.53	10.45
Dry Wt. of Soil + Cont. (g)	7.29	6.78	6.41	5.56	5.36	6.51
Wt. of Container (g)	1.07	1.08	1.01	1.05	1.06	1.04
Moisture Content (%) [Wn]	56.75	56.67	77.04	74.94	73.72	72.03

Liquid Limit	**74**
Plastic Limit	**57**
Plasticity Index	**17**
Classification	**MH**

PI at "A" - Line = 0.73(LL-20) 39.42

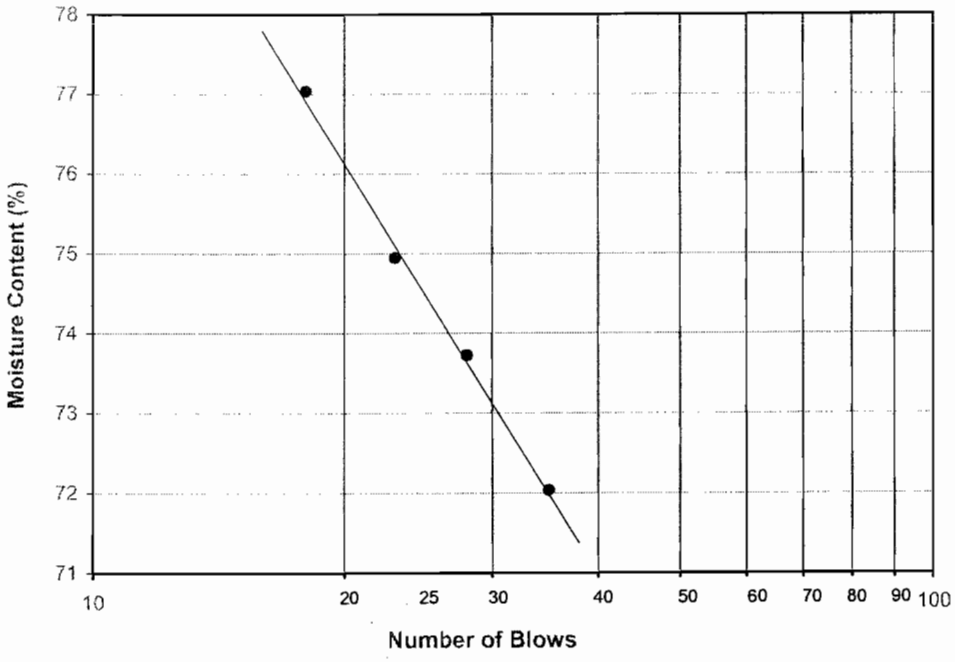
One - Point Liquid Limit Calculation

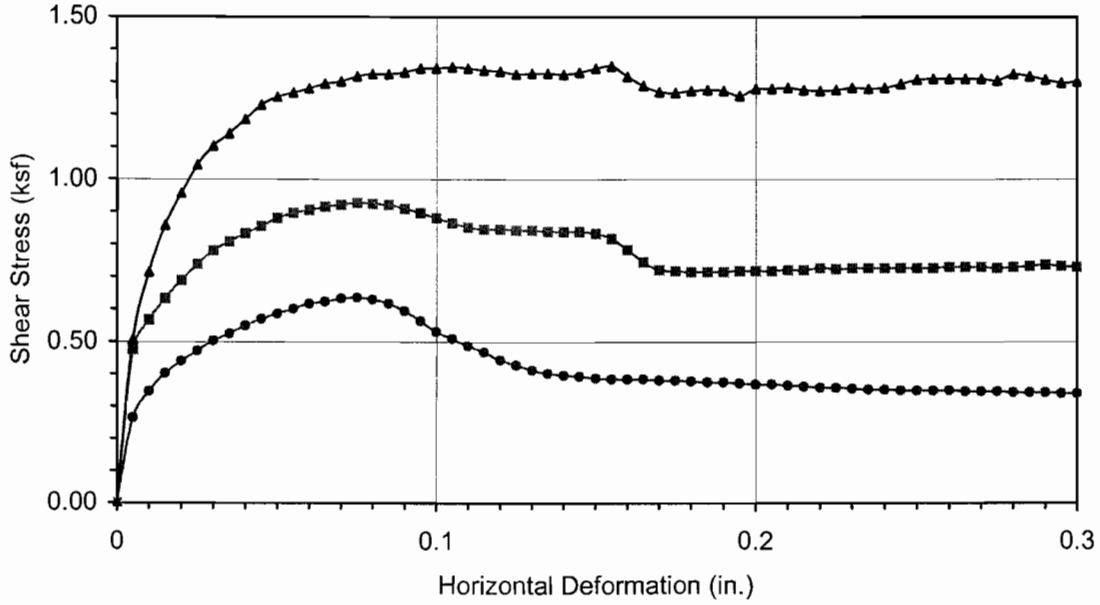
$LL = Wn(N/25)^{0.12}$

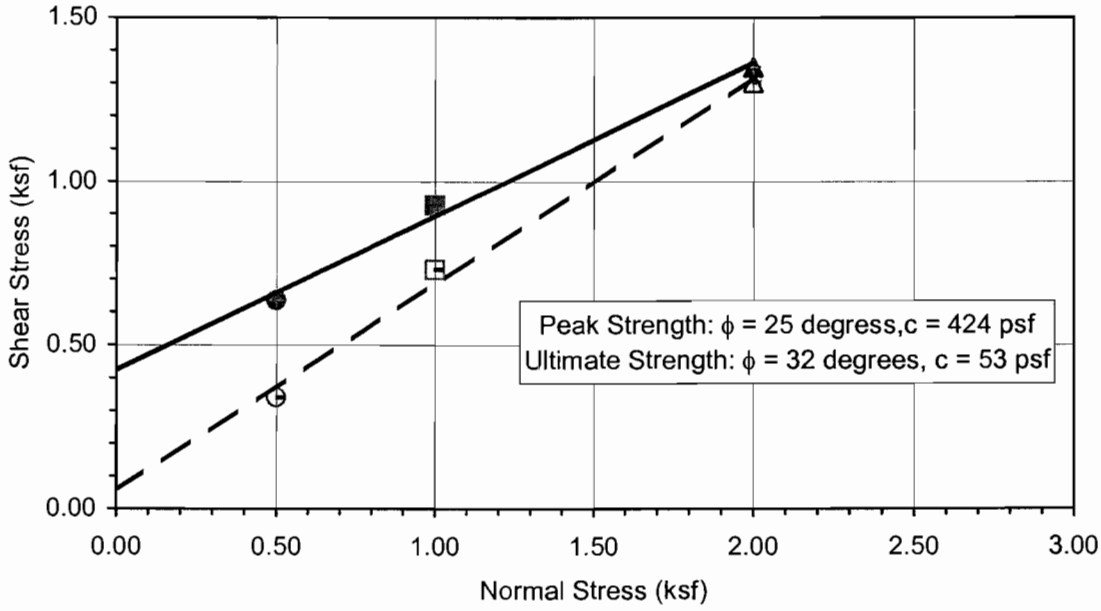


PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [X] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test







Boring No.	**B-3**
Sample No.	**R-4**
Depth (ft)	**15**
Sample Type:	
Drive	
Soil Identification:	
Olive brown sandy silt s(ML)	

Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 0.635	■ 0.927	▲ 1.349
Shear Stress @ End of Test (ksf)	○ 0.340	□ 0.729	△ 1.302
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	26.33	26.33	26.33
Dry Density (pcf)	94.4	97.5	97.5
Saturation (%)	90.4	97.6	97.6
Soil Height Before Shearing (in.)	0.9945	0.9912	0.9868
Final Moisture Content (%)	30.3	29.8	29.7

Leighton

DIRECT SHEAR TEST RESULTS

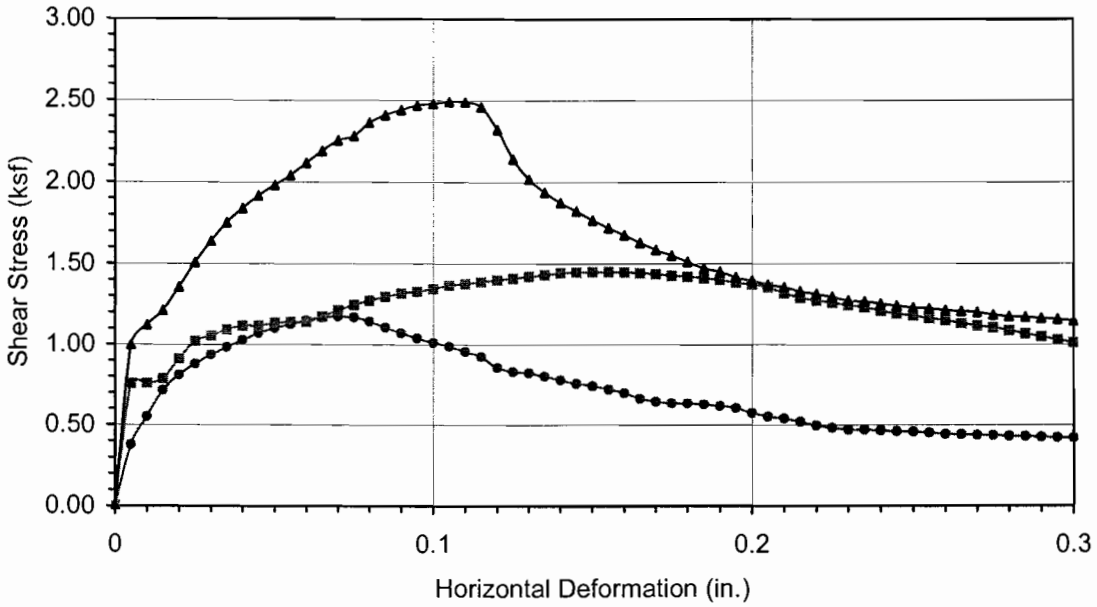
Consolidated Undrained

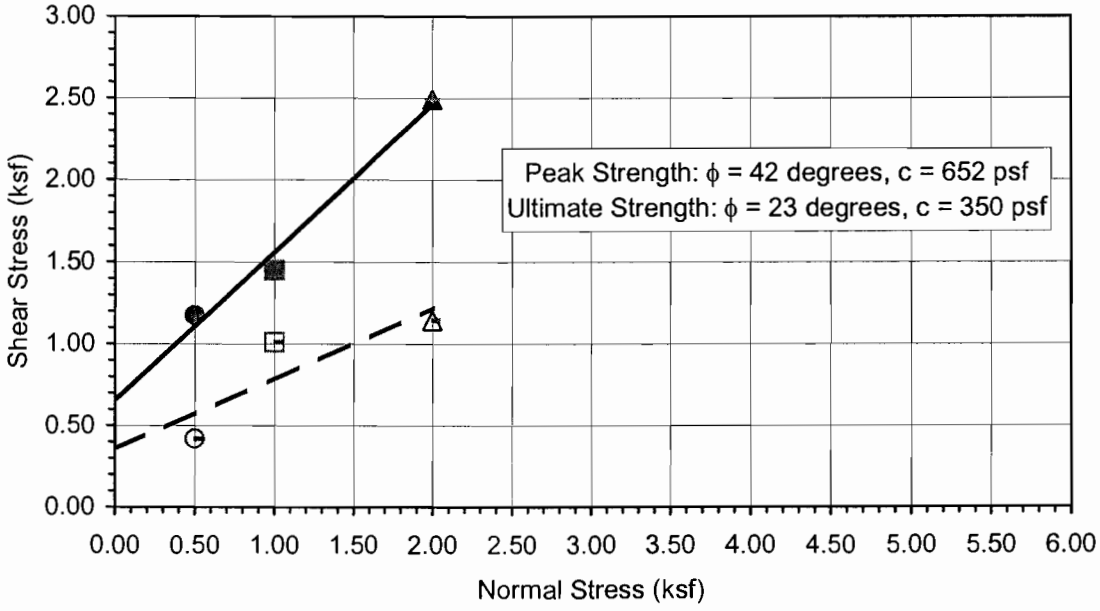
Project No.: 602089-001

Sunset Ridge

01-08

DS B-3 R-4_.xls





Boring No.	**B-3**
Sample No.	**R-6**
Depth (ft)	**55**
Sample Type: Drive	
Soil Identification: Olive gray elastic silt (MH) with petroleum odor	

Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 1.173	■ 1.449	▲ 2.490
Shear Stress @ End of Test (ksf)	○ 0.418	□ 1.009	△ 1.144
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	65.42	65.42	65.42
Dry Density (pcf)	59.2	59.1	58.9
Saturation (%)	95.6	95.4	94.8
Soil Height Before Shearing (in.)	1.0062	0.9982	0.9914
Final Moisture Content (%)	74.6	74.8	71.2

Leighton

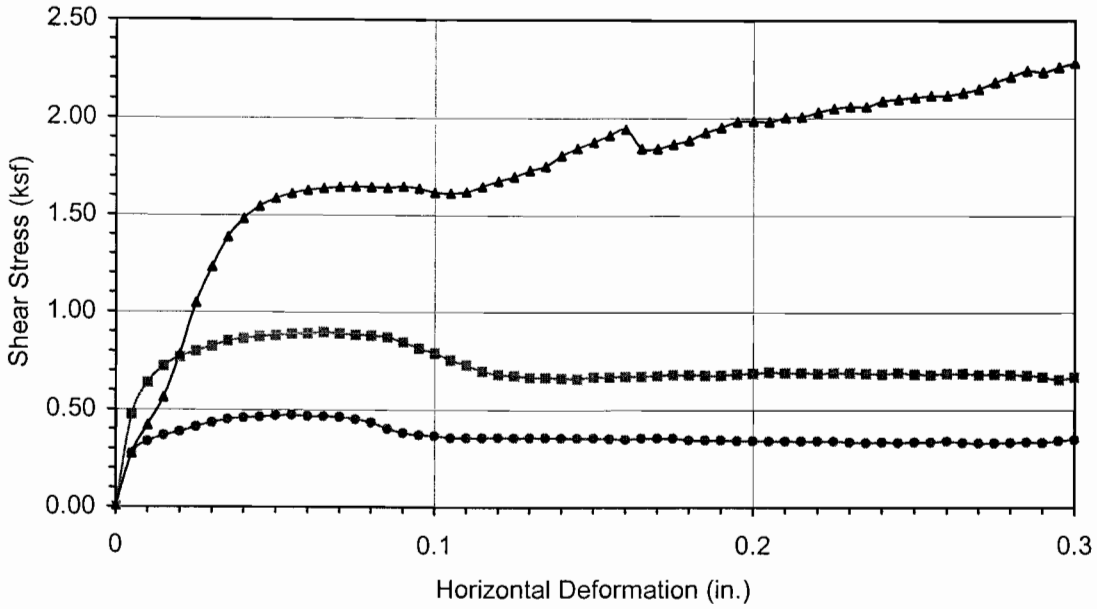
DIRECT SHEAR TEST RESULTS
Consolidated Undrained

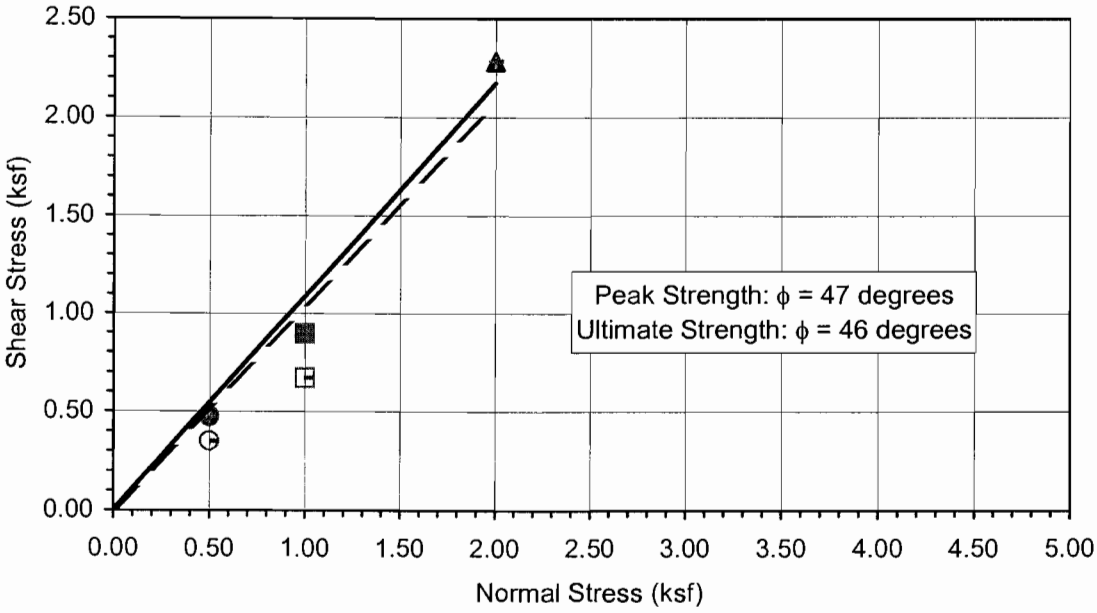
Project No.: 602089-001

Sunset Ridge

12-07

DS B-3 R-6_.xls





Boring No.	**B-5**
Sample No.	**R-2**
Depth (ft)	**10**
Sample Type: Drive	
Soil Identification: Olive yellow silt (ML) with siltstone	

Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 0.472	■ 0.896	▲ 2.282
Shear Stress @ End of Test (ksf)	○ 0.349	□ 0.670	△ 2.282
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	29.02	29.02	29.02
Dry Density (pcf)	95.1	96.8	96.8
Saturation (%)	101.5	105.8	105.8
Soil Height Before Shearing (in.)	0.9968	0.9933	0.9860
Final Moisture Content (%)	30.0	30.3	29.5

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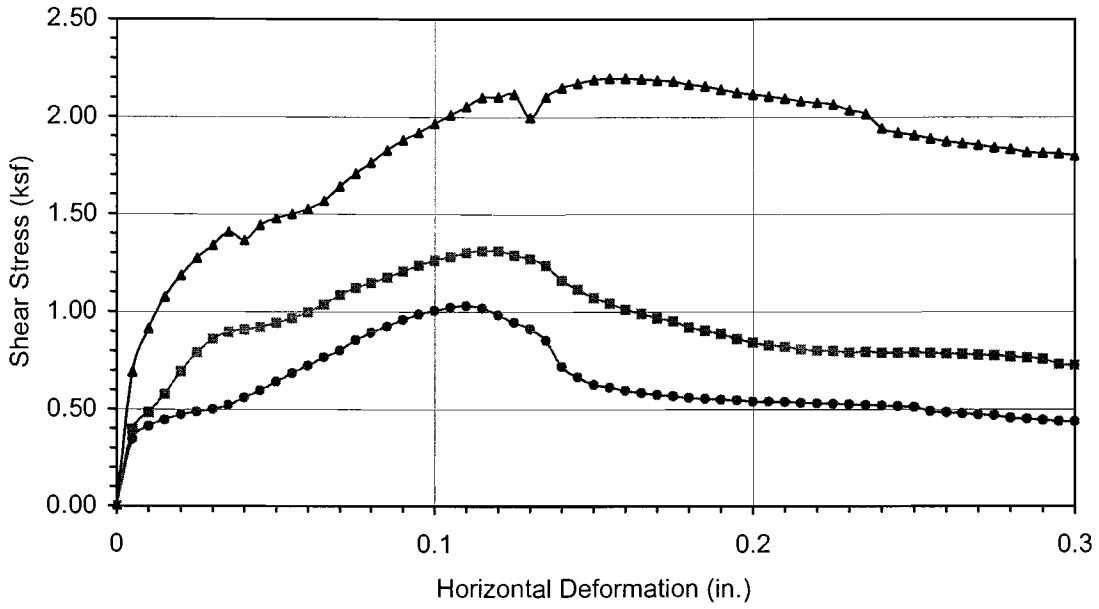
DIRECT SHEAR TEST RESULTS
Consolidated Undrained

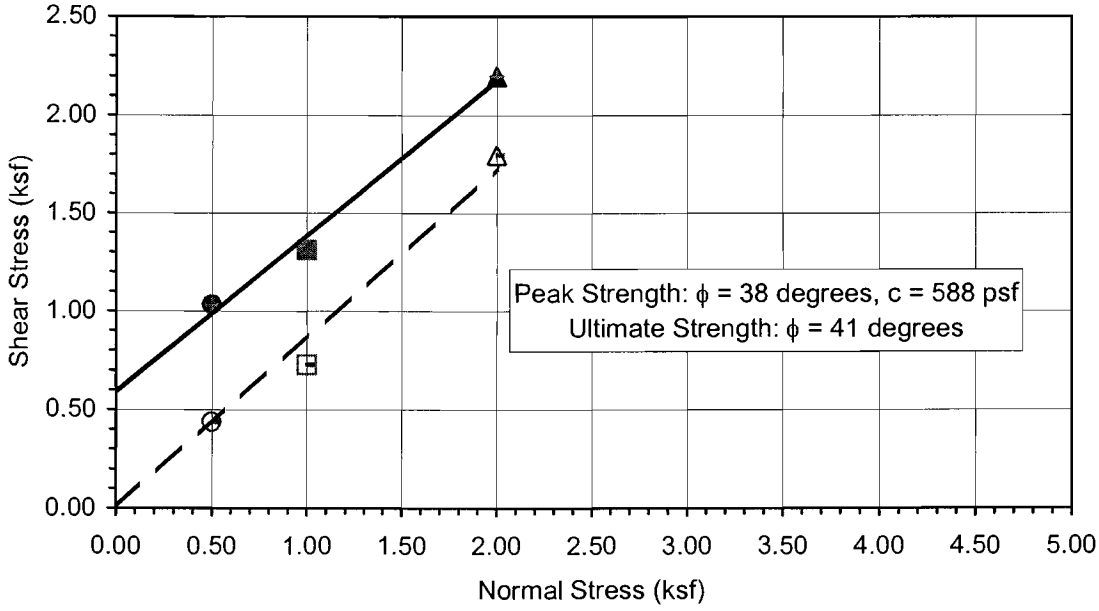
Project No.: 602089-001

Sunset Ridge

12-07

DS B-5 R-2_.xls





Boring No.	**B-7**
Sample No.	**R-2**
Depth (ft)	**5**
Sample Type: Drive	
Soil Identification: Brown silty clay (CL-ML)	

Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 1.031	■ 1.311	▲ 2.197
Shear Stress @ End of Test (ksf)	○ 0.437	□ 0.726	△ 1.798
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	13.16	13.16	13.16
Dry Density (pcf)	113.3	115.4	118.2
Saturation (%)	72.8	77.2	83.5
Soil Height Before Shearing (in.)	0.9996	0.9979	0.9883
Final Moisture Content (%)	19.3	18.9	17.6

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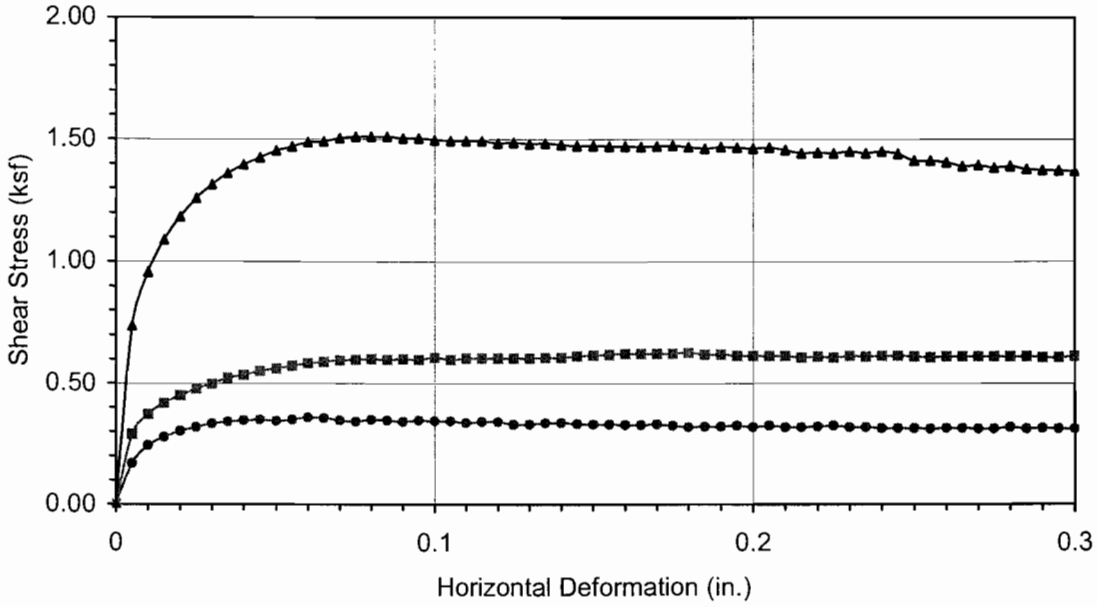
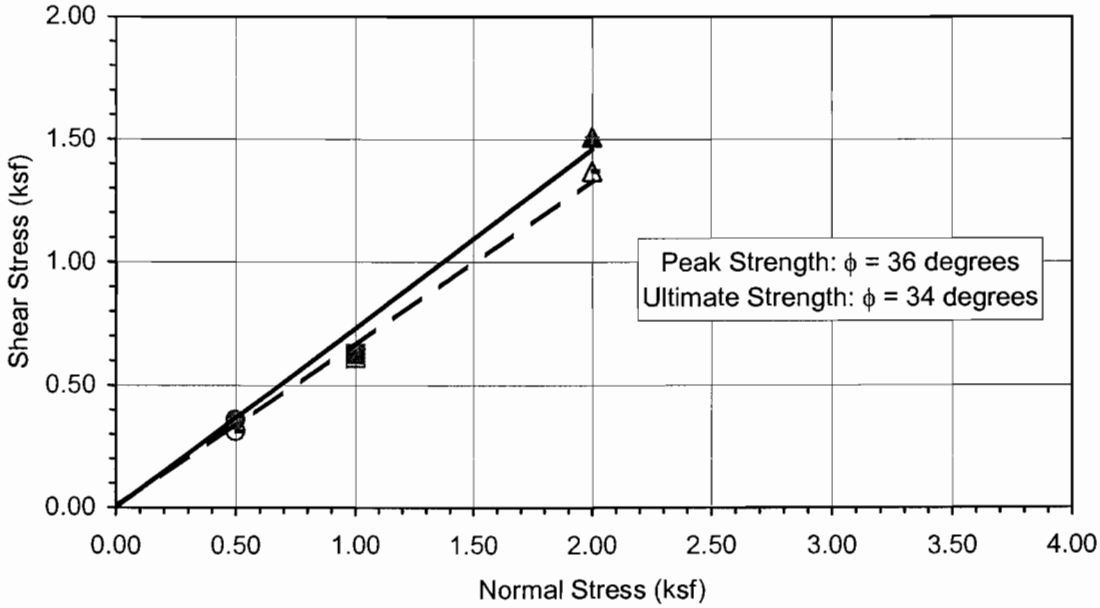
DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 602089-001
Sunset Ridge

