LGC Geotechnical, Inc.

April 28, 2017

Project No. 14057-01

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***Subject:*** ***Preliminary Geotechnical Report for Proposed Rancho La Habra Residential Development, VTTM 17845, City of La Habra, California***

In accordance with your request and authorization, LGC Geotechnical, Inc. has prepared a preliminary geotechnical report for the proposed "Rancho La Habra" residential development generally located south of Imperial Highway and an adjacent commercial center between Beach Boulevard and Idaho Street within the City of La Habra, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to confirm that the site can be developed from a geotechnical perspective.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully Submitted,

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## *1.0 INTRODUCTION*

### *1.1 Purpose and Scope of Services*

This report presents the results of our preliminary geotechnical evaluation for the proposed "Rancho La Habra" residential development, Vesting Tentative Tract No. 17845, located in the City of La Habra, California. The preliminary grading plan by Hunsaker and Associates, Inc. (Hunsaker, 2017) was utilized as a base map for our Geotechnical Map (Sheet 1), and Geotechnical Cross-Sections (Sheets 2 & 3).

The purpose of our study was to evaluate the existing onsite geotechnical conditions and to confirm that the site can be developed from a geotechnical perspective. As part of this report, we have: 1) reviewed available geotechnical reports, geologic maps, and air photos pertinent to the site (Appendix A); 2) performed a subsurface geotechnical evaluation of the site; 3) prepared a geotechnical map of the site incorporating available geotechnical information; 4) prepared geotechnical cross-sections depicting the interpreted subsurface conditions of the site relative to the proposed design; 5) performed global slope stability analysis in support of the proposed design; and 6) prepared this summary report presenting our preliminary findings and conclusions for the proposed development.

The findings and conclusions presented herein should be considered preliminary and will need to be confirmed as part of a grading plan review report to be provided at a later date. It should be noted that LGC Geotechnical does not provide environmental consulting services.

### *1.2 Existing Conditions*

The approximately 151-acre site is currently an 18-hole golf course at the location depicted on the Site Location Map, Figure 1 (Page 7). The golf course includes a clubhouse, associated parking areas and cart paths, a driving range, and three lake features. The irregular-shaped parcel is bound on the west by Beach Boulevard, to the north by existing commercial and residential development located along Imperial Highway, to the east by Idaho Street, and to the south by existing residential Tracts 15031 and 15030. An existing street, Trevino Avenue, traverses the site and provides access to the clubhouse at the central portion of the site and gated access to the residential tracts south of the site.

The site has moderate relief, the lowest in the northern portion at an approximate elevation of 220 feet, the highest at the southeastern corner up to an approximate elevation of 470 feet. The existing residential tracts to the south of the site are generally at higher elevations and separated from the subject site by an ascending slope.

### *1.3 Project Description*

The Applicant proposes to construct on the approximately 151-acre Westridge Golf Course property, 422 homes, including 277 single-family homes and 145 multi-family residences, either a maximum of 20,000 square feet of retail and restaurant uses or 49 multi-family dwelling units adjacent to Beach Boulevard and the existing Westridge Plaza, and open space, trails, and public parks.

Access to the proposed Project site would be provided at three locations. The primary entrance is proposed from Beach Boulevard on the west side of the Project Site by adding a fourth leg to an

existing three leg signalized intersection on Beach Boulevard with the Hillsborough Apartment complex. The eastern entry to the community would add a fourth leg to an existing three leg signalized intersection on Idaho Street at Sandlewood Avenue. The third entry to the proposed development is from the north from La Habra Hills Drive, which is the existing entry to the Westridge Golf Course. Access to all of the residential neighborhoods would be gated and all internal streets private. La Habra Hills Drive would be a public street (non-gated) extending south to the proposed Community Center and public park. Farther to the south, La Habra Hills Drive would extend to the Westridge neighborhood to continue to provide access to that community.

The proposal includes a water quality basin located in the western portion of the site with a maximum design water elevation of 208 feet above sea level (Hunsaker, 2017). A second surface detention/water quality basin is located at the eastern entry adjacent to Idaho Street. The maximum design water elevation for this basin is approximately 311 feet above sea level (Hunsaker, 2017). A below-grade modular wetland system is proposed in the northern portion of the site adjacent to La Habra Hills Drive.

Numerous Mechanically Stabilized Earth (MSE) retaining walls up to approximately 20 feet in height are proposed within the development including two mid-slope MSE retaining walls. In addition, numerous relatively small conventional retaining walls are proposed.

The maximum proposed cut and fill slopes are approximately 80 and 40 feet, respectively. The grading plan depicts planned cuts and fills (not including required remedial grading) up to approximately 55 and 35 feet, respectively. No changes are depicted at the existing central clubhouse, and minor changes depicted on the southern of two existing lake features near the clubhouse. The northern of the two lake features near the existing clubhouse and an existing lake feature at the western portion of the site are planned to be removed as part of the proposed development.

## *1.4 Background*

The subject site is located within a portion of the former West Coyote Oil Field located along the southern boundary of La Habra. Petroleum production by Chevron and affiliated companies started in the region in the early 1900's and ceased in approximately 1995. As part of oil production activities, site topography was altered slightly with construction of oil extraction pads and roads throughout the hills (Continental, 2014). The transition from an oil field to a golf course was undertaken over several years with the involvement of various geotechnical and environmental consultants, as detailed below. Please note that the available reports and maps obtained from the City of La Habra documenting the geotechnical history of the site are incomplete in several cases, and some documents referenced within those reports were not available for review.

On October 1, 1968 while the site was still an active oil field, a fault ruptured offsite and to the east of the site near Idaho Street. Subsequent extensive fault trenching in 1970 by Converse, Davis, & Associates (Converse) allowed for detailed mapping of the approximately 3-inch, vertically offset, fault trace. A series of relatively short exploratory trenches were excavated across the observed ground surface rupture. The well-defined lineament was documented, evaluated, and became known as the "Unnamed West Coyote Hills Fault" as presented in the referenced Fault Evaluation Report and Supplemental Report published by California Department of Mines and Geology (CDMG, 1977 & 1978). CDMG, 1978, suggests that the probable cause of fault rupture was due to oil field operations (subsidence due to oil extraction and groundwater injection activities). The fault was subsequently

assigned a State of California Earthquake Fault Zone in accordance with the Alquist-Priolo Act (CDMG, 1991). As is typical, the Earthquake Fault Zone extends well beyond the lineament of the fault in order to ensure that any potential fault splays are evaluated by a geologist prior to construction of habitable structures within the regulatory zone. The entire Earthquake Fault Zone has since been improved or developed for the current residential uses, roadways, park, golf course, etc.

Leighton and Associates (Leighton) performed a fault study of the region in the early 1990's by trenching the area of the subject site and the two proposed adjacent tracts to the south (Tracts 15030 and 15031). Numerous existing inactive north-south trending faults that characterize the uplifted Coyote Hills geologic structure for this area, are presented on a map and cross sections by Leighton (1992: Figures Only) that were reviewed as part of this study. None of the faults except the Unnamed West Coyote Hills Fault are considered to be active or potentially active. Leighton depicted the (offsite) location of the historically active Unnamed West Coyote Hills Fault as mapped by Converse and a recommended structural setback extending 100 feet from either side of the mapped fault lineament. The approximate fault lineament, the recommended structural setbacks, and the limits of the Earthquake Fault Zone are presented on the Geotechnical Map (Sheet 1).

A geotechnical field evaluation was performed in 1996 by Goffman, McCormick and Urban, Inc., (GMU, 1996: Text Only), as part of a grading plan review for the proposed golf course and adjacent Tracts 15030 and 15031 to the south. The field evaluation consisted of 60 test pits and 36 large-diameter borings up to approximately 66 feet below grade. Although the geotechnical figures showing boring logs and locations were not available as part of our review of the original report of geotechnical studies by GMU, those figures were obtained from a subsequent response to comments report by another consulting firm. Geosoils, Inc. became the geotechnical consultant of record for construction of the Westridge Golf Course and responded to geotechnical review comments in the referenced report (Geosoils, 1997). Selected borings logged by GMU are presented herein on the Geotechnical Map, Sheet 1 (In Pocket), and boring logs in Appendix B.

During the period between the fault evaluation report by Leighton, 1992, and the geotechnical investigation by GMU, 1996, demolition of concrete features was reportedly ongoing at the site. Limited information is available regarding an approximate 25-foot-deep excavation where alternating layers of concrete rubble and soil was placed under observation and testing by Leighton, as described in GMU, 1996. The approximate location of the concrete disposal area is depicted on the Geotechnical Map, Sheet 1; however, the actual elevations and details regarding the material are not available.

The existing golf course was rough graded between 1997 and 1999 during grading of adjacent residential Tracts 15030 and 15031 under geotechnical observation and testing by GeoSoils, Inc. (1999). Grading of the golf course generally involved cuts and fills up to approximately 35 feet, greater in select areas of the westernmost portion of the site. Remedial grading included removal and stockpiling of crude oil-affected native soils. Buttress keyways were constructed for stabilization of ascending slopes to the south of the golf course, and smaller stabilization fill keyways were constructed for the 2:1 (Horizontal to Vertical) slopes along the northern perimeter of the golf course. During grading, approximately nine ancient "major" and numerous "minor" northwest and northeast trending normal faults (typical for the region) were encountered and mapped by GeoSoils. Fault locations were generally as anticipated from the fault map presented in Leighton, 1992. As stated above, these faults were not considered active or potentially active and reportedly all residential lots within Tracts 15030 and 15031 exposing them were overexcavated and capped with a minimum of 5 feet of compacted fill, in order to minimize the potential for differential settlement (GeoSoils, 1999).

Notably, as shown on the Geotechnical Map (Sheet 1), no faults were mapped by GeoSoils during grading that are within or adjacent to the State of California Earthquake Fault Zone.

Grading of the golf course included remedial measures and placement of a subdrain system. Grading was performed with placement of both structural fill (i.e., compacted fill with a required minimum relative compaction of 90 percent) and non-structural fill considered unsuitable for support of structures (i.e., fill placed with a required minimum relative compaction of 85 percent). Structural fill was reportedly placed along the southern perimeter of the golf course in support of the adjacent developments (Tracts 15030 and 15031), below structures and utility alignments across the golf course, and within adjacent perimeter slopes and roadways (Geosoils, 1997). Non-structural artificial fill was placed within the central area of the western portion of the subject site and within several small canyons at the eastern portion of the site. Removals of the near-surface weathered alluvial deposits were reportedly limited in these areas and not specifically removed to competent native soils prior to fill placement (Geosoils, 1999).

Three controlled zones called environmental Re-Use Areas (RUA) are located within non-structural artificial fill at the western half of the site, where specifically "diluted" crude oil-affected soils were placed under environmental observation and testing by Miller Brooks Environmental, Inc. (1999). As part of remedial grading activities, the affected soils were stockpiled, blended as necessary and placed as artificial fill at specific locations in general accordance with project specifications. Evaluation of the crude oil-affected soils and potential impacts to future grading are being addressed by other members of the design team.

Selected subsurface investigation borings by GMU, previously constructed keyways and subdrains, geologic mapping by others, limits of structural and non-structural artificial fill, and limits of the concrete disposal area and environmental Re-Use Areas (RUA) are presented on the Geotechnical Map, Sheet 1 (In Pocket).

In 2001, a geotechnical evaluation was performed for the adjacent commercial center located northwest of the site (Eberhart, 2001). The commercial center is approximately 57 acres with large retail stores and associated parking. The field evaluation consisted of 121 hollow-stem borings (mostly shallow) and two large-diameter borings excavated up to approximately 50 feet below grade. Select borings were reviewed as part of this study.

In 2003, a geotechnical evaluation was performed for a banquet room addition to the existing golf clubhouse by Pacific Geosoils, Inc. (2003). Two small-diameter hand-auger borings were drilled to depths of approximately 12 and 13 feet below existing grade. Pacific Geosoils reported that the subsurface soils in the area of the proposed clubhouse construction consist of fill soils underlain by bedrock. The geotechnical report concluded that existing fill soils were unsuitable for support of foundations and recommended that the building addition be supported on drilled piers into site bedrock, in lieu of performing earthwork removals.

## *1.5 Subsurface Geotechnical Evaluation*

LGC Geotechnical performed a subsurface geotechnical evaluation of the site consisting of the excavation of six large-diameter bucket auger borings, eighteen hollow-stem auger borings and eleven Cone Penetration Test (CPT) soundings to evaluate onsite geotechnical conditions.

Six bucket auger borings (B-1 through B-6) were drilled by Al-Roy Drilling and Haven Geotechnical under subcontract to LGC Geotechnical. The maximum depth of the bucket auger borings was approximately 115 feet below existing grade. The bucket auger borings were excavated to evaluate the geologic structure of the bedrock materials and to obtain samples for laboratory testing. The large-diameter boreholes were surface logged during excavation and downhole logged by an engineering geologist in order to obtain structural geologic information. Borings were subsequently backfilled with cuttings and tamped.

Eighteen hollow-stem borings (HS-1 through HS-18) were drilled by 2R Drilling, Inc. under subcontract to LGC Geotechnical. The depth of the hollow-stem borings ranged from approximately 21.5 to 76.5 feet below existing grade. An LGC Geotechnical representative observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. The borings were excavated using a limited access drill rig equipped with 8-inch-diameter hollow-stem augers. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler generally obtained at 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The SPT sampler and MCD sampler were driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches or until refusal. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples were also collected and logged at select depths for laboratory testing. At the completion of drilling, the borings were backfilled and tamped.

Eleven Cone Penetration Test (CPT) soundings (CPT-1A through CPT-11B) were performed by Kehoe Testing and Engineering, Inc. under subcontract to LGC Geotechnical. CPT soundings were pushed to depths ranging between approximately 5 to 69 feet below existing grade, to practical refusal. The CPT soundings were pushed using an electronic cone penetrometer in general accordance with the current ASTM standards (ASTM D5778 and ASTM D3441). The CPT equipment consisted of a cone penetrometer assembly mounted at the end of a series of hollow sounding rods. The interior of the cone penetrometer is instrumented with strain gauges that allow the simultaneous measurement of cone tip and friction sleeve resistance during penetration. The cone penetration assembly is continuously pushed into the soil by a set of hydraulic rams at a standard rate of 0.8 inches per second while the cone tip resistance and sleeve friction resistance are recorded at approximately every 2 inches and stored in digital form. A specially designed all-wheel drive 25-ton truck provides the required reaction weight for pushing the cone assembly.

The approximate locations of borings and CPT soundings are shown on the Geotechnical Map (Sheet 1). Boring and CPT logs are presented in Appendix B.

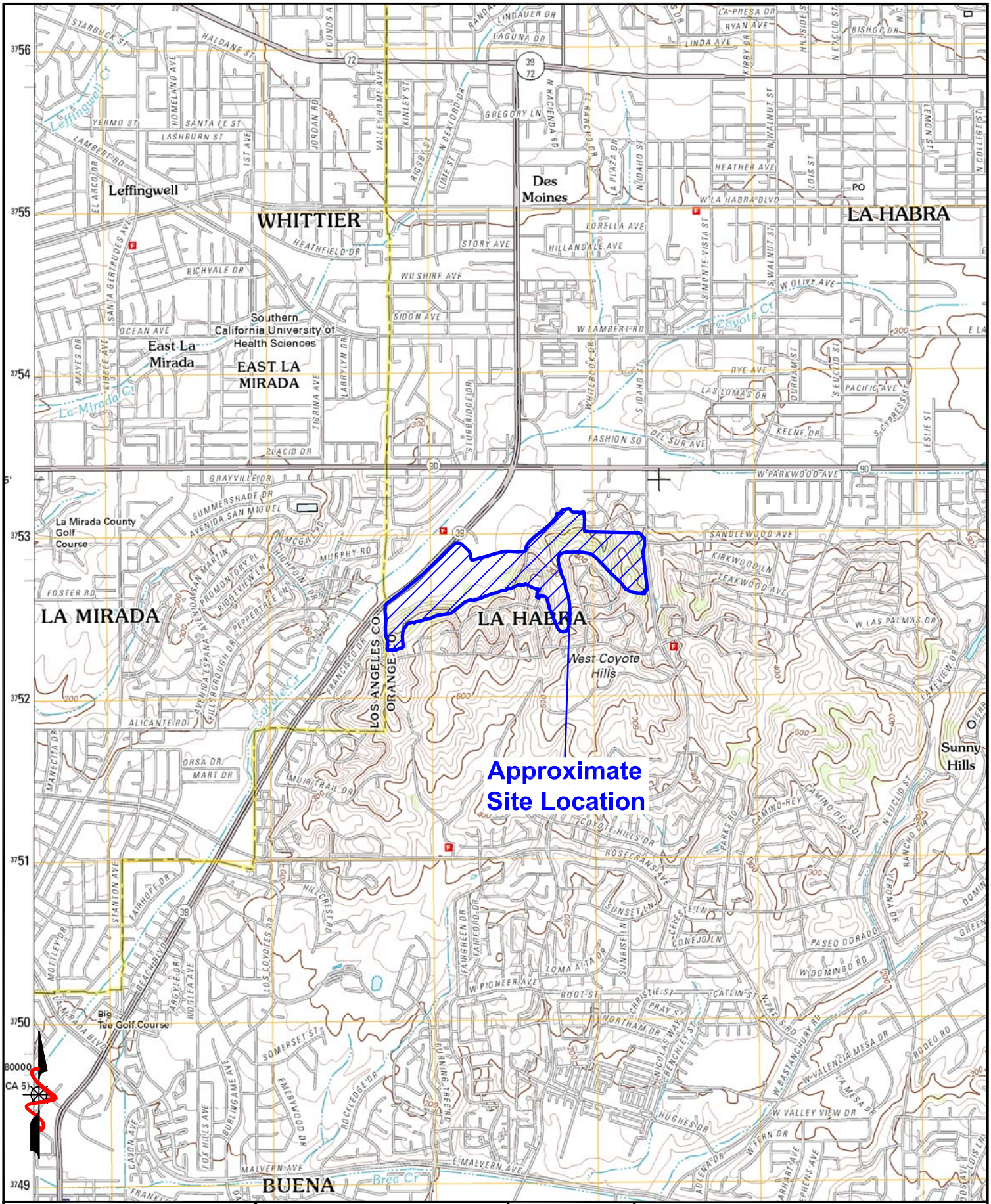
### *1.6 Laboratory Testing*

Representative bulk and driven samples were retained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, Atterberg Limits, grain size analysis, consolidation, direct shear, torsional ring residual shear, torsional ring fully softened shear, expansion index, laboratory compaction and corrosion (sulfate, chloride, pH and minimum resistivity).

The following is a summary of the laboratory test results.

- Dry density of the samples collected ranged from approximately 95 pounds per cubic foot (pcf) to 134 pcf, with an average of 113 pcf. Field moisture contents ranged from approximately 1 percent to 26 percent, with an average of 13 percent.
- Twenty-Five Atterberg Limit (liquid limit and plastic limit) tests were performed. Results indicated Plasticity Index values ranging from 1 to 48.
- Twenty-Two fines content tests were performed and indicated fines content (passing No. 200 sieve) of approximately 7 to 84 percent. According to the Unified Soils Classification System (USCS), fifteen of the tested samples are classified as "coarse-grained" soil.
- Direct shear tests were performed on select driven samples and samples remolded to 90 percent relative compaction. The plots are provided in Appendix C.
- Two torsional ring shear tests were performed on respective grab samples of site clayey materials; one landslide rupture surface clay and one clayey bedrock sample. The plots are provided in Appendix C.
- Consolidation tests were performed on select samples. The deformation versus vertical stress plots are provided in Appendix C.
- Three Expansion Index (EI) tests were performed. Results indicate EI values ranging from 15 to 37, corresponding to "Very Low" and "Low" expansion potential.
- Laboratory compaction testing of five bulk samples indicated maximum dry density values ranging from 115.0 to 140.0 pounds per cubic foot (pcf) and optimum moisture contents ranging from 5.5 to 14.5 percent.
- Corrosion testing indicated soluble sulfate contents ranging from approximately 0.01 to 0.05 percent, chloride contents ranging from approximately 33 to 175 parts per million (ppm), pH values ranging from 7.6 to 8.2, and minimum resistivity values ranging from 478 to 1,898 ohm-cm.

A summary of the results is presented in Appendix C. The moisture and dry density test results are presented on the boring logs in Appendix B.

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|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

LGC Geotechnical, Inc.

**FIGURE 1**
**Site Location Map**

## *2.0 GEOTECHNICAL CONDITIONS*

### *2.1 Regional Geology*

The site is located at the eastern edge of the Los Angeles Basin, within the Peninsular Ranges Geomorphic Province. The Los Angeles Basin consists of a thick sequence of sedimentary deposits partially derived from erosion of the nearby hills and mountain ranges to the north and east of the subject site. The La Habra Heights are a portion of the northwest-trending hills north of the subject area that are bound along their south edge by the active Whittier Fault. The smaller Coyote Hills that underlie the subject site are also of tectonic origin. The Coyote Hills produced oil from structural traps created by faulting and the presence of an east-west domal anticline that coincides with the topographic crest of the hills to the south of the site. The site is located on the gently north-dipping homoclinal limb of the anticline. In general, the region has a complex geologic history influenced by periods of uplift, subsidence, sea level changes, folding, and faulting (Morton, 2004). No active or potentially active faults are known to specifically transect the site.

### *2.2 Site-Specific Geology*

The subject site is located partially on alluvium deposits and partially within the uplifted bedrock that forms the low hills of the Coyote Hills geologic complex south of the site (Morton, 2004). The comparatively young alluvium locally incised a broad, very old alluvial fan that spans the La Habra area to the north. The local alluvium consists of interfingered deposits derived from upstream to the northeast and from the low hills ascending to the south of the site. The bedrock unit underlying the site consists of Quaternary San Pedro Formation, and two existing landslides derived from this material have been identified within the limits of the site. Also, both structural and non-structural artificial fills mantle portions of the site. A brief description of these geologic units is presented in the following sections (from youngest to oldest) and their approximate lateral extents are depicted on the site Geotechnical Map (Sheet 1).

#### *2.2.1 Artificial Fill – Older (Map Symbol - Afo)*

Older artificial fill soils encountered at the subject site are considered structural, reportedly having been placed in relatively thin lifts, at near optimum moisture content, and compacted with heavy construction equipment to achieve a minimum relative compaction of at least 90 percent (GeoSoils, 1999). Structural fill was placed at certain locations for support of golf course structures and utility alignments, along the southern perimeter of the site for support of adjacent tracts to the south, and along the northern perimeter in areas of 2:1 (Horizontal to Vertical) slopes. The material consists of variable layers of silty clay to clayey sand with some gravel, generally moist to very moist, stiff to very stiff/dense.

#### *2.2.2 Artificial Fill – Unsuitable (Map Symbol - Afu)*

Unsuitable artificial fill soils were encountered within the western-central area of the subject site and within several small canyon fill areas within the eastern portion of the site as reported in GeoSoils, 1999. The unsuitable fill is considered non-structural as it was compacted to a minimum relative compaction of 85 percent. Reportedly, the non-structural fill was placed directly on native soils with minimal remedial grading, with the exception of

areas where removals were performed for environmental mitigation (GeoSoils, 1999). The material consists of variable layers of silty clay to clayey sand with some gravel, generally moist to very moist, stiff to very stiff/medium dense to dense. Environmental Re-Use Areas (RUA), aka crude oil affected soils, and concrete disposal area are located within this material. The approximate limits of the RUA's and concrete disposal area are depicted on Geotechnical Map, Sheet 1.

### *2.2.3 Quaternary Alluvium (Map Symbol – Qal)*

Quaternary alluvium underlies the majority of the western portion of the site (GeoSoils, 1999), undifferentiated from colluvium observed by others within the smaller canyons of the Coyote Hills to the south. It generally consists of medium dense silty and clayey sands and stiff to very stiff sandy clays with minor amounts of gravel.

### *2.2.4 Quaternary Landslide Deposit (Map Symbol – Qls)*

Several bedrock-block type landslides were encountered in the vicinity of the subject site during previous investigations and grading activities by others (Goffman, 1996; GeoSoils, 1997 and 1999). Two landslides were removed during grading of the adjacent tracts to the south and one on-site landslide at the western side of the site was stabilized with shear keyways and left in place. Another small, relatively thin landslide was identified in a boring by others at the northeastern edge of the site that was subsequently determined to have been left in place based on Cross-Section 7-7' (Sheet 2).

Where encountered, the landslide material was observed to be similar to the bedrock unit at the site, but highly fractured and weathered. One landslide rupture surface was observed during downhole logging of boring B-6 to be based on a very thin clay bed oriented parallel to bedding.

### *2.2.5 Quaternary San Pedro Formation (Map Symbol – Qsp)*

The sedimentary bedrock unit that underlies the site is the Pleistocene-age Quaternary San Pedro Formation, derived from a shallow marine depositional environment. The formation is broken into four units that vary in dominant material type, variably exposed between the faults that intersect the site. The fossiliferous material generally consists of sandy siltstone and minor amounts of clayey siltstone interbedded with medium to coarse, weakly to well-cemented sandstone. The eastern portion of the site has more sandstone, while the central and western portions of the site have a more variable mix of interbedded siltstone, sandstone, and clayey siltstone. Bedrock mapped by GeoSoils, 1999, that was indicated to be sandstone-dominated or an interbedded sandstone and siltstone, is differentiated on the Geotechnical Map, Sheet 1.

## *2.3 Geologic Structure*

Geologic structure of the bedrock is controlled by the east-west trending domal anticline that crests with the original topographic high of the Coyote Hills to the south of the site. Bedding from GeoSoils, 1999,

and as observed during our recent site investigation, indicates a gentle, west-northwesterly dip within the western portion of the site and an east-northeasterly dip within the eastern portion of the site. Bedding attitudes vary due to localized folding and faulting. Bedding was noted to have zones of high-energy depositional environments producing rip-up clasts and other pre-lithification sedimentary structures. Bedrock cementation ranged from non-cemented siltstone and friable sandstone to well cemented layers up to approximately 2 feet thick. Gypsum, manganese oxide and iron oxide were observed in the upper weathered portion of site bedrock.

An inactive fault encountered at depth within LGC-B-4 was observed along a steeply-dipping, tight, clay-lined shear that marked a sharp change in material type and bedding inclination. The observed fault is consistent with the many ancient faults identified by others prior to and during grading of the golf course and residential tracts to the south (Leighton, 1992 & Geosoils, 1999). Geologic information collected by others is presented on the Geotechnical Map (Sheet 1) along with the results of the recent subsurface investigation.