12-07

DS B-7 R-2_.xls





Boring No.	**B-8**
Sample No.	**R-2**
Depth (ft)	**10**
Sample Type: Drive	
Soil Identification: Yellowish brown silt (ML)	

Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 0.358	■ 0.626	▲ 1.509
Shear Stress @ End of Test (ksf)	○ 0.311	□ 0.610	△ 1.368
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	13.58	13.58	13.58
Dry Density (pcf)	88.1	89.4	107.1
Saturation (%)	40.1	41.4	63.9
Soil Height Before Shearing (in.)	0.9964	0.9915	0.9849
Final Moisture Content (%)	30.1	30.6	22.7

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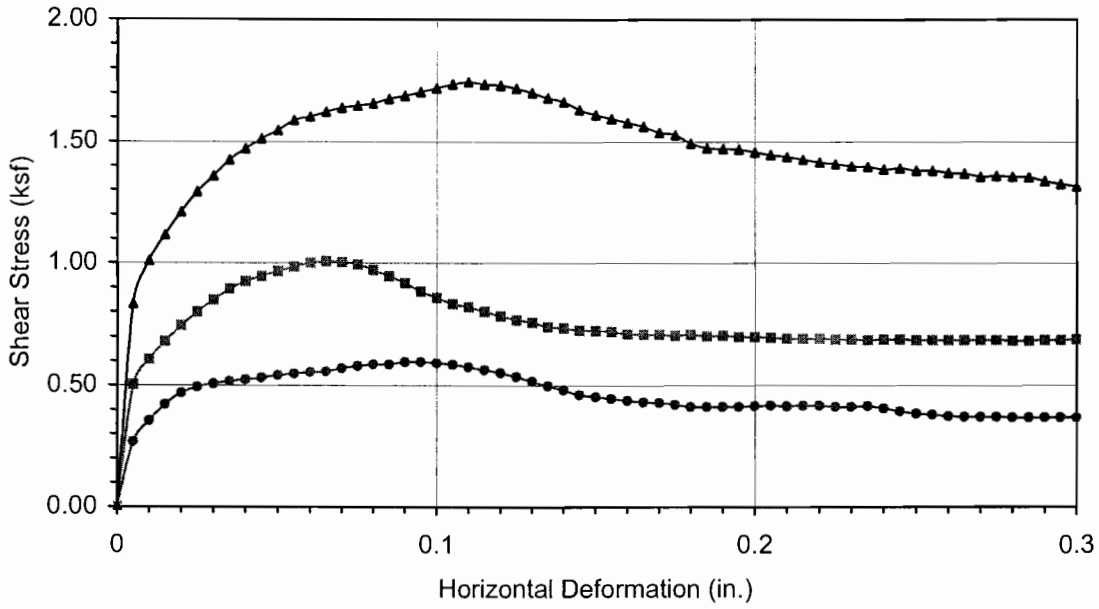
DIRECT SHEAR TEST RESULTS
Consolidated Undrained

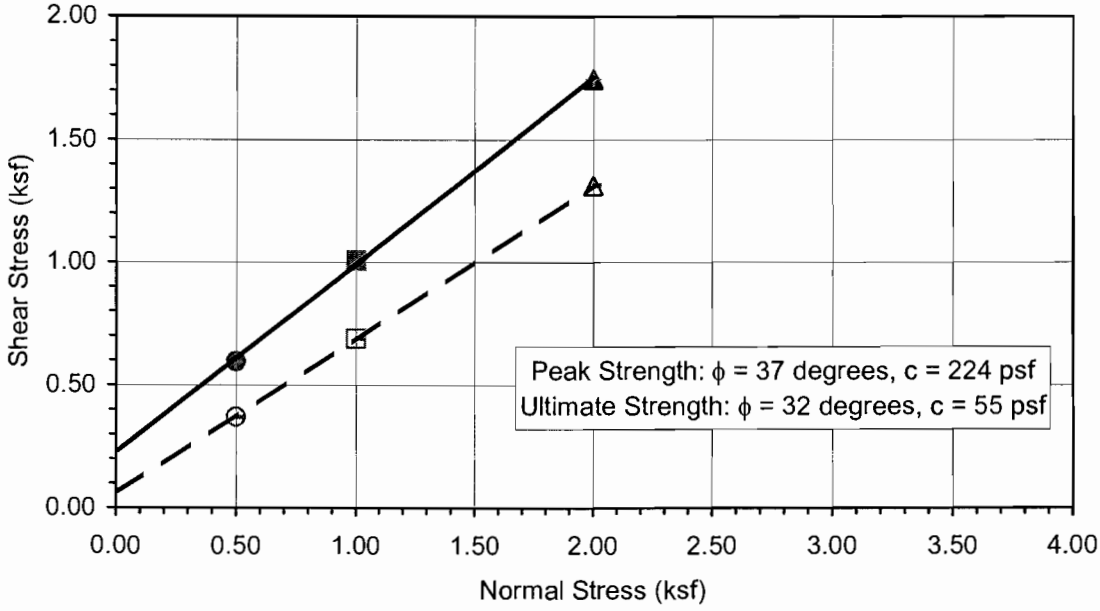
Project No.: 602089-001

Sunset Ridge

12-07

DS B-8 R-2.xls





Boring No.	**B-10**
Sample No.	**R-4**
Depth (ft)	**20**
Sample Type: Drive	
Soil Identification: Yellowish brown silty sand (SM)	

Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 0.594	■ 1.006	▲ 1.745
Shear Stress @ End of Test (ksf)	○ 0.368	□ 0.688	△ 1.314
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	18.06	18.06	18.06
Dry Density (pcf)	106.8	108.4	109.3
Saturation (%)	84.3	87.8	89.9
Soil Height Before Shearing (in.)	0.9993	0.9951	0.9862
Final Moisture Content (%)	21.2	19.7	20.2

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DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 602089-001

Sunset Ridge

12-07

Leighton

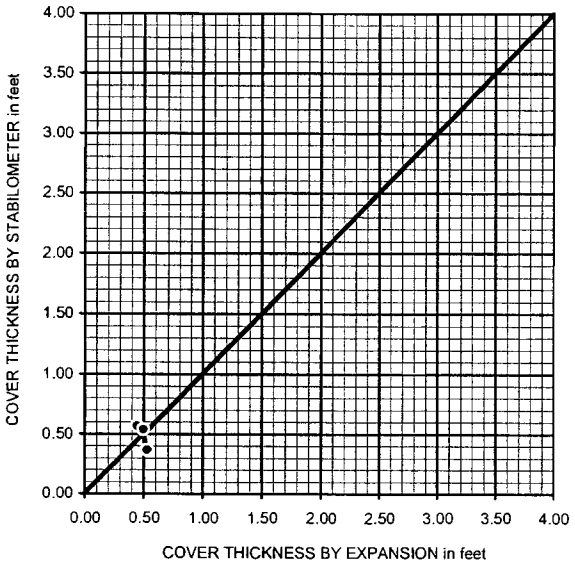
R-VALUE TEST RESULTS

PROJECT NAME:	Sunset Ridge	PROJECT NUMBER:	602089-001
SAMPLE NUMBER:	B1 from each	SAMPLE LOCATION:	B-1+4+5+11 @ 0-5'
SAMPLE DESCRIPTION:	SM	TECHNICIAN:	SCF
		DATE COMPLETED	1/3/2008

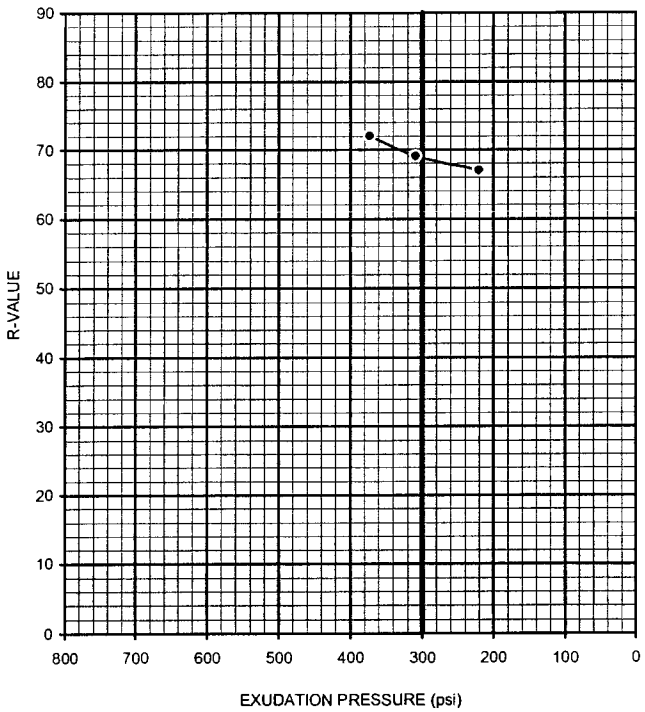
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	11.7	11.9	12.2
HEIGHT OF SAMPLE, Inches	2.52	2.48	2.47
DRY DENSITY, pcf	116.4	115.8	115.7
COMPACTOR PRESSURE, psi	250	215	185
EXUDATION PRESSURE, psi	372	309	220
EXPANSION, Inches x 10exp-4	17	16	11
STABILITY Ph 2,000 lbs (160 psi)	28	30	33
TURNS DISPLACEMENT	4.62	4.77	4.69
R-VALUE UNCORRECTED	72	69	67
R-VALUE CORRECTED	72	69	67

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.45	0.50	0.53
EXPANSION PRESSURE THICKNESS, ft.	0.57	0.53	0.37

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	69
R-VALUE BY EXUDATION:	69
EQUILIBRIUM R-VALUE:	69

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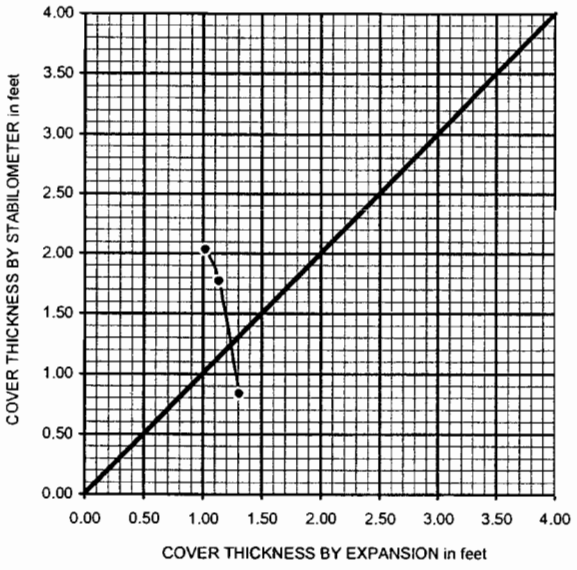
R-VALUE TEST RESULTS

PROJECT NAME:	Sunset Ridge	PROJECT NUMBER:	602089-001
SAMPLE NUMBER:	B1	SAMPLE LOCATION:	B-8 @ 0-5'
SAMPLE DESCRIPTION:	s(CL)	TECHNICIAN:	SCF
		DATE COMPLETED	1/3/2008

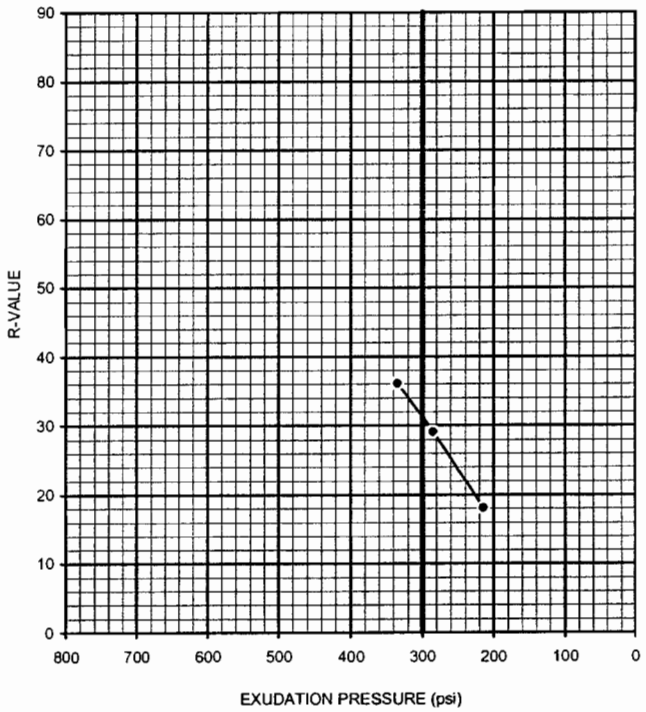
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	12.1	12.5	13.0
HEIGHT OF SAMPLE, Inches	2.52	2.48	2.47
DRY DENSITY, pcf	117.9	124.1	117.6
COMPACTOR PRESSURE, psi	75	50	50
EXUDATION PRESSURE, psi	334	285	214
EXPANSION, Inches x 10exp-4	61	53	25
STABILITY Ph 2,000 lbs (160 psi)	86	94	112
TURNS DISPLACEMENT	3.76	4.20	4.76
R-VALUE UNCORRECTED	36	29	18
R-VALUE CORRECTED	36	29	18

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	1.02	1.14	1.31
EXPANSION PRESSURE THICKNESS, ft.	2.03	1.77	0.83

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	23
R-VALUE BY EXUDATION:	32
EQUILIBRIUM R-VALUE:	23

Leighton

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Sunset Ridge Tested By : V. Juliano Date: 12/21/07

Project No. : 602089-001 Data Input By: J. Ward Date: 01/09/08

Boring No.	B-8	B-1, B-4, B-5, B-11 combined		
Sample No.	B-1	B-1 from each		
Sample Depth (ft)	0-5	0-5		
Soil Identification:	Yellowish brown s(CL)	Yellowish olive brown (SM)		
Wet Weight of Soil + Container (g)	188.95	178.75		
Dry Weight of Soil + Container (g)	178.56	172.59		
Weight of Container (g)	68.59	69.14		
Moisture Content (%)	9.45	5.95		
Weight of Soaked Soil (g)	100.85	100.57		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	13	14		
Crucible No.	29	31		
Furnace Temperature (°C)	840	840		
Time In / Time Out	10:40 / 11:25	10:40 / 11:25		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	20.1361	18.9951		
Wt. of Crucible (g)	20.1312	18.9724		
Wt. of Residue (g) (A)	0.0049	0.0227		
PPM of Sulfate (A) x 41150	201.63	934.11		
PPM of Sulfate, Dry Weight Basis	**223**	**993**		

CHLORIDE CONTENT, DOT California Test 422

ml of Chloride Soln. For Titration (B)	30	30		
ml of AgNO3 Soln. Used in Titration (C)	2.5	0.9		
PPM of Chloride (C -0.2) * 100 * 30 / B	230	70		
PPM of Chloride, Dry Wt. Basis	**254**	**74**		

pH TEST, DOT California Test 532/643

pH Value	**8.26**	**7.38**		
Temperature °C	19.4	19.8		

Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

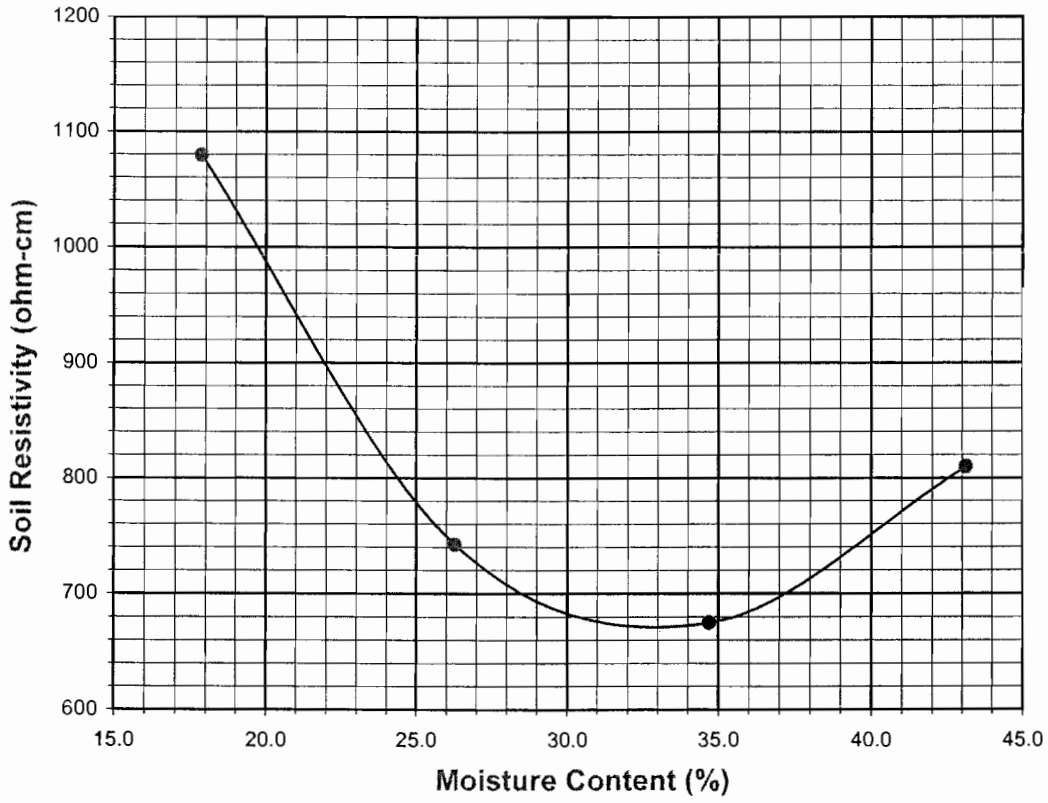
Project Name: Sunset Ridge
Project No. : 602089-001
Boring No.: B-8
Sample No. : B-1
Soil Identification: Yellowish brown s(CL)

Tested By : V. Juliano Date: 12/24/07
Data Input By: J. Ward Date: 01/09/08
Depth (ft.) : 0-5

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	100	17.87	160	1079
2	200	26.29	110	742
3	300	34.71	100	675
4	400	43.12	120	810
5				

Moisture Content (%) (MCi)	9.45
Wet Wt. of Soil + Cont. (g)	188.95
Dry Wt. of Soil + Cont. (g)	178.56
Wt. of Container (g)	68.59
Container No.	
Initial Soil Wt. (g) (Wt)	1300.00
Box Constant	6.746
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
665	**32.9**	**223**	**254**	**8.26**	**19.4**



Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

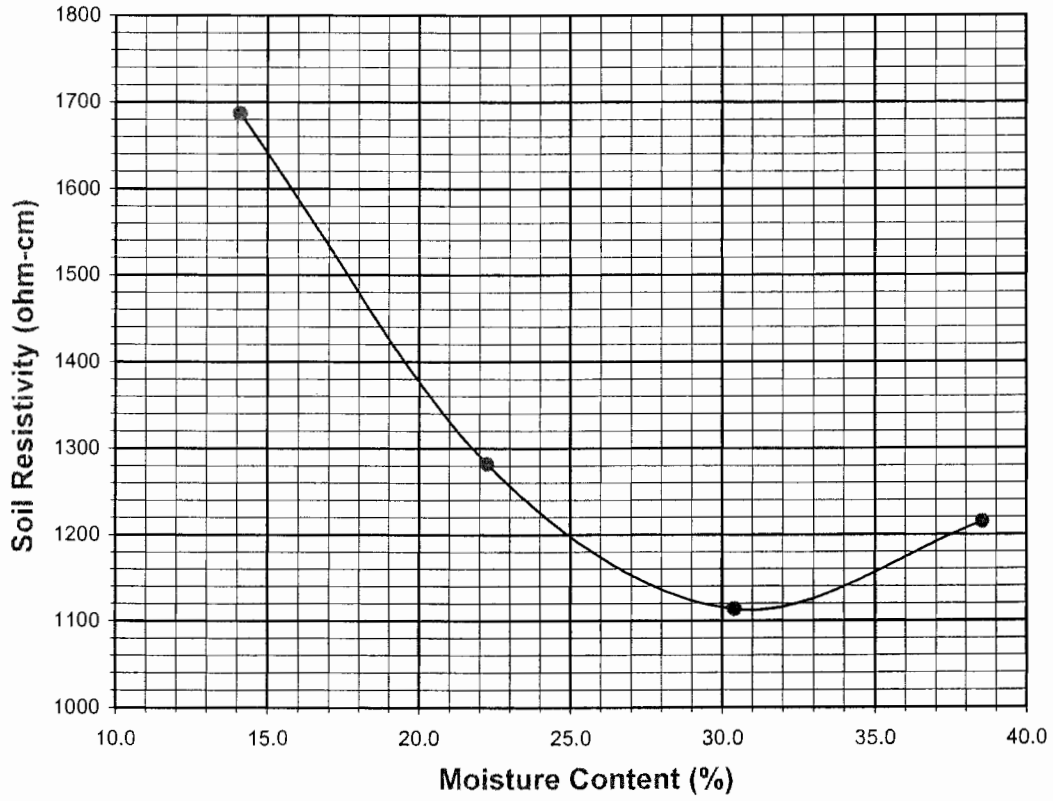
Project Name: Sunset Ridge
Project No. : 602089-001
Boring No.: B-1, B-4, B-5, B-11 combined
Sample No. : B-1 from each
Soil Identification: Yellowish olive brown (SM)

Tested By : V. Juliano Date: 12/24/07
Data Input By: J. Ward Date: 01/09/08
Depth (ft.) : 0-5

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	100	14.10	250	1687
2	200	22.26	190	1282
3	300	30.41	165	1113
4	400	38.56	180	1214
5				

Moisture Content (%) (MCi)	5.95
Wet Wt. of Soil + Cont. (g)	178.75
Dry Wt. of Soil + Cont. (g)	172.59
Wt. of Container (g)	69.14
Container No.	
Initial Soil Wt. (g) (Wt)	1300.00
Box Constant	6.746
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

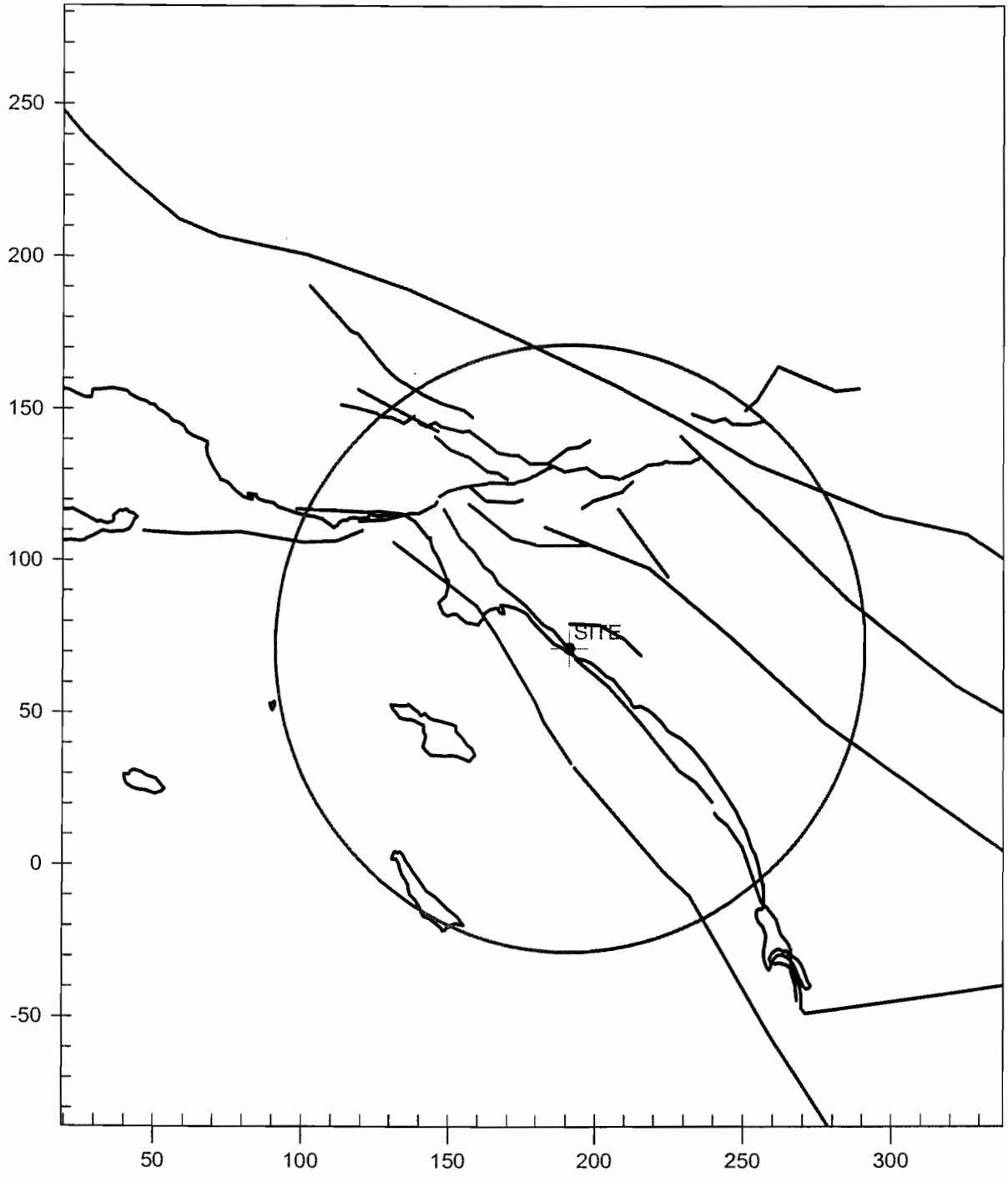
Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
1110	**31.0**	**993**	**74**	**7.38**	**19.8**



APPENDIX C

CALIFORNIA FAULT MAP

Sunset Ridge Park



CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES

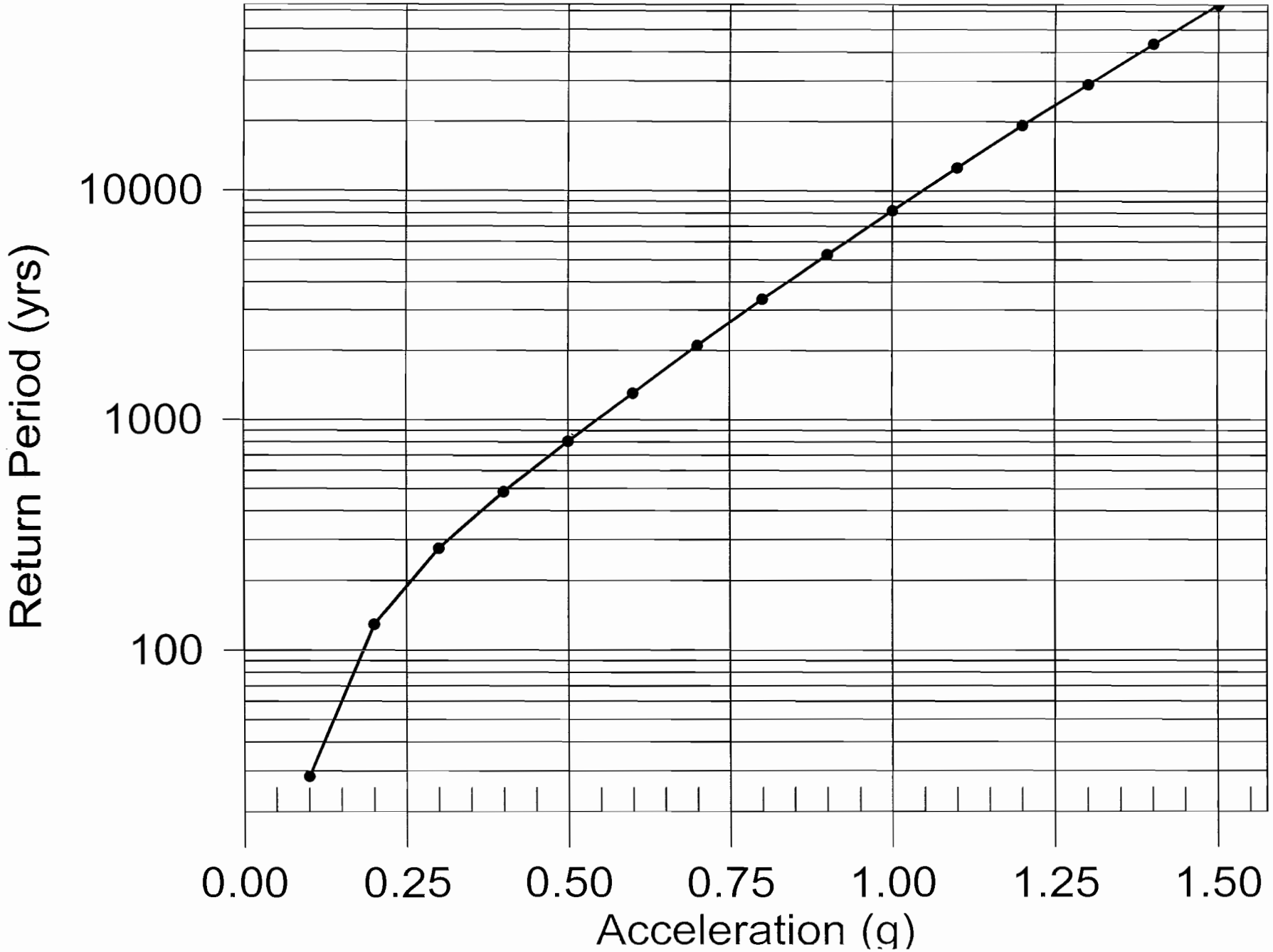
NO.	FAULT NAME	CD_1DRP	CD_2DRP	CDIST	CLODIS	CD_EPI	CD_HYPO
1	NEWPORT-INGLEWOOD (L.A.Basin)	0.3	0.3	0.3	0.3	0.3	1.6 km
2	NEWPORT-INGLEWOOD (Offshore)	4.2	4.2	4.2	4.2	5.2	5.3 km
3	SAN JOAQUIN HILLS	8.0	0.0	5.0	5.0	0.9	5.1 km
4	PALOS VERDES	19.0	19.0	19.0	19.0	19.0	19.1 km
5	PUENTE HILLS BLIND THRUST	34.0	34.0	34.3	34.3	34.9	35.4 km
6	WHITTIER	34.4	34.4	34.4	34.4	34.7	34.7 km
7	ELSINORE (GLEN IVY)	37.9	37.9	37.9	37.9	38.0	38.0 km
8	CORONADO BANK	39.5	39.5	39.5	39.5	40.3	40.3 km
9	CHINO-CENTRAL AVE. (Elsinore)	41.1	34.1	37.2	37.2	34.5	37.3 km
10	SAN JOSE	46.6	46.6	46.6	46.6	47.5	47.5 km
11	UPPER ELYSIAN PARK BLIND THRUST	51.7	51.7	51.8	51.8	52.4	52.6 km
12	ELSINORE (TEMECULA)	54.7	54.7	54.7	54.7	55.4	55.4 km
13	SIERRA MADRE	57.7	57.7	57.7	57.7	58.6	58.6 km
14	RAYMOND	57.8	57.8	57.8	57.8	58.1	58.1 km
15	CUCAMONGA	59.1	59.1	59.1	59.1	60.4	60.4 km
16	VERDUGO	59.9	59.9	59.9	59.9	61.3	61.3 km
17	HOLLYWOOD	61.4	61.4	61.4	61.4	62.1	62.2 km
18	CLAMSHELL-SAWPIT	61.9	61.9	61.9	61.9	63.1	63.1 km
19	SANTA MONICA	66.0	66.0	66.0	66.0	66.3	66.3 km
20	MALIBU COAST	71.3	71.3	71.3	71.3	72.4	72.4 km
21	ROSE CANYON	73.3	73.3	73.3	73.3	74.4	74.4 km
22	SAN JACINTO-SAN BERNARDINO	76.9	76.9	76.9	76.9	76.9	76.9 km
23	SAN JACINTO-SAN JACINTO VALLEY	78.6	78.6	78.6	78.6	78.7	78.8 km
24	SIERRA MADRE (San Fernando)	79.9	79.9	79.9	79.9	80.9	80.9 km
25	ANACAPA-DUME	80.8	80.8	80.8	80.8	82.1	82.1 km
26	SAN GABRIEL	83.5	83.5	83.5	83.5	84.4	84.5 km
27	SAN ANDREAS - San Bernardino M-1	84.4	84.4	84.4	84.4	84.4	84.4 km
28	SAN ANDREAS - Whole M-1a	84.4	84.4	84.4	84.4	84.4	84.6 km
29	SAN ANDREAS - SB-Coach. M-1b-2	84.4	84.4	84.4	84.4	84.4	84.5 km
30	SAN ANDREAS - SB-Coach. M-2b	84.4	84.4	84.4	84.4	84.4	84.5 km
31	SAN ANDREAS - Mojave M-1c-3	84.5	84.5	84.5	84.5	84.5	84.6 km
32	SAN ANDREAS - 1857 Rupture M-2a	84.5	84.5	84.5	84.5	84.5	84.6 km
33	SAN ANDREAS - Cho-Moj M-1b-1	84.5	84.5	84.5	84.5	84.5	84.6 km
34	NORTHRIDGE (E. Oak Ridge)	84.8	77.4	79.9	79.9	78.7	81.0 km
35	CLEGHORN	88.2	88.2	88.2	88.2	88.3	88.3 km
36	ELSINORE (JULIAN)	89.9	89.9	89.9	89.9	90.9	90.9 km
37	SANTA SUSANA	93.5	93.5	93.5	93.5	94.1	94.1 km
38	SAN JACINTO-ANZA	95.4	95.4	95.4	95.4	96.2	96.2 km
39	NORTH FRONTAL FAULT ZONE (West)	98.9	96.9	97.7	97.7	98.1	98.8 km

EXPLANATION

CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

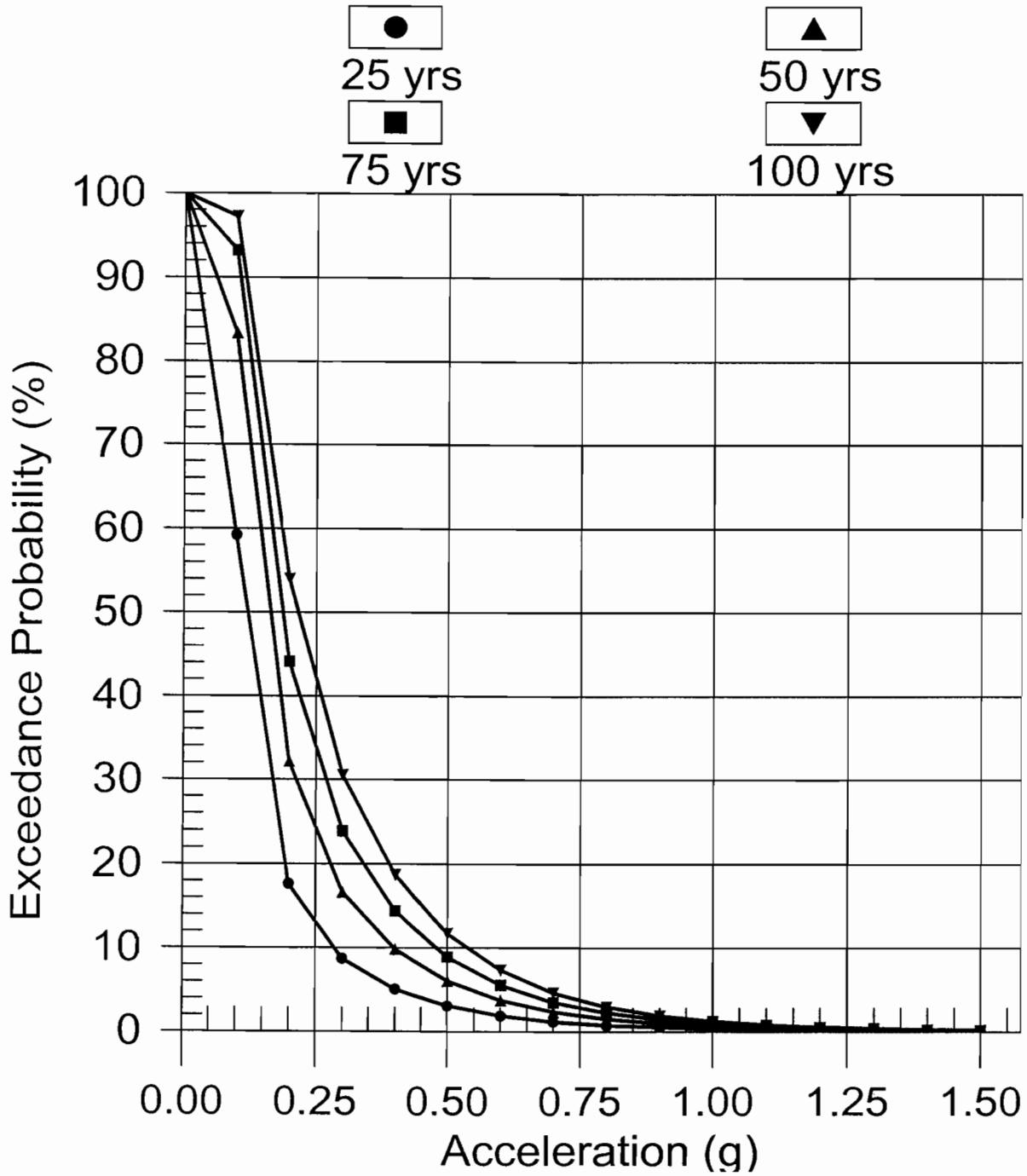
RETURN PERIOD vs. ACCELERATION

BOZ. ET AL.(1999)HOR HS COR



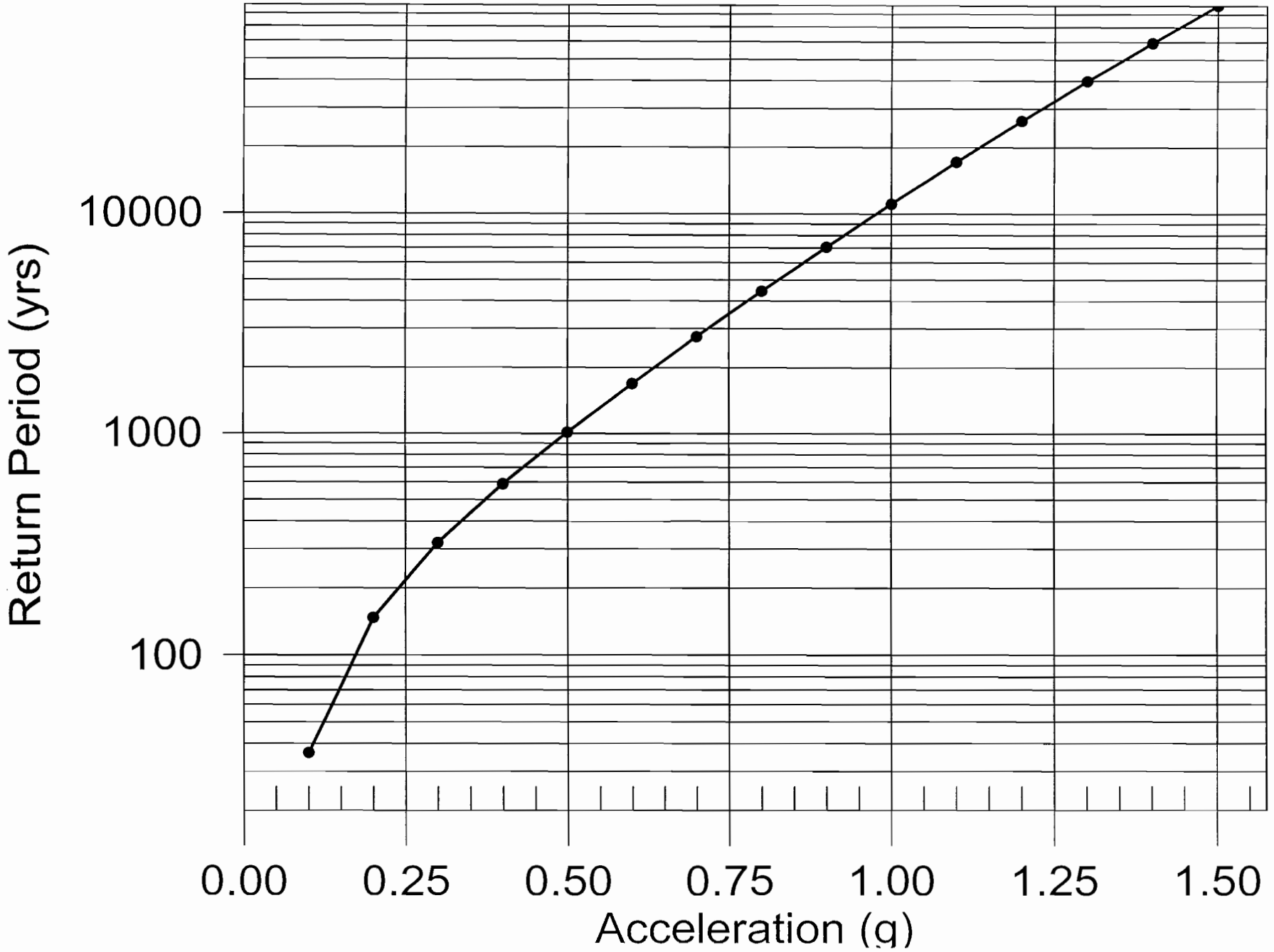
PROBABILITY OF EXCEEDANCE

BOZ. ET AL.(1999)HOR HS COR



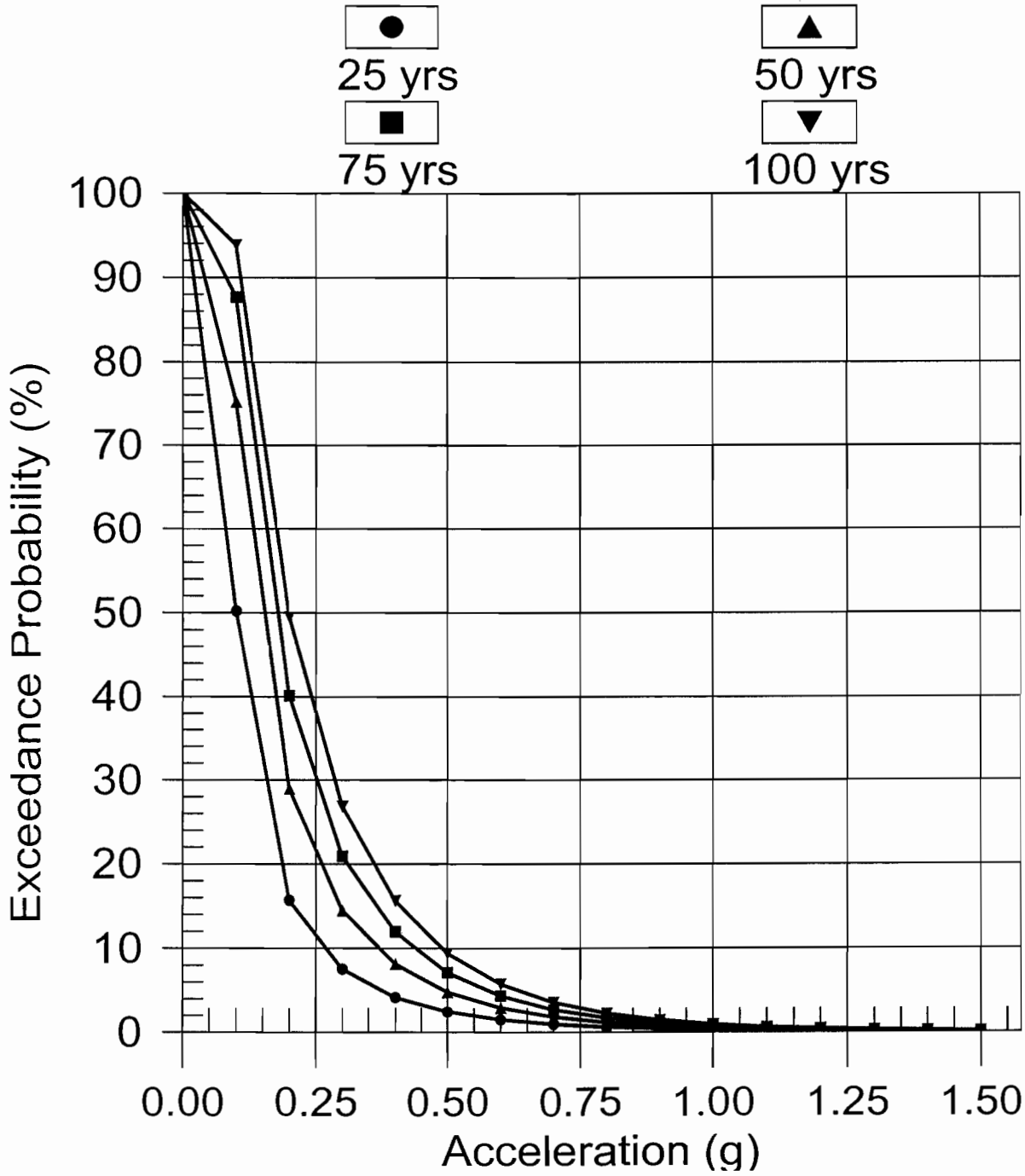
RETURN PERIOD vs. ACCELERATION

SADIGH ET AL. (1997) DEEP SOIL



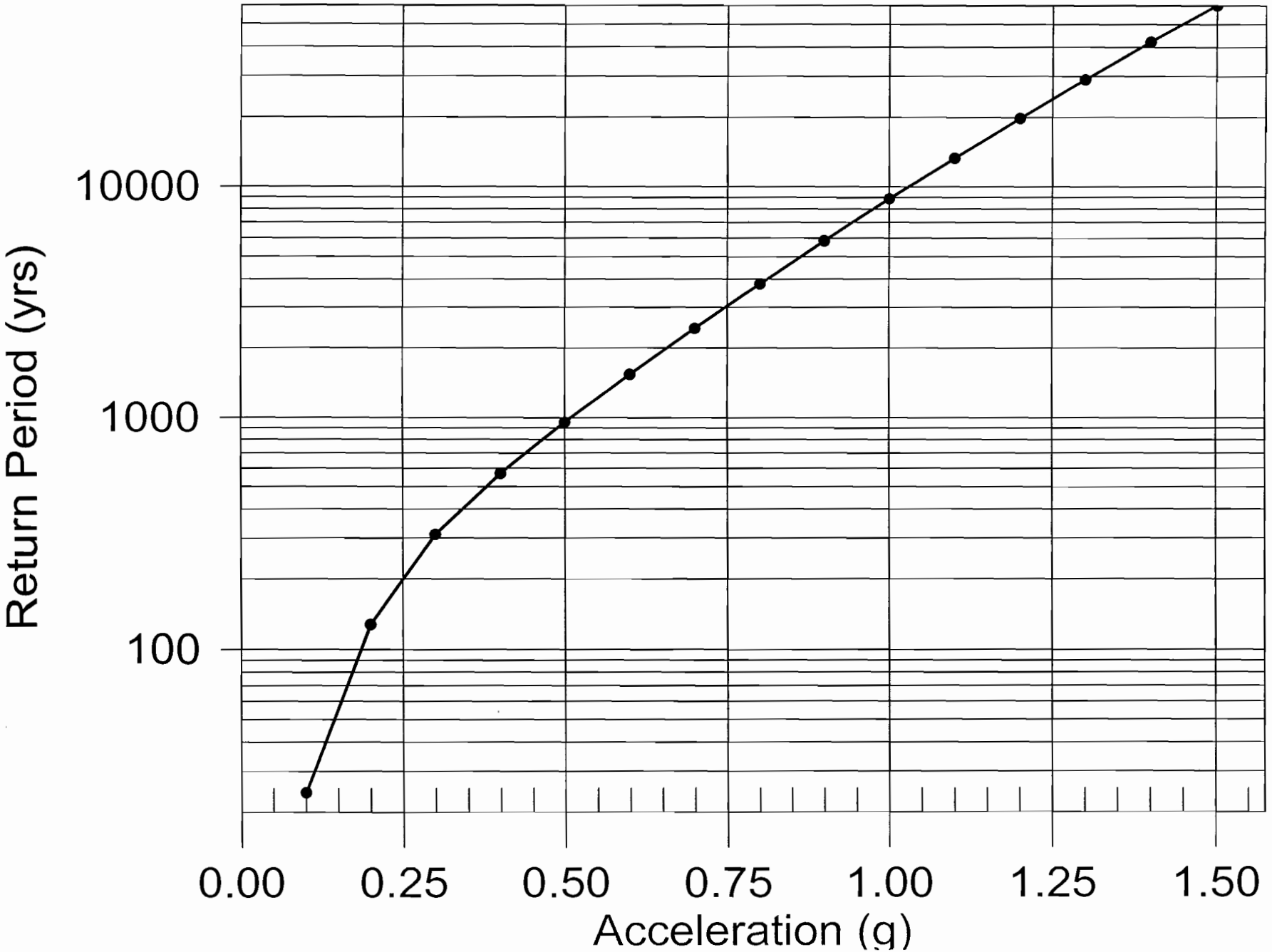
PROBABILITY OF EXCEEDANCE

SADIGH ET AL. (1997) DEEP SOIL



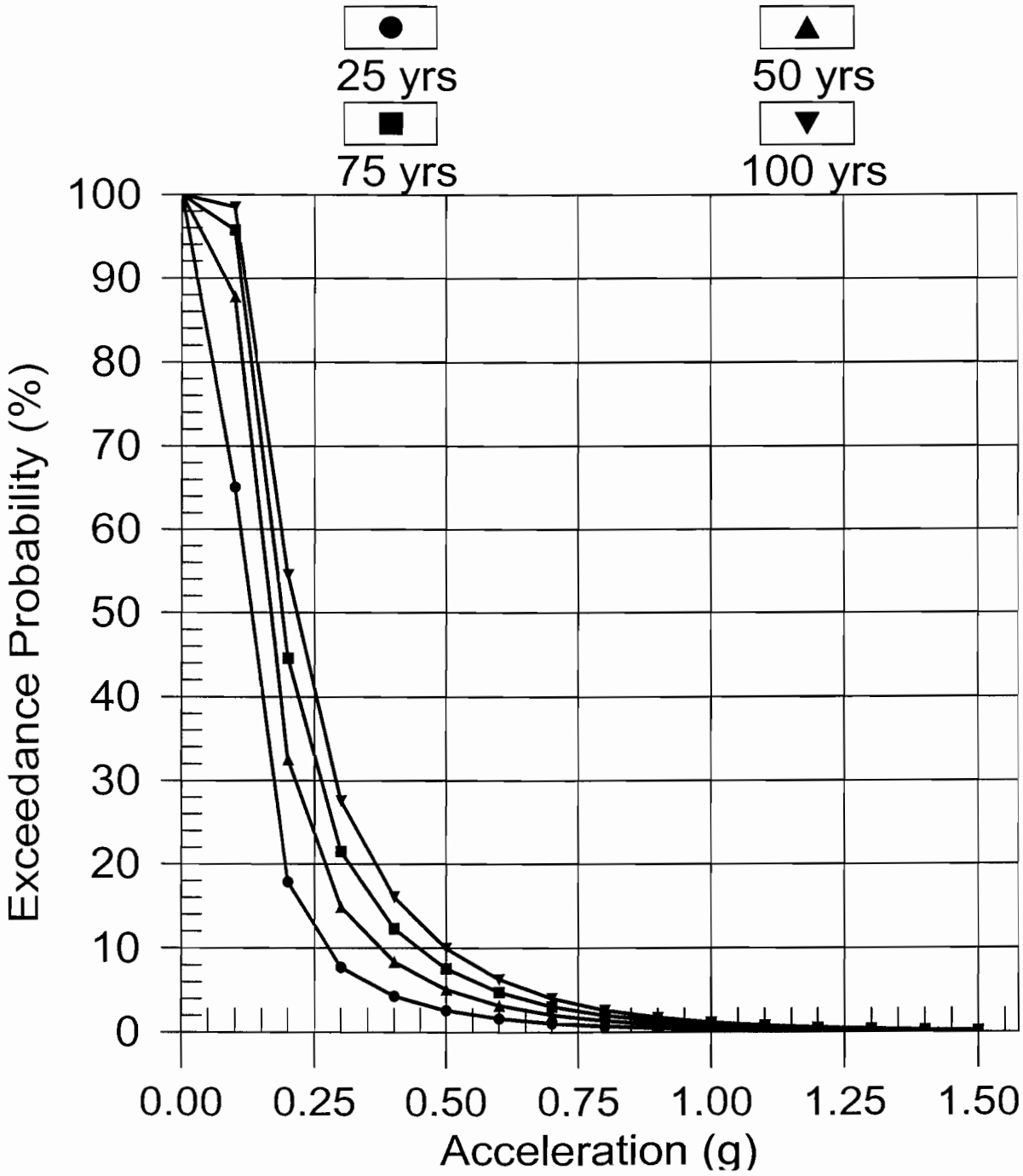
RETURN PERIOD vs. ACCELERATION

ABRAHAMSON & SILVA (1997) SOIL



PROBABILITY OF EXCEEDANCE

ABRAHAMSON & SILVA (1997) SOIL



APPENDIX D

Summary of Direct Shear Test Results for Slope Stability Analysis

Material #	Direct Shear Location / Depth	Lab value ϕ(°)	Lab value c (psf)	Design value ϕ(°)	Design value c (psf)
CROSS-SECTION A-A'					
1	B-7 @ 5'	38	588	34	500
2	B-8 @ 10'	34	0	34	0
3	B-3 @ 15'	32	53	32	50
4	B-10 @ 20'	32	55	32	50
5	B-3 @ 55'	23	350	23	350
CROSS-SECTION B-B'					
1	B-3 @ 15'	32	53	32	50
2	B-10 @ 20'	32	55	32	50
3	B-3 @ 55'	23	350	23	350
CROSS-SECTION C-C'					
1	B-7 @ 5'	38	588	34	500
2	B-8 @ 10'	34	0	34	0
3	B-3 @ 15'	32	53	32	50
4	B-3 @ 55'	23	350	23	350