The landslide complex at the western portion of the site likely occurred as the result of a weak bedding layer, or "clay seam" becoming exposed over time as erosion of the north facing hillside eventually daylighted the weak feature. The geometry of the hillside, several ancient faults and the inclination of the weak bedding surface (out of slope) were likely triggers for the landslide. The landslide appears to be very old based on the muted geomorphology and lack of topographic expression. Landslide rupture surface (clay) was observed in Boring LGC-B-6.

### *2.4 Groundwater*

During our subsurface evaluation, groundwater was encountered at a depth of approximately 29 feet in HS-17 and as seepage at depth within the large-diameter borings LGC-B-4, LGC-B-5 and LGC-B-6. Groundwater was not encountered in the remaining hollow-stem borings to the maximum explored depth of approximately 76.5 feet below existing grade. Groundwater was encountered at 46 to 49 feet below existing grade within the alluvium to the north of the site as investigated and reported by Eberhart (2001) as part of construction of the commercial development to the north of the site. The referenced grading plan review report by GMU, 1996, stated that "subsurface flow was encountered at depths of about 20 feet within the older alluvium underlying the major valley bottom area."

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local seepage or during rainy seasons. Local perched groundwater conditions or surface seepage may develop once site development is completed and landscape irrigation commences.

### *2.5 Faulting and Seismic Hazards*

The Coyote Hills region surrounding the subject site has a complex geologic history influenced by periods of uplift, gentle folding, and faulting (Morton, 2004). Former uses of the subject site included a working oil field that was active for many years, as described in detail in the section titled "Background" (Section 1.4). On October 1, 1968 while the site was still an active oil field, a fault ruptured just east of Idaho Street as defined by approximately 3 inches of vertical displacement. Refer to the Geotechnical Map, Sheet 1, for the location of the fault with respect to the subject site.

Extensive fault trenching by Converse, Davis, & Associates in 1970 allowed detailed mapping of the fault trace including its lateral limits. The well-defined lineament was documented, evaluated and became known as the "Unnamed West Coyote Hills Fault" as presented in the referenced Fault Evaluation Report and Supplemental Report (CDMG, 1977 & 1978). CDMG, 1978 suggests that the probable cause of fault rupture was due to oil field operations (subsidence due to oil extraction and groundwater injection activities).

The Alquist Priolo Earthquake Fault Zoning Act of 1972 was adopted by the State of California to mandate areas of special geotechnical study with respect to potential surface rupture of active faults. The purpose of the regulatory zone is to promote careful geologic evaluation prior to construction of habitable structures. State of California Earthquake Fault Zones were established around "active" faults; the zones are defined by turning points connected by straight lines and they extend hundreds of feet beyond a hypothesized fault location. Per the State Geologist, a fault is generally considered "active" if evidence of surface rupture in Holocene time (the last approximately 11,000 years) is present. The Unnamed West Coyote Hills Fault has been evaluated to be "historically active," because displacement has occurred within the last 200 years, therefore an Earthquake Fault Zone was established for the fault. More specifically, a minimum 100-foot-wide structural setback zone was recommended on either side of the Unnamed West Coyote Hills Fault as it was determined that the fault had been accurately located (CDMG, 1978 & Leighton, 1992). As shown on the Geotechnical Map (Sheet 1), the 100-foot wide recommended setback occurs on both sides of the mapped fault, for a total of 200 feet wide, while the "width" of the Earthquake Fault Zone is a total of approximately 500 feet wide. While the Earthquake Fault Zone establishes the boundary of the regulatory area, it does not restrict or limit development within the zone, provided that an evaluation is performed by a geotechnical professional in accordance with CGS (2007) to confirm the absence of active faults. For example, numerous residential structures have been constructed within the limits of the Earthquake Fault Zone in the area to the east of the proposed development.

The previously existing oil field at the subject site was re-developed in the late 1990's into the Westridge Golf Course and adjacent residential communities to the south. These sites were rough graded under the observation and testing of GeoSoils (1997 &1999). The portion of the golf course that is included within the Earthquake Fault Zone was mapped by GeoSoils during grading at that time and no faults were reported there (Geosoils, 1999).

As shown on Sheet 1, proposed residential Lots 12, 28 and 29 are located within the limits of the Earthquake Fault Zone. However, the proposed residential structures for all three lots are located at least 200 feet away from the reported surface trace of the Unnamed West Coyote Hills Fault, which is significantly more than the previously recommended 100-foot structural setback (CDMG, 1978 & Leighton, 1992). Based on the information shown on Sheet 1 and our review of the referenced documents, it is our opinion that proposed Lots 12, 28 and 29 are not underlain by an active fault. However, those three lots will require verification geologic mapping during grading prior to construction of habitable structures. Recommendations relative to verification mapping are presented in the section titled "Preliminary Recommendations." If an active fault is identified on-site within the limits of the Earthquake Fault Zone, no habitable structures shall be constructed within 50 feet of it.

Due to the distance from the proposed structures to the Unnamed West Coyote Hills Fault, the possibility of damage due to ground rupture is considered low, provided that the portion of development located within the limits of the Earthquake Fault Zone is verified to be lacking fault indicators in accordance with the current standards of practice, State of California guidelines, and City of La Habra guidelines.

Nearby active faults and corresponding monument magnitude are summarized in Table 1 below.

***TABLE 1***

***Near Site Fault Parameters - Westridge VTTM 17845***

| Fault | Approximate Distance from Site (km) | Maximum Earthquake Magnitude (Mmax) |
|---|---|---|
| Puente Hills (Coyote Hills) | 4.4 | 6.8* |
| Elsinore (Whittier Section) | 5.2 | 6.9* |
| Puente Hills (Santa Fe Springs) | 3.2 | 6.6* |
| Unnamed West Coyote Hills | <0.1 | 2.2 to 2.6** |

* from State of California fault database (Caltrans, 2015b)
** from CDMG, 1977

The City of La Habra and surrounding communities experienced a Magnitude 5.1 earthquake on March 28, 2014, and numerous smaller foreshocks and aftershocks. The earthquake epicenter was estimated to be located about one mile east of La Habra, at a depth of approximately 3 miles below ground. Based on USGS reports, the earthquake was associated with the Puente Hills Blind Thrust Fault System, the same fault that caused the 1987 Whittier Narrows Earthquake (USGS, 2015), but not related to the Unnamed West Coyote Hills Fault that is located east of the project site. The north-dipping Puente Hills Blind Thrust Fault System extends north and west toward Los Angeles at depth. A blind thrust fault has no surface rupture and is therefore not zoned for inclusion in the State of California Earthquake Fault Zone maps. It's our current understanding that no changes to the Earthquake Fault Zone maps have been proposed as a result of the event.

The Seismic Hazards Mapping Act of 1990 mandated "Zones of Required Investigation" relative to the hazards presented by regional seismic shaking (hazards other than surface rupture). The site is located within an area with potential for seismic hazards as presented on Figure 2, Seismic Induced Hazard Map (Rear of Text). Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region, which may affect the site, include ground lurching, soil liquefaction, dynamic settlement and earthquake induced landslides. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. A discussion of these secondary effects and proposed mitigation in accordance with the provisions of the Seismic Hazards Mapping Act is provided in the following sections.

### *2.5.1 Liquefaction and Dynamic Settlement*

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similar to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

A portion of the site is located within a State of California Seismic Hazard Zone (CDMG, 1998) for liquefaction potential; refer to Figure 2 (rear of text). The majority of the developed site will consist of compacted fill over dense/hard bedrock and is not considered susceptible to liquefaction. However, the west portion of the site contains alluvial soils that may be susceptible to liquefaction depending primarily on their apparent density (e.g., loose to dense) and plasticity. The majority of the alluvial soils tested are considered to be cohesive and not considered to be susceptible to liquefaction based on their saturated moisture content compared to their Liquid Limit (Bray & Sancio, 2006); refer to Table 1 provided in Appendix D. Dense to very dense sandy soils are also present that are not considered susceptible to liquefaction. However, the data obtained from our field evaluation indicates that the site contains isolated sandy layers susceptible to liquefaction in the upper 50 feet. Liquefaction potential was evaluated using the procedures outlined by Special Publication 117A (SCEC, 1999 & CGS, 2008) and the applicable seismic criteria (e.g., 2016 CBC). Liquefaction analysis is based on a conservative groundwater elevation of 195 feet using the program CLiq (GeoLogismiki, 2017). The soil type interpretations of CPT soundings show good agreement to laboratory testing of fines content and Plasticity Index from samples obtained from adjacent borings, refer to Figure 3 and 4. Changes in design grade (either cut or fill) are incorporated into the calculations by adjustment of the total and effective stress for the induced cyclic stress ratio. Results indicate total seismic settlement on the order of 2 inches or less. Differential seismic settlement can be estimated as half of the total estimated settlement over a horizontal span of about 30 feet. Liquefaction calculations are provided in Appendix D.

### *2.5.2 Lateral Spreading*

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Site sandy soils generally have a normalized clean sand tip resistance well above 70. A normalized clean sand tip resistance of 70 corresponds to a blow count $(N_1)_{60}$ of at least 15. Soils with a corrected SPT $(N_1)_{60}$ blow count of 15 or greater are generally not considered susceptible to lateral spreading (Youd, Hansen, Bartlett, 2002). Evaluation of lateral spreading potential were performed on Cross Sections 11-11', 12-12' and 15-15'. In our analysis, we modeled alluvium using the lower of the liquefied residual strength from the CPT's or the static shear strength based on the stress range. Liquefied shear strength values are based on Robertson, 2010. Plots of liquefied $Su/\sigma'v$ ratios are provided in Appendix D. The seismic coefficient (Kh) is based on the scaled design earthquake peak ground acceleration using a 5-cm displacement threshold per Special Publication 117A. Lateral spreading analysis indicates adequate factors of safety. Refer to Appendix D.

### *2.5.3 Earthquake Induced Landslide*

A portion of the site is located within a State of California Seismic Hazard Zone (CDMG, 1998) for earthquake-induced landslide, as depicted on Figure 2 (rear of text). The hillside zones

depicted on the seismic hazard potential map were originally delineated on the pre-existing topography of the region and are no longer applicable. The hillside remedial grading performed in the late 1990's as reported in GeoSoils, 1999, specifically mitigated this seismic hazard potential. Remedial grading for the golf course and the existing residential tracts to the south consisted of buttress keyways and replacement fill slopes as evaluated during this phase of site investigation and presented on the Geotechnical Map and Cross-Sections (Sheets 1 through 3). For this reason, potential for earthquake-induced landslide at the site is considered low.

## *2.6 Seismic Design Criteria*

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2016 CBC. Since the site contains soils that are susceptible to liquefaction (refer to Section 2.5.1), ASCE 7 which has been adopted by the CBC requires that site soils be assigned Site Class "F" and a site-specific response spectrum be performed. However, in accordance with Section 20.3.1 of ASCE 7, if the fundamental periods of vibration of the planned structure are equal to or less than 0.5 second (anticipated for the planned residential structures), a site-specific response spectrum is not required and ASCE 7/2016 CBC site class and seismic parameters may be used in lieu of a site-specific response spectrum. It should be noted that the seismic parameters provided herein are not applicable for any structure having a fundamental period of vibration greater than 0.5 second. Representative site coordinates of latitude 33.9146 degrees north and longitude -117.9640 degrees west were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations ($S_{MS}$ and $S_{M1}$) and adjusted design spectral response acceleration parameters ($S_{DS}$ and $S_{D1}$) for Site Class D are provided in Table 2 on the following page.

Seismic design criteria as detailed above are based on the currently applicable 2016 CBC (utilizing the 2008 National Seismic Hazard Maps and updated by the Building Seismic Safety Council, 2009). The national seismic hazard maps were updated in 2014 by USGS. It is our understanding that these updates reflect minor improvements in fault probability evaluations (USGS, 2014). If the 2014 National Seismic Hazard Maps are adopted by future editions of the California Building Code, the seismic design parameters presented herein will be updated as necessary. The actual seismic design will be based on the CBC that the City of La Habra has adopted at the time of plan check/permitting.

***TABLE 2***

***Seismic Design Parameters***

| Selected Parameters from 2016 CBC, Section 1613 - Earthquake Loads | Seismic Design Values |
|---|---|
| Site Class per Chapter 20 of ASCE 7 | D* |
| Risk-Targeted Spectral Acceleration for Short Periods ($S_S$)** | 1.973g |
| Risk-Targeted Spectral Accelerations for 1-Second Periods ($S_1$)** | 0.713g |
| Site Coefficient $F_a$ per Table 1613.3.3(1) | 1.0 |
| Site Coefficient $F_v$ per Table 1613.3.3(2) | 1.5 |
| Site Modified Spectral Acceleration for Short Periods ($S_{MS}$) for Site Class D [Note: $S_{MS} = F_aS_S$] | 1.973g |
| Site Modified Spectral Acceleration for 1-Second Periods ($S_{M1}$) for Site Class D [Note: $S_{M1} = F_vS_1$] | 1.070g |
| Design Spectral Acceleration for Short Periods ($S_{DS}$) for Site Class D [Note: $S_{DS} = (^2/_3)S_{MS}$] | 1.315g |
| Design Spectral Acceleration for 1-Second Periods ($S_{D1}$) for Site Class D [Note: $S_{D1} = (^2/_3)S_{M1}$] | 0.713g |
| Mapped Risk Coefficient at 0.2 sec Spectral Response Period, $C_{RS}$ (per ASCE 7) | 0.951 |
| Mapped Risk Coefficient at 1 sec Spectral Response Period, $C_{R1}$ (per ASCE 7) | 0.970 |
| $PGA_M$ (Section 11.8.3 of ASCE 7) | 0.760g |

* Site Class F modified due to building period ≤ 0.5 second, refer to discussion above.

** From USGS, 2017

A deaggregation of the PGA based on a 2,475-year average return period indicates that an earthquake magnitude of 6.7 at a distance of approximately 4.9 km from the site would contribute the most to this ground motion. A deaggregation of the PGA based on a 475-year average return period indicates that an earthquake magnitude of 6.7 at a distance of approximately 5.1 km from the site would contribute the most to this ground motion (USGS, 2008).

## *2.7 Soil Shear Strength Parameters*

The soil shear strength parameters utilized in our slope stability analysis are based on laboratory testing of the onsite materials, previous site shear strength parameters and published shear strength data (CDMG, 2001). The soil shear strength for the landslide rupture surface is based on results of a residual torsional ring shear test from rupture surface clay materials obtained during downhole logging of B-6. Where applicable, soil shear strength parameters were increased (less than composite peak strength values) for seismic loading conditions. Laboratory test results are provided in Appendix C.

***TABLE 3***

***Soil Shear Strength Parameters for Static Slope Stability Analysis***

| Soil Type | ϕ (Degrees) | Cohesion (psf) |
|---|---|---|
| Qsp – Cross Bedding | 32 | 300 |
| Qsp - Along Bedding | 27 | 200 |
| Compacted Fill | 30 | 150 |
| Landslide Material | 24 | 200 |
| Landslide Rupture Surface | 13 | 0 |
| Alluvium | 28 | 200 |

## *2.8 Global Slope Stability Analyses*

Global slope stability analyses were performed on cross-sections positioned throughout the site based on the proposed design profile. Slope stability analysis was performed using the computer program GSTABL7 with STEDwin version 2.005.3 (Gregory Geotechnical Software, 2013). Potential rotational and block surfaces were analyzed using Bishop's Modified Method and Janbu's Simplified Method, respectively. A minimum factor of safety of 1.5 is typically required for static loading conditions. Seismic slope stability analysis was performed in accordance with the County of Orange Grading Manual (1991). Where applicable, the County of Orange Grading Manual requires a horizontal seismic coefficient (Kh) of 0.15 with a minimum resulting factor of safety of 1.1. Since the landslide rupture plane is less than 12 degrees from the horizontal, pseudostatic (seismic) slope stability was not performed for the landslide on Cross Section 1-1' and 2-2' in accordance with County of Orange Grading Manual.

Geogrid reinforcement (beyond requirements for local stability) is required for the planned mid-slope MSE retaining wall located below Lots 241 through 245 for adequate global factors of safety (Cross-Section 13-13').

For the proposed water quality basin depicted on Cross-Sections 1-1' and 2-2', slope stability analysis was performed for a "rapid draw-down" condition based on the peak water level. Rapid draw-down is considered a short-term condition. Based on preliminary information provided by the project civil engineer, the water quality basin will have a peak water storage elevation of approximately 208 feet above mean sea level.

Based on the proposed grading plan, slope stability analysis indicates a global factor of safety greater than 1.5 and 1.1 for static and pseudo-static (seismic) loading conditions, respectively. Slope stability analysis is provided in Appendix E.

Slope stability analyses for temporary back-cuts were performed on Cross Section 5, 8, 12 and 13. Temporary backcuts are a maximum of 1.6:1 (horizontal to vertical). Slope stability analysis indicated factors of safety of at least 1.25 for temporary conditions. Refer to Appendix E.

Additional slope stability analysis may need to be performed once the 40-scale rough grading plans have been prepared and more specific details are available regarding finalized slopes and MSE wall configurations, etc. This additional analysis may include additional cross-sections and static and

pseudo-static slope stability analysis for confirmation of localized stabilization recommendations prior to earthwork activities.

### *2.9 Expansion Potential*

Based on the results of previous nearby and current laboratory testing, site soils have a "Very Low" to "Very High" expansion potential. Final expansion potential of site soils should be determined at the completion of grading. Results of expansion testing at finish grades will be utilized to confirm final foundation design.

### *2.10 Soil Corrosivity*

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils on buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary. Preliminary corrosion testing indicated soluble sulfate contents ranging from 0.01 to 0.05 percent, chloride contents ranging from 33 to 175 parts per million (ppm), pH values ranging from 7.6 to 8.2 and minimum resistivity values ranging from 478 to 1,898 ohm-cm. Sulfate testing from the adjacent tracts to the south indicated sulfate contents ranging from approximately 0.02 to 0.56 percent (GSI, 1999). Based on Caltrans Corrosion Guidelines, soils are considered corrosive to structural elements if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 2,000 ppm (0.2 percent) or greater (Caltrans, 2015a).

Based on preliminary and previous laboratory sulfate test results, the near-surface soils have a severity categorization of "Not Applicable" to "Severe" and are designated to classes "S0" and "S2" per ACI 318, Table 4.2.1 with respect to sulfates. Determination of design elements with respect to sulfates must be based on as-graded conditions.

### *2.11 Infiltration Potential*

Based on our site evaluation and subsurface investigation, the majority of site soils (i.e., bedrock, fill and alluvium) are predominately fine-grained silts and clays that are known to have a very low hydraulic conductivity and therefore have very low infiltration rates. Within the majority of small and large-diameter borings excavated during our subsurface field work, groundwater was not encountered in spite of the substantial amount of water utilized at the golf course every year. Isolated seepage was observed at depth in several borings; however, no signs of surface infiltration were observed. Although we understand that the City of La Habra considers the geologic formation underlying the golf course to be a source of recharge to the City's groundwater basin (Malcolm Pirnie, 2010), it is our opinion that infiltration of surface water is not currently occurring through the surface of the golf course.

At the completion of grading, the proposed development will consist of either a thick cap of compacted fill (approximately 30 to 60 feet thick) over alluvium at the western half of the site or a thinner cap of compacted fill over bedrock at the eastern half of the site. Engineered fill is considered unacceptable for infiltration in accordance with the Orange County Technical Guidance Document "Section VII.1.6, Fill Condition," that states infiltration must extend to native soils below the fill (County of Orange, 2013). However, siltstone bedrock (native soils) below the engineered fill is also unacceptable for infiltration

from a geotechnical standpoint. By definition, bedrock materials do not readily transmit water. The onsite bedrock materials are generally more than 50 percent fine-grained (i.e., clays and silts corresponding to hydrologic soil groups C and D) and bedrock structure includes numerous clayey siltstone interbeds that consist entirely of fine-grained material. Deeply buried alluvium at the western portion of the site is also not a geotechnically acceptable medium for infiltration due to that portion of the site being located in a mapped State of California Seismic Hazard Zone for liquefaction potential as depicted on Figure 2, Seismic Induced Hazard Map (Rear of Text) (CDMG, 1998).

Based on our review of the CPT and boring logs, sandy layers are not continuous. In addition, laboratory testing indicated fines content ranging approximately 29 percent to 62 percent. Soils with a combination of high fines content and high CPT tip resistances are considered to have low hydraulic conductivity. Correlation of CPT sounding soil behavior type and fines content is provided on fence diagrams (Figure 3 and 4).

Purposeful infiltration of water to the subsurface at the subject site is neither feasible nor acceptable from a geotechnical standpoint given the onsite materials and the hillside nature of the site.

## *3.0 CONCLUSIONS*

Based on the results of our subsurface evaluation and geotechnical review of the proposed plan, it is our opinion that the proposed improvements are feasible from a geotechnical standpoint, provided that the recommendations provided here and in future reports are incorporated during site grading and development. A summary of our geotechnical conclusions are as follows:

- The bedrock geologic unit mapped on the site is the Quaternary San Pedro Formation. Artificial fill placed during original grading of the existing golf site overlies alluvium and bedrock across the majority of the site.
- The site contains soils including previously placed non-structural fill and near-surface alluvium that are not suitable for the proposed development in their present condition. Earthwork removals will be required as outlined in the recommendation section.
- Groundwater was encountered at a depth of approximately 29 feet in HS-17 and as seepage at depth within the large-diameter borings LGC-B-4, LGC-B-5 and LGC-B-6. Groundwater was not encountered in the remaining hollow-stem borings to the maximum explored depth of approximately 76.5 feet below existing grade. Design groundwater is estimated at elevation 195 feet within site alluvium. While isolated seepage was observed within the sandy layers of the San Pedro Formation bedrock, it is not considered a groundwater table. Groundwater may be encountered during grading and geotechnical recommendations provided as necessary based on field conditions.
- Proposed earthwork at the site including overexcavation of transition and design cut pads, installation of new subdrains and extension of existing canyon subdrains, and construction of replacement fill keyways with backdrain/subdrains for design cut slopes, are anticipated to mitigate much of the potential for nuisance water to develop. If localized nuisance water issues develop after grading, they should be addressed on a case-by-case basis.
- A portion of the site is located in a State of California Seismic Hazard Zone for liquefaction potential (Figure 2, rear of text). The majority of the developed site will consist of compacted fill over dense/hard bedrock and not considered susceptible to liquefaction. However, a portion of the site contains alluvial soils that are generally considered susceptible to liquefaction depending on their apparent density and plasticity. Based on lab testing, the majority of site alluvial soils is cohesive and not considered susceptible to liquefaction. However, subsurface data indicates that relatively isolated sandy layers within alluvial soils are susceptible to liquefaction and dynamic settlement within the upper 50 feet. Total dynamic settlement is estimated to be on the order of 2 inches or less. Differential dynamic settlement can be estimated at half of the total settlement over a horizontal span of 30 feet for design of foundations.
- A portion of the site is located within a State of California Seismic Hazard Zone as having potential for earthquake-induced landslides (Figure 2, rear of text). This potential hazard has been generally mitigated with remedial grading measures including buttress keyways that were constructed during grading of the residential tracts south of the golf course.
- As shown on the Geotechnical Map, Sheet 1, proposed residential Lots 12, 28 and 29 are located within the limits of a State of California Earthquake Fault Zone The proposed residential structures for all three lots are located at least 200 feet from the "Unnamed West Coyote Hills Fault," significantly more than the recommended 100-foot structural setback from the well-defined fault location (CDMG, 1978 & Leighton, 1992). Based on our review of applicable documents, it is our opinion that proposed Lots 12, 28 and 29 are not underlain by an active fault. However, this will have to be verified during grading as detailed in the following "Preliminary Recommendations" section.
- Due to the distance from the proposed structures to the surface trace of the Unnamed West Coyote Hills Fault (more than approximately 200 feet apart at the closest location) and the fact that oil production has

ceased in the immediate vicinity, the potential for renewed fault activity to impact the proposed development is considered low.

- The Unnamed West Coyote Hills Fault was hypothesized to be active due to the oil production operations and it is not believed to be linked to the major active fault systems that currently interact with the plate tectonics of Southern California. It is highly unlikely that future oil production will occur adjacent to the project, due to the presence of residential and commercial development on all sides. In our professional opinion, potential future activity on the fault would cause less ground shaking at the site than would from one of the major tectonic faults in the region.
- Proposed increase of grades over existing alluvium in portions of the site is estimated to induce on the order of 2½ inches to approximately 6¾ inches of settlement within the alluvium. It is our opinion that site clays are more over consolidated and the actual settlement will be closer to approximately 2½ inches and long-term secondary settlement is negligible. Site alluvial soils are generally very stiff sandy clays and dense clayey sands. Based on laboratory test data consisting of in-situ moisture content and Atterberg Limits (Liquidity Index) and CPT data (tip resistance and interpreted OCR ratio), clayey soils are considered over-consolidated. Significant increase in grades are proposed overlying left in place alluvium along Cross Section 5-5', near CPT-10. Based on interpretation of CPT-10 the minimum over-consolidation ratio of the left in place alluvium is approximately 5. The higher settlement estimate is based on using P'c values estimated from consolidation curves. The lower estimate is based on over-consolidated clays with an approximate average Crε value. These settlement estimates should be further evaluated as part of the grading plan review report based on actual proposed finished grades. Please note that settlement monitoring will be performed starting at the end of grading and construction of proposed structures will not commence until monitoring data indicates that future projected settlement (both primary and secondary) is within tolerable limits. Settlement calculations are provided in Appendix F. Plots of the over-consolidated ratio (OCR) based on CPT data is provided in Appendix D.
- Due to planned fill depths and/or significant increasing of grades over existing alluvium, settlement monitoring will be required at the completion of grading and prior to construction of structures in these areas. Settlement of alluvial soils is estimated to take approximately 6 to 12 months after the completion of rough grading, it is our opinion it will be closer to 6 months to complete. It should be noted that left in place alluvial soils that will experience significant grade increases are generally inter-bedded with sandy layers which will increase the rate of consolidation and decreasing total settlement duration. Refer to CPT-10 and CPT-11B located near Cross Section 5-5'. Refer to Calculations provided in Appendix F.
- The main seismic hazard that may affect the site is from ground shaking from one of the active regional faults. The subject site will likely experience strong seismic ground shaking during its design life.
- Based on the results of our evaluation and analysis provided herein, and provided our recommendations are properly implemented during construction, the proposed development of the site is not anticipated to significantly impact adjacent perimeter properties.
- Design fill slopes are anticipated to be both grossly and surficially stable, as long as they are constructed in accordance with our geotechnical recommendations and are properly landscaped and maintained throughout their design life.
- Existing native and cut slopes surrounding the development are anticipated to be grossly stable; however, minor surficial failures may occur.
- Global slope stability analysis indicates that (global) geogrid reinforcement is necessary in order to provide an adequate factor of safety for the proposed MSE walls located below Lots 241 through 245 (Cross-Section 13-13').
- From a geotechnical perspective, the existing onsite soils including existing fill are considered suitable material for use as general fill (with the exception of MSE wall backfill and conventional retaining wall backfill), provided that they are relatively free from rocks (larger than 8 inches in maximum dimension),

construction debris, and significant organic material. Significant moisture conditioning will be required to obtain the required compaction. It should be noted that portion of the site contains soils that are suitable for backfill of MSE and conventional retaining walls. However, select grading and/or stockpiling will be required. In addition, import of soils suitable for backfill of MSE and conventional retaining walls will also likely be required.