SUMMARY OF DIRECT SHEAR TEST RESULTS FOR SLOPE STA ANALYSIS

Project No. 602089-001

Project Name

Engineer

Date 8/7/09 Figure No.

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

Surficial slope stability calculation

$$F.S. = \frac{C + \delta_b D_s \times \cos^2 \bar{i} \tan \phi}{\delta D_s (\sin \bar{i})(\cos \bar{i})}$$

Where C = cohesion (psf)

δ_b = Bouyant density = 125 - 62.4 = 62.6 pcf

D_s = Depth of saturation

$\bar{i}$ = slope inclination = 26.6° for 2H:1V

ϕ = angle of friction

δ = wet density = 125 pcf

For a 2H:1V slope

$$FS = \frac{C + 62.6 \times D_s \times (\cos 26.6)^2 \tan \phi}{125 \times D_s \times (\sin 26.6)(\cos 26.6)}$$

$$F.S. = \frac{C + 50. D_s \tan \phi}{50 D_s}$$

Assume depth of saturation = 4 feet

" a factor of safety = 1.5

Surficial Slope Stability Calculation 1/2

Project No. 602089-001

Project Name Sunset Ridge Park

Engineer

Date 8/6/09 Figure No.

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

$$1.5 = \frac{c + 50 \times 4 \times \tan\phi}{50 \times 4}$$

$$1.5 = \frac{c + 200 \tan\phi}{200}$$

In order to provide a F.S. ≥ 1.5

the followings can be used:

c	ϕ	F.S.
175	32	1.5
160	35	1.5
185	30	1.5
206	25	1.5

Recommendations: upper 4' of soil should have min $\phi = 30°$, $c = 200$ psf for surficial stability for 2H:1V

Surficial Slope Stability Calculation 2/2

Project No. 602089-001

Project Name Sunset Ridge Park

Engineer

Date 8/6/09 Figure No.

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

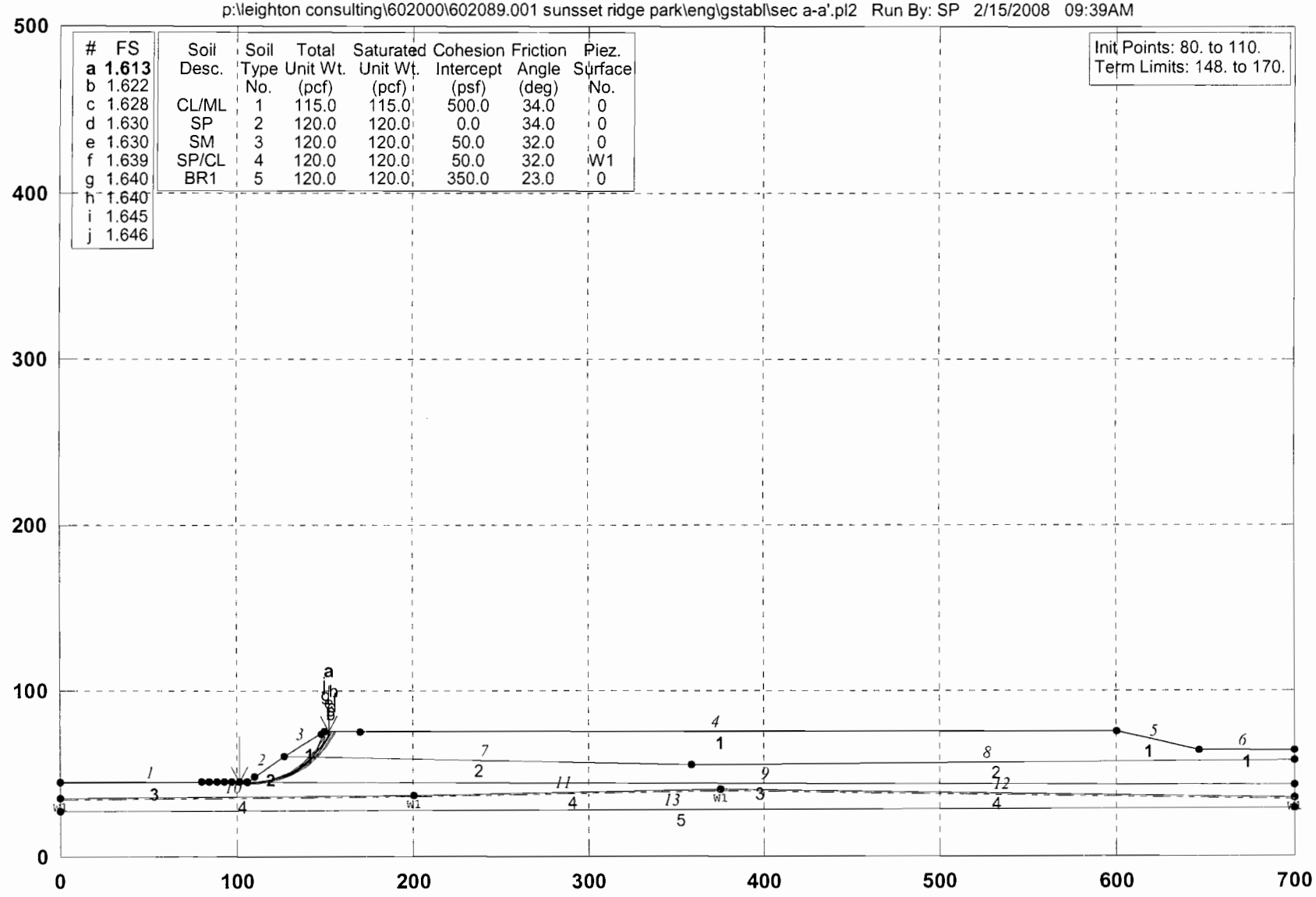
P.N: 602089-001/ Cross Section A-A'/ Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec a-a'.pl2 Run By: SP 2/15/2008 09:39AM

#	FS
a	**1.613**
b	1.622
c	1.628
d	1.630
e	1.630
f	1.639
g	1.640
h	1.640
i	1.645
j	1.646

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CL/ML	1	115.0	115.0	500.0	34.0	0
SP	2	120.0	120.0	0.0	34.0	0
SM	3	120.0	120.0	50.0	32.0	0
SP/CL	4	120.0	120.0	50.0	32.0	W1
BR1	5	120.0	120.0	350.0	23.0	0

Init Points: 80. to 110.
Term Limits: 148. to 170.



GSTABL7 v.2 FSmin=1.613

Safety Factors Are Calculated By The Modified Bishop Method

***** GSTABL7 *****

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

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

SLOPE STABILITY ANALYSIS SYSTEM

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

****

Analysis Run Date: 2/15/2008
Time of Run: 09:39AM
Run By: SP
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec a-a'.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec a-a'.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec a-a'.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section A-A'/
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
6 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	45.00	106.00	45.00	3
2	106.00	45.00	127.00	60.00	2
3	127.00	60.00	150.00	75.00	1
4	150.00	75.00	600.00	75.00	1
5	600.00	75.00	647.00	64.00	1
6	647.00	64.00	700.00	64.00	1
7	127.00	60.00	359.00	55.00	2
8	359.00	55.00	700.00	58.00	2
9	106.00	45.00	700.00	43.00	3
10	0.00	35.00	200.00	37.00	4
11	200.00	37.00	375.00	40.00	4
12	375.00	40.00	700.00	35.00	4
13	0.00	27.00	700.00	29.00	5

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	115.0	115.0	500.0	34.0	0.00	0.0	0
2	120.0	120.0	0.0	34.0	0.00	0.0	0
3	120.0	120.0	50.0	32.0	0.00	0.0	0
4	120.0	120.0	50.0	32.0	0.00	0.0	1
5	120.0	120.0	350.0	23.0	0.00	0.0	0

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 = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	34.00
2	200.00	36.00
3	375.00	39.00
4	700.00	34.00

A Critical Failure Surface Searching Method, Using A Random

Technique For Generating Circular Surfaces, Has Been Specified.
1600 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 8 Points Equally Spaced
Along The Ground Surface Between X = 80.00(ft)
and X = 110.00(ft)
Each Surface Terminates Between X = 148.00(ft)
and X = 170.00(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.
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 Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 3.950 FS Min = 1.613 FS Ave = 2.130
Standard Deviation = 0.269 Coefficient of Variation = 12.61 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.429	45.000
2	106.409	44.556
3	111.408	44.638
4	116.371	45.244
5	121.243	46.369
6	125.970	48.000
7	130.499	50.118
8	134.781	52.700
9	138.767	55.718
10	142.414	59.138
11	145.682	62.922
12	148.534	67.029
13	150.939	71.413
14	152.441	75.000

Circle Center At X = 108.151 ; Y = 91.940 ; and Radius = 47.419
Factor of Safety
*** 1.613 ***
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	4.6	111.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.4	28.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.0	1488.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.7	1655.7	0.0	0.0	0.	0.	0.0	0.0	0.0
5	2.2	1735.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.9	4876.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.7	5894.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	1.0	1408.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	3.5	4951.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.3	6222.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	4.0	5688.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	3.6	4838.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	0.4	558.6	0.0	0.0	0.	0.	0.0	0.0	0.0
14	2.8	3233.1	0.0	0.0	0.	0.	0.0	0.0	0.0
15	2.9	2669.2	0.0	0.0	0.	0.	0.0	0.0	0.0
16	1.5	1037.8	0.0	0.0	0.	0.	0.0	0.0	0.0
17	0.9	479.7	0.0	0.0	0.	0.	0.0	0.0	0.0
18	1.5	309.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.429	45.000
2	106.394	44.416

3	111.394	44.373
4	116.369	44.872
5	121.261	45.905
6	126.013	47.461
7	130.568	49.522
8	134.874	52.064
9	138.880	55.057
10	142.538	58.465
11	145.806	62.249
12	148.646	66.364
13	151.024	70.762
14	152.753	75.000

Circle Center At X = 109.297 ; Y = 90.441 ; and Radius = 46.117

Factor of Safety

*** 1.622 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.111	44.441
3	107.111	44.355
4	112.096	44.743
5	117.021	45.602
6	121.843	46.924
7	126.519	48.697
8	131.005	50.905
9	135.261	53.528
10	139.250	56.543
11	142.935	59.922
12	146.283	63.636
13	149.264	67.650
14	151.851	71.928
15	153.331	75.000

Circle Center At X = 105.517 ; Y = 97.026 ; and Radius = 52.695

Factor of Safety

*** 1.628 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.119	44.516
3	107.119	44.484
4	112.102	44.906
5	117.025	45.776
6	121.850	47.089
7	126.536	48.832
8	131.045	50.993
9	135.340	53.553
10	139.385	56.492
11	143.148	59.784
12	146.597	63.404
13	149.705	67.321
14	152.445	71.503
15	154.308	75.000

Circle Center At X = 104.967 ; Y = 99.624 ; and Radius = 55.181

Factor of Safety

*** 1.630 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.097	44.325
3	107.094	44.156
4	112.083	44.494
5	117.011	45.337
6	121.829	46.676
7	126.486	48.496

8	130.934	50.779
9	135.128	53.502
10	139.023	56.636
11	142.581	60.149
12	145.765	64.004
13	148.540	68.163
14	150.880	72.582
15	151.860	75.000

Circle Center At X = 106.259 ; Y = 93.377 ; and Radius = 49.228

Factor of Safety

*** 1.630 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.104	44.379
3	107.101	44.210
4	112.093	44.494
5	117.039	45.228
6	121.898	46.407
7	126.630	48.021
8	131.197	50.057
9	135.561	52.497
10	139.686	55.323
11	143.539	58.510
12	147.087	62.033
13	150.302	65.862
14	153.157	69.967
15	155.629	74.313
16	155.941	75.000

Circle Center At X = 106.479 ; Y = 99.322 ; and Radius = 55.119

Factor of Safety

*** 1.639 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.429	45.000
2	106.358	44.166
3	111.353	43.942
4	116.338	44.332
5	121.238	45.330
6	125.978	46.921
7	130.487	49.081
8	134.698	51.777
9	138.546	54.969
10	141.974	58.609
11	144.930	62.642
12	147.370	67.006
13	149.256	71.637
14	150.165	75.000

Circle Center At X = 110.692 ; Y = 84.538 ; and Radius = 40.609

Factor of Safety

*** 1.640 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.066	44.127
3	107.052	43.748
4	112.050	43.867
5	117.012	44.483
6	121.888	45.590
7	126.630	47.177
8	131.190	49.227
9	135.523	51.721
10	139.587	54.635
11	143.341	57.938

12	146.747	61.598
13	149.772	65.579
14	152.386	69.841
15	154.563	74.343
16	154.803	75.000

Circle Center At X = 108.364 ; Y = 93.844 ; and Radius = 50.116

Factor of Safety

*** 1.640 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.083	44.230
3	107.078	44.010
4	112.067	44.341
5	116.990	45.219
6	121.785	46.634
7	126.396	48.569
8	130.765	51.000
9	134.840	53.897
10	138.571	57.226
11	141.913	60.945
12	144.824	65.010
13	147.271	69.371
14	149.222	73.974
15	149.414	74.618

Circle Center At X = 106.578 ; Y = 89.331 ; and Radius = 45.324

Factor of Safety

*** 1.645 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.060	44.093
3	107.048	43.748
4	112.043	43.969
5	116.981	44.752
6	121.799	46.088
7	126.436	47.961
8	130.831	50.345
9	134.928	53.210
10	138.676	56.520
11	142.025	60.232
12	144.934	64.299
13	147.365	68.669
14	149.286	73.285
15	149.731	74.824

Circle Center At X = 107.600 ; Y = 87.927 ; and Radius = 44.183

Factor of Safety

*** 1.646 ***

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

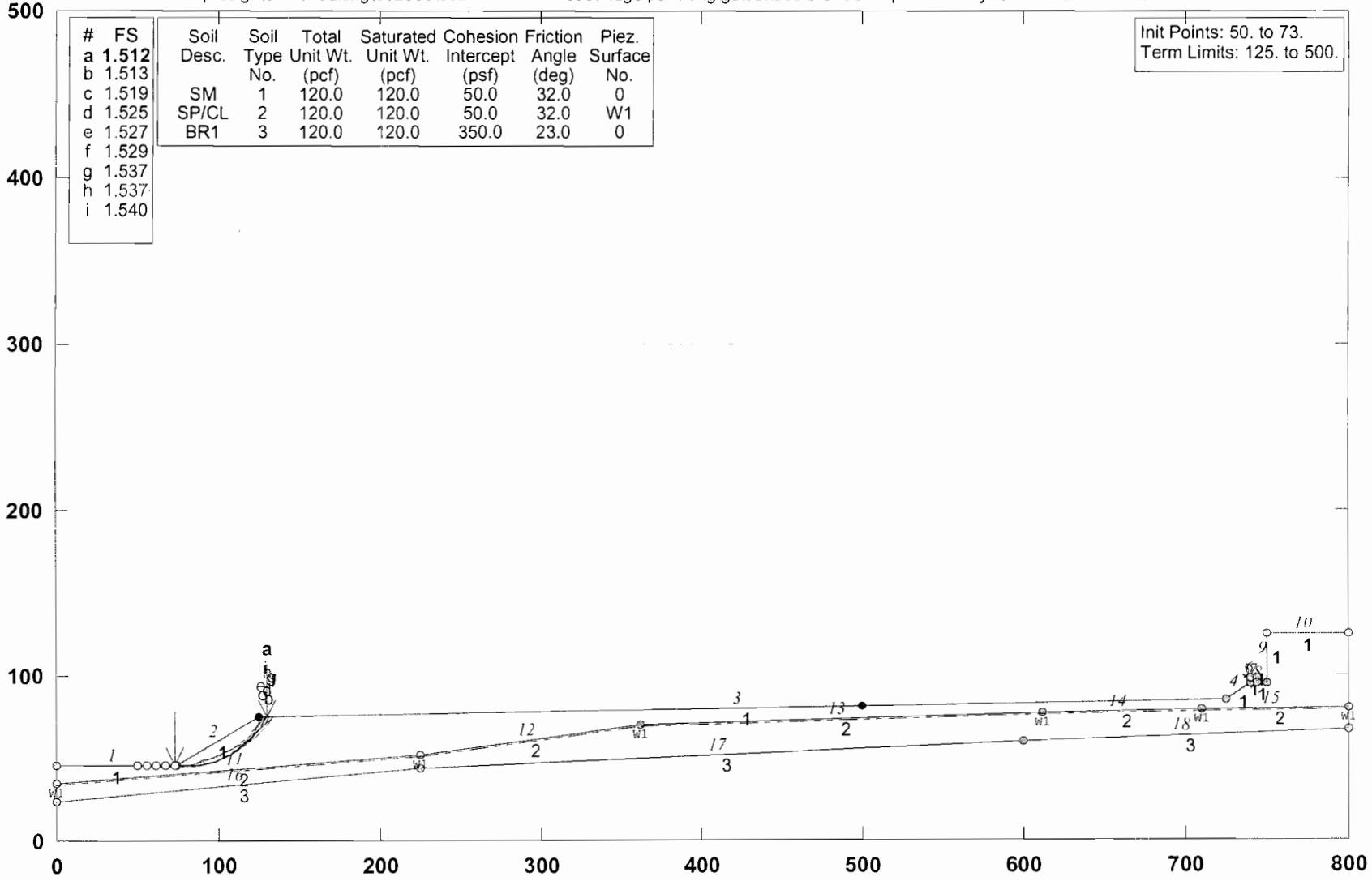
P.N: 602089-001/ Cross Section B-B'/ Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec b-b" trail 1.pl2 Run By: SP 2/15/2008 09:45AM

#	FS
a	**1.512**
b	1.513
c	1.519
d	1.525
e	1.527
f	1.529
g	1.537
h	1.537
i	1.540

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SM	1	120.0	120.0	50.0	32.0	0
SP/CL	2	120.0	120.0	50.0	32.0	W1
BR1	3	120.0	120.0	350.0	23.0	0

Init Points: 50. to 73.
Term Limits: 125. to 500.



GSTABL7 v.2 FSmin=1.512

Safety Factors Are Calculated By The Modified Bishop Method

***** GSTABL7 *****

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

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

SLOPE STABILITY ANALYSIS SYSTEM

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

****

Analysis Run Date: 2/15/2008
Time of Run: 09:45AM
Run By: SP
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec b-b'' trail 1.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec b-b'' trail 1.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec b-b'' trail 1.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section B-B'/
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
10 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	46.00	74.00	46.00	1
2	74.00	46.00	125.00	75.00	1
3	125.00	75.00	725.00	85.00	1
4	725.00	85.00	740.00	95.00	1
5	740.00	95.00	740.01	98.00	1
6	740.01	98.00	744.00	98.00	1
7	744.00	98.00	744.01	95.00	1
8	744.01	95.00	750.00	95.00	1
9	750.00	95.00	750.01	125.00	1
10	750.01	125.00	800.00	125.00	1
11	0.00	35.00	225.00	52.00	2
12	225.00	52.00	362.00	70.00	2
13	362.00	70.00	612.00	77.00	2
14	612.00	77.00	710.00	79.00	2
15	710.00	79.00	800.00	80.00	2
16	0.00	24.00	225.00	44.00	3
17	225.00	44.00	600.00	60.00	3
18	600.00	60.00	800.00	67.00	3

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	120.0	120.0	50.0	32.0	0.00	0.0	0
2	120.0	120.0	50.0	32.0	0.00	0.0	1
3	120.0	120.0	350.0	23.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 6 Coordinate Points
Pore Pressure Inclination Factor = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	34.00
2	225.00	51.00

3	362.00	69.00
4	612.00	76.00
5	710.00	78.00
6	800.00	79.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
400 Surface(s) Initiate(s) From Each Of 5 Points Equally Spaced
Along The Ground Surface Between X = 50.00(ft)
and X = 73.00(ft)
Each Surface Terminates Between X = 125.00(ft)
and X = 500.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
5.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Attempted = 2000
Number of Trial Surfaces With Valid FS = 2000
Statistical Data On All Valid FS Values:
FS Max = 10.765 FS Min = 1.512 FS Ave = 4.014
Standard Deviation = 2.050 Coefficient of Variation = 51.07 %
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.000	46.000
2	77.980	45.557
3	82.980	45.562
4	87.960	46.014
5	92.879	46.911
6	97.698	48.245
7	102.378	50.005
8	106.881	52.177
9	111.172	54.743
10	115.216	57.684
11	118.981	60.974
12	122.435	64.589
13	125.552	68.499
14	128.306	72.672
15	129.600	75.077

Circle Center At X = 80.427 ; Y = 101.277 ; and Radius = 55.774
Factor of Safety
*** 1.512 ***
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	1.0	5.3	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.0	667.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.0	2475.3	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.0	4023.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	4.9	5237.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.8	6087.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.7	6560.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	4.5	6661.5	0.0	0.0	0.	0.	0.0	0.0	0.0
9	4.3	6414.6	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.0	5859.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	3.8	5049.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	3.5	4053.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	2.6	2484.8	0.0	0.0	0.	0.	0.0	0.0	0.0
14	0.6	453.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	2.8	1469.7	0.0	0.0	0.	0.	0.0	0.0	0.0
16	1.3	185.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	67.250	46.000
2	72.211	45.375
3	77.206	45.148
4	82.203	45.320
5	87.170	45.890
6	92.076	46.855
7	96.890	48.208
8	101.580	49.940
9	106.117	52.042
10	110.471	54.499
11	114.616	57.295
12	118.525	60.413
13	122.172	63.834
14	125.535	67.534
15	128.592	71.491
16	130.945	75.099

Circle Center At X = 77.560 ; Y = 107.694 ; and Radius = 62.549

Factor of Safety

*** 1.513 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.000	46.000
2	77.971	45.466
3	82.971	45.421
4	87.951	45.866
5	92.864	46.797
6	97.662	48.204
7	102.299	50.073
8	106.731	52.388
9	110.915	55.125
10	114.811	58.259
11	118.382	61.759
12	121.593	65.592
13	124.413	69.721
14	126.815	74.106
15	127.212	75.037