- Specific zones of crude oil-affected artificial fill will require evaluation and recommendations by the project environmental consultant. LGC Geotechnical is not an environmental consultant.
- Based on the results of previous nearby and current laboratory testing, site soils have a "Very Low" to "Very High" expansion potential. Mitigation measures will be required for any planned foundations and site improvements such as concrete flatwork to minimize the impacts of expansive soils. In addition, improvements located in close proximity to adjacent slopes will be impacted by slope creep. Final expansion potential of site soils should be determined at the completion of grading.
- Site soils (i.e., bedrock, fill and alluvium) are predominately fine-grained silts and clays which have very low permeability and therefore have very low infiltration rates. It is our opinion that infiltration of surface water is not currently occurring. At the completion of grading, the proposed development will consist of either a thick cap of compacted fill over alluvium or a thin cap of compacted fill over bedrock and therefore purposeful infiltration of water is not feasible nor recommended from a geotechnical standpoint.

## *4.0 PRELIMINARY RECOMMENDATIONS*

A grading plan review report based on the 40-scale rough grading plans should be prepared in order to provide updated geotechnical recommendations (as necessary) for the proposed development. Additional field work and laboratory testing may be required. Additional and/or modified geotechnical recommendations may also be required.

Based on our preliminary study, the following is a summary of our preliminary geotechnical recommendations.

- The majority of artificial fill placed for construction of the existing golf course is considered non-structural and is not suitable for support of the proposed residential/commercial development in its current condition. Removals of unsuitable material up to approximately 50 feet deep below existing grades are recommended for the western portion of the site and within several isolated small canyon areas at the eastern portion of the site, as noted on the Geotechnical Map, Sheet 1. The western portion of the site (area of Cross-Sections 1-1'-1" through 5-5') is anticipated to require removal of non-structural fill and removal of approximately 5 feet of the underlying alluvium in order to expose competent material suitable for placement of structural fill. The smaller canyon areas at the eastern portion of the site are anticipated to require removal of localized alluvium (Cross-Sections 6-6', 7-7', and 8-8') and one area of relatively thin surficial landslide (Cross-Section 7-7') to expose competent bedrock. Estimated remedial grading profiles are depicted on the Cross-Sections, Sheets 2 & 3.
- As part of remedial grading, unsuitable soils should be removed to competent soils, temporarily stockpiled (where necessary) and replaced as properly compacted fill. Prior to placement as compacted fill, significant organic materials or other unsuitable materials shall be removed and properly exported offsite. The actual depths and lateral extents of grading should be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Local conditions may be encountered during excavation that could require additional removals beyond the minimums presented herein in order to obtain an acceptable subgrade preliminary, estimated removals are shown on the Geotechnical Map (Sheet 1), and as estimated remedial profiles on Cross-Sections (Sheets 2 & 3).
- Approximate existing subdrain locations, as presented in the as graded report for the golf course and adjacent residential tracts to the south (Geosoils, 1999), are presented on the Geotechnical Map, Sheet 1. The subdrains are anticipated to be encountered during the proposed rough grading operation and should be protected in place or extended to proper gravity flow outlets as necessary. Each subdrain will be handled on a case-by-case basis in order to maintain and/or improve the existing drainage system that serves both the subject site and the adjacent residential tracts to the south.
- The soils within the re-use areas (RUA 1 through 3) that are within the zone of influence of the proposed residential buildings shall be removed and replaced as properly compacted fill. The location of where these soils are placed and the thickness of the clean soil cap shall be determined by the project environmental consultant. The design cut slope potentially exposing RUA 3 (Cross-Section 1-1'-1") should be provided with a compacted replacement fill slope consisting of clean soil.
- Stabilization fill keyways should be constructed for design cut slopes that are not undercut by remedial grading. Locations of recommended stabilization fill keyways are shown on the Geotechnical Map, Sheet 1. Design cut lots, or lots with less than 5 feet of design fill, should be overexcavated a minimum of 5 feet below respective pad grades.
- Temporary backcuts during grading should be constructed at a maximum slope ratio of 1.6:1 (horizontal: vertical).

- Proposed fill slopes should be constructed at a slope ratio of 2:1 (horizontal to vertical) or flatter.
- Fills placed deeper than 40 feet below proposed grade should be compacted to an increased minimum relative compaction of 93 percent relative compaction. Fill should be moisture-conditioned to be between optimum moisture content and 2 percent over optimum moisture content, per ASTM D1557.
- Materials from the concrete disposal area shall be removed and replaced as general fill provided it is environmental suitable and crushed such that it is no larger than 8 inches in maximum dimension and well blended (i.e., no nesting and voids) into site fills. Any concrete material placed in MSE wall backfill areas should be crushed to meet gradation requirements of aggregate base per the latest edition of the Greenbook.
- Three lots at the eastern boundary of the site (Lots 12, 28 and 29) are located within the limits of the State of California Earthquake Fault Zone that encompasses a relatively wide area surrounding the offsite, active Unnamed West Coyote Hills Fault and requires geologic evaluation prior to construction of structures. During grading, the limits of the Earthquake Fault Zone should be staked by the project surveyor and the exposed bedrock carefully mapped by the project geologist. Proposed Lots 12, 28 and 29 are in design cut areas requiring finished grade to be lowered by approximately 5 to 15 feet. We recommend the design cut be performed first to expose the surrounding bedrock, and then the excavation of one backhoe trench per lot, generally perpendicular to the length of the Earthquake Fault Zone. Each trench should be excavated to a minimum of 5 feet deep in to ensure a vertical observation surface for detailed mapping. The City of La Habra's geotechnical reviewer should be notified to observe and confirm the geologic mapping. Due to previous grading that has occurred within the limits of the Earthquake Fault Zone, it's likely that soil horizons typically utilized for dating faults (to determine whether it's active or not) have already been removed. In the event that a fault splay which is deemed active is observed during grading within the limits of the Earthquake Fault Zone, a minimum 50-foot structural setback will be recommended.
- Where removals are performed to bedrock (i.e., no alluvium left in place), settlement monuments should be placed where fill depths are greater than approximately 40 feet. Fill depth is measured from removal bottom to finish grade. In addition, in areas where design grades increase 10 feet or more from existing grades and left in-place alluvium is approximately 20 feet or greater settlement monuments should be installed. Settlement monuments should be installed promptly after the completion of grading. Settlement monuments should be read by a licensed surveyor with an off-site benchmark. The survey readings should be obtained four times in the first two months, twice in the third month, and then once a month unless otherwise requested by the geotechnical consultant. Shallow footings and slab-on-grade foundations should be constructed after settlement monitoring data indicates future total settlements are within tolerable limits. Temporary surcharge loading may be used to decrease the settlement waiting period.
- Due to the height of the proposed fill slope and Mechanically Stabilized Earth (MSE) wall, additional geogrid reinforcement length (beyond local stability requirements to be determined by the MSE wall designer) will be required for adequate global stability factors of safety for the MSE wall located below Lots 241 through 245 (Cross-Section 13-13'). Preliminary slope stability analysis indicates at least 6 layers of geogrid reinforcement lengths of 60 feet, with an allowable strength (after appropriate reduction factors are applied by the manufacturer) of approximately 3.5 kips per foot, spaced at a maximum vertical spacing of 2 feet, are required for adequate global factors of safety. Further refinement of the design for required global stability geogrid will occur during preparation of the 40-scale grading plan and with input from the MSE wall designer.
- MSE walls and conventional retaining walls should be backfilled with relatively sandy soils. Portions of the onsite soils are too fine-grained and therefore are not suitable for MSE and conventional retaining wall backfill. Therefore, select grading of on-site sandy soils and/or import of sandy soils meeting project recommendations will be required. Sandy soils should comprise the geogrid zone required for

local stability as determined by the MSE wall designer. For conventional retaining walls, the sandy import zone should be a minimum of one-half the height of the retaining wall.

- Allowance in the earthwork volumes budget should be made for an estimated 5 to 10 percent reduction in volume of existing soils. It should be stressed that these values are only estimates and that an actual shrinkage factor would be extremely difficult to predetermine. Subsidence due to earthwork activities is expected to be on the order of 0.1 to 0.2 feet. These values are estimates only and exclude losses due to removal of vegetation or debris. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by the contractor, and the accuracy of the topographic survey.
- Due to onsite expansive soils, mitigation measures such as stiffened and/or post-tensioned slab foundations are recommended. Pre-soaking of the subgrade soils will be required to reduce the potential impact of expansive soils.
- At completion of grading, additional testing will be required to confirm the characteristics of the fill materials including expansion potential and corrosivity characteristics. While LGC Geotechnical does not provide recommendations for corrosion, based on our experience typical mitigation measures include increased compressive strength for structural concrete, decreased water-to-cement ratio for structural concrete and/or encapsulation of post-tensioned cables. A corrosion consultant should provide recommendations for mitigation of corrosivity based on laboratory testing results of near-surface soils at completion of grading.
- Due to liquefaction potential in portions of the site, stiffened and/or post-tensioned slab foundations are recommended.
- Due to site soils being predominately compacted fill and bedrock consisting of fine grained soil interbeds (silts and clays), the hillside nature of the site, and the presence of potentially liquefiable alluvial soils, we strongly recommend against the intentional infiltration of storm water.
- After completion of site rough grading, graded slopes, existing perimeter landscaped slopes, existing and proposed new subdrain outlets, etc., will require regular maintenance in accordance with this and future geotechnical grading plan review reports.

## *5.0 LIMITATIONS*

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is based on data obtained from limited observations of the site, which have been extrapolated to characterize the site. While the scope of services performed is considered suitable to adequately characterize the site geotechnical conditions relative to the proposed development, no practical evaluation can completely eliminate uncertainty regarding the anticipated geotechnical conditions in connection with a subject site. Variations may exist and conditions not observed or described in this report may be encountered during grading and construction.

The findings of this report are valid as of the present date. However, changes in the conditions of a site can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. The findings and conclusions presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site. This report is intended exclusively for use by the client, any use of or reliance on this report by a third party shall be at such party's sole risk.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification.

## MAP EXPLANATION

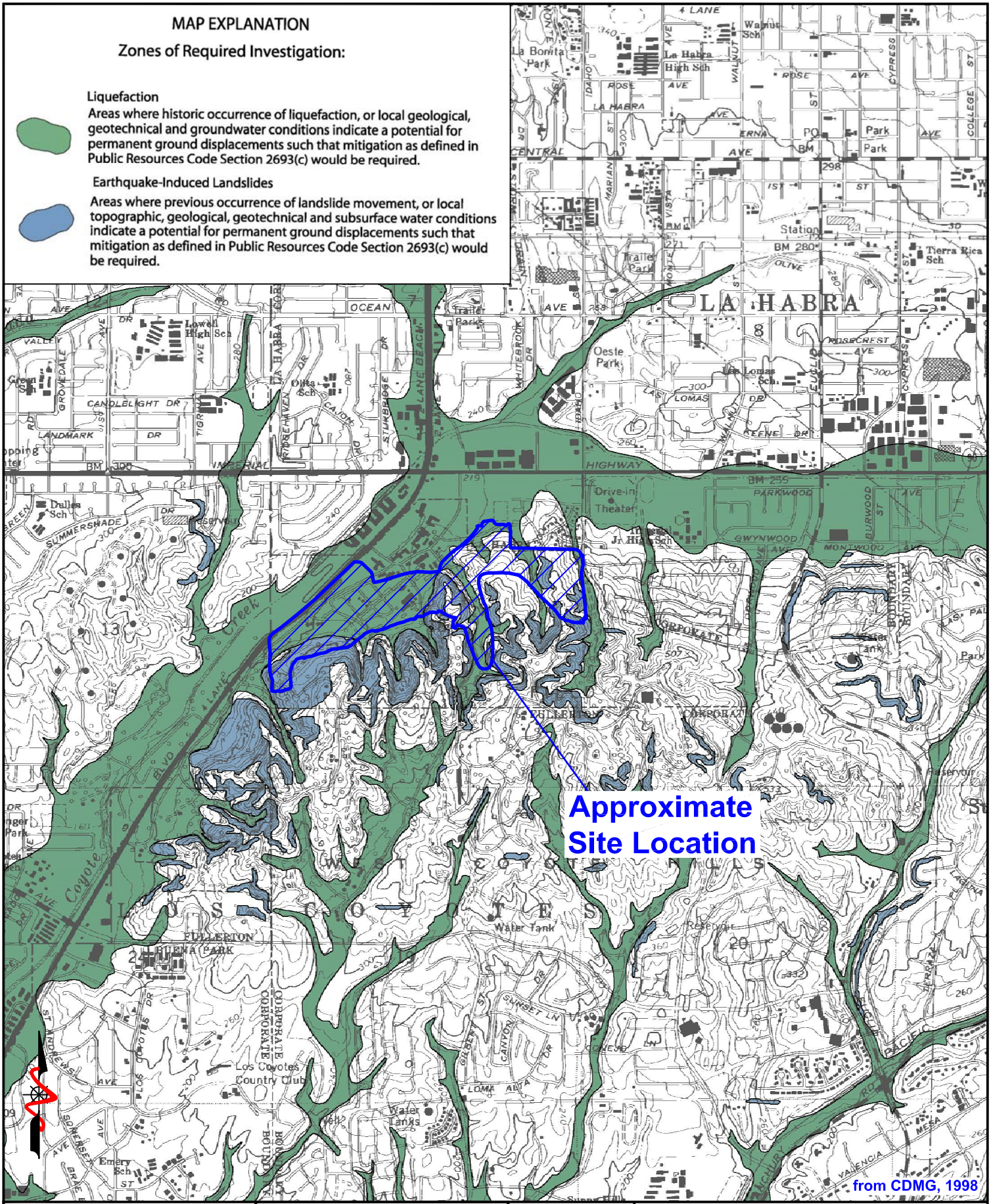
### Zones of Required Investigation:

**Liquefaction**

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

**Earthquake-Induced Landslides**

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.



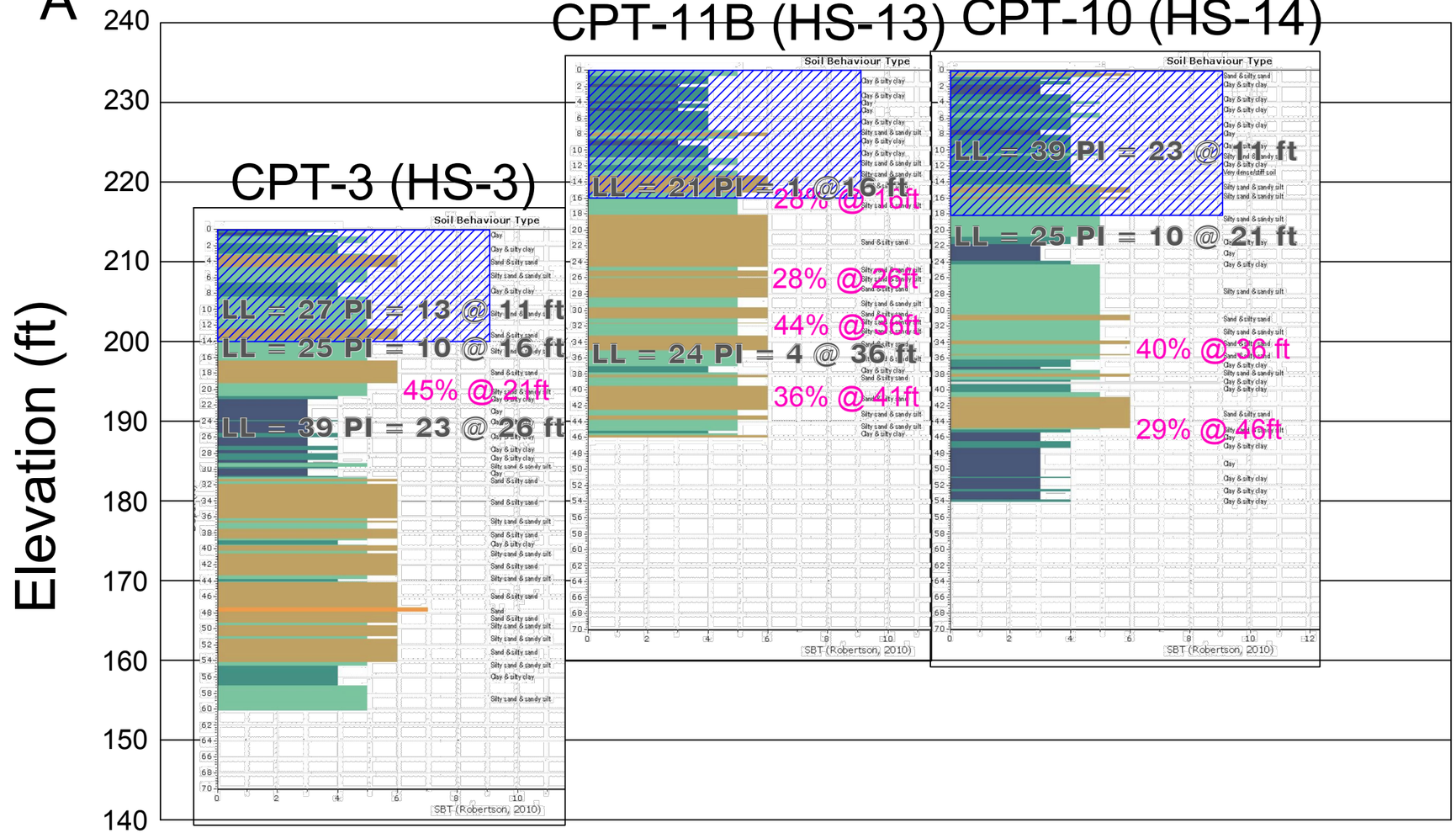

LGC Geotechnical, Inc.

**FIGURE 2**
**Seismic Induced Hazard Map**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

A

A'




***Horizontal Not to Scale***

## LEGEND

Soil to be Removed (Approximate)

Soil to be Removed and Recompacted (Approximate)

LL = 39 PI = 23 @ 36 ft — Atterberg Limits and Approximate Depth from Laboratory Testing

45% @ 21ft — Fines Content and Approximate Depth From Laboratory Testing

SCALE: 1"=16' ***(Vertical Only)***

16' 0 16' 32'


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***FIGURE 3***
***CPT Fence Diagram A-A'***

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | 1" = 16' |
| DATE | April 2017 |

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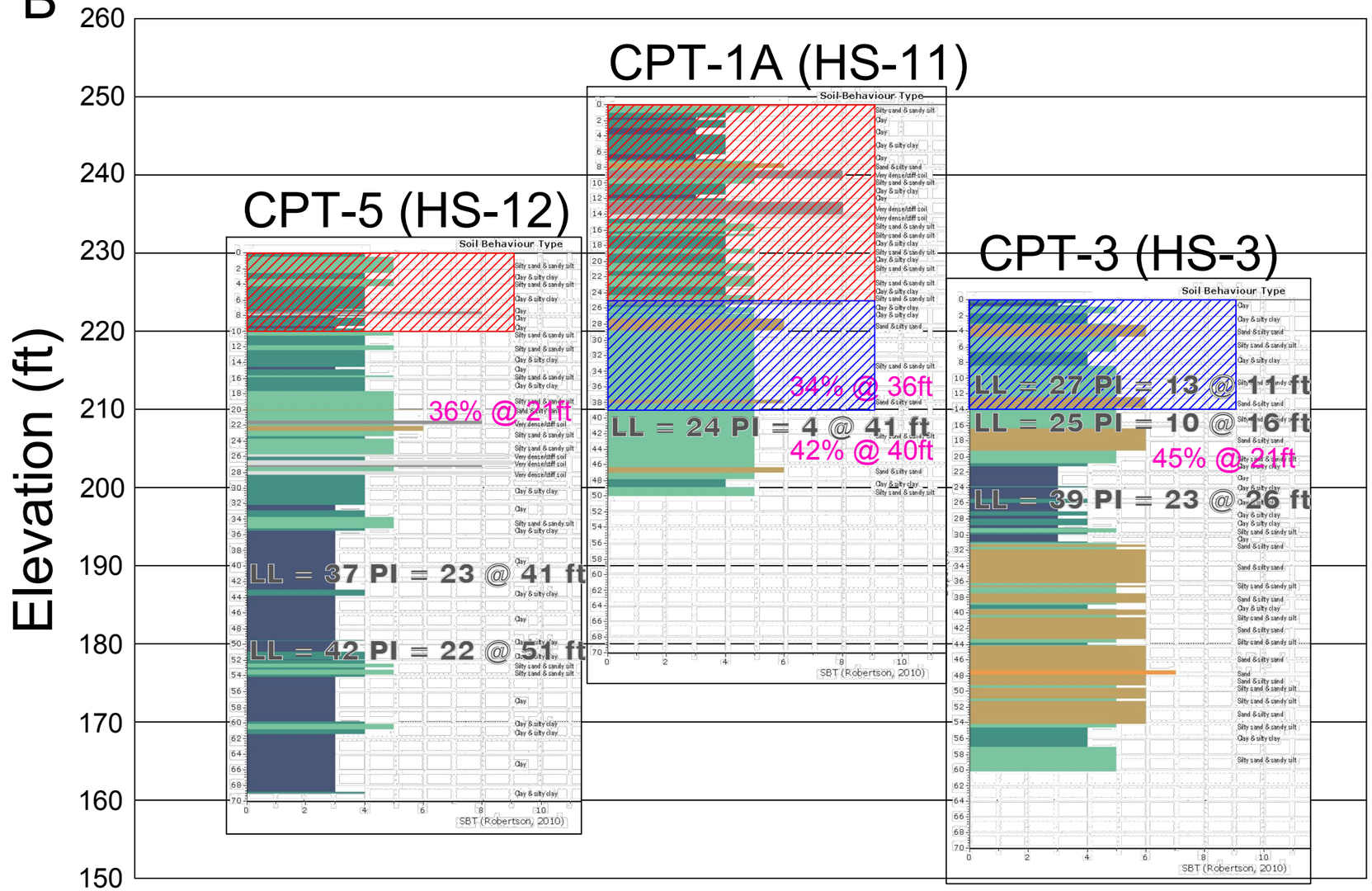
B

B'




***Horizontal Not to Scale***

## LEGEND

Soil to be Removed (Approximate)

Soil to be Removed and Recompacted (Approximate)

LL = 42 PI = 22 @ 51 ft — Atterberg Limits and Approximate Depth from Laboratory Testing

45% @ 21ft — Fines Content and Approximate Depth From Laboratory Testing

SCALE: 1"=16' ***(Vertical Only)***

16' 0 16' 32'


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***FIGURE 4***
***CPT Fence Diagram B-B'***

| | |
|---|---|
| *PROJECT NAME* | *Rancho La Habra - VTTM 17845* |
| *PROJECT NO.* | *14057-01* |
| *ENG. / GEOL.* | *DJB / KTM* |
| *SCALE* | *1" = 16'* |
| *DATE* | *April 2017* |

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# *Appendix A*
# *References*

## *APPENDIX A*

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# *Appendix B*
# *Logs of Exploratory Borings and CPT Soundings*

# Geotechnical Boring Log B-1

| | | | |
|---|---|---|---|
| **Date :** | 7/23/2014 Page 1 of 2 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Westridge | **Type of Rig :** | Earthdrill Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12" | **Hole Diameter :** 28" |
| **Elevation of Top of Hole :** | ~ 323 ' MSL | **Drive Weight :** | 0' to 23': #2400; 24' to 43': #1550; 44' to 62': #850 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 320 | 0 | | | | | | | | **@ 0' to T.D. Quaternary San Pedro Formation (Qsp)**<br>@ 0' 3" of Asphalt Concrete over 6" of Aggregate Base<br>@ 1' Silty fine SANDSTONE with scattered rip-up clasts of fine Sandy SILTSTONE, light orange brown and gray mottled, dry upper foot grades to slightly moist, dense, few angular rocks up to 2", oxidation stains | |
| | 5 | | GB: N20E, 18NW | B-1 | | | | | @ 5' B-1, Silty fine SANDSTONE to fine Sandy SILTSTONE, light brown, moist, moderately dense<br>@ 6' General bedding on Sandy laminations, vague<br>@ 7' SILTSTONE with Clay and Sand, light blue gray, moist, very stiff to slightly hard, non planar, scattered manganese nodules, angular concretions up to 2"; color varies to greenish gray, blue gray, and some orange brown, scattered fossil shells. Variable sand and clay content, decrease in oxidation with depth. | EI<br>CR |
| 315 | | | | | | | | | | |
| | 10 | | | R-1 | 6 | 101.3 | 21.5 | | @ 10' SILTSTONE with fine Sand, light blue gray, slightly moist, dense | |
| 310 | | | | | | | | | | |
| | 15 | | | | | | | | @ 15' Increase sand content | |
| 305 | | | | | | | | | | |
| | 20 | | | R-2 | 9 | 109.6 | 18.2 | CL | @ 20' SILTSTONE with fine SAND, light blue gray, moist, very stiff to hard, few oxidation/fine sand lenses, low angle bedding | DS |
| 300 | | | | | | | | | | |
| | 25 | | GB: N50E, 13N | | | | | | @ 25' General bedding, vague SAND laminations and oxidation banding, non-continuous, scattered shell fossils | |
| 295 | | | B: N10E, 12W | | | | | | @ 28' Bedding on 3" thick concretion and sand laminations, slightly undulatory, not continuous around hole, soft sediment deformation | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