Circle Center At X = 80.927 ; Y = 96.397 ; and Radius = 51.016

Factor of Safety

*** 1.519 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.750	46.000
2	60.719	45.443
3	65.713	45.191
4	70.712	45.247
5	75.699	45.608
6	80.654	46.275
7	85.560	47.245
8	90.396	48.513
9	95.145	50.076
10	99.790	51.927
11	104.313	54.060
12	108.696	56.466
13	112.923	59.136
14	116.979	62.060
15	120.847	65.228
16	124.515	68.626
17	127.966	72.244
18	130.366	75.089

Circle Center At X = 67.324 ; Y = 126.556 ; and Radius = 81.383

Factor of Safety

*** 1.525 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	73.000	46.000
2	77.966	45.421
3	82.966	45.353
4	87.946	45.796
5	92.855	46.746
6	97.641	48.192
7	102.255	50.120
8	106.647	52.510
9	110.772	55.336
10	114.586	58.568
11	118.050	62.174
12	121.128	66.114
13	123.787	70.349
14	125.998	74.833
15	126.067	75.018

Circle Center At X = 81.132 ; Y = 94.178 ; and Radius = 48.859

Factor of Safety

*** 1.527 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	67.250	46.000
2	72.221	45.464
3	77.218	45.292
4	82.215	45.483
5	87.184	46.038
6	92.099	46.952
7	96.936	48.222
8	101.667	49.840
9	106.267	51.797
10	110.714	54.085
11	114.982	56.689
12	119.049	59.597
13	122.894	62.794
14	126.496	66.261
15	129.836	69.982
16	132.897	73.935
17	133.700	75.145

Circle Center At X = 77.088 ; Y = 113.982 ; and Radius = 68.690

Factor of Safety

*** 1.529 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.750	46.000
2	60.728	45.533
3	65.725	45.344
4	70.724	45.434
5	75.710	45.801
6	80.669	46.446
7	85.583	47.365
8	90.439	48.556
9	95.221	50.016
10	99.915	51.740
11	104.505	53.722
12	108.978	55.957
13	113.320	58.437
14	117.517	61.154
15	121.556	64.101
16	125.425	67.269
17	129.111	70.646
18	132.604	74.224
19	133.404	75.140

Circle Center At X = 66.619 ; Y = 135.153 ; and Radius = 89.814

Factor of Safety

*** 1.537 ***
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.750	46.000
2	60.705	45.331
3	65.693	44.981
4	70.693	44.951
5	75.684	45.243
6	80.647	45.854
7	85.560	46.782
8	90.403	48.023
9	95.157	49.573
10	99.802	51.424
11	104.318	53.569
12	108.688	56.000
13	112.892	58.706
14	116.914	61.676
15	120.738	64.898
16	124.347	68.358
17	127.726	72.043
18	130.177	75.086

Circle Center At X = 68.659 ; Y = 122.735 ; and Radius = 77.813

Factor of Safety
*** 1.537 ***
Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.750	46.000
2	60.699	45.287
3	65.684	44.908
4	70.684	44.864
5	75.676	45.156
6	80.636	45.783
7	85.544	46.741
8	90.376	48.026
9	95.110	49.633
10	99.726	51.555
11	104.203	53.781
12	108.520	56.304
13	112.658	59.110
14	116.599	62.188
15	120.323	65.524
16	123.816	69.102
17	127.060	72.907
18	128.660	75.061

Circle Center At X = 68.847 ; Y = 119.132 ; and Radius = 74.296

Factor of Safety
*** 1.540 ***
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	67.250	46.000
2	72.167	45.093
3	77.149	44.673
4	82.149	44.745
5	87.117	45.307
6	92.006	46.353
7	96.769	47.875
8	101.360	49.857
9	105.733	52.280
10	109.848	55.121
11	113.664	58.352
12	117.144	61.942
13	120.255	65.856
14	122.967	70.057
15	125.253	74.504

```
   16        125.452       75.008
Circle Center At X =    78.930 ; Y =    95.458 ; and Radius =    50.819
      Factor of Safety
     ***    1.541   ***
         **** END OF GSTABL7 OUTPUT ****
```

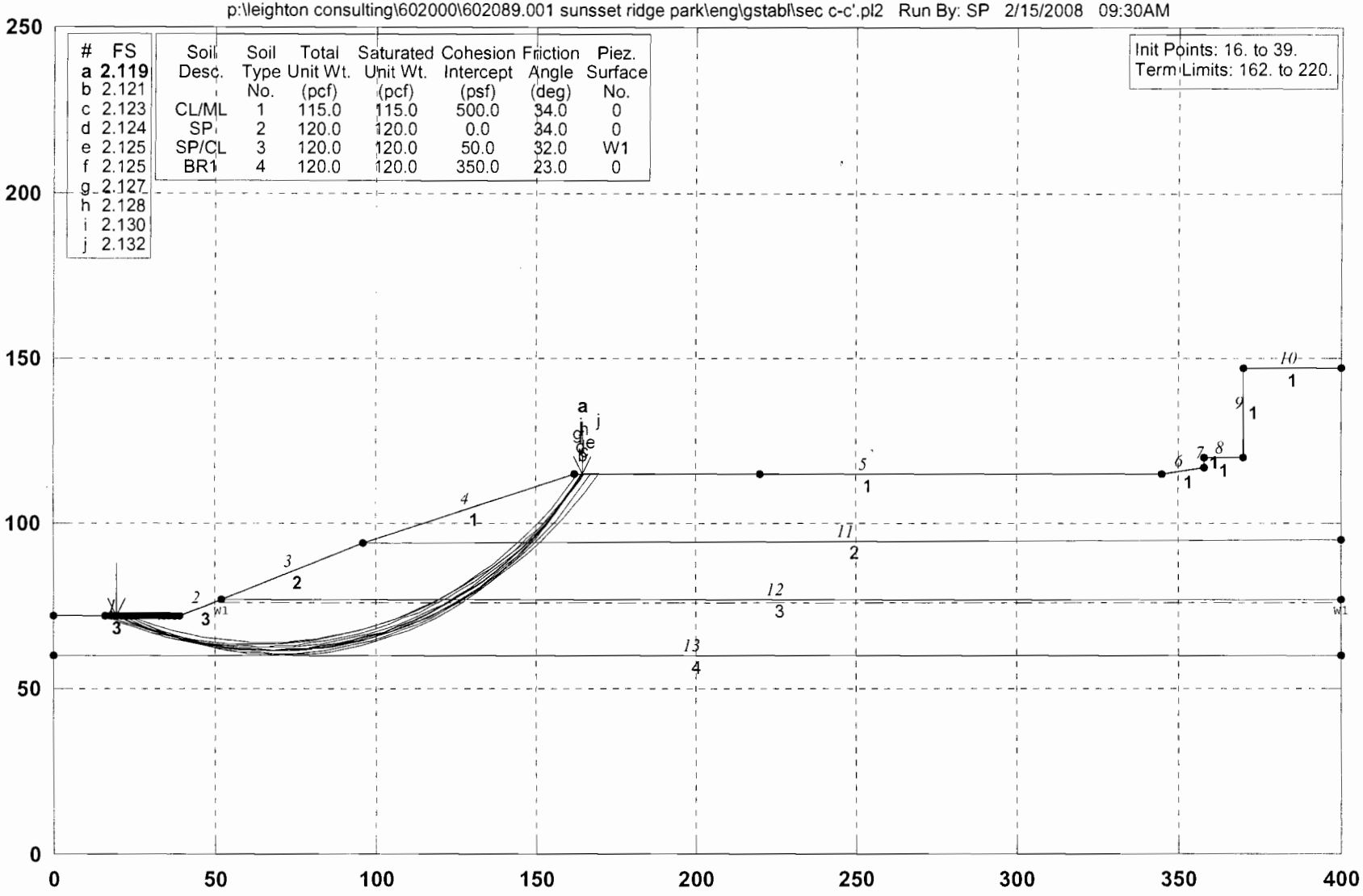
P.N: 602089-001/ Cross Section C-C'/ Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec c-c'.pl2 Run By: SP 2/15/2008 09:30AM

#	FS
a	2.119
b	2.121
c	2.123
d	2.124
e	2.125
f	2.125
g	2.127
h	2.128
i	2.130
j	2.132

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CL/ML	1	115.0	115.0	500.0	34.0	0
SP	2	120.0	120.0	0.0	34.0	0
SP/CL	3	120.0	120.0	50.0	32.0	W1
BR1	4	120.0	120.0	350.0	23.0	0

Init Points: 16. to 39.
Term Limits: 162. to 220.



GSTABL7 v.2 FSmin=2.119

Safety Factors Are Calculated By The Modified Bishop Method

***** GSTABL7 *****

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

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

SLOPE STABILITY ANALYSIS SYSTEM

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

****

Analysis Run Date: 2/15/2008
Time of Run: 09:30AM
Run By: SP
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c'.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c'.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c'.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section C-C'/
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
10 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	72.00	39.00	72.00	3
2	39.00	72.00	52.00	77.00	3
3	52.00	77.00	96.00	94.00	2
4	96.00	94.00	162.00	115.00	1
5	162.00	115.00	345.00	115.00	1
6	345.00	115.00	358.00	117.00	1
7	358.00	117.00	358.00	120.00	1
8	358.00	120.00	370.00	120.00	1
9	370.00	120.00	370.01	147.00	1
10	370.01	147.00	400.00	147.00	1
11	96.00	94.00	400.00	95.00	2
12	52.00	77.00	400.00	77.00	3
13	0.00	60.00	400.00	60.00	4

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

ISOTROPIC SOIL PARAMETERS
4 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	115.0	115.0	500.0	34.0	0.00	0.0	0
2	120.0	120.0	0.0	34.0	0.00	0.0	0
3	120.0	120.0	50.0	32.0	0.00	0.0	1
4	120.0	120.0	350.0	23.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	52.00	76.00
2	400.00	76.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 15 Points Equally Spaced

Along The Ground Surface Between X = 16.00(ft)
and X = 39.00(ft)
Each Surface Terminates Between X = 162.00(ft)
and X = 220.00(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.
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 Attempted = 3000
Number of Trial Surfaces With Valid FS = 3000
Statistical Data On All Valid FS Values:
FS Max = 3.414 FS Min = 2.119 FS Ave = 2.737
Standard Deviation = 0.280 Coefficient of Variation = 10.23 %
Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.286	72.000
2	23.885	70.038
3	28.564	68.277
4	33.315	66.719
5	38.129	65.368
6	42.997	64.226
7	47.910	63.295
8	52.858	62.577
9	57.833	62.074
10	62.824	61.785
11	67.824	61.712
12	72.822	61.855
13	77.809	62.214
14	82.776	62.788
15	87.713	63.576
16	92.612	64.576
17	97.464	65.786
18	102.258	67.205
19	106.987	68.829
20	111.641	70.657
21	116.212	72.683
22	120.691	74.905
23	125.070	77.318
24	129.341	79.917
25	133.496	82.699
26	137.527	85.658
27	141.426	88.787
28	145.187	92.083
29	148.802	95.537
30	152.264	99.144
31	155.567	102.898
32	158.706	106.790
33	161.673	110.814
34	164.464	114.963
35	164.486	115.000

Circle Center At X = 67.008 ; Y = 177.510 ; and Radius = 115.801
Factor of Safety
*** 2.119 ***
Individual data on the 41 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	541.3	1147.9	1554.0	0.	0.	0.0	0.0	0.0
2	4.7	1596.1	1168.0	2134.8	0.	0.	0.0	0.0	0.0
3	4.8	2566.7	1185.9	2652.6	0.	0.	0.0	0.0	0.0
4	4.8	3440.8	1201.6	3106.4	0.	0.	0.0	0.0	0.0
5	0.9	703.5	217.3	598.9	0.	0.	0.0	0.0	0.0

6	4.0	3872.8	863.5	2896.4	0.	0.	0.0	0.0	0.0
7	4.9	6320.5	498.5	3818.7	0.	0.	0.0	0.0	0.0
8	4.1	6486.2	0.0	3353.1	0.	0.	0.0	0.0	0.0
9	0.9	1495.7	0.0	722.8	0.	0.	0.0	0.0	0.0
10	5.0	9531.6	0.0	4266.5	0.	0.	0.0	0.0	0.0
11	5.0	10954.8	0.0	4390.1	0.	0.	0.0	0.0	0.0
12	5.0	12238.3	0.0	4446.4	0.	0.	0.0	0.0	0.0
13	5.0	13371.7	0.0	4435.4	0.	0.	0.0	0.0	0.0
14	5.0	14346.9	0.0	4357.1	0.	0.	0.0	0.0	0.0
15	5.0	15157.2	0.0	4211.7	0.	0.	0.0	0.0	0.0
16	4.9	15797.9	0.0	3999.3	0.	0.	0.0	0.0	0.0
17	4.9	16266.1	0.0	3720.4	0.	0.	0.0	0.0	0.0
18	3.4	11523.7	0.0	2397.0	0.	0.	0.0	0.0	0.0
19	1.5	5026.5	0.0	978.6	0.	0.	0.0	0.0	0.0
20	4.8	16501.9	0.0	2965.4	0.	0.	0.0	0.0	0.0
21	4.7	16236.5	0.0	2490.6	0.	0.	0.0	0.0	0.0
22	4.7	15816.1	0.0	1952.2	0.	0.	0.0	0.0	0.0
23	4.6	15248.3	0.0	1351.1	0.	0.	0.0	0.0	0.0
24	4.5	14542.6	0.0	688.4	0.	0.	0.0	0.0	0.0
25	2.0	6294.0	0.0	77.6	0.	0.	0.0	0.0	0.0
26	1.8	5643.8	0.0	0.0	0.	0.	0.0	0.0	0.0
27	0.6	1772.1	0.0	0.0	0.	0.	0.0	0.0	0.0
28	4.3	12762.7	0.0	0.0	0.	0.	0.0	0.0	0.0
29	4.2	11714.7	0.0	0.0	0.	0.	0.0	0.0	0.0
30	4.0	10580.8	0.0	0.0	0.	0.	0.0	0.0	0.0
31	3.9	9377.3	0.0	0.0	0.	0.	0.0	0.0	0.0
32	3.8	8121.2	0.0	0.0	0.	0.	0.0	0.0	0.0
33	2.2	4247.5	0.0	0.0	0.	0.	0.0	0.0	0.0
34	1.4	2587.9	0.0	0.0	0.	0.	0.0	0.0	0.0
35	3.5	5578.6	0.0	0.0	0.	0.	0.0	0.0	0.0
36	3.3	4333.3	0.0	0.0	0.	0.	0.0	0.0	0.0
37	3.1	3106.9	0.0	0.0	0.	0.	0.0	0.0	0.0
38	3.0	1918.4	0.0	0.0	0.	0.	0.0	0.0	0.0
39	0.3	146.3	0.0	0.0	0.	0.	0.0	0.0	0.0
40	2.5	529.4	0.0	0.0	0.	0.	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.286	72.000
2	23.918	70.118
3	28.626	68.434
4	33.400	66.949
5	38.233	65.668
6	43.116	64.591
7	48.040	63.721
8	52.996	63.060
9	57.975	62.609
10	62.970	62.368
11	67.970	62.337
12	72.966	62.518
13	77.951	62.910
14	82.915	63.511
15	87.849	64.322
16	92.744	65.339
17	97.592	66.563
18	102.384	67.989
19	107.112	69.617
20	111.766	71.443
21	116.340	73.463
22	120.824	75.675
23	125.211	78.073
24	129.493	80.655
25	133.662	83.415
26	137.711	86.349
27	141.633	89.451
28	145.420	92.715

29	149.067	96.136
30	152.565	99.708
31	155.910	103.425
32	159.095	107.279
33	162.115	111.264
34	164.705	115.000

Circle Center At X = 66.182 ; Y = 180.795 ; and Radius = 118.473

Factor of Safety

*** 2.121 ***

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.665	70.201
3	25.398	68.590
4	30.192	67.169
5	35.039	65.941
6	39.931	64.909
7	44.861	64.072
8	49.820	63.434
9	54.801	62.994
10	59.795	62.755
11	64.795	62.715
12	69.792	62.875
13	74.779	63.234
14	79.748	63.793
15	84.690	64.551
16	89.598	65.505
17	94.464	66.655
18	99.280	67.999
19	104.039	69.534
20	108.732	71.259
21	113.352	73.169
22	117.893	75.264
23	122.346	77.538
24	126.704	79.988
25	130.961	82.611
26	135.110	85.401
27	139.143	88.356
28	143.056	91.470
29	146.840	94.737
30	150.491	98.154
31	154.002	101.713
32	157.368	105.410
33	160.584	109.239
34	163.644	113.194
35	164.929	115.000

Circle Center At X = 63.294 ; Y = 187.677 ; and Radius = 124.971

Factor of Safety

*** 2.123 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	20.929	72.000
2	25.459	69.885
3	30.082	67.980
4	34.787	66.287
5	39.564	64.811
6	44.404	63.555
7	49.296	62.522
8	54.230	61.713
9	59.196	61.130
10	64.183	60.774
11	69.181	60.647
12	74.180	60.748
13	79.170	61.078
14	84.138	61.635

15	89.077	62.419
16	93.974	63.427
17	98.820	64.658
18	103.605	66.109
19	108.318	67.777
20	112.951	69.658
21	117.493	71.750
22	121.934	74.046
23	126.266	76.543
24	130.479	79.235
25	134.565	82.117
26	138.515	85.183
27	142.321	88.426
28	145.974	91.839
29	149.468	95.416
30	152.795	99.148
31	155.948	103.029
32	158.921	107.049
33	161.706	111.202
34	164.010	115.000

Circle Center At X = 69.463 ; Y = 170.053 ; and Radius = 109.407

Factor of Safety

*** 2.124 ***

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.286	72.000
2	23.878	70.022
3	28.550	68.241
4	33.293	66.660
5	38.100	65.282
6	42.960	64.110
7	47.867	63.145
8	52.809	62.390
9	57.779	61.845
10	62.768	61.512
11	67.767	61.392
12	72.766	61.484
13	77.757	61.788
14	82.730	62.304
15	87.677	63.031
16	92.588	63.967
17	97.456	65.111
18	102.270	66.461
19	107.023	68.015
20	111.705	69.769
21	116.308	71.720
22	120.825	73.866
23	125.246	76.201
24	129.564	78.722
25	133.771	81.424
26	137.859	84.303
27	141.821	87.352
28	145.650	90.567
29	149.339	93.943
30	152.882	97.471
31	156.271	101.147
32	159.501	104.964
33	162.565	108.915
34	165.459	112.992
35	166.760	115.000

Circle Center At X = 68.106 ; Y = 179.028 ; and Radius = 117.637

Factor of Safety

*** 2.125 ***

Failure Surface Specified By 34 Coordinate Points

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

1	22.571	72.000
2	27.137	69.961
3	31.790	68.131
4	36.521	66.514
5	41.321	65.113
6	46.179	63.932
7	51.087	62.973
8	56.032	62.238
9	61.006	61.728
10	65.998	61.444
11	70.998	61.388
12	75.995	61.558
13	80.979	61.955
14	85.940	62.579
15	90.868	63.426
16	95.752	64.497
17	100.582	65.788
18	105.349	67.297
19	110.042	69.022
20	114.652	70.957
21	119.170	73.100
22	123.586	75.446
23	127.890	77.989
24	132.075	80.726
25	136.131	83.650
26	140.050	86.755
27	143.824	90.035
28	147.445	93.482
29	150.906	97.091
30	154.199	100.853
31	157.319	104.761
32	160.257	108.806
33	163.009	112.981
34	164.212	115.000

Circle Center At X = 69.740 ; Y = 171.409 ; and Radius = 110.032

Factor of Safety

*** 2.125 ***

Failure Surface Specified By 33 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.571	72.000
2	27.275	70.303
3	32.045	68.806
4	36.874	67.510
5	41.754	66.418
6	46.675	65.532
7	51.628	64.854
8	56.606	64.385
9	61.600	64.125
10	66.599	64.075
11	71.597	64.235
12	76.583	64.605
13	81.549	65.185
14	86.487	65.972
15	91.387	66.966
16	96.241	68.165
17	101.041	69.567
18	105.777	71.170
19	110.442	72.970
20	115.027	74.964
21	119.524	77.150
22	123.925	79.522
23	128.223	82.077
24	132.409	84.811
25	136.477	87.718
26	140.420	90.794
27	144.229	94.032

28	147.900	97.427
29	151.424	100.974
30	154.796	104.666
31	158.010	108.496
32	161.060	112.458
33	162.853	115.000

Circle Center At X = 65.286 ; Y = 183.041 ; and Radius = 118.973

Factor of Safety

*** 2.127 ***

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.697	70.286
3	25.457	68.756
4	30.273	67.412
5	35.138	66.258
6	40.044	65.293
7	44.984	64.521
8	49.951	63.942
9	54.936	63.557
10	59.932	63.367
11	64.932	63.371
12	69.928	63.571
13	74.913	63.965
14	79.878	64.552
15	84.817	65.334
16	89.721	66.306
17	94.584	67.470
18	99.397	68.822
19	104.155	70.360
20	108.849	72.083
21	113.472	73.988
22	118.017	76.071
23	122.478	78.330
24	126.847	80.761
25	131.118	83.360
26	135.285	86.124
27	139.341	89.048
28	143.279	92.128
29	147.095	95.360
30	150.782	98.737
31	154.334	102.256
32	157.747	105.910
33	161.014	109.695
34	164.131	113.604
35	165.158	115.000

Circle Center At X = 62.317 ; Y = 191.601 ; and Radius = 128.256

Factor of Safety

*** 2.128 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.571	72.000
2	27.067	69.812
3	31.662	67.839
4	36.344	66.085
5	41.104	64.555
6	45.931	63.251
7	50.814	62.176
8	55.743	61.334
9	60.705	60.725
10	65.691	60.352
11	70.690	60.214
12	75.689	60.313
13	80.677	60.648
14	85.645	61.218

15	90.580	62.022
16	95.471	63.058
17	100.308	64.325
18	105.080	65.818
19	109.776	67.536
20	114.385	69.473
21	118.898	71.626
22	123.304	73.990
23	127.593	76.559
24	131.756	79.328
25	135.784	82.290
26	139.668	85.440
27	143.398	88.770
28	146.966	92.272
29	150.366	95.938
30	153.588	99.762
31	156.626	103.733
32	159.473	107.843
33	162.122	112.084
34	163.758	115.000

Circle Center At X = 71.096 ; Y = 165.962 ; and Radius = 105.752

Factor of Safety

*** 2.130 ***

Failure Surface Specified By 36 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.619	70.085
3	25.310	68.355
4	30.066	66.814
5	34.880	65.462
6	39.744	64.304
7	44.650	63.339
8	49.591	62.571
9	54.558	61.999
10	59.544	61.626
11	64.541	61.451
12	69.541	61.475
13	74.536	61.698
14	79.518	62.120
15	84.480	62.739
16	89.413	63.555
17	94.309	64.567
18	99.162	65.773
19	103.963	67.170
20	108.704	68.758
21	113.378	70.533
22	117.978	72.492
23	122.497	74.633
24	126.927	76.952
25	131.261	79.445
26	135.492	82.108
27	139.614	84.938
28	143.621	87.930
29	147.505	91.078
30	151.261	94.379
31	154.883	97.826
32	158.364	101.414
33	161.700	105.139
34	164.886	108.992
35	167.916	112.970
36	169.338	115.000

Circle Center At X = 66.431 ; Y = 187.066 ; and Radius = 125.632

Factor of Safety

*** 2.132 ***

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

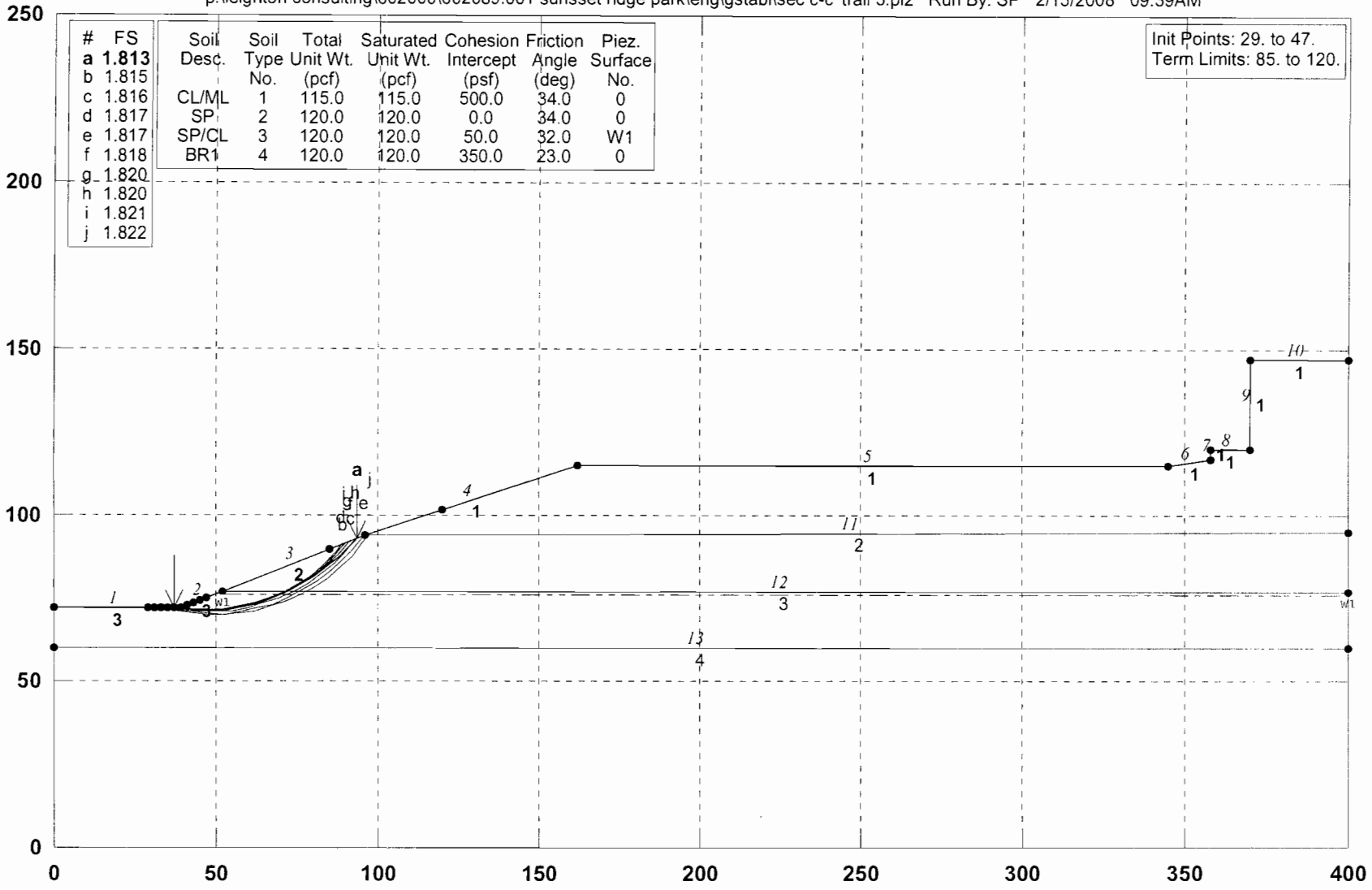
P.N: 602089-001/ Cross Section C-C'/ Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec c-c' trail 3.pl2 Run By: SP 2/15/2008 09:39AM

#	FS
a	**1.813**
b	1.815
c	1.816
d	1.817
e	1.817
f	1.818
g	1.820
h	1.820
i	1.821
j	1.822

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CL/ML	1	115.0	115.0	500.0	34.0	0
SP	2	120.0	120.0	0.0	34.0	0
SP/CL	3	120.0	120.0	50.0	32.0	W1
BR1	4	120.0	120.0	350.0	23.0	0

Init Points: 29. to 47.
Term Limits: 85. to 120.