Last Edited: 1/14/2015

# Geotechnical Boring Log B-1

| | | | |
|---|---|---|---|
| **Date :** | 7/23/2014 Page 2 of 2 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Westridge | **Type of Rig :** | Earthdrill Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12" | **Hole Diameter :** 28" |
| **Elevation of Top of Hole :** | ~ 323 ' MSL | **Drive Weight :** | 0' to 23': #2400; 24' to 43': #1550; 44' to 62': #850 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | | | R-3 | 11 | 104.1 | 21.1 | CL | @ 30' SILTSTONE, blue gray, moist, very stiff to hard | DS AL |
| 290 | | | | | | | | | | |
| | 35 | | | B-2 | | | | | @ 34' Gradual increase in hardness, lacks oxidation, lacks defects, scattered manganese and few shells | |
| 285 | | | | | | | | | | |
| | 40 | | | R-4 | 15 | 106.6 | 20.3 | CL-ML | @ 40' SILTSTONE with trace fine Sand, moderately gray, moist, very stiff to hard, lacks structure, lacks oxidation, gradual increase in moisture with depth | DS |
| 280 | | | | | | | | | @ 42' Few fine SANDY laminations, very short, vague | |
| | 45 | | | | | | | | | |
| 275 | | | | | | | | | @ 48' End visual log. | |
| | 50 | | | R-5 | 26 | 106.1 | 19.7 | CL-ML | @ 50' Same as above | |
| 270 | | | | | | | | | **Total Depth = 51.5'**<br>**No Ground Water Encountered**<br>**Backfilled with Cuttings and Capped with AC to 6 inches on 7/23/2014** | |
| | 55 | | | | | | | | | |
| 265 | | | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

# Geotechnical Boring Log B-2

| | | | |
|---|---|---|---|
| **Date :** | 7/23/2014 Page 1 of 2 | **Drilling Company :** | Haven Geotechnical Const. Inc. |
| **Project Name :** | Westridge | **Type of Rig :** | Limited Access Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** N/A | **Hole Diameter :** 24" |
| **Elevation of Top of Hole :** | ~ 325 ' MSL | **Drive Weight :** | N/A |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 325 | 0 | | J: N79E, 73N | | | | | | **@ 0' to 14' Quaternary Landslide Deposit (Qls)**<br>@ 0' Extremely weathered fine Sandy SILTSTONE, very light brown, dry, slightly stiff, roots, iron oxide, manganese oxide, blocky<br>@ 3' Joint in fine Sandy SILTSTONE, light brown to light gray, slightly moist, stiff, Rootlets to 6'. Gradual increase in moisture and density with depth. | |
| 320 | 5 | | B: N15W, 9W | | | | | | @ 6' Bedding, thin SAND lens | |
| 315 | 10 | | GB: N30E, 17W<br>RS: N35W, 12W | | | | | | @ 12' General bedding, broken concretion, lens<br>@ 13' Gypsum<br>@ 14' Rupture surface attitude, thin SAND lens, Silty CLAY, and gypsum in a 3" thick zone, very moist, continuous, planar, oxidized. | |
| 310 | 15 | | B: N5W, 7W | | | | | | **@ 14' to T.D. Quaternary San Pedro Formation (Qsp)**<br>@14' Sandy SILTSTONE with Sand lenses, light gray, moist, very stiff<br>@ 17' Bedding, SAND lenses, minor cross bedding, laminations, thin SILTSTONE interbeds, oxidized, abundant gypsum, all SAND is fine grained, scattered concretions | |
| 305 | 20 | | B: N10E, 13W | | | | | | @ 23' Bedding, pebble conglomerate, beach sand crossbeds, shells, pebbles (rounded), quartz rich, moist, moderately dense, zones of cementation, soft sediment deformation, minor belling | |
| 300 | 25 | | | | | | | | @ 27' Grades to fine Sandy SILTSTONE, light orangish brown, moist, dense, gypsum subplanar to 1/4", manganese oxide | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

Last Edited: 1/14/2015

# Geotechnical Boring Log B-2

| | | | |
|---|---|---|---|
| **Date :** | 7/23/2014 Page 2 of 2 | **Drilling Company :** | Haven Geotechnical Const. Inc. |
| **Project Name :** | Westridge | **Type of Rig :** | Limited Access Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** N/A | **Hole Diameter :** 24" |
| **Elevation of Top of Hole :** | ~ 325 ' MSL | **Drive Weight :** | N/A |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 295 | 30 | | B: N15E, 5W | | | | | | @ 30' Bedding. | |
| | | | B: N12E, 14W | | | | | | @ 33' Bedding, interbedded SANDSTONE and SILTSTONE, light greenish gray with orange and light brown, moist, dense/very stiff, oxidation and gypsum stringers, laminations of micas, manganese oxide | |
| 290 | 35 | | | | | | | | @ 35' Lenses of fine SAND in SILTSTONE, mottled orange and gray, very moist, very stiff, soft sediment deformation, manganese oxide nodules, iron oxide nodules, non-planar fractures lined with iron oxide | |
| 285 | 40 | | | | | | | | | |
| | | | J: N85W, vert. | | | | | | @ 43' Short joint, iron oxide lined | |
| 280 | 45 | | | | | | | | | |
| | | | J: N85W, vert. | | | | | | @ 48' Short joint, iron oxide lined. End visual log. | |
| 275 | 50 | | | | | | | | **Total Depth = 50'**<br>**No Ground Water Encountered**<br>**Backfilled with Cuttings on 7/23/2014** | |
| 270 | 55 | | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

# Geotechnical Boring Log B-3

| | | | |
|---|---|---|---|
| **Date :** | 2/4/2015 Page 1 of 2 | **Drilling Company :** | Haven Geotechnical Construction Inc. |
| **Project Name :** | Westridge | **Type of Rig :** | Limited Access Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** N/A | **Hole Diameter :** 24" |
| **Elevation of Top of Hole :** | ~ 313 ' MSL | **Drive Weight :** | N/A |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by N/A

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 310 | 0 | | | | | | | | **@ 0' to T.D. Quaternary San Pedro Formation (Qsp)** @ 0' Sandy CLAY with scattered rounded Gravel: moderate brown, very moist, stiff; piece of wood, roots. @ 2' Pebbly SAND interfingered with SANDSTONE and SILTSTONE, CLAYSTONE rip-up clasts up to 10", light orange, brown, and light gray, very moist, dense, iron oxide, crystalline gypsum | |
| 305 | 5 | | B: N50E, 12N | | | | | | @ 8' Bedding attitude on oxidation banding. Approximately 70% fine to coarse SANDSTONE and 30% SILTSTONE/CLAYSTONE rip up clasts, gypsum crystals | |
| 300 | 10 | | GB: N75E, 16N | | | | | | @ 10' General bedding attitude on cross-bedding within pebbly sandstone | |
| 295 | 15 | | | | | | | | @ 14' North half of borewall is large SILTSTONE block, tightly next to Pebbly SANDSTONE, gypsum along contact and within siltstone. SANDSTONE coarsens downward, pebbles up to 3" in diameter, rounded | |
| 290 | 20 | | | | | | | | @ 19' SANDSTONE with few Pebbles, light orange and faint gray mottling, slightly moist, dense, weakly cemented | |
| 285 | 25 | | | | | | | | @ 23' Gray Siltstone concretions up to 1' in diameter, scattered small shells | |
| | | | | | | | | | @ 26' Concretion nodule, gypsum crystals | |
| | | | | | | | | | @ 28' Sandy SILTSTONE with CLAY, light gray and orange mottled, very moist, very dense, iron oxide, manganese oxide | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

Last Edited: 4/2/2015

# Geotechnical Boring Log B-3

| | | | |
|---|---|---|---|
| **Date :** | 2/4/2015 Page 2 of 2 | **Drilling Company :** | Haven Geotechnical Construction Inc. |
| **Project Name :** | Westridge | **Type of Rig :** | Limited Access Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** N/A | **Hole Diameter :** 24" |
| **Elevation of Top of Hole :** | ~ 313 ' MSL | **Drive Weight :** | N/A |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by N/A

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 280 | 30 | | | B-1 | | | | CL | @ 30' Bulk B-1. Fine Sandy SILTSTONE with trace CLAY, light orange and light gray mottled, very moist, dense, weakly cemented<br><br>@ 33' Slight increase in clay content<br>@ 34' End visual log. Concretion zone below as observed in tailings. | -200<br>AL<br>DS<br>MD |
| | 35 | | | | | | | | **Total Depth = 35'**<br>**No Ground Water Encountered**<br>**Backfilled with Cuttings on 2/4/2015** | |
| 275 | 40 | | | | | | | | | |
| 270 | 45 | | | | | | | | | |
| 265 | 50 | | | | | | | | | |
| 260 | 55 | | | | | | | | | |
| 255 | | | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

# Geotechnical Boring Log B-4

| | | | |
|---|---|---|---|
| **Date :** | 2/11/2015 Page 1 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Westridge | **Type of Rig :** | EZ Bore |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 28" |
| **Elevation of Top of Hole :** | ~ 315 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | | **@ 0' to 30' Unsuitable Artificial Fill (afu)** 4" of grass over fine Sandy SILT and Silty fine SAND and Clayey SILT, light and dark brown mottled, moist, stiff/slightly dense layers, variable | |
| 310 | 5 | | | | | | | | | |
| 305 | 10 | | | R-1 | 2 | 111.4 | 16.8 | SM-ML | @ 10' Fine Sandy SILT, light brown and dark gray mottled, moist, stiff, wood fragment | |
| 300 | 15 | | | | | | | | Increase sand content. Scattered pebbles and rootlets. | |
| 295 | 20 | | | R-2 | 4 | 118.0 | 9.8 | SM-ML | @ 20' Fine to medium SAND, light brown and light gray mottled, moist, dense | |
| 290 | 25 | | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

Last Edited: 4/2/2015

# Geotechnical Boring Log B-4

| | | | |
|---|---|---|---|
| **Date :** | 2/11/2015 Page 2 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Westridge | **Type of Rig :** | EZ Bore |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 28" |
| **Elevation of Top of Hole :** | ~ 315 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | | C: N60W, 20NE | R-3 | 3 | 109.0 | 5.4 | SM | **@30' to T.D. Quaternary San Pedro Formation (Qsp)** @ 30' Contact attitude, fill to bedrock contact in sample. Bedrock is SANDSTONE with Silt and some SILTSTONE, light orangish brown, slightly moist, dense. Zones of rounded cobbles and pebbles, crossbeds, moderately to highly weathered, few rootlets in upper portion | |
| | | | B: N62W, 10N to 28N | | | | | | | |
| 285 | 35 | | | | | | | | @ 33' Bedding attitude, dip varies due to cross-bedding in sandstone | -200 AL DS MD |
| | | | | B-1 | | | | | | |
| 280 | 40 | | | R-4 | 4 | 104.1 | 4.2 | ML | @ 40' Fine SANDSTONE with Silt to Silty fine SANDSTONE, light orange brown and light gray mottled, slightly moist, very dense, oxidation banding, scattered nodules of white mineral. | DS AL |
| | | | B: N62E, 16NW | | | | | | @ 44' Bedding attitude on Siltstone bed, 1/4" thick, planar continuous, rootlets below is fine SANDSTONE with Silt, moist, dense, mottled iron oxide staining | |
| 275 | 45 | | | | | | | | | |
| 270 | 50 | | | R-5 | 3 | 112.0 | 1.4 | SM-ML | @ 50' Fine Sandy SILTSTONE to Silty fine SANDSTONE, light orange brown and light gray mottled, moist, dense | |
| | | | B: N20W, 47E | | | | | | @ 52' Bedding attitude on SANDSTONE bed, soft sediment deformation, minor oxidation and shearing, scattered concretions, rounded pebbles | |
| | | | | | | | | | @ 54' Abundant soft sediment deformation and rip-ups, truncated by fault | |
| 265 | 55 | | F: N15W, 59E | GB-1 | | | | | @ 55' Fault attitude (top at 53, bottom at 57'), planar, clay-lined shear (small grab sample GB-1). Few rootlets, hard white mineral. Below is CLAYSTONE with trace fine SAND, gray with light orange, moist, very stiff | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

# Geotechnical Boring Log B-4

| | | | |
|---|---|---|---|
| **Date :** | 2/11/2015 Page 3 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Westridge | **Type of Rig :** | EZ Bore |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 28" |
| **Elevation of Top of Hole :** | ~ 315 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| | 60 | | J: N70E, 68W | R-6 | 5 | 102.1 | 23.3 | CL | @ 60' Clayey SILTSTONE with trace fine Sand, light gray to brownish gray, moist, slightly hard, minor oxidation, slightly weathered. @ 61' Joint attitude, rough and manganese oxide lined | DS |
| 260 | 65 | | | | | | | | | |
| 255 | 70 | | | R-7 | 5 | 102.4 | 22.9 | | @ 70' Clayey SILTSTONE, moderate gray and orangish brown mottled, moist, slightly hard, iron oxide staining | DS |
| | | | J: N8W, 49N; B: N5E, 9W | | | | | | @ 73' Joint attitude. Bedding attitude on vague laminations within massive strata | |
| 250 | 75 | | | | | | | | @ 75' Becomes unoxidized light gray SILTSTONE with CLAY and fine SAND, light gray, very moist, very stiff, scattered shells | |
| 245 | 80 | | | R-8 | 7 | 106.3 | 21.8 | SM-ML | @ 80' SILTSTONE with fine SAND, moderate gray, most, slightly hard to hard, fossiliferous with shells and burrow traces. @ 81' Seepage from east wall. | |
| 240 | 85 | | | | | | | | @ 85' Grades to fine Sandy SILTSTONE with CLAY, very moist to wet zones, dense, very stiff | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

# Geotechnical Boring Log B-4

| | | | |
|---|---|---|---|
| **Date :** | 2/11/2015 Page 4 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Westridge | **Type of Rig :** | EZ Bore |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 28" |
| **Elevation of Top of Hole :** | ~ 315 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| | 90 | | | R-9 | 14 | 107.3 | 20.7 | SM-ML | @ 90' Sandy SILTSTONE with Clay, light gray, wet, slightly hard. Widely scattered tight, faint, non-planar fractures, few fossils, seepage | |
| 235 | 95 | | | | | | | | @ 95' Increase sand content and decrease clay content. Fine Sandy SILTSTONE with trace Clay to Silty SANDSTONE, wet, hard | |
| 230 | 100 | | | R-10 | 16 | 106.1 | 21.4 | SM-ML | @ 100' As above at 95' | |
| 225 | 105 | | | | | | | | @ 105' Decrease fracturing. Bedrock generally fresh. | |
| 220 | 110 | | | R-11 | 15 | 103.8 | 22.8 | SM-ML | @ 110' As above @ 95' | |
| | | | | | | | | | @ 111' End visual log. | |
| | | | | | | | | | @ 113' Standing water. | |
| 215 | 115 | | | | | | | | **Total Depth = 115'** | |
| | | | | | | | | | **Minor seepage @ 74' , Heavy seepage @ 85' to 113', Standing Groundwater Encountered @ 113'** | |
| | | | | | | | | | **Backfilled with Cuttings and Tamped on 2/4/2015** | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

# Geotechnical Boring Log B-5

| | | | |
|---|---|---|---|
| **Date :** | 2/12/2015 Page 1 of 2 | **Drilling Company :** | Haven Geotechnical Construction Inc. |
| **Project Name :** | Westridge | **Type of Rig :** | Limited Access Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** N/A | **Hole Diameter :** 24" |
| **Elevation of Top of Hole :** | ~ 350 ' MSL | **Drive Weight :** | N/A |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | | **@ 0' to T.D. Quaternary San Pedro Formation (Qsp)** | |
| | | | | | | | | | @ 0' Sandy SILTSTONE, light yellow and light gray, dry, dense, moderately weathered, iron oxide, fossil shells to 4". | |
| | | | B: N5W, 13W | | | | | | @ 3' Bedding attitude on very thin silt lens | |
| | | | B: N20E, 14W | | | | | | @ 4' Bedding attitude, very thin brown sandstone lens. Scattered manganese oxide and fossils | |
| 345 | 5 | | | | | | | | | |
| | | | B: N10W, 15W | | | | | | @ 8' Bedding attitude on very thin interbeds, weakly cemented, iron oxide stained, moist, very dense/slightly hard with zones of well cemented. Rootlets in few fractures. | |
| 340 | 10 | | | | | | | | | |
| 335 | 15 | | B: N30E, 12W | | | | | | @ 15' Bedding attitude on 2" sandstone interbed, orangish brown and gray fine Sandy SILTSTONE and SANDSTONE interbeds, slightly moist, very dense/ hard, weakly cemented. | |
| | | | B: N32E, 18W | | | | | | @ 18' Bedding attitude, brown, friable sandbed with cross laminations, 12" thick, overlies very hard concretion, mostly continuous around borehole. | |
| 330 | 20 | | | | | | | | @ 20' Very thin, Clayey SILTSTONE interbed within SANDSTONE that indicates soft sediment deformation occurred | |
| 325 | 25 | | | | | | | | @ 25' Concretion, 6" thick within friable sandstone. Below is Silty SANDSTONE with SILTSTONE interbeds, moist, slightly hard and dense to very dense, manganese oxide, iron oxide, soft sediment deformation, very tight. | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

Last Edited: 2/17/2015

# Geotechnical Boring Log B-5

| | | | |
|---|---|---|---|
| **Date :** | 2/12/2015 Page 2 of 2 | **Drilling Company :** | Haven Geotechnical Construction Inc. |
| **Project Name :** | Westridge | **Type of Rig :** | Limited Access Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** N/A | **Hole Diameter :** 24" |
| **Elevation of Top of Hole :** | ~ 350 ' MSL | **Drive Weight :** | N/A |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | | B: N28E, 18W | | | | | | @ 30' Bedding attitude. Clayey SILTSTONE with fine SAND, light gray, very moist, very stiff. Grades to fine Sandy SILTSTONE below. | |
| 320 | 35 | | B: N10W, 10E | | | | | | @ 33' Orange with mica laminations, SANDSTONE bed, 8" thick, iron oxide, moist to very moist, very dense. @ 34' Increase moisture, manganese oxide stained, fine Sandy SILTSTONE, light orange brown. @ 35' Bedding attitude, thin SILTSTONE interbed. Wet material but no visible free water | |
| | | | | | | | | | @ 38' Heavy seepage | |
| 315 | 40 | | | | | | | | @ 41' End visual log | |
| 310 | 45 | | | | | | | | **Total Depth = 45' Heavy Seepage Encountered at 38' Backfilled with Cuttings on 2/12/2015** | |
| 305 | 50 | | | | | | | | | |
| 300 | 55 | | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 1 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 325 | 0 | | | | | | | | **@ 0' to 10' Quaternary Landslide Deposit (Qls):** @0' Fine SANDSTONE and fine Silty SANDSTONE: light brown, yellowish brown, and gray mottled, few shells | |
| | | | SH: N80W, 60N | GB-3 | | | | | @ 3' Shear plane attitude, internal rupture surface. Rootlets, slightly sheared clay: olive gray, slightly moist, slightly stiff to stiff; iron oxide; 1/8" thick, soft moist, clay lined shear with fine sand lenses, highly weathered, fractured, iron oxide, manganese oxide. Grab Sample GB-3. | |
| 320 | 5 | | | | | | | | | |
| | | | | | | | | | @ 10' Rupture surface attitude at base of fractured/oxidized/offset material. CLAY: gray, soft to stiff, moist 1/4" thick, overlies 5" thick light yellowish sandstone bed with soft sediment deformation and siltstone lenses. Grab Sample GB-4; rupture surface clay. | |
| | 10 | | RS: NS, 15W | GB-4 | | | | CH | **@10' to T.D. Quaternary San Pedro Formation (Qsp):** | AL TS |
| 315 | | | B: N22E, 11W | | | | | | @10' Interbedded gray siltstone and yellow sandstone, very thin to moderately thick, moist, very stiff/dense; intact; slightly weathered; tight; faint soft sediment deformation. @ 11' Bedding attitude. | |
| | 15 | | | | | | | | | |
| 310 | | | | | | | | | @ 16' Thin concretion with shells within yellow SANDSTONE with laminations, slightly friable | |
| | | | | | | | | | @ 18' Fine Sandy SILTSTONE with sand lenses: light brown and light yellow, moist, dense to very dense. Minor gypsum lenses, soft sediment deformation, tight. | |
| | 20 | | B: N28E, 11W | | | | | | @ 20' Bedding attitude, fine sand lenses, gypsum. | |
| 305 | | | | | | | | | | |
| | 25 | | B: N15E, 10W | | | | | | @ 25' Bedding attitude on sand lens, 1" thick with gypsum/ manganese oxide, tight, flame structures in fine sandy siltstone, overall affected by soft sediment deformation, moderately weathered, jointed. | |
| 300 | | | J: N55W, 53N | | | | | | @ 29' Joint attitude with gypsum up to 1/2" wide. Decrease in gypsum, below is gray sandy siltstone with iron oxide staining | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

Last Edited: 11/28/2016

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 2 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 295 | 30 | | | | | | | | | |
| | 35 | | | GB-5 | | | | | @ 35' Zone of faint spider web jointing with manganese oxide, non-continuous, sub vertical, tight<br>@ 36' SILTSTONE with Clay: moist, very stiff; Grab Sample GB-5; siltstone with clay. Below is Sandy SILTSTONE with fine SAND lenses: gray with orange, moist, dense, very stiff to slightly hard; iron oxide; shells to 2" in diameter | |
| 290 | 40 | | B: N5W, 8W | | | | | | @ 41' Bedding attitude. Continuous SANDSTONE lenses; thinly bedded | |
| 285 | 45 | | | | | | | | @ 45.5' Top of SANDSTONE: light brown, very moist to wet, dense; fine to medium sand; very weakly cemented | |
| 280 | | | | | | | | | @ 48' Base of sandstone, undulatory contact with iron oxide at base | |
| | 50 | | GB: N20E, 10N | GB-1 | | | | CL | @ 50' General bedding attitude, SILTSTONE with Sandstone lenses: mottled light brown and orange, very moist, very stiff<br>@ 51' SILTSTONE with Clay interbedded with Sandstone lenses: orange brown, very moist, very stiff; scattered shell fragments; soft sediment deformation. Grab Sample GB-1; siltstone with clay. | AL |
| 275 | | | | | | | | | | |
| | 55 | | | | | | | | | |
| 270 | | | B:N20E, 12W | | | | | | @ 58' Bedding attitude. SANDSTONE bed, 4" thick: reddish brown, wet, very dense<br>@ 59' SILTSTONE with trace fine Sand: dark gray, very moist to wet, very stiff to hard; zones of iron oxide staining; scattered shells; soft sediment deformation | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 3 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 265 | 60 | | | | | | | | @ 60' SILTSTONE with trace fine Sand: dark gray, very moist to wet, very stiff to hard; zones of iron oxide staining; scattered shells; soft sediment deformation; minor seepage on one wall | |
| 260 | 65 | | | | | | | | | |
| 255 | 70 | | | | | | | | | |
| 250 | 75 | | J: N85W, 82N | | | | | | @ 75' Attitude on iron oxide lined joint; rough; tight; small seepage | |
| | | | GB: N20E, 15W | | | | | | @ 78' General bedding attitude; not representative; 1/3 of boring is sharply defined iron oxide zone around joint; prevalent soft sediment deformation | |
| 245 | 80 | | | | | | | | @ 81' Active seepage from joints. SILTSTONE with fine Sand and Sand lenses: dark gray, wet, very stiff; tight | |
| 240 | 85 | | J: N85W, 72N | | | | | | @ 85' Joint attitudes on iron oxide lined joints | |
| | | | J: N65W, 58S | GB-2 | | | | CL/ML | @ 86' SILTSTONE with Clay: dark gray, very moist, few sub planar tight joints. Grab Sample GB-2. | AL TS |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 4 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 235 | 90 | | | | | | | | @ 90' Fresh, unoxidized bedrock. Increase hardness from slightly hard to hard. SILTSTONE with variable fine Sand content: dark gray, wet, hard; shells up to 1/2" diameter. Below is massive, generally lacks defects, water from seepage at 81' running down boring walls. | |
| 230 | 95 | | | | | | | | | |
| 225 | 100 | | | | | | | | | |
| 220 | 105 | | | | | | | | | |
| 215 | 110 | | | | | | | | @ 111' End visual log. | |
| 210 | 115 | | | | | | | | @ 114' Standing water. | |
| | | | | | | | | | **Total Depth = 115'** | |
| | | | | | | | | | **Ground Water Encountered; Active Seepage at 81'** | |
| | | | | | | | | | **Backfilled with Cuttings on 11/18/2016** | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

# Geotechnical Boring Log Borehole HS-1

**Date:** 7/14/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~274' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 25' - <u>Unsuitable Artifical Fill (afu)</u>** | |
| 270 | | | R-1 | 6<br>16<br>28 | 132.9 | 8.3 | SC | @2.5' - Clayey SAND with Gravel, brownish orange, slightly moist, dense | |
| | 5 | | | | | | | | |
| 265 | | | | | | | | | |
| | 10 | | R-2 | 13<br>10<br>14 | 121.4 | 12.4 | | @10' - Clayey SAND with Gravel, orangish light brown, moist, medium dense | |
| 260 | | | | | | | | | |
| | 15 | | | | | | | | |
| 255 | | | | | | | | | |
| | 20 | | R-3 | 5<br>5<br>7 | 116.4 | 8.0 | SM | @20' - Silty SAND with Gravel, brown, moist, loose | |
| 250 | | | | | | | | | |
| | 25 | | | | | | | **@25' to 33' - <u>Quaternary Alluvium (Qal)</u>** | EI, CR |
| | | B-1 | | | | | | | |
| 245 | | | R-4 | 7<br>8<br>11 | 118.3 | 10.7 | | @29' - Clayey SILT with Gravel, orangish brown, slightly moist to moist, stiff; rootlets | |
| | 30 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-1

| | |
|---|---|
| **Date:** 7/14/2014 | **Drilling Company:** 2R |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~274' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 2 of 2 |

Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | | | | | | **@33' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>** | |
| 240 | 35 | | R-5 | 10<br>15<br>17 | 114.8 | 6.7 | SM | @35' - Silty SAND with Gravel, orange and light brown, moist, medium dense | |
| 235 | 40 | B-2 | R-6 | 12<br>17<br>18 | 108.2 | 5.6 | | @40' - Silty SAND, light brown to white, orange, mottled, slightly moist, medium dense | MD, DS |
| 230 | 45 | | R-7 | 12<br>22<br>40 | 111.8 | 15.8 | | @45' - Silty SAND, orange, gray, white, mottled grading to homogeneous orange, very moist, dense | |
| 225 | 50 | | R-8 | 13<br>20<br>29 | 99.4 | 24.6 | CL | @50' - CLAY, light brown, very moist, hard; very thin Calcium Carbonate lens present | |
| 220 | 55 | | | | | | | Total Depth = 51.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/14/2014 | |
| 215 | 60 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-2

**Date:** 7/14/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~302' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| 300 | 0 | | | | | | | **@0' to 30' - <u>Unsuitable Artifical Fill (afu)</u>** | |
| | | | R-1 | 20<br>50/6" | 118.6 | 12.1 | SM | @2.5' - Silty SAND with Gravel, light brown, orange, mottled, slightly moist, very dense | |
| 295 | 5 | | | | | | | | |
| | 10 | | R-2 | 18<br>25<br>37 | 114.6 | 14.8 | CL-ML to SP | @10' - Silty CLAY grading to SAND, brown to gray, moist, hard/dense | |
| 290 | | | | | | | | | |
| 285 | 15 | | | | | | | | |
| | 20 | | R-3 | 10<br>16<br>37 | 115.8 | 15.7 | SC | @20' - Clayey SAND with Gravel, orangish light brown, moist, dense | |
| 280 | | | | | | | | | |
| 275 | 25 | | | | | | | | |
| | 30 | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-2

| | |
|---|---|
| **Date:** 7/14/2014 | **Drilling Company:** 2R |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~302' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 2 of 3 |

Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| 270 | 30 | | R-4 | 50/6" | 106.6 | 10.0 | SC | **@30'± to 50' - Possibly Older Artificial Fill (afo)**<br>@30' - Clayey SAND with Gravel, moist, very dense | |
| 265 | 35 | B-1 | | | | | | | |
| 260 | 40 | | R-5 | 30<br>22<br>50/5" | 114.6 | 14.5 | | @40' - Clayey SAND with Gravel, grayish brown with some orange, moist, very dense, dark organic clasts | |
| 255 | 45 | | | | | | | **@50' to 60' - Quaternary Alluvium (Qal)** | |
| 250 | 50 | | R-6 | 26<br>30<br>50/6" | 117.2 | 14.5 | | @50' Clayey SAND with Gravel, orange, moist, very dense, rootlets present | |
| 245 | 55 | | R-7 | 22<br>50/5" | 118.3 | 10.5 | SM | @55' - Silty SAND, grayish brown, moist, very dense, rootlets present | |
| | 60 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-2

| | |
|---|---|
| **Date:** 7/14/2014 | **Drilling Company:** 2R |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~302' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 3 of 3 |

Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| 240 | 60 | B-2 | R-8 | 20<br>40<br>50/5" | | | CL | **@60' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>**<br>@60' - CLAY with Sand and Gravel, light brown to black and dark gray, moist, hard | |
| 235 | 65 | | R-9 | 25<br>50/6" | | | | @65' - Sandy CLAY with Gravel, gray with some orange mottling, very moist, dark organic clasts, hard<br>@67' - Cuttings very wet, potential perched groundwater | |
| 230 | 70 | | R-10 | 13<br>20<br>30 | | | SC | @70' - Clayey SAND, dark gray with white mottling, moist, dense, clasts of bluish gray clay | |
| 225 | 75 | | R-11 | 16<br>30<br>50/6" | | | SC/<br>SP-SM | @75' - Clayey SAND, dark gray, moist to very moist, dense, dark organic clasts; distinct change to SAND with Silt, orange and light brown, very moist, very dense | |
| 220 | 80 | | | | | | | Total Depth = 76.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/14/2014 | |
| 215 | 85 | | | | | | | | |
| | 90 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-3

**Date:** 7/14/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~214' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 10' - Unsuitable Artifical Fill (afu)** | |
| 210 | | | R-1 | 12<br>16<br>26 | 115.3 | 12.9 | SM | @2.5' - Silty SAND, dark brown, orangish brown, gray, mottled, moist, dense | |
| | 5 | | R-2 | 14<br>20<br>20 | 109.3 | 18.0 | SC | @5' - Clayey SAND with trace Gravel, brown, moist, medium dense to dense, rootlets present | |
| 205 | | | | | | | | **@10' to T.D. - Quaternary Alluvium (Qal)** | |
| | 10 | | R-3 | 5<br>9<br>9 | 118.1 | 11.6 | CL | @10' - CLAY with trace Gravel, dark grayish brown, moist, stiff | AL<br>CN |
| 200 | | | | | | | | | |
| | 15 | B-1 | R-4 | 5<br>6<br>8 | 115.1 | 9.7 | | @15' - Sandy CLAY with Gravel, dark yellowish brown, slightly moist, stiff | AL<br>CN |
| | | | | | | | SM | @17' - Silty SAND with Gravel, moist | MD<br>DS |
| 195 | | | | | | | | | |
| | 20 | | R-5 | 15<br>6<br>11 | 114.0 | 9.9 | SC | @ 20' - Clayey SAND with Gravel, orangish brown, slightly moist, medium dense | -#200 |
| 190 | | | | | | | | | |
| | 25 | | R-6 | 5<br>6<br>11 | 103.2 | 21.3 | CL | @ 25' - CLAY with Gravel, dark yellowish brown with gray lenses, very moist, stiff | AL<br>CN |
| | | | | | | | | Total Depth = 26.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/14/2014 | |
| 185 | 30 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-4

**Date:** 7/15/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~257' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>** | |
| 255 | | | R-1 | 22<br>40<br>42 | 115.3 | 12.9 | ML | @2.5' - SILT with Sand, gray, light brown, orange, mottled, moist, hard | |
| | 5 | | R-2 | 18<br>30<br>50/6" | 109.3 | 18.0 | CL-ML | @5' - Silty CLAY, gray, light brown, orange, mottled, slightly moist, hard | |
| 250 | | | | | | | | | |
| | 10 | | R-3 | 18<br>37<br>48 | 105.7 | 20.7 | CL | @10' - CLAY, dark gray, moist, hard | |
| 245 | | | | | | | | | |
| | 15 | B-1 | R-4 | 15<br>30<br>40 | 106.0 | 21.1 | ML | @15' - SILT with Sand, light brown, gray, orange, mottled, moist, hard | |
| 240 | | | | | | | | | |
| | 20 | | R-5 | 30<br>50/6" | 108.3 | 19.7 | CL-ML | @20' - Silty CLAY with Sand, dark gray with some orange mottling, moist, hard | |
| 235 | | | | | | | | Total Depth = 21.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/15/2014 | |
| | 25 | | | | | | | | |
| 230 | | | | | | | | | |
| | 30 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-5

**Date:** 7/15/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~233' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 30' - Older Artificial Fill (afo)** | |
| 230 | | | R-1 | 22<br>25<br>35 | 121.9 | 7.1 | SM | @2.5' - Silty SAND with Gravel, brown and light brown, dry to slightly moist, dense | |
| | 5 | | | | | | | | |
| 225 | | | | | | | | | |
| | 10 | | R-2 | 17<br>17<br>27 | 111.4 | 14.2 | CL | @10' - Sandy CLAY with trace Gravel, orange, light brown with a distinct change to gray and light brown half way through sample, moist, dense | -#200 |
| 220 | | | | | | | | | |
| | 15 | | | | | | | | |
| 215 | | | | | | | | | |
| | 20 | | | 38<br>50/5" | | | | @20' - No Sample Recovery | |
| 210 | | | R-3 | 8<br>14<br>19 | 103.4 | 22.8 | CL | @23' -CLAY with SAND, gray and orange mottled, moist, very stiff | |
| | 25 | | | | | | | | |
| 205 | | | R-4 | 17<br>27<br>41 | 121.9 | 11.3 | SC | @28' - Clayey SAND with black organic clasts and trace Gravel, blue gray, moist, dense to very dense | |
| | 30 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-5

**Date:** 7/15/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~233' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | | | | | | **@30' to T.D. - <u>Quaternary Alluvium (Qal)</u>** | |
| 200 | | | R-5 | 6<br>15<br>23 | 119.4 | 13.7 | CL | @33' - CLAY with Sand, mottled brown, orange, and gray, moist, very stiff, organic clasts | |
| | 35 | | | | | | | | |
| 195 | | | R-6 | 25<br>35<br>50/6" | 120.1 | 13.7 | | @38' - Sandy CLAY with trace Gravel and organic clasts, brownish gray, moist, hard | -#200 |
| | 40 | | | | | | | Total Depth = 39.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/15/2014 | |
| 190 | | | | | | | | | |
| | 45 | | | | | | | | |
| 185 | | | | | | | | | |
| | 50 | | | | | | | | |
| 180 | | | | | | | | | |
| | 55 | | | | | | | | |
| 175 | | | | | | | | | |
| | 60 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-6

**Date:** 7/15/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~280' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 13' - Unsuitable Artifical Fill (afu)** | |
| | | | R-1 | 18<br>24<br>33 | 110.6 | 18.1 | ML | @2.5' - SILT with trace gravel, gray, orange, light brown, mottled, very moist, hard, organic clasts, rootlets present | |
| 275 | 5 | | | | | | | | |
| 270 | 10 | | R-2 | 10<br>17<br>19 | 120.9 | 10.5 | SC | @10' - Clayey SAND with Gravel, orange brown, slightly moist, medium dense, tile piece present | |
| | | | | | | | | **@13' to 28' - Quaternary Landslide Deposit (Qls)** | |
| | | | R-3 | 5<br>11<br>16 | 115.0 | 13.2 | | @13' - Clayey SAND with Gravel, orange and brown, moist, medium dense | |
| 265 | 15 | | | | | | | | |
| | | | R-4 | 9<br>14<br>18 | | 12.7 | CL | @18' - CLAY with Gravel, brown with white patches, moist, very stiff, sample disturbed | |
| 260 | 20 | | | | | | | | |
| | | B-1 | R-5 | 6<br>7<br>9 | 113.6 | 10.6 | SC | @23' - Clayey SAND with Gravel, brown with some orange, moist, medium dense | EI, CR |
| 255 | 25 | | | | | | | | |
| | | | | | | | | **@28' to T.D. - Quaternary San Pedro Formation (Qsp)** | |
| | | | R-6 | 9<br>11<br>16 | 104.2 | 10.3 | ML | @28' - Sandy SILT, light orange, slightly moist, very stiff, rootlets present | |
| | 30 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-6

| | |
|---|---|
| **Date:** 7/15/2014 | **Drilling Company:** 2R |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~280' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 2 of 2 |

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | Logged By CNJ<br>Sampled By CNJ<br>Checked By BTZ<br><br>DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | | | | | | | |
| | | | R-7 | 8<br>21<br>37 | 111.0 | 12.1 | ML | @33' - Sandy SILT, light orange, slightly moist, hard | |
| 250 | 35 | | | | | | | Total Depth = 34.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/15/2014 | |
| 245 | 40 | | | | | | | | |
| 240 | 45 | | | | | | | | |
| 235 | 50 | | | | | | | | |
| 230 | 55 | | | | | | | | |
| | 60 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-7

**Date:** 7/15/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~260' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map | 

Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>** | |
| | | | R-1 | 18<br>38<br>45 | 117.5 | 8.5 | SM | @2.5' - Silty SAND and fine Gravel, orangish grayish brown, moist, very dense | |
| 255 | 5 | | R-2 | 22<br>35<br>50/5" | 116.7 | 4.0 | | @5' - Silty SAND with Gravel, mottled orange and light brown, slightly moist, very dense | |
| 250 | 10 | | R-3 | 22<br>50/6" | 105.3 | 4.3 | SP | @10' - SAND with Gravel, mottled orange and light brown, moist, very dense | |
| 245 | 15 | | R-4 | 30<br>25<br>42 | 105.6 | 4.4 | | @15' - SAND, slightly moist, light brown with some mottled orange, dense to very dense, trace organic material | |
| 240 | 20 | | R-5 | 25<br>50/4" | 107.2 | 5.4 | SM | @20' - Silty SAND, orangish light brown, slightly moist, very dense | |
| | | | | | | | | Total Depth = 21.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/15/2014 | |
| 235 | 25 | | | | | | | | |
| | 30 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-8

**Date:** 7/16/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~310' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 20' - Older Artificial Fill (afo)** | |
| | | | R-1 | 50/5" | 111.5 | 5.1 | ML | @2.5' - Sandy SILT with Gravel, light brown, slightly moist, hard, roots and plant material present | |
| 305 | 5 | | | | | | | | |
| 300 | 10 | | R-2 | 24<br>26<br>29 | 114.2 | 12.2 | CL | @10' - Sandy CLAY with Gravel, slightly moist, hard, black organic streaks | |
| 295 | 15 | | | | | | | | |
| | | | | | | | | **@20' to T.D. - Quaternary San Pedro Formation (Qsp)** | |
| 290 | 20 | | R-3 | 11<br>13<br>15 | 124.1 | 10.2 | SC | @20' - Clayey SAND with fine Gravel, bluish, brownish, gray, slightly moist, medium dense | |
| | | | R-4 | 10<br>25<br>50/6" | 118.9 | 11.8 | | @22' - Clayey SAND with fine Gravel, bluish, greenish gray, moist, very dense, black organic streaks | |
| | | | | | | | | @24' - Rig Chatter | |
| 285 | 25 | | | | | | | | |
| | | | R-5 | 12<br>21<br>22 | 124.8 | 3.4 | SP-SM | @27' - SAND with Silt and medium to coarse Gravel, orange and light brown, slightly moist, dense | |
| | 30 | | | | | | | @28' - Significant Rig Chatter and gravel encountered in cuttings | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-8

**Date:** 7/16/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~310' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SPT-1 | 23<br>12<br>9 | | 9.5 | SM | @30' - Silty SAND with Gravel, dark gray, moist, medium dense | |
| 280 | 35 | | | | | | | Total Depth = 31.5' (Auger Refusal)<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/16/2014 | |
| 275 | 40 | | | | | | | | |
| 270 | 45 | | | | | | | | |
| 265 | 50 | | | | | | | | |
| 260 | 55 | | | | | | | | |
| | 60 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-9

**Date:** 7/16/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~330' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map | 

Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>** | |
| | | | R-1 | 17<br>17<br>18 | 104.4 | 10.2 | SM | @2.5' - Silty SAND with Gravel, light brown, orange, mottled, moist, medium dense | |
| 325 | 5 | | R-2 | 17<br>50/5" | 112.7 | 3.5 | | @5' - Silty SAND with Gravel, light brown grades to brown, slightly moist, very dense, roots present in finer material | |
| 320 | 10 | | R-3 | 50/6" | 94.8 | 13.4 | SP-SM | @10' - SAND with Silt and trace Gravel, light brown and orange mottled, very moist, very dense | |
| 315 | 15 | | | 50/4" | | | | @15' - No sample recovery | |
| | | | | | | | | @18' - Rig Chatter | |
| 310 | 20 | | R-4 | 18<br>26<br>30 | 102.7 | 12.6 | CL | @20' - CLAY, light brown and light orange mottled, moist, hard | |
| | | | | | | | | Total Depth = 21.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/16/2014 | |
| 305 | 25 | | | | | | | | |
| | 30 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-10

**Date:** 7/16/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~330' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 25' - <u>Unsuitable Artifical Fill (afu)</u>** | |
| | | | R-1 | 20<br>22<br>50/5" | 117.9 | 11.3 | SM | @2.5' - Silty SAND with little Gravel, brown, very dense, rootlets present | |
| 325 | 5 | | | | | | | | |
| 320 | 10 | | R-2 | 18<br>28<br>30 | 118.6 | 10.9 | CL | @10' - Sandy CLAY with Gravel, brown, slightly moist, hard | |
| 315 | 15 | | | | | | | | |
| 310 | 20 | | R-3 | 14<br>28<br>48 | 125.2 | 8.3 | SC | @20' - Clayey SAND with little Gravel, dark brown, black organic streaks, slightly moist, very dense | |
| 305 | 25 | | | | | | | **@25' to 48' - <u>Quaternary Alluvium (Qal)</u>** | |
| | 30 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 7/17/2014

# Geotechnical Boring Log Borehole HS-10

**Date:** 7/16/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~330' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-4 | 10<br>17<br>21 | 123.1 | 12.0 | CL | @30' - CLAY with Gravel, brown, slightly moist, very stiff | |
| | | | R-5 | 10<br>15<br>20 | 122.1 | 12.3 | | @33' - Same as above | |
| 300 | 35 | | | | | | | | |
| | | | R-6 | 12<br>23<br>27 | 121.1 | 12.5 | | @38' - Sandy CLAY with fine Gravel, mottled light brown and brown, slightly moist, hard | |
| 295 | 40 | | | | | | | | |
| | | | R-7 | 6<br>10<br>15 | 118.4 | 12.5 | | @43' - Sandy CLAY with Gravel, brown, slightly moist, very stiff | |
| 290 | 45 | | | | | | | **@48' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>** | |
| | | | R-8 | 10<br>13<br>16 | 117.9 | 12.8 | SC | @48' - Clayey SAND, mottled orange and light brown, Sand and Clay mottled, moist, medium dense | |
| 285 | 50 | | | | | | | | |
| | | | R-9 | 13<br>15<br>10 | 109.6 | 4.3 | SP-SM | @53' - SAND with Silt, mottled orange, light brown, slightly moist, medium dense | |
| 280 | 55 | | | | | | | Total Depth = 54.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/16/2014 | |
| | 60 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ⏚ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-11

| | |
|---|---|
| **Date:** 7/31/2014 | **Drilling Company:** 2R |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~249' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 1 of 2 |

Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| 245 | 0 | | | | | | | **@0' to 35' - Unsuitable Artificial Fill (afu)** | |
| | 5 | | | | | | | | |
| 240 | 10 | | R-1 | 12<br>26<br>25 | 126.4 | 9.3 | CL | @10' - Sandy CLAY with Gravel, orangish brown, slightly moist to moist, hard | |
| 235 | 15 | | | | | | | | |
| 230 | 20 | | R-2 | 7<br>18<br>47 | 116.8 | 15.1 | ML | @20' - Sandy SILT with Gravel, gray with brown and orange mottling present, moist, hard, dark organic streaks present | |
| 225 | 25 | | | | | | | | |
| 220 | 30 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 8/5/2014

# Geotechnical Boring Log Borehole HS-11

| | |
|---|---|
| **Date:** 7/31/2014 | **Drilling Company:** 2R |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~249' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 2 of 2 |

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | Logged By CNJ<br>Sampled By CNJ<br>Checked By BTZ<br><br>DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-3 | 20<br>20<br>50 | 122.6 | 4.2 | SM | @30' - Silty SAND with Gravel, dark brown, slightly moist, very dense | |
| 215 | | | | | | | | | |
| | 35 | | R-4 | 8<br>8<br>11 | 116.2 | 6.2 | SM | **@35' to T.D. - <u>Quaternary Alluvium (Qal)</u>**<br>@35' - Silty SAND with Gravel, brown, slightly moist, medium dense | -200 |
| 210 | | | | | | | | | |
| | 40 | | R-5 | 8<br>11<br>15 | 119.2 | 4.6 | SC-SM | @40' - Silty Clayey SAND with trace Gravel, orangish brown, slightly moist, medium dense, white rootlet casts present | AL<br>-200 |
| 205 | | | | | | | | | |
| | 45 | | R-6 | 8<br>12<br>16 | 119.9 | 6.5 | SC | @45' - Clayey SAND with trace Gravel, orangish brown, slightly moist, medium dense, white rootlet casts present | |
| 200 | | | | | | | | | |
| | 50 | | R-7 | 8<br>12<br>22 | 124.9 | 3.9 | | @50' - Clayey SAND with trace Gravel, orangish brown, slightly moist, medium dense, white rootlet casts present | |
| 195 | | | | | | | | Total Depth = 51.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/31/2014 | |
| | 55 | | | | | | | | |
| 190 | | | | | | | | | |
| | 60 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-12

**Date:** 7/31/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~230' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 35' - Older Artificial Fill (afo)** | |
| 225 | 5 | | | | | | | | |
| 220 | 10 | | R-1 | 12<br>20<br>34 | 114.7 | 12.4 | SC to CL | @10' - Clayey SAND grading to Sandy CLAY, gray brown, moist, dense/hard, trace plant matter present | |
| 215 | 15 | | | | | | | | |
| 210 | 20 | | R-2 | 17<br>24<br>30 | 117.1 | 11.4 | SM | @20' - Silty SAND, orange brown, slightly moist, dense | #200 |
| 205 | 25 | | | | | | | | |
| | 30 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ⏚ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 8/5/2014

# Geotechnical Boring Log Borehole HS-12

**Date:** 7/31/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~230' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-3 | 16<br>36<br>46 | 124.6 | 9.6 | SC to CL | @30' - Clayey SAND with Gravel grading to Sandy CLAY with Gravel, orangish grayish brown, slightly moist, very dense/hard | |
| 200 | 35 | | | | | | | **@35' to T.D. - <u>Quaternary Alluvium (Qal)</u>** | |
| 195 | 40 | | R-4 | 5<br>11<br>16 | 115.7 | 14.8 | CL | @40' - CLAY with Sand, dark brown to grayish brown, moist, very stiff | AL<br>CN |
| 190 | 45 | | R-5 | 5<br>9<br>12 | 109.3 | 18.7 | | @45' CLAY with Sand, yellowish brown, very moist, stiff to very stiff | |
| 185 | 50 | | R-6 | 5<br>8<br>14 | 97.5 | 25.7 | | @ 50' - Lean CLAY with trace Gravel, olive gray with orange to red oxidation mottling, very moist, very stiff | AL<br>CN |
| 180 | 55 | | R-7 | 5<br>10<br>14 | 100.2 | 23.9 | | @55' - Same as above but lacks gravel | |
| | 60 | | | | | | | Total Depth = 56.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/31/2014 | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-13

**Date:** 7/31/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~234' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 14' - Unsuitable Artificial Fill (afu)** | |
| 230 | 5 | | | | | | | | |
| 225 | 10 | | R-1 | 12<br>21<br>30 | 114.6 | 15.1 | CL | @10' - Sandy CLAY, orangish brown, moist, hard | |
| 220 | | | | | | | | **@14' to 46' - Quaternary Alluvium (Qal)** | |
| | 15 | | R-2 | 5<br>5<br>4 | 105.3 | 6.7 | SM | @15' - Silty SAND with trace Gravel, brown, slightly moist, loose | AL<br>-200 |
| 215 | 20 | | R-3 | 9<br>15<br>20 | 122.9 | 7.6 | SC | @20' - Clayey SAND with some Gravel, brown, slightly moist, medium dense | |
| 210 | 25 | | R-4 | 7<br>7<br>8 | 111.7 | 6.9 | SM | @25' - Silty SAND with Gravel, light brown to brown, slightly moist, medium dense | -200 |
| 205 | 30 | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 8/5/2014

# Geotechnical Boring Log Borehole HS-13

**Date:** 7/31/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~234' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-5 | 7<br>11<br>14 | 118.7 | 6.8 | ML | @30' - Sandy SILT with trace Gravel, brown, slightly moist, very stiff | |
| 200 | | | | | | | | | |
| | 35 | | R-6 | 4<br>6<br>7 | 106.9 | 9.8 | SM-SC | @35' - Silty Clayey SAND with some fine Gravel, brown, slightly moist, loose, white rootlet casts present | AL<br>-200 |
| 195 | | | | | | | | | |
| | 40 | | R-7 | 7<br>11<br>28 | 116.4 | 9.0 | | @40' - Medium dense | -200 |
| 190 | | | | | | | | | |
| | 45 | | R-8 | 8<br>12<br>15 | 117.3 | 9.3 | SM | @45' - Silty SAND with trace Gravel, light brown to brown, moist, medium dense, white rootlet casts<br>**@46' to T.D. - Quaternary San Pedro Formation (Qsp)** | |
| 185 | | | | | | | | | |
| | 50 | | R-9 | 12<br>35<br>50 | 115.8 | 10.7 | | @50' - SAND with trace Gravel, light brown to brown with orange oxidation nodules, moist, very dense | |
| 180 | | | | | | | | Total Depth = 51.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 7/31/2014 | |
| | 55 | | | | | | | | |
| 175 | | | | | | | | | |
| | 60 | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ⏚ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-14

**Date:** 7/31/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~234' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | Approximately 4" of Asphalt Concrete over 5" of Aggregate Base<br>**@0' to 15' - <u>Unsuitable Artificial Fill (afu)</u>** | |
| 230 | 5 | | R-1 | 10<br>10<br>12 | 111.6 | 11.7 | CL | @5' - Sandy Clay, orangish light brown to gray brown, moist, very stiff | |
| 225 | 10 | | R-2 | 9<br>13<br>17 | 107.5 | 21.4 | | @10' - CLAY, dark olive gray with orange iron oxidation nodules, moist, very stiff | AL<br>CN |
| 220 | 15 | | R-3 | 13<br>23<br>25 | 122.7 | 8.5 | SC | **@15' to T.D. - <u>Quaternary Alluvium (Qal)</u>**<br>@15' - Clayey SAND with some Gravel, brown, moist, dense, iron oxidation nodules | |
| 215 | 20 | | R-4 | 4<br>5<br>7 | 115.3 | 9.1 | SC | @20' - Clayey SAND with trace Gravel, olive brown, moist, loose | AL<br>CN |
| 210 | 25 | | R-5 | 4<br>5<br>10 | 116.8 | 8.6 | | @25' - Clayey SAND with trace Gravel, brown to yellow brown, moist, medium dense, root traces and calcium carbonate present | |
| 205 | 30 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ⏚ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 8/5/2014

# Geotechnical Boring Log Borehole HS-14

**Date:** 7/31/2014 | **Drilling Company:** 2R

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~234' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-6 | 7<br>8<br>10 | 122.7 | 8.5 | SC | @30' - Clayey SAND with trace Gravel, brown, slightly moist, medium dense, calcium carbonate present | |
| 200 | | | | | | | | | |
| | 35 | | R-7 | 6<br>9<br>10 | 116.1 | 8.7 | | @35' - Rootlets present | -#200 |
| 195 | | | | | | | | | |
| | 40 | | R-8 | 11<br>21<br>27 | 129.0 | 10.1 | CL | @40' - Sandy CLAY with trace Gravel, brown, slightly moist, hard | |
| 190 | | | | | | | | | |
| | 45 | | R-9 | 12<br>20<br>20 | 126.7 | 8.2 | SC | @45' - Clayey SAND with trace fine Gravel, brown, slightly moist, dense | -#200 |
| 185 | | | | | | | | | |
| | 50 | | R-10 | 11<br>16<br>20 | 119.3 | 12.3 | CL | @50' - Sandy CLAY with trace Gravel, brown, moist, very stiff | |
| 180 | | | | | | | | Total Depth = 51.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings and Capped with Asphalt Concrete Cold Patch on 7/31/2014 | |
| | 55 | | | | | | | | |
| 175 | | | | | | | | | |
| | 60 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-15

**Date:** 2/3/2015 | **Drilling Company:** 2R Drilling

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~263' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | B-1 | | | | | | **@0' to 20' - Older Artificial Fill (afo)** | |
| 260 | | | | | | | | | |
| | 5 | | R-1 | 12<br>26<br>50/3" | 118.0 | 14.4 | SC | @5' - Clayey SAND with some very fine Gravel, brown with dark brown and orange blebs, moist, very dense | |
| 255 | | | | | | | | | |
| | 10 | | R-2 | 12<br>20<br>20 | 116.3 | 12.6 | SP-SC | @10' - SAND with Clay and medium Gravel, yellow orange brown with gray clayey blebs, very moist to wet, medium dense | |
| 250 | | | | | | | | | |
| | 15 | | R-3 | 12<br>16<br>25 | 102.8 | 22.0 | SC | @15' - Clayey SAND with fine Gravels, medium brown with dark organic blebs and gray clayey blebs, very moist, dense | |
| 245 | | | | | | | | | |
| | 20 | | R-4 | 16<br>33<br>45 | 124.2 | 7.6 | | **@20' to 26.5' - Quaternary Alluvium (Qal)**<br>@20' - Clayey SAND with very fine to fine Gravel, orange and yellow matrix, moist to very moist, very dense; iron oxide nodules, rounded gravel | AL<br>-200 |
| 240 | | | | | | | | | |
| | 25 | | R-5 | 16<br>25<br>31 | 119.2 | 13.4 | | @25' - Clayey SAND, medium brown with colorful clasts, moist to very moist, dense, iron oxide nodules | AL<br>CN |
| 235 | | | | | | | | **@26.5' to T.D. - Quaternary San Pedro Formation (Qsp)**<br>@26.5' - Silty fine SAND, gray and orange mottling, micaceous | |
| | 30 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 2/19/2015

# Geotechnical Boring Log Borehole HS-15

| | |
|---|---|
| **Date:** 2/3/2015 | **Drilling Company:** 2R Drilling |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~263' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 2 of 2 |

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | Logged By CNJ<br>Sampled By CNJ<br>Checked By BTZ<br><br>DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-6 | 36<br>50/4" | 100.2 | 12.6 | SM | @30' - Silty SAND, gray and orange mottling, slightly moist to moist, very dense, micaceous | |
| 230 | 35 | | | | | | | Total Depth = 31.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 2/3/2015 | |
| 225 | 40 | | | | | | | | |
| 220 | 45 | | | | | | | | |
| 215 | 50 | | | | | | | | |
| 210 | 55 | | | | | | | | |
| 205 | 60 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ⏚ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-16

**Date:** 2/3/2015 | **Drilling Company:** 2R Drilling

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~215' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 10' - Older Artificial Fill (afo)** | |
| 210 | 5 | | R-1 | 19<br>25<br>27 | 121.9 | 9.6 | SC | @5' - Clayey SAND with some Gravel, medium brown, moist, dense to very dense, blebs or sand, clay, and dark brown material | |
| 205 | 10 | | R-2 | 6<br>7<br>10 | 110.7 | 12.6 | SM | **@10' to 27' - Quaternary Alluvium (Qal)**<br>@10' - Fine Silty SAND, brown to dark brown, moist, medium dense, homogeneous texture and rounded colorful sand | |
| 200 | 15 | | R-3 | 12<br>14<br>18 | 109.8 | 11.0 | CL | @15' - Sandy CLAY, orange brown, moist, dense, root cast | -200 |
| 195 | 20 | | R-4 | 7<br>9<br>15 | 111.7 | 16.4 | | @20' - CLAY, orange brown to medium dark brown, moist, trace gravel | CN<br>AL |
| 190 | 25 | | R-5 | 11<br>18<br>28 | 104.3 | 22.1 | | @25' - CLAY with Sand, reddish brown, moist, rounded clasts that coarsen with sample depth, white mineralization around clasts, iron oxide nodules | -200 |
| | 30 | | | | | | | **@27' to T.D. - Quaternary San Pedro Formation**<br>@27' - Clayey SILT, gray and orange mottling, iron oxide | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 2/19/2015

# Geotechnical Boring Log Borehole HS-16

| | |
|---|---|
| **Date:** 2/3/2015 | **Drilling Company:** 2R Drilling |
| **Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem |
| **Project Number:** 14057-01 | **Drop:** 30" **Hole Diameter:** 8" |
| **Elevation of Top of Hole:** ~215' MSL | **Drive Weight:** 140 pounds |
| **Hole Location:** See Geotechnical Map | Page 2 of 2 |

Logged By CNJ
Sampled By CNJ
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-6 | 17<br>32<br>45 | 106.3 | 19.9 | ML | @30' - SILT with Sand, dark orange and gray brown mottling, moist, hard, micaceous, iron oxide | |
| 185 | 35 | | R-7 | 24<br>34<br>46 | 104.1 | 21.7 | | @35' - SILT with Sand, orange and gray brown mottling, moist to very moist, hard, micaceous, trace fossils, iron oxide | AL<br>-200 |
| 180 | 40 | | R-8 | 20<br>40<br>45 | 98.2 | 26.2 | ML-CL | @40' - Silty CLAY with fine Sand, orange and gray and brown mottling, very moist, hard, shells, micaceous | |
| 175 | 45 | | R-9 | 38<br>50-5" | | 20.6 | | @45' - Silty CLAY, dark gray, moist to very moist, hard | |
| 170 | 50 | | R-10 | 50/3" | | | ML | @50' - SILT with Sand, dark gray, hard, partial recovery | |
| | | | | | | | | Total Depth = 51.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 2/3/2015 | |
| 165 | 55 | | | | | | | | |
| | 60 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ⏚ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-17

**Date:** 2/4/2015 | **Drilling Company:** 2R Drilling

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~208' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By ASR
Sampled By ASR
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | **@0' to 10' - Older Artificial Fill (afo)** | |
| 205 | | | | | | | | | |
| | 5 | B-1 | R-1 | 12<br>19<br>35 | 112.3 | 19.0 | CL | @5' - Sandy CLAY, light brown, moist, hard | AL<br>DS<br>-200<br>MD |
| 200 | | | | | | | | | |
| | 10 | | R-2 | 12<br>24<br>22 | 114.8 | 9.7 | ML | **@10' to 48' - Quaternary Alluvium (Qal)**<br>@10' Sandy SILT, reddish light brown, moist, hard | |
| 195 | | | | | | | | | |
| | 15 | | R-3 | 8<br>13<br>19 | 105.1 | 9.1 | SM | @15' - Silty SAND, light brown, moist, medium dense | -200 |
| 190 | | | | | | | | | |
| | 20 | | R-4 | 4<br>6<br>7 | 99.0 | 26.3 | CL | @20' - CLAY, yellowish brown, very moist, medium stiff | CN<br>AL |
| 185 | | | | | | | | | |
| | 25 | | R-5 | 5<br>8<br>14 | 110.4 | 18.2 | | @25' - CLAY, dark yellowish brown, moist, very stiff | CN<br>AL |
| 180 | | ▽ | | | | | | | |
| | 30 | | | | | | | | |

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 2/19/2015

# Geotechnical Boring Log Borehole HS-17

**Date:** 2/4/2015 | **Drilling Company:** 2R Drilling

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~208' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By ASR
Sampled By ASR
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-6 | 5<br>13<br>22 | 107.4 | 21.2 | SM | @30' - Silty SAND, light brown, very moist, medium dense | -200 |
| 175 | | | | | | | | | |
| | 35 | | R-7 | 16<br>33<br>50/5" | 112.7 | 18.6 | | @35' - Silty SAND, light brown, wet, very dense | |
| 170 | | | | | | | | | |
| | 40 | | R-8 | 11<br>15<br>20 | | 18.5 | SP-SM | @40' - SAND with Silt, light brown, wet, medium dense | -200 |
| 165 | | | | | | | | | |
| | 45 | | R-9 | 7<br>14<br>46 | 107.2 | 21.5 | SC | @45' - Clayey SAND, light gray, wet, dense | |
| 160 | | | | | | | | **@48' to T.D.' - <u>Quaternary San Pedro Formation (Qsp)</u>** | |
| | 50 | | R-10 | 15<br>50/5" | 111.9 | 18.2 | | @50' - Clayey SAND, light gray, wet, very dense | |
| 155 | | | | | | | | | |
| | 55 | | R-11 | 17<br>50/5" | 109.5 | 19.6 | SM | @55' - Silty SAND, light gray, wet, very dense | |
| 150 | | | | | | | | | |
| | 60 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-17

**Date:** 2/4/2015 | **Drilling Company:** 2R Drilling

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~208' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By ASR
Sampled By ASR
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 60 | | R-12 | 21<br>29<br>36 | 128.1 | 9.8 | SP-SM | @60' - SAND with Silt, wet, dense | |
| 145 | | | | | | | | | |
| | 65 | | R-13 | 10<br>50/5" | 133.7 | 7.7 | | @65' - SAND with Silt, wet, very dense, very rounded, shell fragment present | |
| 140 | | | | | | | | | |
| | 70 | | SPT-1 | 32<br>50/3" | | 5.4 | | @70' - SAND with Silt, slightly moist, very dense | |
| | | | | | | | | Total Depth = 71'<br>Groundwater Encountered at Approximately 29'<br>Backfilled with Cuttings on 2/4/2015 | |
| 135 | | | | | | | | | |
| | 75 | | | | | | | | |
| 130 | | | | | | | | | |
| | 80 | | | | | | | | |
| 125 | | | | | | | | | |
| | 85 | | | | | | | | |
| 120 | | | | | | | | | |
| | 90 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

# Geotechnical Boring Log Borehole HS-18

**Date:** 2/4/2015 | **Drilling Company:** 2R Drilling

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~290' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By ASR
Sampled By ASR
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | B-1 | | | | | | **@0' to 40' - Unsuitable Artificial Fill (afu)** | |
| 285 | 5 | | R-1 | 11<br>17<br>12 | | | SM | @5' - Silty SAND, dark gray, slight moist, stiff, dense | |
| 280 | 10 | | R-2 | 7<br>10<br>12 | | | CL | @10' - CLAY, dark gray, slightly moist, very stiff | |
| 275 | 15 | | R-3 | 11<br>13<br>17 | | | | @15' - CLAY, dark gray, slightly moist to moist, very stiff | |
| 270 | 20 | | R-4 | 11<br>13<br>14 | | | | @20' - CLAY with Sand, dark gray, slightly moist to moist, stiff | |
| 265 | 25 | | R-5 | 19<br>24<br>33 | | | SM | @25' - Silty SAND, dark gray, slightly moist to moist, dense | |
| | 30 | | | | | | | | |

LGC Geotechnical, Inc.

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE (CA Modified Sampler) |
| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
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| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

Last Edited: 2/19/2015

# Geotechnical Boring Log Borehole HS-18

**Date:** 2/4/2015 | **Drilling Company:** 2R Drilling

**Project Name:** Westridge | **Type of Rig:** Limited Access Hollow Stem

**Project Number:** 14057-01 | **Drop:** 30" | **Hole Diameter:** 8"

**Elevation of Top of Hole:** ~290' MSL | **Drive Weight:** 140 pounds

**Hole Location:** See Geotechnical Map



Logged By ASR
Sampled By ASR
Checked By BTZ

| Elevation (ft) | Depth (ft) | Graphic Log | Sample Number | Blow Count | Dry Density (pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | R-6 | 8<br>12<br>17 | | | SM | @30' - Silty SAND, dark gray, slightly moist to moist, medium dense | |
| 260 | 35 | | R-7 | 18<br>38<br>44 | | | | @35' - Silty SAND, light gray, slight moist, dense to very dense | |
| 255 | 40 | | R-8 | 26<br>50/5" | 106.3 | 21.2 | CL | **@40' to T.D. - <u>Quaternary Landslide Deposit/Quaternary San Pedro Formation Undifferentiated (Qls/Qsp)</u>**<br>@40' - Silty fine SAND, light gray and brown, slightly moist, very dense, iron oxide staining | |
| 250 | 45 | | R-9 | 38<br>50/5" | 104.5 | 22.6 | ML | @45' - SILT with Sand, light gray and brown, moist, very dense, iron oxide | |
| 245 | 50 | | R-10 | 32<br>50/5" | 100.3 | 25.0 | | @50' - SILT with Sand, light brown, moist, very dense | |
| | | | | | | | | Total Depth = 51.5'<br>Groundwater Not Encountered<br>Backfilled with Cuttings on 2/4/2015 | |
| 240 | 55 | | | | | | | | |
| | 60 | | | | | | | | |

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**SAMPLE TYPES:**

| | |
|---|---|
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| G | GRAB SAMPLE |
| SPT | STANDARD PENETRATION TEST SAMPLE |
| ▽ | GROUNDWATER TABLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
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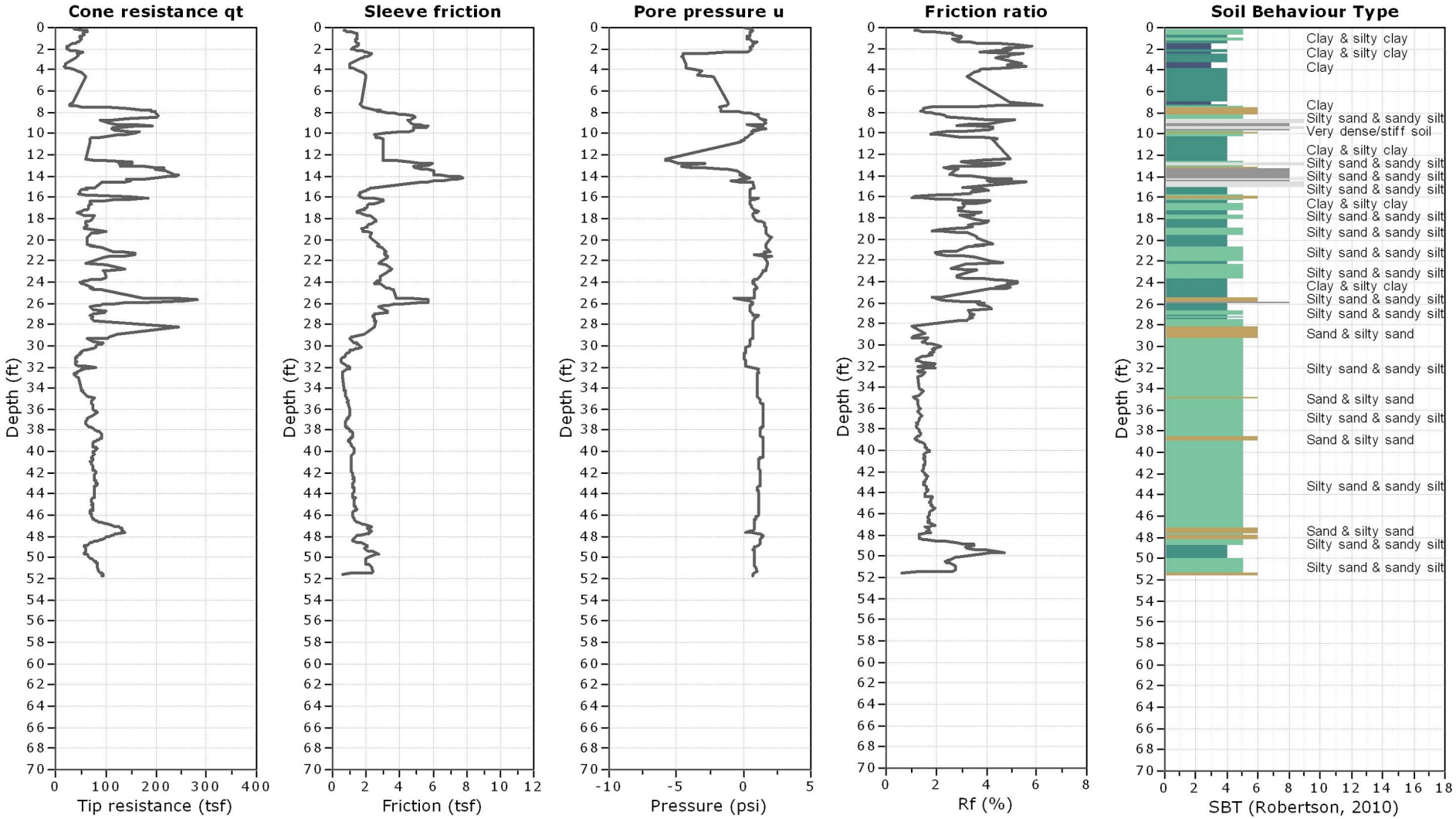
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| -#200 | % PASSING # 200 SIEVE |

**Kehoe Testing and Engineering**
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-1A**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 51.74 ft, Date: 7/22/2014
Cone Type: Vertek



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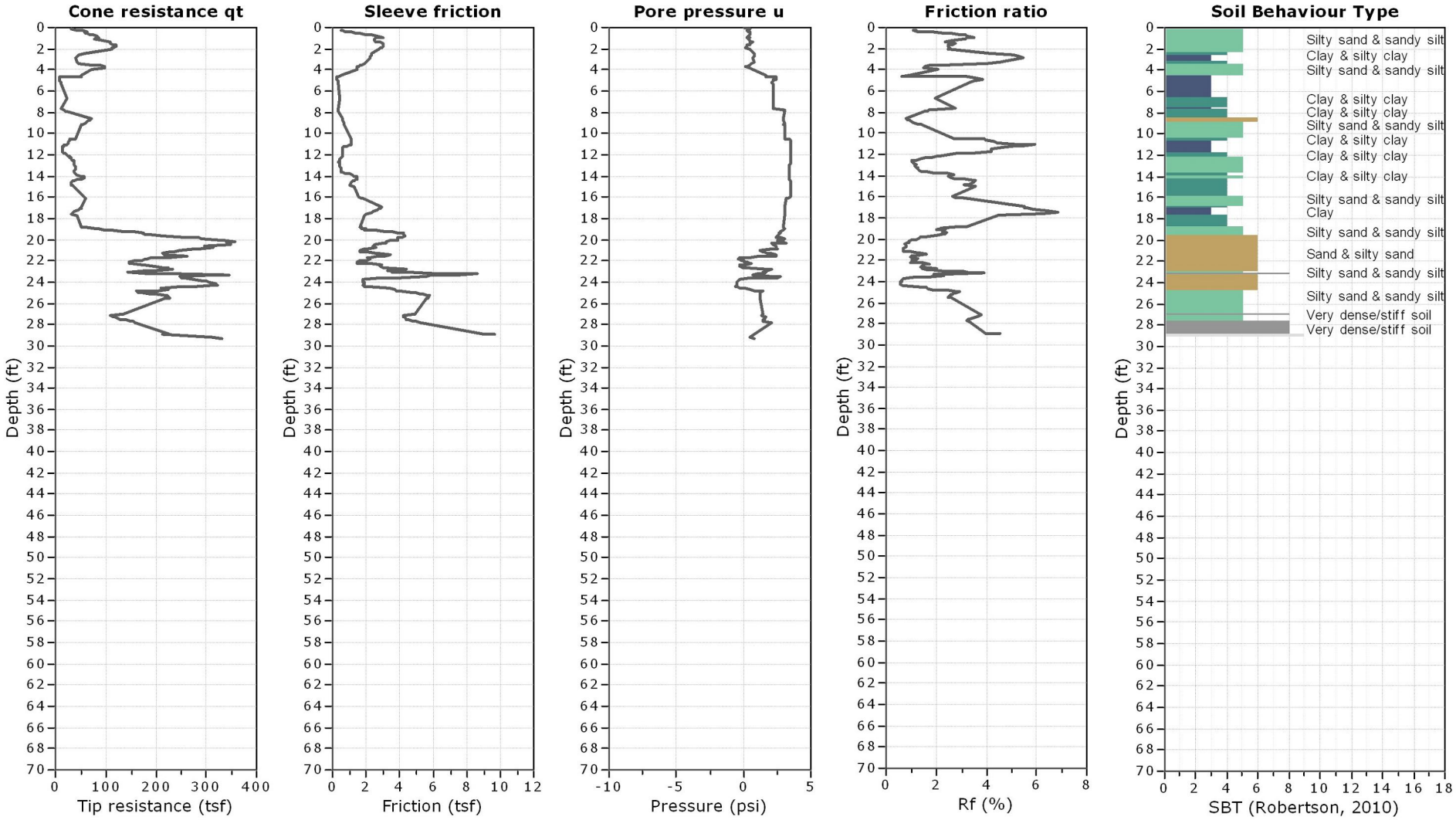
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-2**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 29.28 ft, Date: 7/22/2014
Cone Type: Vertek



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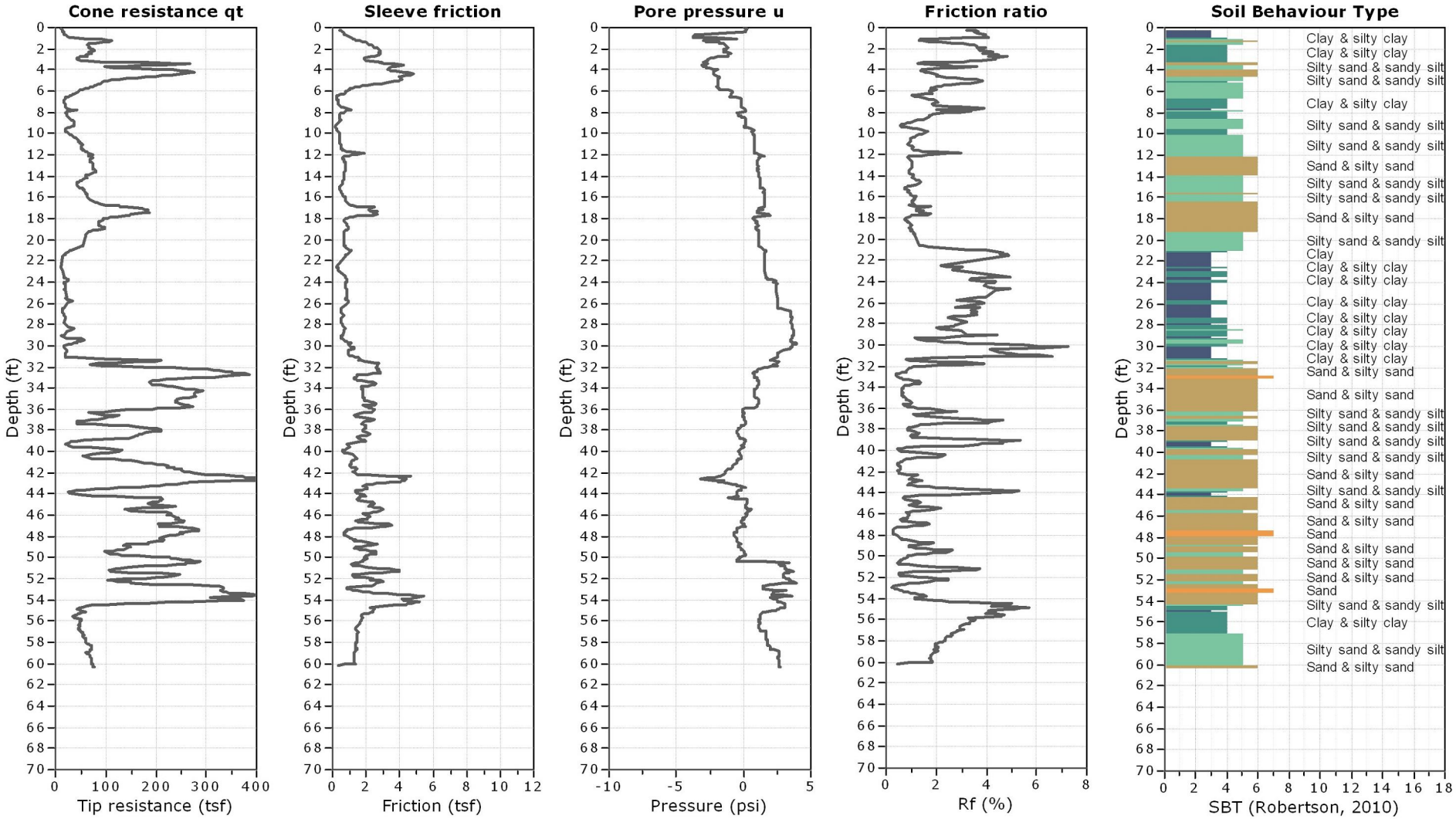
**CPT: CPT-3**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 60.34 ft, Date: 7/22/2014
Cone Type: Vertek