GSTABL7 v.2 FSmin=1.813

Safety Factors Are Calculated By The Modified Bishop Method

***** GSTABL7 *****

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

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

SLOPE STABILITY ANALYSIS SYSTEM

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

****

Analysis Run Date: 2/15/2008
Time of Run: 09:39AM
Run By: SP
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' Trail 3.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' Trail 3.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' Trail 3.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section C-C'/
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
10 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	72.00	39.00	72.00	3
2	39.00	72.00	52.00	77.00	3
3	52.00	77.00	96.00	94.00	2
4	96.00	94.00	162.00	115.00	1
5	162.00	115.00	345.00	115.00	1
6	345.00	115.00	358.00	117.00	1
7	358.00	117.00	358.00	120.00	1
8	358.00	120.00	370.00	120.00	1
9	370.00	120.00	370.01	147.00	1
10	370.01	147.00	400.00	147.00	1
11	96.00	94.00	400.00	95.00	2
12	52.00	77.00	400.00	77.00	3
13	0.00	60.00	400.00	60.00	4

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

ISOTROPIC SOIL PARAMETERS
4 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	115.0	115.0	500.0	34.0	0.00	0.0	0
2	120.0	120.0	0.0	34.0	0.00	0.0	0
3	120.0	120.0	50.0	32.0	0.00	0.0	1
4	120.0	120.0	350.0	23.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	52.00	76.00
2	400.00	76.00

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 10 Points Equally Spaced

Along The Ground Surface Between X = 29.00(ft)
and X = 47.00(ft)
Each Surface Terminates Between X = 85.00(ft)
and X = 120.00(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.
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 Attempted = 2000
Number of Trial Surfaces With Valid FS = 2000
Statistical Data On All Valid FS Values:
FS Max = 3.783 FS Min = 1.813 FS Ave = 2.225
Standard Deviation = 0.270 Coefficient of Variation = 12.14 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.000	72.000
2	41.976	71.508
3	46.975	71.409
4	51.966	71.704
5	56.919	72.391
6	61.802	73.465
7	66.585	74.921
8	71.240	76.748
9	75.736	78.935
10	80.046	81.470
11	84.143	84.336
12	88.002	87.516
13	91.598	90.989
14	93.359	92.979

Circle Center At X = 45.749 ; Y = 134.688 ; and Radius = 63.296
Factor of Safety
*** 1.813 ***
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	2.0	23.7	499.2	514.0	0.	0.	0.0	0.0	0.0
2	3.0	327.5	681.9	810.7	0.	0.	0.0	0.0	0.0
3	5.0	1587.9	633.0	1416.9	0.	0.	0.0	0.0	0.0
4	5.0	2677.5	0.0	1386.3	0.	0.	0.0	0.0	0.0
5	0.0	21.5	0.0	9.2	0.	0.	0.0	0.0	0.0
6	4.9	3482.5	0.0	1224.0	0.	0.	0.0	0.0	0.0
7	4.9	4052.4	0.0	958.4	0.	0.	0.0	0.0	0.0
8	4.8	4315.7	0.0	563.8	0.	0.	0.0	0.0	0.0
9	2.7	2542.6	0.0	99.5	0.	0.	0.0	0.0	0.0
10	1.9	1758.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.5	476.6	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.0	3548.5	0.0	0.0	0.	0.	0.0	0.0	0.0
13	4.3	3517.1	0.0	0.0	0.	0.	0.0	0.0	0.0
14	4.1	2814.3	0.0	0.0	0.	0.	0.0	0.0	0.0
15	3.9	1962.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.6	1015.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	1.8	138.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.000	72.000
2	41.942	71.243
3	46.934	70.958
4	51.931	71.146
5	56.887	71.805
6	61.759	72.931

7	66.502	74.512
8	71.074	76.536
9	75.435	78.982
10	79.544	81.830
11	83.366	85.055
12	86.865	88.626
13	89.038	91.310

Circle Center At X = 47.451 ; Y = 123.747 ; and Radius = 52.792

Factor of Safety

*** 1.815 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.000	72.000
2	41.974	71.486
3	46.972	71.385
4	51.963	71.696
5	56.910	72.419
6	61.781	73.547
7	66.542	75.074
8	71.161	76.989
9	75.606	79.278
10	79.847	81.927
11	83.855	84.916
12	87.602	88.227
13	91.063	91.835
14	91.368	92.210

Circle Center At X = 45.708 ; Y = 131.809 ; and Radius = 60.440

Factor of Safety

*** 1.816 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.000	72.000
2	41.952	71.309
3	46.947	71.083
4	51.941	71.326
5	56.891	72.034
6	61.752	73.202
7	66.484	74.819
8	71.043	76.871
9	75.390	79.341
10	79.488	82.206
11	83.300	85.442
12	86.793	89.019
13	88.465	91.089

Circle Center At X = 46.856 ; Y = 124.512 ; and Radius = 53.429

Factor of Safety

*** 1.817 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.000	72.000
2	37.882	70.922
3	42.838	70.259
4	47.832	70.017
5	52.829	70.196
6	57.793	70.796
7	62.689	71.812
8	67.481	73.238
9	72.136	75.062
10	76.621	77.273
11	80.904	79.854
12	84.953	82.786
13	88.741	86.050
14	92.241	89.621
15	95.426	93.475

16	95.714	93.889

Circle Center At X = 48.209 ; Y = 129.209 ; and Radius = 59.196

Factor of Safety

*** 1.817 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	39.000	72.000
2	43.970	71.457
3	48.969	71.354
4	53.958	71.692
5	58.897	72.468
6	63.749	73.677
7	68.475	75.309
8	73.039	77.352
9	77.405	79.788
10	81.539	82.600
11	85.410	85.766
12	88.986	89.260
13	91.587	92.295

Circle Center At X = 47.636 ; Y = 128.000 ; and Radius = 56.662

Factor of Safety

*** 1.818 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	39.000	72.000
2	43.970	71.452
3	48.969	71.357
4	53.956	71.715
5	58.890	72.525
6	63.730	73.778
7	68.437	75.465
8	72.972	77.572
9	77.296	80.082
10	81.375	82.973
11	85.176	86.223
12	88.665	89.803
13	90.277	91.789

Circle Center At X = 47.516 ; Y = 126.419 ; and Radius = 55.082

Factor of Safety

*** 1.820 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	35.000	72.000
2	39.931	71.175
3	44.915	70.771
4	49.915	70.793
5	54.895	71.239
6	59.819	72.106
7	64.652	73.389
8	69.358	75.078
9	73.904	77.160
10	78.257	79.620
11	82.384	82.442
12	86.258	85.604
13	89.848	89.084
14	93.130	92.856
15	93.167	92.905

Circle Center At X = 47.163 ; Y = 129.539 ; and Radius = 58.810

Factor of Safety

*** 1.820 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	39.000	72.000

2	43.968	71.436
3	48.967	71.334
4	53.954	71.696
5	58.886	72.517
6	63.721	73.792
7	68.417	75.509
8	72.934	77.653
9	77.233	80.206
10	81.277	83.146
11	85.032	86.448
12	88.465	90.083
13	89.593	91.524

Circle Center At X = 47.564 ; Y = 125.269 ; and Radius = 53.953

Factor of Safety

*** 1.821 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.000	72.000
2	41.887	70.943
3	46.849	70.327
4	51.846	70.156
5	56.838	70.433
6	61.786	71.155
7	66.649	72.315
8	71.390	73.906
9	75.969	75.913
10	80.350	78.322
11	84.499	81.113
12	88.382	84.263
13	91.968	87.747
14	95.228	91.538
15	97.281	94.408

Circle Center At X = 51.252 ; Y = 126.064 ; and Radius = 55.911

Factor of Safety

*** 1.822 ***

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

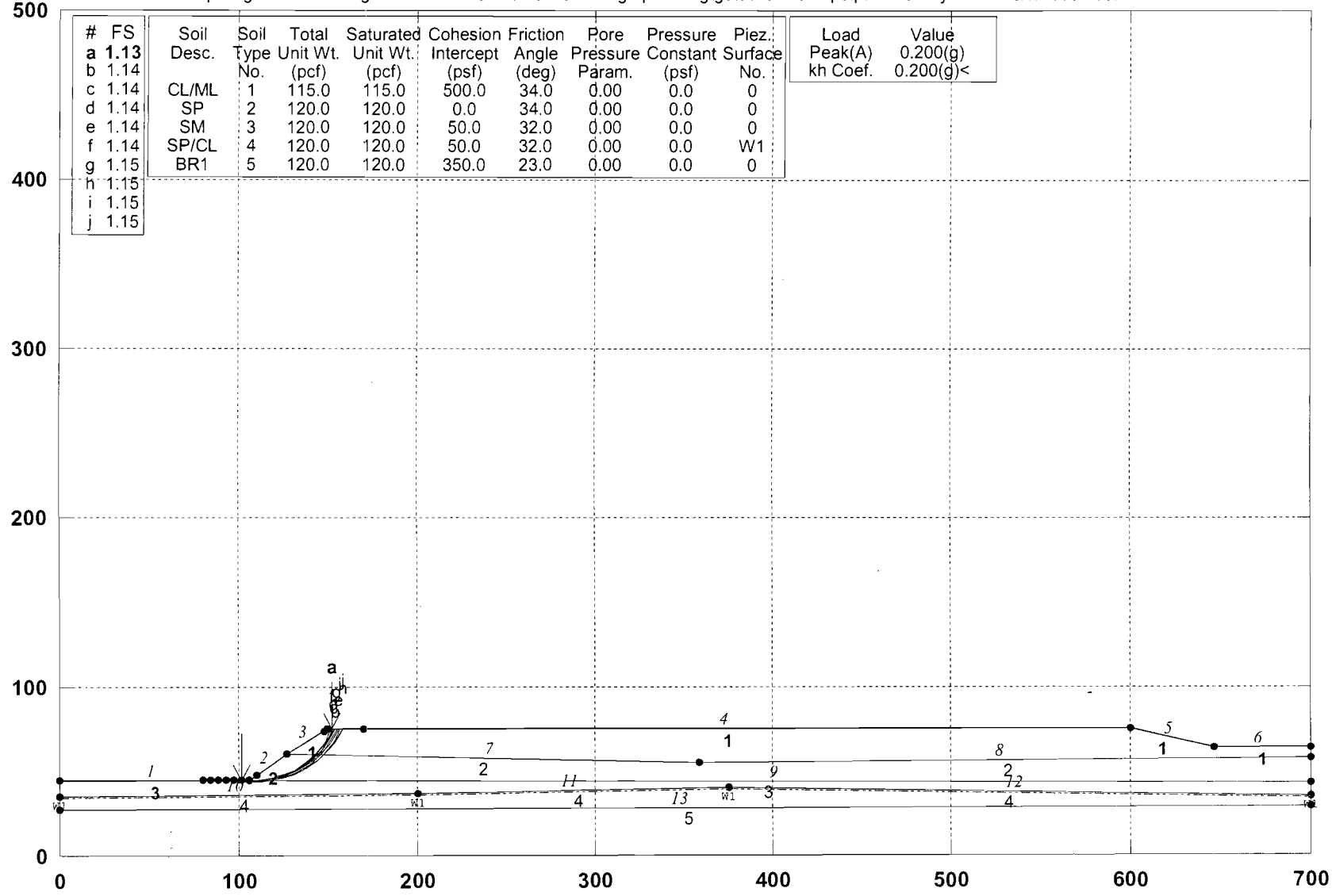
P.N: 602089-001/ Cross Section A-A'/PS Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec a-a' ps.pl2 Run By: VMC 8/7/2009 09:22AM

#	FS
a	**1.13**
b	1.14
c	1.14
d	1.14
e	1.14
f	1.14
g	1.15
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)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
CL/ML	1	115.0	115.0	500.0	34.0	0.00	0.0	0
SP	2	120.0	120.0	0.0	34.0	0.00	0.0	0
SM	3	120.0	120.0	50.0	32.0	0.00	0.0	0
SP/CL	4	120.0	120.0	50.0	32.0	0.00	0.0	W1
BR1	5	120.0	120.0	350.0	23.0	0.00	0.0	0

Load	Value
Peak(A)	0.200(g)
kh Coef.	0.200(g)<



GSTABL7 v.2 FSmin=1.13

Safety Factors Are Calculated By The Modified Bishop Method

***** GSTABL7 *****

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

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

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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: 8/7/2009
Time of Run: 09:22AM
Run By: VMC
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec a-a' ps.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec a-a' ps.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec a-a' ps.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section A-A'/PS
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
6 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	45.00	106.00	45.00	3
2	106.00	45.00	127.00	60.00	2
3	127.00	60.00	150.00	75.00	1
4	150.00	75.00	600.00	75.00	1
5	600.00	75.00	647.00	64.00	1
6	647.00	64.00	700.00	64.00	1
7	127.00	60.00	359.00	55.00	2
8	359.00	55.00	700.00	58.00	2
9	106.00	45.00	700.00	43.00	3
10	0.00	35.00	200.00	37.00	4
11	200.00	37.00	375.00	40.00	4
12	375.00	40.00	700.00	35.00	4
13	0.00	27.00	700.00	29.00	5

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	115.0	115.0	500.0	34.0	0.00	0.0	0
2	120.0	120.0	0.0	34.0	0.00	0.0	0
3	120.0	120.0	50.0	32.0	0.00	0.0	0
4	120.0	120.0	50.0	32.0	0.00	0.0	1
5	120.0	120.0	350.0	23.0	0.00	0.0	0

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 = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	34.00
2	200.00	36.00
3	375.00	39.00
4	700.00	34.00

Specified Peak Ground Acceleration Coefficient (A) = 0.200(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.200(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.
1600 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 8 Points Equally Spaced
Along The Ground Surface Between X = 80.00(ft)
and X = 110.00(ft)
Each Surface Terminates Between X = 148.00(ft)
and X = 170.00(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.
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 Attempted = 1600
Number of Trial Surfaces With Valid FS = 1600
Statistical Data On All Valid FS Values:
FS Max = 2.910 FS Min = 1.134 FS Ave = 1.465
Standard Deviation = 0.189 Coefficient of Variation = 12.88 %
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.429	45.000
2	106.409	44.556
3	111.408	44.638
4	116.371	45.244
5	121.243	46.369
6	125.970	48.000
7	130.499	50.118
8	134.781	52.700
9	138.767	55.718
10	142.414	59.138
11	145.682	62.922
12	148.534	67.029
13	150.939	71.413
14	152.441	75.000

Circle Center At X = 108.151 ; Y = 91.940 ; and Radius = 47.419
Factor of Safety
*** 1.134 ***
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	4.6	111.8	0.0	0.0	0.	0.	22.4	0.0	0.0
2	0.4	28.1	0.0	0.0	0.	0.	5.6	0.0	0.0
3	5.0	1488.2	0.0	0.0	0.	0.	297.6	0.0	0.0
4	2.7	1655.7	0.0	0.0	0.	0.	331.1	0.0	0.0
5	2.2	1735.8	0.0	0.0	0.	0.	347.2	0.0	0.0
6	4.9	4876.5	0.0	0.0	0.	0.	975.3	0.0	0.0
7	4.7	5894.2	0.0	0.0	0.	0.	1178.8	0.0	0.0
8	1.0	1408.3	0.0	0.0	0.	0.	281.7	0.0	0.0
9	3.5	4951.3	0.0	0.0	0.	0.	990.3	0.0	0.0
10	4.3	6222.5	0.0	0.0	0.	0.	1244.5	0.0	0.0
11	4.0	5688.4	0.0	0.0	0.	0.	1137.7	0.0	0.0
12	3.6	4838.2	0.0	0.0	0.	0.	967.6	0.0	0.0
13	0.4	558.6	0.0	0.0	0.	0.	111.7	0.0	0.0
14	2.8	3233.1	0.0	0.0	0.	0.	646.6	0.0	0.0
15	2.9	2669.2	0.0	0.0	0.	0.	533.8	0.0	0.0
16	1.5	1037.8	0.0	0.0	0.	0.	207.6	0.0	0.0
17	0.9	479.7	0.0	0.0	0.	0.	95.9	0.0	0.0
18	1.5	309.7	0.0	0.0	0.	0.	61.9	0.0	0.0

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.119	44.516
3	107.119	44.484
4	112.102	44.906
5	117.025	45.776
6	121.850	47.089
7	126.536	48.832
8	131.045	50.993
9	135.340	53.553
10	139.385	56.492
11	143.148	59.784
12	146.597	63.404
13	149.705	67.321
14	152.445	71.503
15	154.308	75.000

Circle Center At X = 104.967 ; Y = 99.624 ; and Radius = 55.181

Factor of Safety

*** 1.139 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.111	44.441
3	107.111	44.355
4	112.096	44.743
5	117.021	45.602
6	121.843	46.924
7	126.519	48.697
8	131.005	50.905
9	135.261	53.528
10	139.250	56.543
11	142.935	59.922
12	146.283	63.636
13	149.264	67.650
14	151.851	71.928
15	153.331	75.000

Circle Center At X = 105.517 ; Y = 97.026 ; and Radius = 52.695

Factor of Safety

*** 1.139 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.429	45.000
2	106.394	44.416
3	111.394	44.373
4	116.369	44.872
5	121.261	45.905
6	126.013	47.461
7	130.568	49.522
8	134.874	52.064
9	138.880	55.057
10	142.538	58.465
11	145.806	62.249
12	148.646	66.364
13	151.024	70.762
14	152.753	75.000

Circle Center At X = 109.297 ; Y = 90.441 ; and Radius = 46.117

Factor of Safety

*** 1.140 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.104	44.379
3	107.101	44.210

4	112.093	44.494
5	117.039	45.228
6	121.898	46.407
7	126.630	48.021
8	131.197	50.057
9	135.561	52.497
10	139.686	55.323
11	143.539	58.510
12	147.087	62.033
13	150.302	65.862
14	153.157	69.967
15	155.629	74.313
16	155.941	75.000

Circle Center At X = 106.479 ; Y = 99.322 ; and Radius = 55.119

Factor of Safety

*** 1.142 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.097	44.325
3	107.094	44.156
4	112.083	44.494
5	117.011	45.337
6	121.829	46.676
7	126.486	48.496
8	130.934	50.779
9	135.128	53.502
10	139.023	56.636
11	142.581	60.149
12	145.765	64.004
13	148.540	68.163
14	150.880	72.582
15	151.860	75.000

Circle Center At X = 106.259 ; Y = 93.377 ; and Radius = 49.228

Factor of Safety

*** 1.144 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.066	44.127
3	107.052	43.748
4	112.050	43.867
5	117.012	44.483
6	121.888	45.590
7	126.630	47.177
8	131.190	49.227
9	135.523	51.721
10	139.587	54.635
11	143.341	57.938
12	146.747	61.598
13	149.772	65.579
14	152.386	69.841
15	154.563	74.343
16	154.803	75.000

Circle Center At X = 108.364 ; Y = 93.844 ; and Radius = 50.116

Factor of Safety

*** 1.147 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.143	45.000
2	102.091	44.283
3	107.084	44.008
4	112.081	44.175
5	117.044	44.785

6	121.933	45.832
7	126.710	47.307
8	131.338	49.201
9	135.780	51.496
10	140.001	54.176
11	143.968	57.219
12	147.650	60.602
13	151.018	64.297
14	154.046	68.276
15	156.709	72.508
16	157.984	75.000

Circle Center At X = 107.710 ; Y = 100.264 ; and Radius = 56.265

Factor of Safety

*** 1.151 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.429	45.000
2	106.379	44.295
3	111.375	44.094
4	116.365	44.400
5	121.299	45.210
6	126.126	46.515
7	130.796	48.302
8	135.260	50.553
9	139.474	53.244
10	143.394	56.348
11	146.980	59.833
12	150.194	63.662
13	153.005	67.798
14	155.382	72.197
15	156.547	75.000

Circle Center At X = 110.853 ; Y = 93.419 ; and Radius = 49.328

Factor of Safety

*** 1.152 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	101.429	45.000
2	106.392	44.396
3	111.390	44.267
4	116.378	44.615
5	121.310	45.436
6	126.142	46.722
7	130.829	48.463
8	135.330	50.642
9	139.602	53.239
10	143.608	56.231
11	147.311	59.591
12	150.677	63.288
13	153.677	67.288
14	156.281	71.556
15	157.956	75.000

Circle Center At X = 110.240 ; Y = 96.728 ; and Radius = 52.473

Factor of Safety

*** 1.152 ***

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

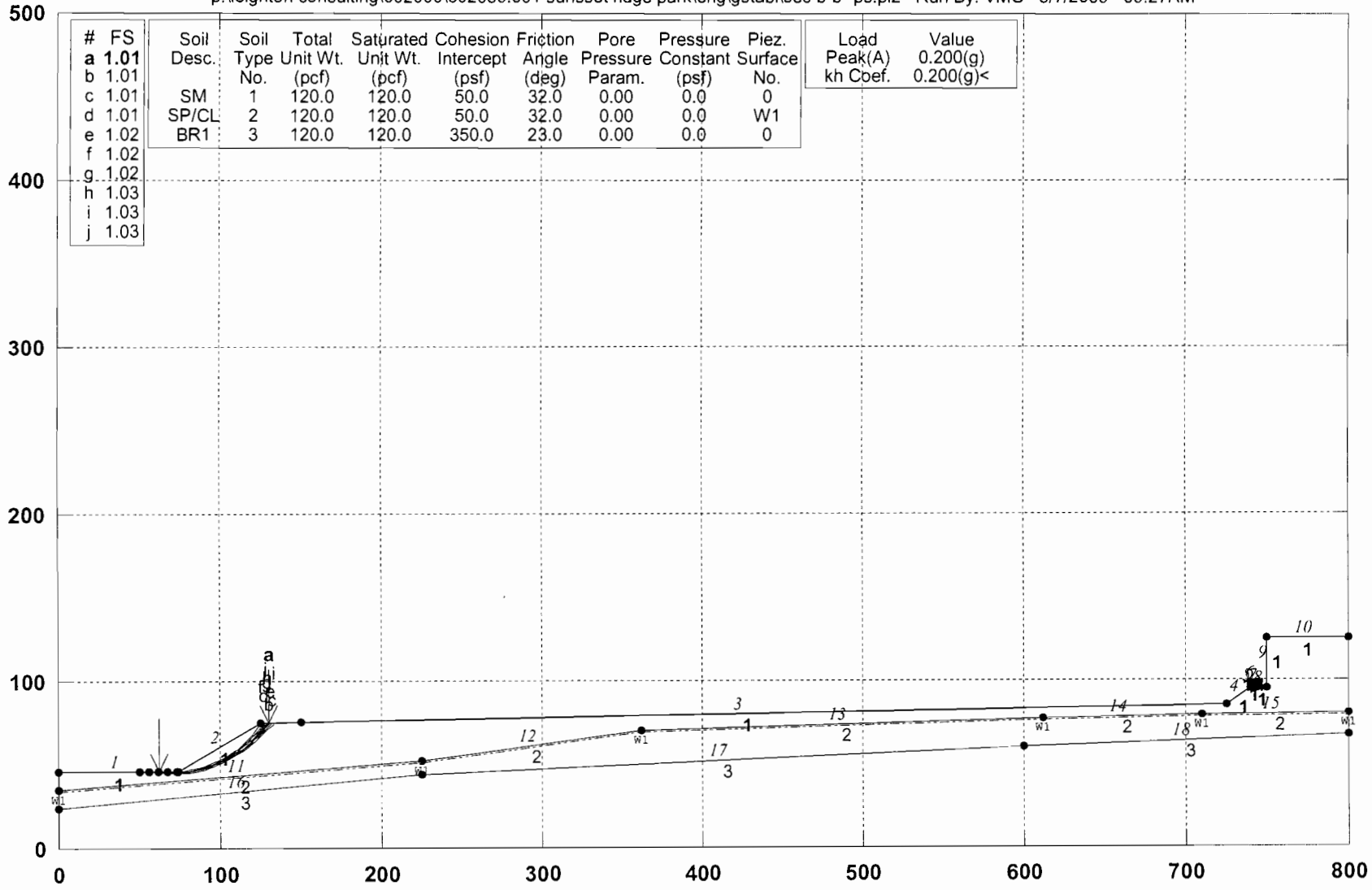
P.N: 602089-001/ Cross Section B-B'/PS Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec b-b" ps.pl2 Run By: VMC 8/7/2009 09:27AM