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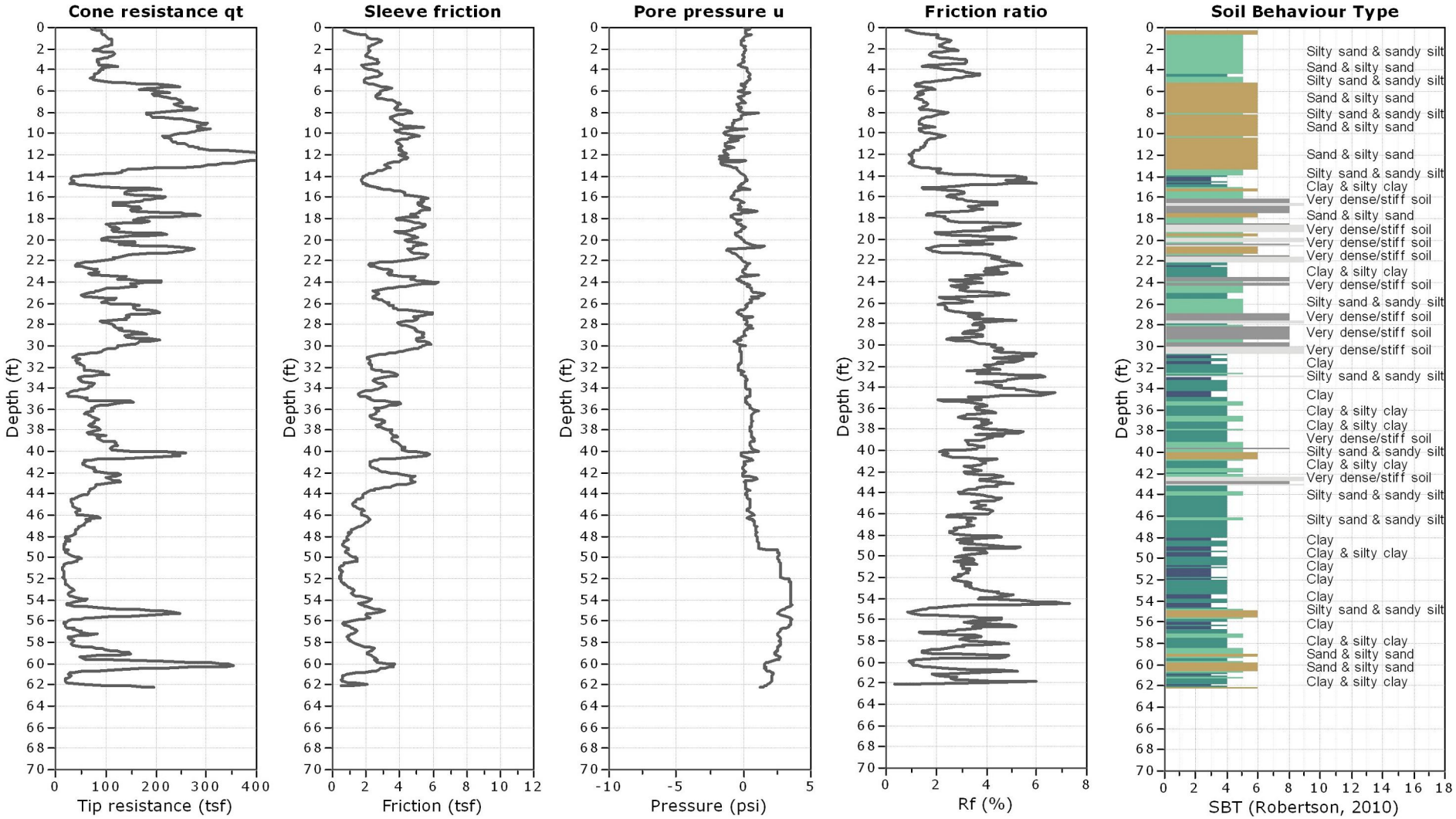
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-4**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 62.25 ft, Date: 7/22/2014
Cone Type: Vertek



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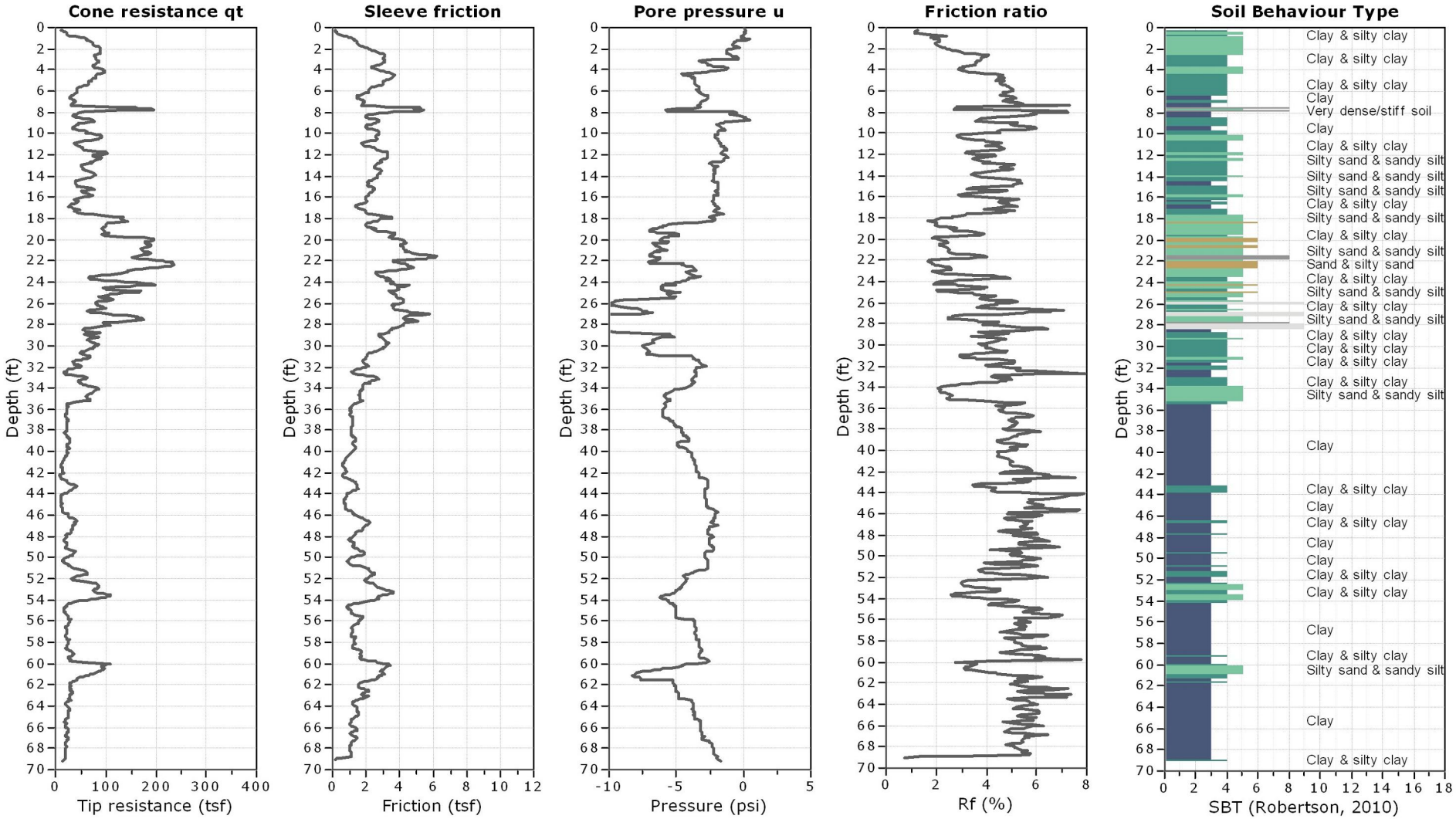
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-5**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 69.17 ft, Date: 7/22/2014
Cone Type: Vertek



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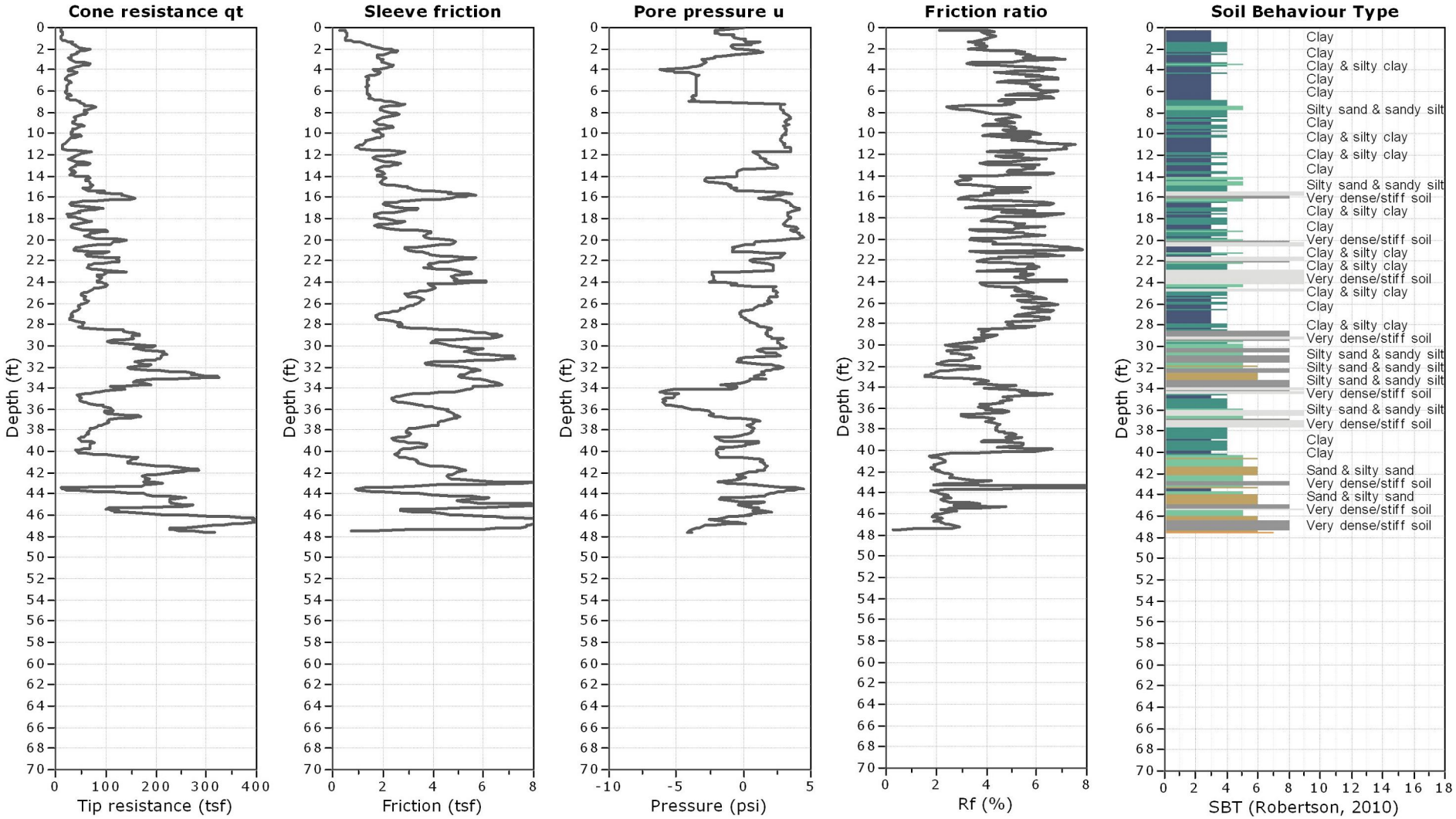
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-6**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 47.65 ft, Date: 7/22/2014
Cone Type: Vertek

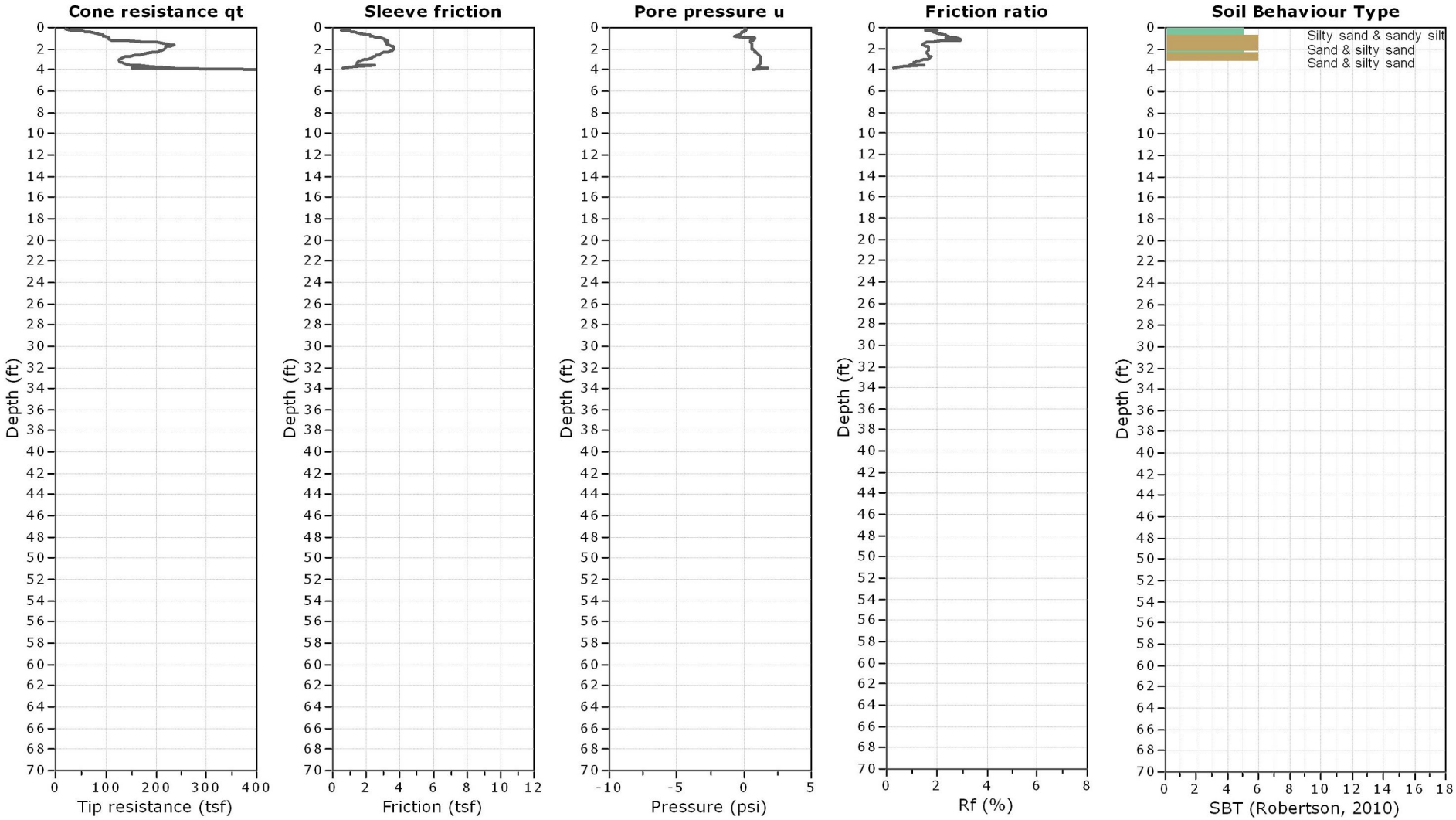


**Kehoe Testing and Engineering**
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-7**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 3.90 ft, Date: 7/22/2014
Cone Type: Vertek



**Kehoe Testing and Engineering**
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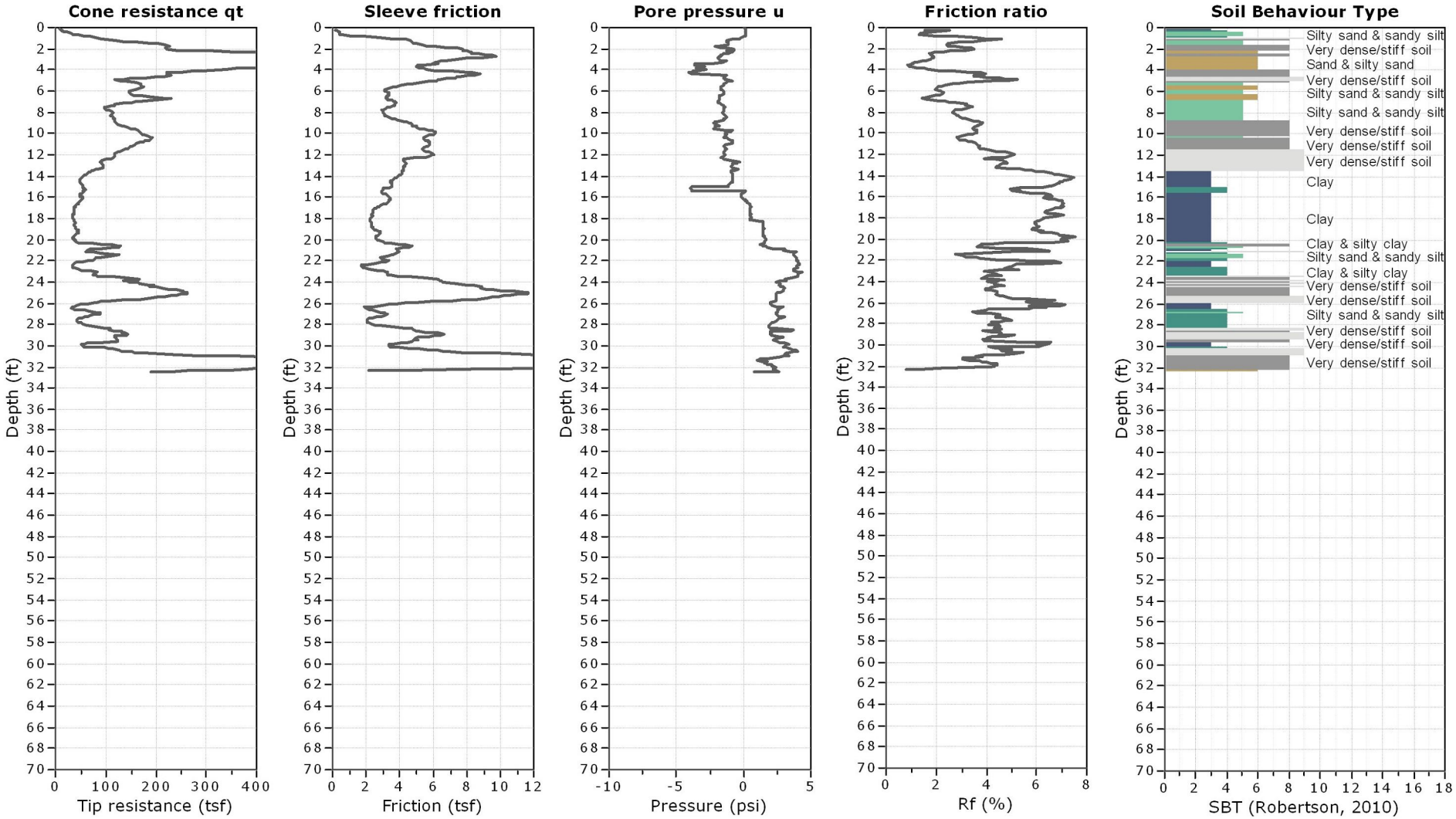
www.kehoetesting.com

**CPT: CPT-8**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 32.50 ft, Date: 7/23/2014
Cone Type: Vertek



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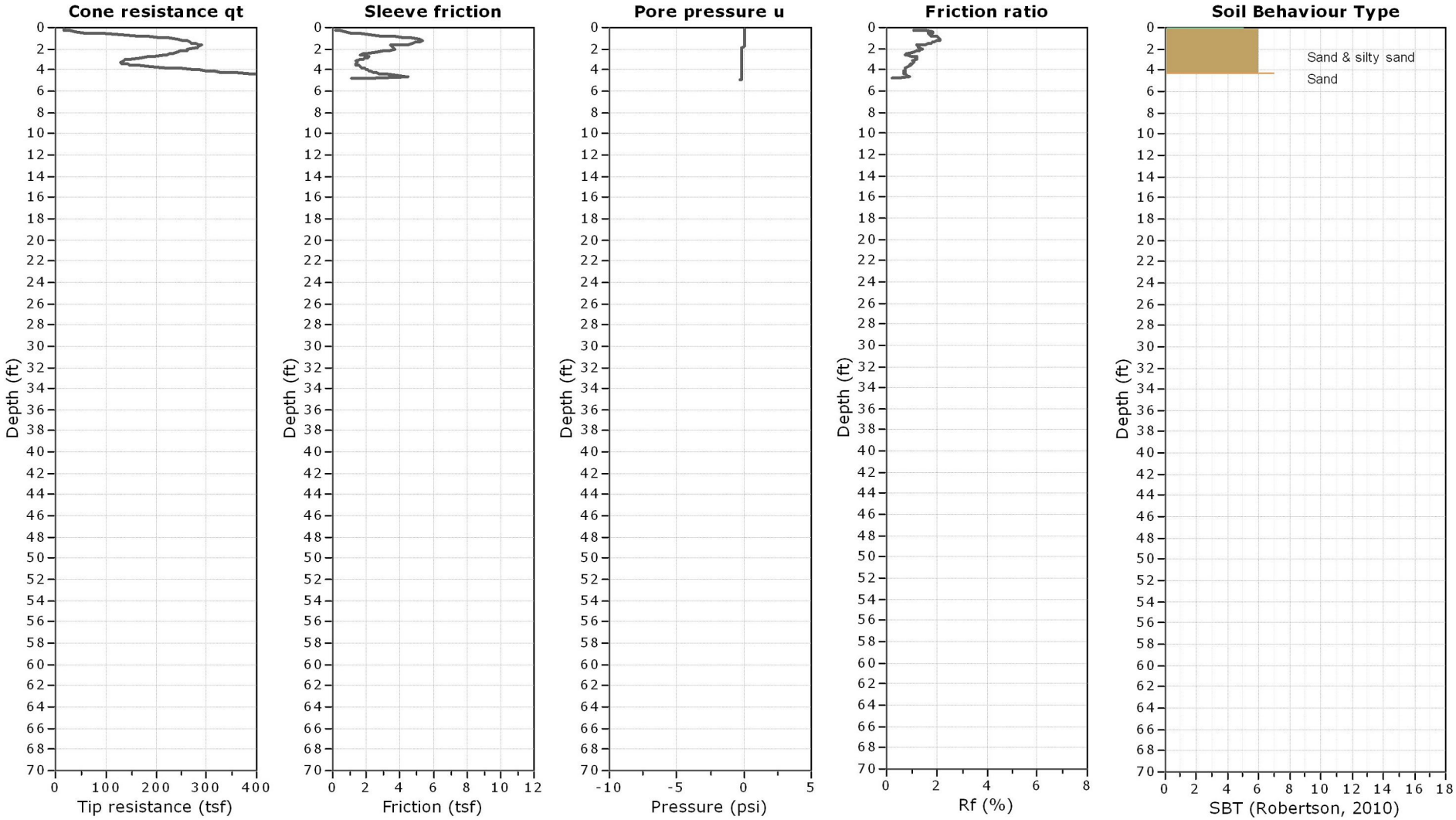
**CPT: CPT-9A**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 4.96 ft, Date: 7/24/2014
Cone Type: Vertek



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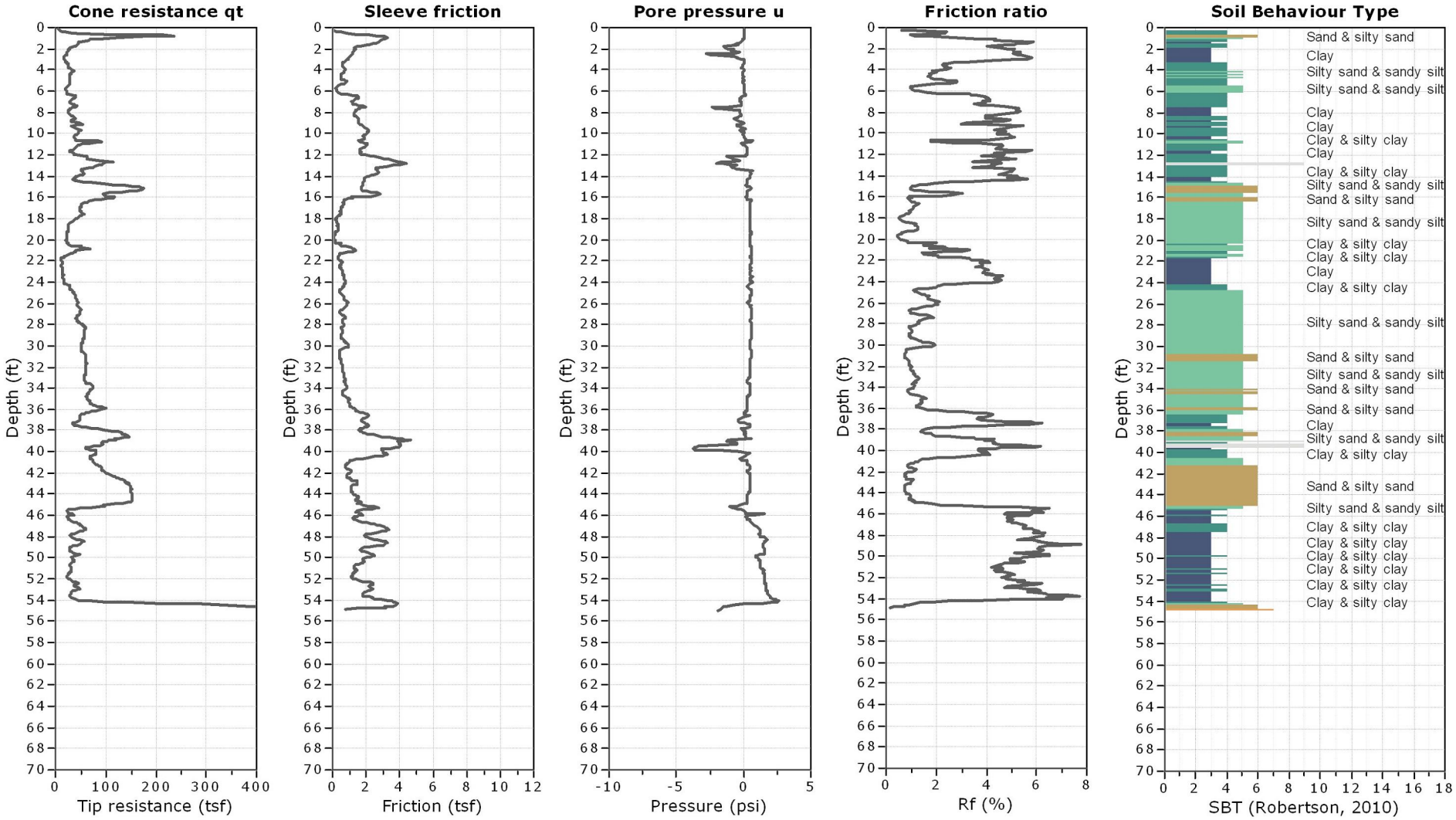
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-10**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 54.96 ft, Date: 7/24/2014
Cone Type: Vertek