#	FS
a	**1.01**
b	1.01
c	1.01
d	1.01
e	1.02
f	1.02
g	1.02
h	1.03
i	1.03
j	1.03

Soil Desc.	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.
SM	1	120.0	120.0	50.0	32.0	0.00	0.0	0
SP/CL	2	120.0	120.0	50.0	32.0	0.00	0.0	W1
BR1	3	120.0	120.0	350.0	23.0	0.00	0.0	0

Load	Value
Peak(A)	0.200(g)
kh Coef.	0.200(g)<



GSTABL7 v.2 FSmin=1.01

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

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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: 8/7/2009
Time of Run: 09:27AM
Run By: VMC
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec b-b'' ps.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec b-b'' ps.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec b-b'' ps.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section B-B'/PS
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
10 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	46.00	74.00	46.00	1
2	74.00	46.00	125.00	75.00	1
3	125.00	75.00	725.00	85.00	1
4	725.00	85.00	740.00	95.00	1
5	740.00	95.00	740.01	98.00	1
6	740.01	98.00	744.00	98.00	1
7	744.00	98.00	744.01	95.00	1
8	744.01	95.00	750.00	95.00	1
9	750.00	95.00	750.01	125.00	1
10	750.01	125.00	800.00	125.00	1
11	0.00	35.00	225.00	52.00	2
12	225.00	52.00	362.00	70.00	2
13	362.00	70.00	612.00	77.00	2
14	612.00	77.00	710.00	79.00	2
15	710.00	79.00	800.00	80.00	2
16	0.00	24.00	225.00	44.00	3
17	225.00	44.00	600.00	60.00	3
18	600.00	60.00	800.00	67.00	3

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	120.0	120.0	50.0	32.0	0.00	0.0	0
2	120.0	120.0	50.0	32.0	0.00	0.0	1
3	120.0	120.0	350.0	23.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 6 Coordinate Points
Pore Pressure Inclination Factor = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	34.00
2	225.00	51.00

3	362.00	69.00
4	612.00	76.00
5	710.00	78.00
6	800.00	79.00

Specified Peak Ground Acceleration Coefficient (A) = 0.200(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(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.
2000 Trial Surfaces Have Been Generated.
400 Surface(s) Initiate(s) From Each Of 5 Points Equally Spaced
Along The Ground Surface Between X = 50.00(ft)
and X = 73.00(ft)
Each Surface Terminates Between X = 125.00(ft)
and X = 150.00(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.
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 Attempted = 2000
Number of Trial Surfaces With Valid FS = 2000
Statistical Data On All Valid FS Values:
FS Max = 1.782 FS Min = 1.005 FS Ave = 1.411
Standard Deviation = 0.186 Coefficient of Variation = 13.18 %
Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.500	46.000
2	66.480	45.555
3	71.479	45.449
4	76.474	45.681
5	81.441	46.252
6	86.358	47.157
7	91.203	48.394
8	95.953	49.955
9	100.586	51.835
10	105.081	54.024
11	109.418	56.513
12	113.576	59.290
13	117.536	62.342
14	121.281	65.655
15	124.793	69.215
16	128.055	73.004
17	129.608	75.077

Circle Center At X = 70.548 ; Y = 119.220 ; and Radius = 73.777
Factor of Safety
*** 1.005 ***
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	5.0	132.9	0.0	0.0	0.	0.	26.6	0.0	0.0
2	5.0	298.6	0.0	0.0	0.	0.	59.7	0.0	0.0
3	2.5	148.9	0.0	0.0	0.	0.	29.8	0.0	0.0
4	2.5	320.4	0.0	0.0	0.	0.	64.1	0.0	0.0
5	5.0	1700.2	0.0	0.0	0.	0.	340.0	0.0	0.0
6	4.9	2906.0	0.0	0.0	0.	0.	581.2	0.0	0.0
7	4.8	3854.1	0.0	0.0	0.	0.	770.8	0.0	0.0
8	4.7	4536.0	0.0	0.0	0.	0.	907.2	0.0	0.0
9	4.6	4951.1	0.0	0.0	0.	0.	990.2	0.0	0.0
10	4.5	5106.1	0.0	0.0	0.	0.	1021.2	0.0	0.0
11	4.3	5015.4	0.0	0.0	0.	0.	1003.1	0.0	0.0

12	4.2	4700.3	0.0	0.0	0.	0.	940.1	0.0	0.0
13	4.0	4188.8	0.0	0.0	0.	0.	837.8	0.0	0.0
14	3.7	3514.8	0.0	0.0	0.	0.	703.0	0.0	0.0
15	3.5	2717.4	0.0	0.0	0.	0.	543.5	0.0	0.0
16	0.2	139.6	0.0	0.0	0.	0.	27.9	0.0	0.0
17	3.1	1391.5	0.0	0.0	0.	0.	278.3	0.0	0.0
18	1.6	190.8	0.0	0.0	0.	0.	38.2	0.0	0.0

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.500	46.000
2	66.474	45.486
3	71.471	45.315
4	76.468	45.489
5	81.441	46.005
6	86.367	46.862
7	91.222	48.055
8	95.984	49.580
9	100.630	51.428
10	105.138	53.591
11	109.486	56.059
12	113.655	58.820
13	117.624	61.861
14	121.374	65.168
15	124.889	68.725
16	128.150	72.515
17	130.071	75.085

Circle Center At X = 71.452 ; Y = 118.009 ; and Radius = 72.694

Factor of Safety
*** 1.010 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.500	46.000
2	66.476	45.508
3	71.473	45.345
4	76.470	45.512
5	81.446	46.008
6	86.377	46.831
7	91.244	47.978
8	96.025	49.442
9	100.699	51.219
10	105.245	53.300
11	109.644	55.677
12	113.877	58.338
13	117.925	61.272
14	121.772	64.467
15	125.399	67.909
16	128.791	71.582
17	131.643	75.111

Circle Center At X = 71.442 ; Y = 121.141 ; and Radius = 75.796

Factor of Safety
*** 1.012 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.500	46.000
2	66.476	45.511
3	71.475	45.391
4	76.468	45.641
5	81.430	46.258
6	86.333	47.239
7	91.150	48.580
8	95.854	50.273
9	100.422	52.308
10	104.826	54.675
11	109.043	57.360

12	113.051	60.350
13	116.828	63.627
14	120.352	67.174
15	123.605	70.971
16	126.569	74.998
17	126.586	75.026

Circle Center At X = 70.599 ; Y = 113.085 ; and Radius = 67.699

Factor of Safety

*** 1.013 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.500	46.000
2	66.466	45.418
3	71.460	45.183
4	76.459	45.298
5	81.438	45.760
6	86.372	46.568
7	91.238	47.719
8	96.012	49.205
9	100.670	51.021
10	105.191	53.157
11	109.552	55.604
12	113.731	58.348
13	117.710	61.377
14	121.467	64.675
15	124.985	68.228
16	128.247	72.018
17	130.541	75.092

Circle Center At X = 72.324 ; Y = 116.860 ; and Radius = 71.682

Factor of Safety

*** 1.016 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.500	46.000
2	66.474	45.490
3	71.472	45.364
4	76.466	45.624
5	81.424	46.267
6	86.318	47.291
7	91.119	48.689
8	95.797	50.453
9	100.326	52.572
10	104.678	55.033
11	108.828	57.823
12	112.750	60.924
13	116.422	64.318
14	119.821	67.985
15	122.927	71.902
16	125.016	75.000

Circle Center At X = 70.617 ; Y = 110.089 ; and Radius = 64.735

Factor of Safety

*** 1.024 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.750	46.000
2	60.726	45.510
3	65.723	45.325
4	70.721	45.448
5	75.703	45.877
6	80.648	46.610
7	85.540	47.646
8	90.359	48.979
9	95.087	50.606
10	99.707	52.519

11	104.200	54.712
12	108.550	57.176
13	112.742	59.903
14	116.758	62.881
15	120.584	66.100
16	124.205	69.548
17	127.608	73.211
18	129.132	75.069

Circle Center At X = 66.244 ; Y = 126.669 ; and Radius = 81.348

Factor of Safety

*** 1.024 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	61.500	46.000
2	66.449	45.285
3	71.437	44.946
4	76.437	44.984
5	81.420	45.400
6	86.357	46.191
7	91.220	47.352
8	95.982	48.877
9	100.615	50.757
10	105.093	52.981
11	109.390	55.537
12	113.482	58.410
13	117.346	61.584
14	120.959	65.040
15	124.301	68.759
16	127.352	72.720
17	128.891	75.065

Circle Center At X = 73.430 ; Y = 111.106 ; and Radius = 66.190

Factor of Safety

*** 1.025 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.750	46.000
2	60.728	45.530
3	65.724	45.339
4	70.723	45.427
5	75.710	45.795
6	80.668	46.441
7	85.582	47.362
8	90.437	48.558
9	95.218	50.022
10	99.909	51.751
11	104.497	53.740
12	108.966	55.983
13	113.303	58.471
14	117.494	61.198
15	121.526	64.155
16	125.386	67.332
17	129.063	70.721
18	132.545	74.309
19	133.263	75.138

Circle Center At X = 66.643 ; Y = 134.765 ; and Radius = 89.431

Factor of Safety

*** 1.026 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	55.750	46.000
2	60.728	45.533
3	65.726	45.377
4	70.723	45.530
5	75.702	45.994

6	80.642	46.766
7	85.524	47.844
8	90.331	49.222
9	95.042	50.896
10	99.640	52.860
11	104.108	55.105
12	108.428	57.623
13	112.582	60.405
14	116.557	63.439
15	120.335	66.714
16	123.902	70.217
17	127.245	73.935
18	128.131	75.052

Circle Center At X = 65.764 ; Y = 125.742 ; and Radius = 80.368

Factor of Safety

*** 1.027 ***

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

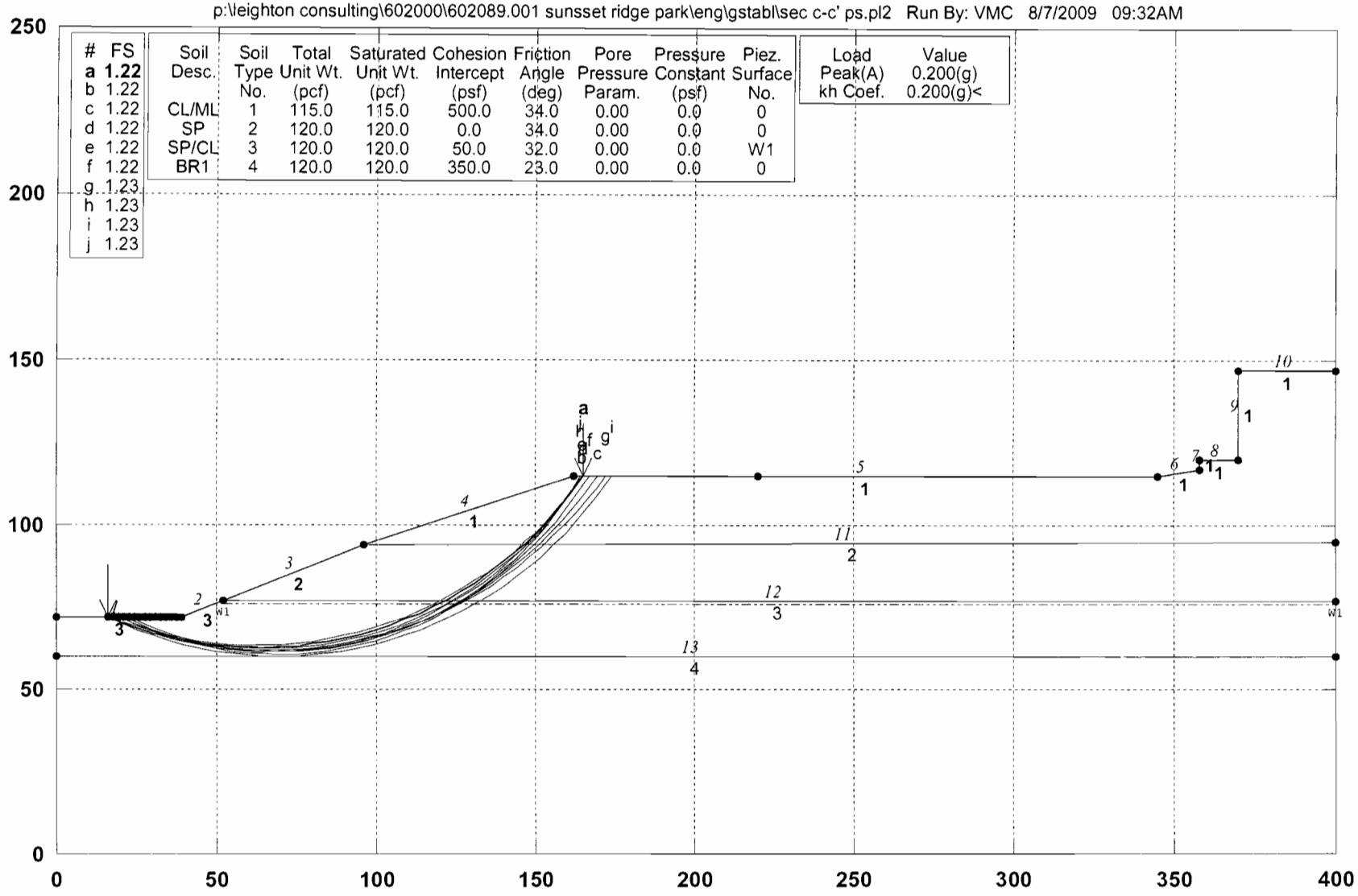
P.N: 602089-001/ Cross Section C-C'/PS Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec c-c' ps.pl2 Run By: VMC 8/7/2009 09:32AM

#	FS
a	**1.22**
b	1.22
c	1.22
d	1.22
e	1.22
f	1.22
g	1.23
h	1.23
i	1.23
j	1.23

Soil Desc.	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.
CL/ML	1	115.0	115.0	500.0	34.0	0.00	0.0	0
SP	2	120.0	120.0	0.0	34.0	0.00	0.0	0
SP/CL	3	120.0	120.0	50.0	32.0	0.00	0.0	W1
BR1	4	120.0	120.0	350.0	23.0	0.00	0.0	0

Load	Value
Peak(A)	0.200(g)
kh Coef.	0.200(g)<



GSTABL7 v.2 FSmin=1.22

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

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

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

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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: 8/7/2009
Time of Run: 09:32AM
Run By: VMC
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' ps.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' ps.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' ps.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section C-C'/PS
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
10 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	72.00	39.00	72.00	3
2	39.00	72.00	52.00	77.00	3
3	52.00	77.00	96.00	94.00	2
4	96.00	94.00	162.00	115.00	1
5	162.00	115.00	345.00	115.00	1
6	345.00	115.00	358.00	117.00	1
7	358.00	117.00	358.00	120.00	1
8	358.00	120.00	370.00	120.00	1
9	370.00	120.00	370.01	147.00	1
10	370.01	147.00	400.00	147.00	1
11	96.00	94.00	400.00	95.00	2
12	52.00	77.00	400.00	77.00	3
13	0.00	60.00	400.00	60.00	4

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

ISOTROPIC SOIL PARAMETERS
4 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	115.0	115.0	500.0	34.0	0.00	0.0	0
2	120.0	120.0	0.0	34.0	0.00	0.0	0
3	120.0	120.0	50.0	32.0	0.00	0.0	1
4	120.0	120.0	350.0	23.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	52.00	76.00
2	400.00	76.00

Specified Peak Ground Acceleration Coefficient (A) = 0.200(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(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.
3000 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 15 Points Equally Spaced
Along The Ground Surface Between X = 16.00(ft)
and X = 39.00(ft)
Each Surface Terminates Between X = 162.00(ft)
and X = 220.00(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.
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 Attempted = 3000
Number of Trial Surfaces With Valid FS = 3000
Statistical Data On All Valid FS Values:
FS Max = 1.837 FS Min = 1.217 FS Ave = 1.530
Standard Deviation = 0.144 Coefficient of Variation = 9.39 %
Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.665	70.201
3	25.398	68.590
4	30.192	67.169
5	35.039	65.941
6	39.931	64.909
7	44.861	64.072
8	49.820	63.434
9	54.801	62.994
10	59.795	62.755
11	64.795	62.715
12	69.792	62.875
13	74.779	63.234
14	79.748	63.793
15	84.690	64.551
16	89.598	65.505
17	94.464	66.655
18	99.280	67.999
19	104.039	69.534
20	108.732	71.259
21	113.352	73.169
22	117.893	75.264
23	122.346	77.538
24	126.704	79.988
25	130.961	82.611
26	135.110	85.401
27	139.143	88.356
28	143.056	91.470
29	146.840	94.737
30	150.491	98.154
31	154.002	101.713
32	157.368	105.410
33	160.584	109.239
34	163.644	113.194
35	164.929	115.000

Circle Center At X = 63.294 ; Y = 187.677 ; and Radius = 124.971
Factor of Safety
*** 1.217 ***
Individual data on the 41 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)	Surcharge Load Ver (lbs)	Surcharge Load (lbs)
1	4.7	503.6	1164.4	1528.7	0.	0.	100.7	0.0	0.0
2	4.7	1479.5	1181.4	2060.7	0.	0.	295.9	0.0	0.0

3	4.8	2370.5	1196.6	2533.7	0.	0.	474.1	0.0	0.0
4	4.8	3166.9	1209.8	2946.8	0.	0.	633.4	0.0	0.0
5	4.0	3078.3	988.6	2646.4	0.	0.	615.7	0.0	0.0
6	0.9	801.7	237.9	653.0	0.	0.	160.3	0.0	0.0
7	4.9	5214.9	887.8	3591.0	0.	0.	1043.0	0.0	0.0
8	5.0	6816.6	262.6	3821.0	0.	0.	1363.3	0.0	0.0
9	2.2	3464.2	0.0	1729.1	0.	0.	692.8	0.0	0.0
10	2.8	4847.4	0.0	2260.1	0.	0.	969.5	0.0	0.0
11	5.0	9692.3	0.0	4095.2	0.	0.	1938.5	0.0	0.0
12	5.0	10945.5	0.0	4138.8	0.	0.	2189.1	0.0	0.0
13	5.0	12062.4	0.0	4120.1	0.	0.	2412.5	0.0	0.0
14	5.0	13036.0	0.0	4039.0	0.	0.	2607.2	0.0	0.0
15	5.0	13860.7	0.0	3895.6	0.	0.	2772.1	0.0	0.0
16	4.9	14532.4	0.0	3690.3	0.	0.	2906.5	0.0	0.0
17	4.9	15048.4	0.0	3423.3	0.	0.	3009.7	0.0	0.0
18	4.9	15407.4	0.0	3095.0	0.	0.	3081.5	0.0	0.0
19	1.5	4945.2	0.0	908.4	0.	0.	989.0	0.0	0.0
20	3.3	10612.1	0.0	1797.5	0.	0.	2122.4	0.0	0.0
21	4.8	15394.5	0.0	2256.8	0.	0.	3078.9	0.0	0.0
22	4.7	15077.5	0.0	1748.3	0.	0.	3015.5	0.0	0.0
23	4.6	14623.7	0.0	1181.2	0.	0.	2924.7	0.0	0.0
24	4.5	14040.4	0.0	556.5	0.	0.	2808.1	0.0	0.0
25	1.4	4372.7	0.0	37.2	0.	0.	874.5	0.0	0.0
26	2.0	5855.2	0.0	0.0	0.	0.	1171.0	0.0	0.0
27	1.1	3108.2	0.0	0.0	0.	0.	621.6	0.0	0.0
28	4.4	12520.5	0.0	0.0	0.	0.	2504.1	0.0	0.0
29	4.3	11604.5	0.0	0.0	0.	0.	2320.9	0.0	0.0
30	4.1	10600.0	0.0	0.0	0.	0.	2120.0	0.0	0.0
31	4.0	9519.8	0.0	0.0	0.	0.	1904.0	0.0	0.0
32	3.9	8377.8	0.0	0.0	0.	0.	1675.6	0.0	0.0
33	3.1	5999.3	0.0	0.0	0.	0.	1199.9	0.0	0.0
34	0.7	1190.2	0.0	0.0	0.	0.	238.0	0.0	0.0
35	3.7	6008.8	0.0	0.0	0.	0.	1201.8	0.0	0.0
36	3.5	4830.7	0.0	0.0	0.	0.	966.1	0.0	0.0
37	3.4	3649.9	0.0	0.0	0.	0.	730.0	0.0	0.0
38	3.2	2482.3	0.0	0.0	0.	0.	496.5	0.0	0.0
39	1.4	752.4	0.0	0.0	0.	0.	150.5	0.0	0.0
40	1.6	542.1	0.0	0.0	0.	0.	108.4	0.0	0.0
41	1.3	133.5	0.0	0.0	0.	0.	26.7	0.0	0.0

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.286	72.000
2	23.885	70.038
3	28.564	68.277
4	33.315	66.719
5	38.129	65.368
6	42.997	64.226
7	47.910	63.295
8	52.858	62.577
9	57.833	62.074
10	62.824	61.785
11	67.824	61.712
12	72.822	61.855
13	77.809	62.214
14	82.776	62.788
15	87.713	63.576
16	92.612	64.576
17	97.464	65.786
18	102.258	67.205
19	106.987	68.829
20	111.641	70.657
21	116.212	72.683
22	120.691	74.905
23	125.070	77.318
24	129.341	79.917
25	133.496	82.699

26	137.527	85.658
27	141.426	88.787
28	145.187	92.083
29	148.802	95.537
30	152.264	99.144
31	155.567	102.898
32	158.706	106.790
33	161.673	110.814
34	164.464	114.963
35	164.486	115.000

Circle Center At X = 67.008 ; Y = 177.510 ; and Radius = 115.801

Factor of Safety

*** 1.220 ***

Failure Surface Specified By 36 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.619	70.085
3	25.310	68.355
4	30.066	66.814
5	34.880	65.462
6	39.744	64.304
7	44.650	63.339
8	49.591	62.571
9	54.558	61.999
10	59.544	61.626
11	64.541	61.451
12	69.541	61.475
13	74.536	61.698
14	79.518	62.120
15	84.480	62.739
16	89.413	63.555
17	94.309	64.567
18	99.162	65.773
19	103.963	67.170
20	108.704	68.758
21	113.378	70.533
22	117.978	72.492
23	122.497	74.633
24	126.927	76.952
25	131.261	79.445
26	135.492	82.108
27	139.614	84.938
28	143.621	87.930
29	147.505	91.078
30	151.261	94.379
31	154.883	97.826
32	158.364	101.414
33	161.700	105.139
34	164.886	108.992
35	167.916	112.970
36	169.338	115.000

Circle Center At X = 66.431 ; Y = 187.066 ; and Radius = 125.632

Factor of Safety

*** 1.220 ***

Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.697	70.286
3	25.457	68.756
4	30.273	67.412
5	35.138	66.258
6	40.044	65.293
7	44.984	64.521
8	49.951	63.942
9	54.936	63.557

10	59.932	63.367
11	64.932	63.371
12	69.928	63.571
13	74.913	63.965
14	79.878	64.552
15	84.817	65.334
16	89.721	66.306
17	94.584	67.470
18	99.397	68.822
19	104.155	70.360
20	108.849	72.083
21	113.472	73.988
22	118.017	76.071
23	122.478	78.330
24	126.847	80.761
25	131.118	83.360
26	135.285	86.124
27	139.341	89.048
28	143.279	92.128
29	147.095	95.360
30	150.782	98.737
31	154.334	102.256
32	157.747	105.910
33	161.014	109.695
34	164.131	113.604
35	165.158	115.000

Circle Center At X = 62.317 ; Y = 191.601 ; and Radius = 128.256

Factor of Safety

*** 1.221 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.286	72.000
2	23.918	70.118
3	28.626	68.434
4	33.400	66.949
5	38.233	65.668
6	43.116	64.591
7	48.040	63.721
8	52.996	63.060
9	57.975	62.609
10	62.970	62.368
11	67.970	62.337
12	72.966	62.518
13	77.951	62.910
14	82.915	63.511
15	87.849	64.322
16	92.744	65.339
17	97.592	66.563
18	102.384	67.989
19	107.112	69.617
20	111.766	71.443
21	116.340	73.463
22	120.824	75.675
23	125.211	78.073
24	129.493	80.655
25	133.662	83.415
26	137.711	86.349
27	141.633	89.451
28	145.420	92.715
29	149.067	96.136
30	152.565	99.708
31	155.910	103.425
32	159.095	107.279
33	162.115	111.264
34	164.705	115.000

Circle Center At X = 66.182 ; Y = 180.795 ; and Radius = 118.473

Factor of Safety
*** 1.221 ***
Failure Surface Specified By 35 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.286	72.000
2	23.878	70.022
3	28.550	68.241
4	33.293	66.660
5	38.100	65.282
6	42.960	64.110
7	47.867	63.145
8	52.809	62.390
9	57.779	61.845
10	62.768	61.512
11	67.767	61.392
12	72.766	61.484
13	77.757	61.788
14	82.730	62.304
15	87.677	63.031
16	92.588	63.967
17	97.456	65.111
18	102.270	66.461
19	107.023	68.015
20	111.705	69.769
21	116.308	71.720
22	120.825	73.866
23	125.246	76.201
24	129.564	78.722
25	133.771	81.424
26	137.859	84.303
27	141.821	87.352
28	145.650	90.567
29	149.339	93.943
30	152.882	97.471
31	156.271	101.147
32	159.501	104.964
33	162.565	108.915
34	165.459	112.992
35	166.760	115.000

Circle Center At X = 68.106 ; Y = 179.028 ; and Radius = 117.637

Factor of Safety
*** 1.223 ***
Failure Surface Specified By 36 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.645	70.150
3	25.357	68.478
4	30.130	66.988
5	34.957	65.682
6	39.829	64.562
7	44.742	63.628
8	49.686	62.884
9	54.655	62.329
10	59.642	61.964
11	64.639	61.791
12	69.639	61.809
13	74.634	62.018
14	79.618	62.418
15	84.583	63.009
16	89.522	63.789
17	94.427	64.757
18	99.292	65.912
19	104.109	67.253
20	108.871	68.777
21	113.571	70.482

22	118.203	72.366
23	122.759	74.425
24	127.233	76.657
25	131.619	79.059
26	135.909	81.627
27	140.098	84.357
28	144.179	87.245
29	148.147	90.287
30	151.996	93.479
31	155.719	96.816
32	159.313	100.293
33	162.770	103.905
34	166.087	107.646
35	169.259	111.512
36	171.904	115.000

Circle Center At X = 66.669 ; Y = 192.417 ; and Radius = 130.643

Factor of Safety

*** 1.226 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	20.929	72.000
2	25.459	69.885
3	30.082	67.980
4	34.787	66.287
5	39.564	64.811
6	44.404	63.555
7	49.296	62.522
8	54.230	61.713
9	59.196	61.130
10	64.183	60.774
11	69.181	60.647
12	74.180	60.748
13	79.170	61.078
14	84.138	61.635
15	89.077	62.419
16	93.974	63.427
17	98.820	64.658
18	103.605	66.109
19	108.318	67.777
20	112.951	69.658
21	117.493	71.750
22	121.934	74.046
23	126.266	76.543
24	130.479	79.235
25	134.565	82.117
26	138.515	85.183
27	142.321	88.426
28	145.974	91.839
29	149.468	95.416
30	152.795	99.148
31	155.948	103.029
32	158.921	107.049
33	161.706	111.202
34	164.010	115.000

Circle Center At X = 69.463 ; Y = 170.053 ; and Radius = 109.407

Factor of Safety

*** 1.226 ***

Failure Surface Specified By 37 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	16.000	72.000
2	20.571	69.974
3	25.219	68.130
4	29.936	66.472
5	34.715	65.001
6	39.548	63.720

7	44.428	62.631
8	49.347	61.736
9	54.298	61.036
10	59.272	60.532
11	64.263	60.225
12	69.261	60.115
13	74.261	60.203
14	79.253	60.489
15	84.229	60.971
16	89.183	61.650
17	94.106	62.524
18	98.991	63.592
19	103.829	64.852
20	108.614	66.302
21	113.338	67.940
22	117.994	69.764
23	122.574	71.770
24	127.071	73.955
25	131.478	76.317
26	135.789	78.850
27	139.996	81.553
28	144.092	84.419
29	148.073	87.445
30	151.931	90.625
31	155.660	93.956
32	159.254	97.432
33	162.709	101.047
34	166.018	104.795
35	169.176	108.672
36	172.178	112.670
37	173.788	115.000

Circle Center At X = 69.535 ; Y = 186.627 ; and Radius = 126.512

Factor of Safety

*** 1.227 ***

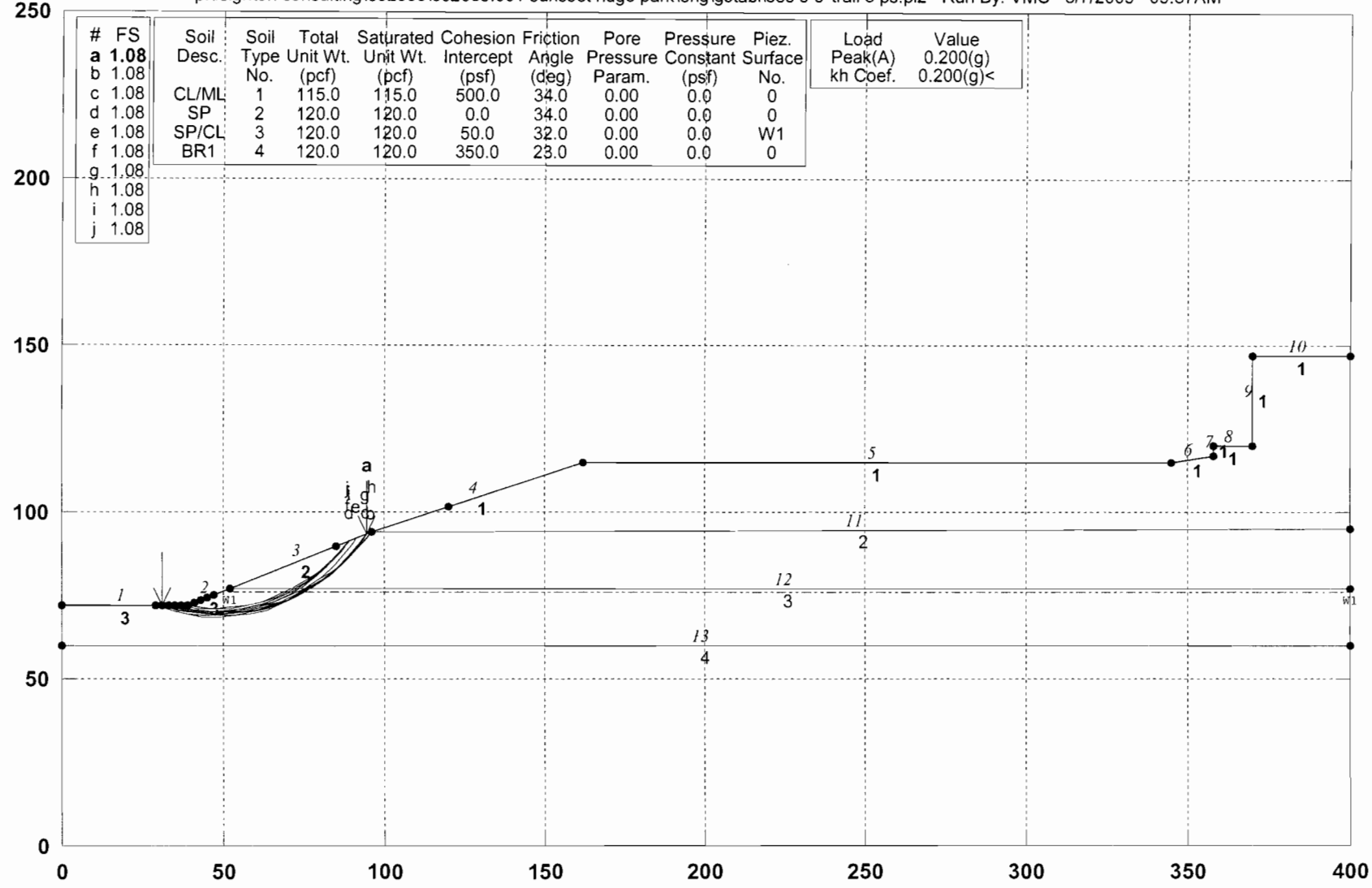
Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.571	72.000
2	27.137	69.961
3	31.790	68.131
4	36.521	66.514
5	41.321	65.113
6	46.179	63.932
7	51.087	62.973
8	56.032	62.238
9	61.006	61.728
10	65.998	61.444
11	70.998	61.388
12	75.995	61.558
13	80.979	61.955
14	85.940	62.579
15	90.868	63.426
16	95.752	64.497
17	100.582	65.788
18	105.349	67.297
19	110.042	69.022
20	114.652	70.957
21	119.170	73.100
22	123.586	75.446
23	127.890	77.989
24	132.075	80.726
25	136.131	83.650
26	140.050	86.755
27	143.824	90.035
28	147.445	93.482
29	150.906	97.091
30	154.199	100.853

```
   31        157.319      104.761
   32        160.257      108.806
   33        163.009      112.981
   34        164.212      115.000
Circle Center At X =    69.740 ; Y =   171.409 ; and Radius =   110.032
      Factor of Safety
     ***    1.229   ***
         **** END OF GSTABL7 OUTPUT ****
```

P.N: 602089-001/ Cross Section C-C'/PS Sunset Ridge Park, Newport Beach, CA

p:\leighton consulting\602000\602089.001 sunsset ridge park\eng\gstabl\sec c-c' trail 3 ps.pl2 Run By: VMC 8/7/2009 09:37AM



#	FS
a	**1.08**
b	1.08
c	1.08
d	1.08
e	1.08
f	1.08
g	1.08
h	1.08
i	1.08
j	1.08

Soil Desc.	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.
CL/ML	1	115.0	115.0	500.0	34.0	0.00	0.0	0
SP	2	120.0	120.0	0.0	34.0	0.00	0.0	0
SP/CL	3	120.0	120.0	50.0	32.0	0.00	0.0	W1
BR1	4	120.0	120.0	350.0	23.0	0.00	0.0	0

Load	Value
Peak(A)	0.200(g)
kh Coef.	0.200(g)<

GSTABL7 v.2 FSmin=1.08

Safety Factors Are Calculated By The Modified Bishop Method

***** GSTABL7 *****

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

** Original Version 1.0, January 1996; Current Version 2.004, June 2003 **

****

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: 8/7/2009
Time of Run: 09:37AM
Run By: VMC
Input Data Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' trail 3 ps.in
Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' trail 3 ps.OUT
Unit System: English
Plotted Output Filename: P:\Leighton Consulting\602000\602089.001 Sunsset Ridge Park\ENG\Gstabl\sec c-c' trail 3 ps.PLT
PROBLEM DESCRIPTION: P.N: 602089-001/ Cross Section C-C'/PS
Sunset Ridge Park, Newport Beach, CA

BOUNDARY COORDINATES
10 Top Boundaries
13 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	72.00	39.00	72.00	3
2	39.00	72.00	52.00	77.00	3
3	52.00	77.00	96.00	94.00	2
4	96.00	94.00	162.00	115.00	1
5	162.00	115.00	345.00	115.00	1
6	345.00	115.00	358.00	117.00	1
7	358.00	117.00	358.00	120.00	1
8	358.00	120.00	370.00	120.00	1
9	370.00	120.00	370.01	147.00	1
10	370.01	147.00	400.00	147.00	1
11	96.00	94.00	400.00	95.00	2
12	52.00	77.00	400.00	77.00	3
13	0.00	60.00	400.00	60.00	4

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

ISOTROPIC SOIL PARAMETERS
4 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	115.0	115.0	500.0	34.0	0.00	0.0	0
2	120.0	120.0	0.0	34.0	0.00	0.0	0
3	120.0	120.0	50.0	32.0	0.00	0.0	1
4	120.0	120.0	350.0	23.0	0.00	0.0	0

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 1.00

Point No.	X-Water (ft)	Y-Water (ft)
1	52.00	76.00
2	400.00	76.00

Specified Peak Ground Acceleration Coefficient (A) = 0.200(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.200(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.
2000 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 10 Points Equally Spaced
Along The Ground Surface Between X = 29.00(ft)
and X = 47.00(ft)
Each Surface Terminates Between X = 85.00(ft)
and X = 120.00(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.
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 Attempted = 2000
Number of Trial Surfaces With Valid FS = 2000
Statistical Data On All Valid FS Values:
FS Max = 2.361 FS Min = 1.078 FS Ave = 1.348
Standard Deviation = 0.177 Coefficient of Variation = 13.10 %
Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.000	72.000
2	35.824	70.684
3	40.745	69.798
4	45.724	69.349
5	50.724	69.340
6	55.706	69.771
7	60.630	70.640
8	65.458	71.939
9	70.153	73.658
10	74.678	75.785
11	78.999	78.301
12	83.081	81.188
13	86.893	84.424
14	90.405	87.983
15	93.590	91.837
16	94.743	93.514

Circle Center At X = 48.324 ; Y = 125.858 ; and Radius = 56.576
Factor of Safety
*** 1.078 ***
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	4.8	380.9	1204.0	1453.3	0.	0.	76.2	0.0	0.0
2	3.2	610.7	792.8	1128.2	0.	0.	122.1	0.0	0.0
3	1.7	498.4	427.4	668.7	0.	0.	99.7	0.0	0.0
4	5.0	2423.4	789.5	2005.2	0.	0.	484.7	0.0	0.0
5	5.0	3722.2	151.2	2076.6	0.	0.	744.4	0.0	0.0
6	1.3	1126.7	0.0	527.8	0.	0.	225.3	0.0	0.0
7	3.7	3604.1	0.0	1482.9	0.	0.	720.8	0.0	0.0
8	4.9	5422.6	0.0	1807.8	0.	0.	1084.5	0.0	0.0
9	4.8	5780.8	0.0	1469.7	0.	0.	1156.2	0.0	0.0
10	4.7	5807.6	0.0	998.8	0.	0.	1161.5	0.0	0.0
11	4.5	5520.9	0.0	398.9	0.	0.	1104.2	0.0	0.0
12	0.4	441.3	0.0	2.9	0.	0.	88.3	0.0	0.0
13	1.7	2006.0	0.0	0.0	0.	0.	401.2	0.0	0.0
14	2.2	2506.1	0.0	0.0	0.	0.	501.2	0.0	0.0
15	4.1	4151.6	0.0	0.0	0.	0.	830.3	0.0	0.0
16	3.8	3174.0	0.0	0.0	0.	0.	634.8	0.0	0.0
17	3.5	2088.8	0.0	0.0	0.	0.	417.8	0.0	0.0
18	3.2	972.1	0.0	0.0	0.	0.	194.4	0.0	0.0
19	1.2	85.2	0.0	0.0	0.	0.	17.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	33.000	72.000
2	37.882	70.922
3	42.838	70.259
4	47.832	70.017
5	52.829	70.196
6	57.793	70.796
7	62.689	71.812
8	67.481	73.238
9	72.136	75.062
10	76.621	77.273
11	80.904	79.854
12	84.953	82.786
13	88.741	86.050
14	92.241	89.621
15	95.426	93.475
16	95.714	93.889

Circle Center At X = 48.209 ; Y = 129.209 ; and Radius = 59.196

Factor of Safety

*** 1.079 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	29.000	72.000
2	33.786	70.552
3	38.681	69.534
4	43.647	68.955
5	48.645	68.819
6	53.636	69.128
7	58.579	69.878
8	63.436	71.065
9	68.169	72.678
10	72.740	74.705
11	77.112	77.131
12	81.252	79.934
13	85.126	83.095
14	88.705	86.587
15	91.959	90.383
16	93.985	93.222

Circle Center At X = 47.668 ; Y = 124.944 ; and Radius = 56.139

Factor of Safety

*** 1.080 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.000	72.000
2	41.942	71.243
3	46.934	70.958
4	51.931	71.146
5	56.887	71.805
6	61.759	72.931
7	66.502	74.512
8	71.074	76.536
9	75.435	78.982
10	79.544	81.830
11	83.366	85.055
12	86.865	88.626
13	89.038	91.310

Circle Center At X = 47.451 ; Y = 123.747 ; and Radius = 52.792

Factor of Safety

*** 1.080 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.000	72.000
2	37.824	70.685
3	42.754	69.849

4	47.741	69.499
5	52.739	69.639
6	57.700	70.268
7	62.575	71.379
8	67.318	72.962
9	71.883	75.001
10	76.226	77.478
11	80.307	80.368
12	84.085	83.643
13	87.524	87.272
14	90.591	91.221
15	91.166	92.132

Circle Center At X = 48.812 ; Y = 120.513 ; and Radius = 51.025

Factor of Safety

*** 1.081 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	37.000	72.000
2	41.952	71.309
3	46.947	71.083
4	51.941	71.326
5	56.891	72.034
6	61.752	73.202
7	66.484	74.819
8	71.043	76.871
9	75.390	79.341
10	79.488	82.206
11	83.300	85.442
12	86.793	89.019
13	88.465	91.089

Circle Center At X = 46.856 ; Y = 124.512 ; and Radius = 53.429

Factor of Safety

*** 1.081 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	29.000	72.000
2	33.757	70.460
3	38.634	69.360
4	43.592	68.711
5	48.588	68.518
6	53.581	68.782
7	58.529	69.502
8	63.391	70.670
9	68.125	72.278
10	72.693	74.311
11	77.056	76.754
12	81.177	79.585
13	85.023	82.781
14	88.560	86.314
15	91.760	90.157
16	93.828	93.161

Circle Center At X = 48.196 ; Y = 123.074 ; and Radius = 54.562

Factor of Safety

*** 1.081 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.000	72.000
2	35.904	71.025
3	40.869	70.432
4	45.865	70.226
5	50.861	70.406
6	55.829	70.973
7	60.738	71.922
8	65.559	73.248

9	70.263	74.943
10	74.822	76.997
11	79.208	79.398
12	83.395	82.131
13	87.358	85.179
14	91.073	88.525
15	94.519	92.149
16	96.033	94.010

Circle Center At X = 46.040 ; Y = 134.642 ; and Radius = 64.422

Factor of Safety

*** 1.081 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	33.000	72.000
2	37.883	70.925
3	42.846	70.317
4	47.844	70.183
5	52.833	70.524
6	57.766	71.336
7	62.601	72.612
8	67.292	74.340
9	71.799	76.506
10	76.080	79.089
11	80.097	82.066
12	83.813	85.411
13	87.196	89.093
14	88.807	91.221

Circle Center At X = 46.760 ; Y = 122.676 ; and Radius = 52.511

Factor of Safety

*** 1.082 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.000	72.000
2	35.835	70.725
3	40.770	69.922
4	45.759	69.599
5	50.757	69.757
6	55.716	70.396
7	60.590	71.511
8	65.334	73.089
9	69.904	75.118
10	74.258	77.577
11	78.354	80.445
12	82.154	83.694
13	85.624	87.294
14	88.709	91.183

Circle Center At X = 46.616 ; Y = 121.416 ; and Radius = 51.825

Factor of Safety

*** 1.082 ***

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

APPENDIX E

Seismic Lateral Pressure Calculations

Based on direct shear test results

- Ultimate shear strength of the soil at site ranges from $\phi = 32^\circ$ to 46° within 5' to 20' below current grade

∴ a shear strength of $\phi = 32^\circ$ will be used for seismic lateral pressure

Design Parameters:

$\phi = 32^\circ$

$$K_A = \frac{\cos^2(\phi - \theta)}{\cos^2\theta \cos(\theta+\delta) * \left[1 + \sqrt{\frac{\sin(\phi+\delta)\sin(\phi-\beta)}{\cos(\theta+\delta)\cos(\theta-\beta)}}\right]^2}$$

where $\phi = 32^\circ$

$\theta = 0^\circ$ for straight wall

$\delta = 0^\circ$ for smooth wall

$\beta = 0^\circ$ for level slope

$= 26.6^\circ$ for 2H:1V

$\beta^* = \beta + \psi$

$= 11.3^\circ$ for level

$= 37.9$ " 2H:1V

$\psi = \tan^{-1}\left(\frac{k_h}{1-k_v}\right)$

$= \tan^{-1}\left(\frac{0.2}{1-0}\right)$

$= 11.3^\circ$

$\theta^* = \theta + \psi$

$= 11.3^\circ$ for level & 2H:1V

Lateral seismic Pressure Calculation

1/3

Project No. 602089-001

Project Name Sunset Ridge

Engineer

Date 8/6/09 Figure No.

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For level backfall:

$$K_{AE}(\beta^*, \theta^*) = \frac{\cos^2(32^\circ - 11.3)}{\cos^2(11.3)\cos(11.3+0)\left[1+\sqrt{\frac{\sin(32+0)\sin(32-11.3)}{\cos(11.3+0)\cos(0-11.3)}}\right]^2}$$

$$= \frac{0.875}{0.96 \times 0.98 \left[1+\sqrt{\frac{0.53 \times 0.35}{0.99 \times 0.98}}\right]^2}$$

$$= \frac{0.875}{0.94 \times 2.07}$$

$$= 0.449$$

P_{static} = 38 psf/ft $\rightarrow K_A = 0.31$

$\Delta K_{AE} = 0.449 - 0.31$

$= 0.139$

$\gamma = 125$ pcf

$\Delta P_{AE} = 0.139 \times 125$ pcf

$= \underline{17.46 \text{ psf/ft}}$ $\rightarrow$ Recommendation = 18 psf/ft

Lateral Seismic Pressure Calculation

2/3

Project No. 602089-001

Project Name Sunset Ridge

Engineer

Date 8/6/09 Figure No.

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For 2H:1V backfill

$$K_{AE} = \frac{\cos^2(32^\circ - 11.3^\circ)}{(\cos^2 11.3)\cos(11.3) \times \left[1 + \sqrt{\frac{\sin(32)\sin(32+37.9)}{\cos(11.3)\cos(11.3-37.9)}}\right]^2}$$

$$= \frac{0.875}{0.96 \times 0.98} = 0.93$$

(ignore term due to sq. root of negative #, conservative)

$P_{static} = 58$ psf/ft $\rightarrow$ $K_A = 0.464$

$$\Delta K_{AE} = 0.93 - 0.464 = 0.466$$

$$\Delta P_{AE} = 0.466 \times 125 \text{ pcf} = 58.25 \text{ psf/ft}$$

As this is a short term loading & considering the sq. root term that was ignored above,

Recommended P_{AE} = 55 psf/ft

Lateral Seismic Pressure Calculation

3/3

Project No. 602089-001

Project Name Sunset Ridge

Engineer

Date 8/6/09 Figure No.

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APPENDIX F

CITY OF NEWPORT BEACH
BUILDING DEPARTMENT
GEOTECHNICAL REPORT REVIEW CHECKLIST

Date Received: 7-9-09
Date of Report: 6-25-09
Consultant: Leighton

Date Completed: 7-14-09
Plan Check No: -
Our Job No: 202A-156

Site Address: Superior Ave. and PCH
Newport Beach, California

Title of Report: Geotechnical Study for the Proposed Sunset Ridge Park Project for the Environmental Impact Report (EIR) , Superior Ave. and Pacific Coast Highway, City of Newport Beach, California

Purpose of Report: Geotechnical recommendations for preliminary planning of a park site.

Project Information/Background:

RECEIVED BY
PLANNING DEPARTMENT
JUL 14 2009
CITY OF NEWPORT BEACH

Y/N	Review of Existing City Files
Y/N	Reference to Site(s) by Street Address
Y/N	Reference to Grading/Foundation Plans by Date
Y/N	Subsurface Investigation
Y/N	Aerial Photograph

Hazards	Discussion
Adverse Geologic Structure	Y/N/NA
Bluff Retreat	Y/N/NA
Debris/Mud Flow	Y/N/NA
Differential Settlement	Y/N/NA
Erosion	Y/N/NA
Expansive Soils	Y/N/NA
Faulting	Y/N/NA
Fractured Bedrock	Y/N/NA
Groundwater	Y/N/NA
Landslide	Y/N/NA
Liquefaction	Y/N/NA
Settlement/Collapsible Soils	Y/N/NA
Slump	Y/N/NA
Soil/Rock Creep	Y/N/NA
Sulfate Rich Soils	Y/N/NA

Supporting Analysis/Data		Recommendations for	
Y/N/NA	Slope Stability Calculations	Y/N/NA	Foundations
Y/N/NA	Shear Strength Values	Y/N/NA	Retaining Walls
Y/N/NA	Other Laboratory Data	Y/N/NA	Foundation Setbacks
Y/N/NA	Seismicity	Y/N/NA	Slabs
Y/N/NA	Boring/Trench Logs	Y/N/NA	Flatwork
Y/N/NA	Liquefaction Study	Y/N/NA	Grading
Y/N/NA	Calculations Supporting Recommendations	Y/N/NA	Pools/Spas
Y/N/NA	Geologic Map and Cross Sections	Y/N/NA	Slope/Bluff Setbacks
Y/N/NA	Drainage Plan	Y/N/NA	Adequacy for Intended use
		Y/N/NA	Not Adversely Impacting Adjoining Sites

_X_ PRIOR TO APPROVAL OF THE REPORT, ATTEND TO THE ITEMS BELOW:

1. **Page 13. Slab-on-grade. Please provide input recommendations for Structural Engineer per Section 1805.8.2 of 2007 CBC.**

2. **Page 13. Concrete Flatwork. Please provide minimum thickness and reinforcement based on expansive subgrade.**

3. **Page 14. Seismic Earth Pressures. Please provide supporting computations.**

4. **Appendix D. Slope Stability. (a) Please provide basis for adopted shear values, (b) Please provide seismic stability computations and (c) Please provide surficial stability computations for proposed cut and fill slopes.**

5. **General**

   (a) **Provide slope setback recommendations as well as slope creep loading.**
   (b) **Provide a statement that the proposed construction would not adversely impact adjoining properties.**
   (c) **Comments on access road pending submittal of further study and exploration (page 7).**
   (d) **A final design geotechnical report shall be submitted showing limits of cut and fill on an approved grading plan, location of keys, terrace drains, benching details, etc.**
   (e) **Please provide wet stamped and signed report by a registered engineer and a CEG.**

Limitations of Review:

Our review is intended to determine if the submitted report(s) comply with City Codes and generally accepted geotechnical practices within the local area. The scope of our services for this third party review has been limited to a brief site visit and a review of the above referenced report and associated documents, as supplied by the City of Newport Beach. Re-analysis of reported data and/or calculations and preparation of amended construction or design recommendations are specifically not included within our scope of services. Our review should not be considered as a certification, approval or acceptance previous consultant's work, nor is meant as an acceptance of liability for final design or construction recommendations made by the geotechnical consultant of record or the project designers or engineers. Opinions presented in this review are for City's use only.

BY:_____

Gamini Weeratunga, G.E. 2403
BAGAHI ENGINEERING, INC.

BY:_____

Ken Bagahi, Ph.D., G.E.
BAGAHI ENGINEERING, INC.