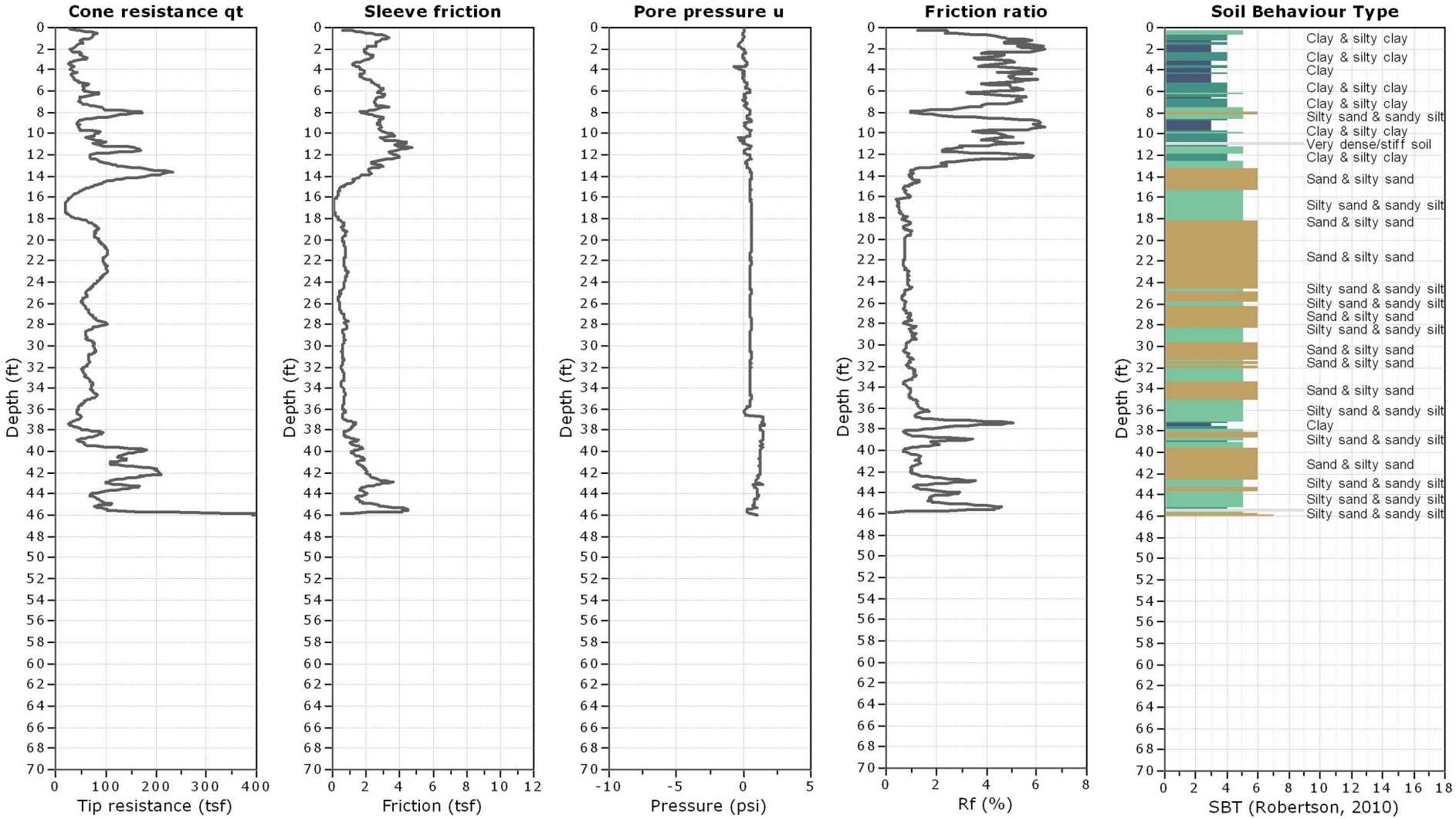


**Kehoe Testing and Engineering**
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

**CPT: CPT-11B**

**Project:** **LGC Geotechnical, Inc./Westridge Golf Course**
**Location:** **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 46.03 ft, Date: 7/24/2014
Cone Type: Vertek



*From GMU, 1996*

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 257±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary Bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 41 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 1/30/96

REMARKS

Bottom at 41 feet
No caving or water
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | COLLUVIUM/OLDER ALLUVIUM, (Qcol/Qoal) | SILTY SAND (SM), fine, light brown, dry to damp, loose; | 255 | | | | | | | | | |
| | | becoming very fine below 3 feet; | | | | | | | | | | |
| 5 | | becoming tan to light brown below 5 feet; | 250 | 5 | | | P | 2400 | 5 | 101 | | |
| | | rounded, medium gravel at 8 feet. | | | | | | | | | | |
| 10 | | | | 10 | | | 5 | 2400 | 4 | 110 | | CN |
| | | WELL GRADED SAND (SW), with gravel, light brown, damp, medium dense. | 245 | | | | | | | | | |
| 15 | | SILTY SAND (SM), fine, tan to light brown, damp, medium dense; | | 15 | | | 3 | 2400 | 7 | 111 | | |
| | | | 240 | | | | | | | | | |
| 20 | | with very fine sand at 20 feet; | | 20 | | | 3 | 2400 | 8 | 107 | | CN |
| | | | 235 | | | | | | | | | |
| 25 | | | | 25 | | | 2 | 1550 | 12 | 104 | | |
| | | damp to moist below 28 feet. | 230 | | | | | | | | | |
| | | SILT (ML), with very fine sand, light brown, damp to moist, stiff, slightly porous; | | | | | | | | | | |
| 30 | | becoming mottled olive gray to light brown below 30 feet. | | 30 | | | 6 | 1550 | 17 | 103 | | |
| | | | 225 | | | | | | | | | |
| 35 | | | | 35 | | | 7 | 1550 | 23 | 99 | | |
| | | | 220 | | | | | | | | | |
| | SAN PEDRO FM, (Qsp), siltstone | SILT (ML), mottled olive gray to light brown, moist, stiff. | | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE DH 1

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.1

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA | | | TEST DATA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
| | | | | | | ■ | 8 | 1550 | 24 | 97 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 1

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.1

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 295± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 56 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/7/96

REMARKS

Bottom at 56 feet
No water or caving
Hole backfilled with native soils

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FILL (Af), very fine grained sand | SILTY SAND (SM), light brown, damp, loose to medium dense; becoming light olive brown in color below 3 feet. | 295 | | | | | | | | | |
| 5 | | SILT (ML) with fine sand, light olive brown, damp, firm, | 290 | 5 | | | 1 | 2400 | 14 | 101 | | |
| 10 | | becoming moist below 9 feet. | 285 | 10 | | | 1 | 2400 | 16 | 99 | | |
| 15 | | SILTY SAND (SM), fine, light brown, damp to moist, loose to medium dense. | 280 | 15 | | | 1 | 2400 | 10 | 110 | | |
| | COLLUVIUM/ALLUVIUM (Qcol/Qoal) | SILTY SAND (SM), fine, olive brown, moist, medium dense; | | | | | | | | | | |
| 20 | | | 275 | 20 | | | 3 | 2400 | 11 | 114 | | |
| 25 | | less fines at 25 feet. | 270 | 25 | | | 4 | 1550 | 12 | 81 | | |
| | | LEAN CLAY (CL), olive, moist, stiff. | | | | | | | | | | |
| 30 | | | 265 | 30 | | | 6 | 1550 | 19 | 106 | | |
| | | SILTY SAND (SM) with small gravel, olive brown, moist, medium dense. | | | | | | | | | | |
| 35 | | LEAN CLAY (CL) with silt, olive, wet, firm; | 260 | 35 | | | 3 | 1550 | 21 | 102 | | |
| | | | 255 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 4

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.4

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | with some fine sand at 41 feet. | 255 | | | | P | 1550 | 25 | 100 | | |
| 45 | | | 250 | 45 | | | 9 | 1550 | 25 | 98 | | |
| | SAN PEDRO FM (Qsp), siltstone | SILT (ML), olive gray, moist, stiff, slightly micaceous; | | | | | | | | | | |
| 50 | | becoming gray below 50 feet. | 245 | 50 | | | 50 | 850 | 23 | 106 | | |
| 55 | | | 240 | 55 | | | 35 | 850 | 22 | 105 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 4

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.4

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 275±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rovary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 60 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/7/96

REMARKS

Bottom at 56 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FILL (Af) | SILTY SAND (SM), fine brown, damp, loose; | 275 | | | | | | | | | |
| | | becoming light brown below 4 feet; | | | | | | | | | | |
| 5 | | becoming brown in color below 8 feet. | 270 | 5 | | | 2 | 2400 | 5 | 110 | | |
| | COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal) | SILTY SAND (SM), fine, brown, damp, medium dense; | | | | | | | | | | |
| 10 | | with medium to coarse sand at 10 feet; | 265 | 10 | | | 3 | 2400 | 6 | 114 | | |
| | | with some small gravel at 13 feet; | | | | | | | | | | |
| 15 | | moist at 16 feet; | 260 | 15 | | | 2 | 2400 | 5 | 112 | | |
| 20 | | damp below 20 feet; | 255 | 20 | | | 4 | 2400 | 4 | 113 | | |
| | large rounded gravel at 21 feet | | | | | | | | | | | |
| 25 | | fine to medium sand at 26 feet. | 250 | 25 | | | 3 | 1550 | 6 | 110 | | CN |
| 30 | | | 245 | 30 | | | 7 | 1550 | 5 | 116 | | |
| | | WELL GRADED SAND (SW), light brown, damp, medium dense; | | | | | | | | | | |
| | | small gravel at 33 feet; | | | | | | | | | | |
| 35 | | | 240 | 35 | | | 8 | 1550 | 3 | 119 | | |
| | | | 230 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 5

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.5

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | becoming damp to moist below 40 feet. | 235 | | | CH | 8 | 1550 | 7 | 117 | | CN |
| | | SILTY SAND (SM), light brown, damp to moist, medium dense. | | | | | | | | | | |
| 45 | | WELL GRADED SAND (SW) with gravel, light brown, damp, medium dense. | 230 | 45 | | | 10 | 1550 | 8 | 115 | | |
| | SAN PEDRO FM (Qsp), siltstone | SILT (ML), olive, moist, stiff; | | | | | | | | | | |
| 50 | | | 225 | 50 | | | 16 | 850 | 26 | 98 | | |
| | | becoming olive-gray in color below 53 feet. | | | | | | | | | | |
| 55 | | | 220 | 55 | | | 21 | 850 | 28 | 95 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 5

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.5

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 410±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/13/96

REMARKS

Bottom at 61 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FILL (Af) | SILT (ML), light brown, dry to damp, firm. | 410 | | | | | | | | | |
| | LANDSLIDE DEBRIS (Qls), light brown silt with fine sand, highly fractured with rootlets to 8 feet. | SILT (ML), light brown, damp, firm; | | | | | | | | | | |
| 5 | | becoming orange brown below 5 feet. | 405 | 5 | | | | | | | | |
| 10 | sharp contact with fine grained sand, B-N85E, 28SE, at 9 feet | POORLY GRADED SAND (SP), fine, light brown, damp. | 400 | 10 | | | 4 | 2400 | 3 | 101 | | |
| 15 | contact with coarse grain sand, B-N15E, 50SW at 14 feet | | 395 | 15 | | | | | | | | |
| | 3" clay bed highly sheared, B-N30W, 45SW, at 17 feet, becoming a gray silt below 17 feet | SILT (ML), olive, damp to moist, firm to stiff; | | | | | | | | | | |
| 20 | stiff below 21 feet | becoming olive gray below 20 feet. | 390 | 20 | | | 6 | 2400 | 18 | 105 | | |
| 25 | slightly micaceous below 25 feet | | 385 | 25 | | | | | | | | |
| | bedding within slide, B-N40W, 12NE at 29 feet | | | | | | | | | | | |
| 30 | 1/2" thick fine sand layer, B-N40E, 15NW at 34 feet, 2" thick clay shear, rupture surface, RS-N10W, 20SW, at 35 feet | | 380 | 30 | | | 10 | 1550 | 23 | 102 | | |
| 35 | SAN PEDRO FM (Qsp), olive siltstone with very fine sand | SILT (ML), olive gray, damp to moist, firm to stiff; | 375 | 35 | | | | | | | | |
| | | | 370 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 17

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.17

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | slightly micaceous with fine sand below 40 feet. | 370 | | | | 12 | 1550 | 21 | 103 | | |
| | bedding break, B-N70E, 9NW, at 42 feet, gray siltstone, slightly fractured below 42 feet | | | | | | | | | | | |
| 45 | J-N50W, 55NE | | 365 | 45 | | | | | | | | |
| | thinnly bedded siltstone, B-N25E, 8NW at 47 feet | | | | | | | | | | | |
| 50 | | | 360 | 50 | | | 50 | 850 | 25 | 102 | | |
| | J-N40W, 60NE, at 51 feet | | | | | | | | | | | |
| 55 | shear, S-N30W, 42NE, at 55 feet | | 355 | 55 | | | | | | | | |
| 60 | | | 350 | 60 | | | 33/8" | 850 | 21 | 98 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 17

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.17

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 270±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH 41.0 ELEVATION 229.0
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/14/96

REMARKS

Bottom at 61 feet
Seepage at 41 feet, no caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ASPHALT, 2" thick asphalt<br>FILL (Af), with 2" diameter, well rounded gravel | SILTY SAND (SW), fine, tan to light brown, dry to damp, loose. | 270 | | | | | | | | | |
| | LANDSLIDE DEBRIS (Qls), light brown, fine sandy silt, soft to 17 feet | SILT (ML) with small gravel, light brown, damp, firm. | | | | | | | | | | |
| 5 | | | 265 | 5 | | | | | | | | |
| 10 | | | 260 | 10 | | | 2 | 2400 | 7 | 103 | | |
| 15 | | | 255 | 15 | | | | | | | | |
| | silty, fine grained sand, below 17 feet | SILTY SAND (SM), fine to medium, reddish light brown, damp, medium dense; | | | | | | | | | | |
| 20 | abundant well rounded pebbles, gradational contact to a fine grained yellow brown, friable sand below, 20 feet | with some gravel and small cobbles below 20 feet.<br>POORLY GRADED SAND (SP), reddish light brown, damp, medium dense; | 250 | 20 | | | 8 | 2400 | 5 | 114 | | |
| 25 | silty fine sand, moderatly dense below 24 feet | change to tan light brown below 25 feet. | 245 | 25 | | | | | | | | |
| | gradational change to a silt with very fine sand below 28 feet | SILTY SAND (SM), fine, tan to light brown, damp, medium dense. | | | | | | | | | | |
| 30 | | | 240 | 30 | | | 20 | 1550 | 13 | 100 | | |
| | | SILT (ML) with fine sand, tan to light brown, damp to moist, stiff; | | | | | | | | | | |
| 35 | olive color silt, stiff, slightly, micaceous below 35 feet<br>orange rust staining between fractures at 37 feet<br>4" thick fine moist to wet sand layer, B-N50W, 35NE, at | becoming light olive in color below 37 feet. | 235 | 35 | | | | | | | | |
| | | | 230 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 19

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.19

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 39 feet<br>rupture surface, clay shear with seepage, RS-N45W, 50NE at 41 feet | | 230 | | | | 10 | 1550 | 23 | 102 | | |
| 45 | SAN PEDRO FM (Qsp), gray color siltstone, highly fractured to 45 feet | SILT (ML), gray, moist, firm; becoming gray in color below 44 feet; micaceous below 45 feet. | 225 | 45 | | | | | | | | |
| | bedding break, N10E, 14NW, at 48 feet | | | | | | | | | | | |
| 50 | | | 220 | 50 | | | 30 | 850 | 25 | 101 | | |
| | very stiff below 54 feet | | | | | | | | | | | |
| 55 | bedding break, B-N50W, 6SW, at 55 feet | | 215 | 55 | | | | | | | | |
| | 1" thick hard silicious layer with slight seepage, N-S, 12SW at 59 feet | | 210 | 60 | | | 35 | 850 | 24 | 102 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 19

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.19

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 485±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 66 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/16/96

REMARKS

Bottom at 66 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOPSOIL, dark brown clay with rootlets | LEAN CLAY (CL), brown, damp to moist, firm to stiff, with rootlets. | 485 | | | | | | | | | |
| 5 | SAN PEDRO FM (Qsp), olive gray siltstone with orange staining, weathered to 6 feet<br>3" thick gray clay layer, B-N55W, 14NE, at 5 feet<br>gradational change to fine grained sand at 6 feet<br>change back to siltstone below 7 feet<br>caliche streaking at 8.5 feet | SILT (ML), light gray, moist, firm to stiff; | 480 | 5 | | | | | | | | |
| 10 | becoming thinnly bedded at 10 feet, with interbedded fine sand layers approx. 2" thick<br>1/4" thick gypsum bed, B-N70W, 15NE, at 11 feet<br>B-N60W, 18NE, at 13 feet | becoming olive color below 8 feet;<br>becoming stiff below 10 feet; | 475 | 10 | | ■ | 8 | 2400 | 11 | 102 | | |
| 15 | 12" thick dark gray clay bed at 15 feet<br>shear with hairline roots, S-N20W, 44SW, at 16 feet | becoming olive gray in color below 15 feet; | 470 | 15 | | | | | | | | |
| 20 | Approx. B-N-S, 12E, at 18 feet<br>olive color, very fine grained sand below 19 feet<br>fine sand at 21 feet | change to light gray below 18 feet, with fine sand; | 465 | 20 | | ■ | 6 | 2400 | 8 | 99 | | |
| 25 | olive silt below 23 feet<br>B-N40W, 18NE, at 24 feet | | 460 | 25 | | | | | | | | |
| 30 | becoming very stiff below 27 feet<br>very fine sand at 28 feet<br>gypsum lined joint, J-E-W, vertical at 29 feet | | 455 | 30 | | ■ | 14 | 1550 | 20 | 103 | | |
| 35 | 1 foot layer fine sand at 33 feet<br>1 foot layer olive gray silt, very stiff at 34 feet<br>light gray silty sandstone below 36 feet | | 450 | 35 | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 21

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.21

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | with very fine sand at 40 feet. | 445 | | | | 17 | 1550 | 11 | 119 | | |
| | 5" thick layer of silty fine sandstone at 42 feet<br><br>fine grained sandstone below 44 feet | SILTY SAND (SP), fine, light gray, damp, dense; | | | | | | | | | | |
| 45 | 4" thick sandy gravel offset by fault, S-N20W, 50SW, at 45 feet<br>6" thick olive siltstone bed at 45.5 feet<br>well graded friable sandstone below 46 feet | moist at 45 feet. | 440 | 45 | | | | | | | | |
| 50 | abundant pebbles and gravel, well rounded below 47 feet<br>4" thick clay shear, gypsum within clay, S-N50E, 38NW, at 50 feet | WELL GRADED SAND (SW) with gravel, light gray, damp, dense. | 435 | 50 | | | 30/10" | 850 | 6 | 110 | | |
| 55 | 18" thick gravel bed, approximate bedding, B-N70E, 30NW, at 55 feet<br>fine grained sandstone, light gray below 55 feet<br>dark gray siltstone at 58 feet | | 430 | 55 | | | | | | | | |
| | | POORLY GRADED SAND (SP), fine, light gray, damp, dense. | | | | | | | | | | |
| 60 | 2" thick, very moist clay bed, B-N50E, 18NW, at 59 feet<br>4", well cemented, sandy conglomerate at 60 feet, shear S-N85, 50NW | SILTY GRAVEL (GM), medium, light brown to gray, damp to moist, dense. | 425 | 60 | | | | | | | | |
| 65 | | WELL GRADED SAND (SW), light gray, damp, dense. | 420 | 65 | | | 40/9" | 850 | 2 | 132 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 21

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.21

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 485± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/16/96

REMARKS
Bottom at 50.5 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | SAN PEDRO FM (Qsp), brown color fine sandstone with rootlets<br>light brown silt at 1 foot<br>1/4" thick clay bed, B-N20W, 8NE, at 1.5 feet<br>2" thick fine to medium grained sand layer at 2 feet<br>thinnly bedded siltstone below 2.5 feet<br>1" thick gypsum layer, rust stained, B-N10E, 15SE, at 4 feet<br>massive olive siltstone below 5 feet<br>becoming a fine sandy siltstone below 9 feet<br>dense olive gray silty fine sandstone, moderatly bedded, below 10 feet<br>fine grained friable sandstone below 15 feet<br>becoming fine to medium grained below 18 feet<br>6" thick well graded sand layer at 20 feet<br>2" thick clay bed, B-N80W, 16NE, at 20.5 feet<br>6" thick gravel layer at 22 feet<br>fine sandstone below 22.5 feet<br>gravel layer between 24 and 27 feet<br>6" thick siltstone blebs within gravel, clay shear seperating small and larger gravel, S-E-W, 55N, at 24 feet<br>coarse sand with gravel below 27 feet<br>B-N80E, 14NW, at 29 feet<br>6" thick claybed, B-N55W, 11NE, at 32 feet<br>friable fine sand at 33 feet<br>well graded sand below 33 feet<br>3" thick gravel layer, B-N55W, 18NE, at 38 feet<br>massive fine sandstone below | SILTY SAND (SW), fine, light brown, damp, loose. | 485 | 0 | | | | | | | | | |
| 5 | | | 480 | 5 | | | | | | | | |
| 10 | | SILT (ML), olive gray, moist, stiff. | 475 | 10 | | | 10 | 2400 | 15 | 105 | | |
| 15 | | SILTY SAND (SW), fine, light brown, damp to moist, dense. | 470 | 15 | | | | | | | | |
| 20 | | | 465 | 20 | | | 15 | 2400 | 4 | 109 | | |
| 25 | | | 460 | 25 | | | | | | | | |
| 30 | | POORLY GRADED GRAVEL (GP), tan to light brown, damp, dense. | 455 | 30 | | | | | | | | |
| 35 | | SILTY SAND (SW), fine, light brown, damp, dense. | 450 | 35 | | | ≥ 20/10" | 1550 | 4 | 103 | 85 | CP,CS,HY,AL,EI,CH,DS(R) |
| | | POORLY GRADED SAND (SP), fine, light gray, damp, dense. | 445 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 22

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.22

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA | | | TEST DATA | | | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | |
| | 39 feet | | 445 | | | | | | | | | |
| 45 | | | 440 | 45 | | 30/10" | | 1550 | 7 | 99 | | |
| 50 | | | 435 | 50 | | 40/5" | | 850 | 3 | 106 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 22

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.22

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills,
GROUND SURFACE ELEVATION 425± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/19/96

REMARKS

Bottom at 61 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOPSOIL, slightly porous brown clay | LEAN CLAY (CL), brown, damp to moist, firm. | 425 | | | | | | | | | |
| | SAN PEDRO FM (Qsp), alternating layers of fine sands and silts to 8 feet, hairline rootlets along joint/fractures to 10 feet | POORLY GRADED SAND (SP), very fine, olive brown, damp to moist, loose. | | | | | | | | | | |
| 5 | B-N65W, 5NE, at 5 feet | | 420 | 5 | | | | | | | | |
| | B-N25E, 15SE, at 9 feet | | | | | | | | | | | |
| 10 | 4" thick fine sand layer, gray silt with fine sand below 9.5 feet becoming stiffer below 11 feet | LEAN CLAY (CL) with fine sand, olive, moist, stiff. | 415 | 10 | | | 4 | 2400 | 22 | 98 | | |
| | light gray fine grained friable sand below 14 feet, approx. bedding, B-N65W, 15NE, at 14 feet | POORLY GRADED SAND (SP), fine, olive, moist, medium dense. | | | | | | | | | | |
| 15 | | | 410 | 15 | | | | | | | | |
| | olive gray silt below 17 feet, B-N60W, 20NE, at 17 feet | SILTY SAND (SM), fine, olive, moist, stiff, medium dense. | | | | | | | | | | |
| 20 | siltstone highly fractured below 20 feet | LEAN CLAY (CL) with fine sand, olive, moist, stiff with orange rust staining. | 405 | 20 | | | 4 | 2400 | 21 | 103 | | |
| | shear with polished surface, S-N80E, 55NW, at 23 feet | SILT (ML), olive gray, moist, stiff. | | | | | | | | | | |
| 25 | B-N60E, 20NW, at 25 feet | | 400 | 25 | | | | | | | | |
| | 1 foot layer fine sand at 27 feet<br>olive gray silt below 28 feet | | | | | | | | | | | |
| 30 | silty fine sandstone below 30 feet | | 395 | 30 | | | 8 | 1550 | 20 | 100 | | |
| | dense fine grained sand below 34 feet | | | | | | | | | | | |
| 35 | | SILTY SAND (SM), fine, olive, damp to moist, medium dense. | 390 | 35 | | | | | | | | |
| | 2" thick silt bed, B-N50W, 15NE, at 37 feet<br>shear, S-N35E, 18SE, at 38 feet | | | | | | | | | | | |
| | | | 360 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 24

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.24

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B-N30E, 20SE, at 43 feet | | 385 | | | | | | | | | |
| 45 | fine to medium sand below 44.5 feet<br>dark gray siltstone, B-N70W, 14NE, at 46 feet<br>gradational change to silty fine grained sand below 47 feet | | 380 | 45 | | | 12 | 1550 | 19 | 100 | | |
| 50 | | POORLY GRADED SAND (SP), fine, light gray, dense. | 375 | 50 | | | 25 | 850 | 16 | 99 | | |
| | gray silt with fine sand below 51 feet<br>dark gray clay stone, very stiff and moist below 53 feet<br>end visual log at 53 feet | LEAN CLAY (CL), gray, moist, stiff.<br>SILT (ML), olive gray, moist, stiff. | 370 | 55 | | | | | | | | |
| 60 | | | 365 | 60 | | | 24 | 850 | 20 | 105 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 24

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.24

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 222±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rovary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Oen drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/4/96

REMARKS
No water or caving
Hole tamped while backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ASPHALT, 3" | | | | | | | | | | | |
| | FILL (Af), red brick pieces | SILTY SAND (SW), fine to medium, dark gray, damp to moist, medium dense; | | | | | | | | | | |
| | | becoming brown in color below 2 feet; | 220 | | | | | | | | | |
| | | petroleum odor at 4 feet; becoming very fine grained below 5 feet | | | | | | | | | | |
| 5 | COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal) | SILT (ML) with fine sand, olive, moist, firm to stiff; | | 5 | | | 1 | 2400 | 10 | 108 | | |
| | | | 215 | | | | | | | | | |
| 10 | | | | 10 | | | 1 | 2400 | 12 | 104 | | |
| | | | 210 | | | | | | | | | |
| 15 | | becoming light olive color below 15 feet. | | 15 | | | 2 | 2400 | 9 | 111 | | |
| | | | 205 | | | | | | | | | |
| 20 | | SILTY SAND (SW), fine to medium, with small gravel, olive, moist, medium dense. | | 20 | | | 3 | 2400 | 8 | 113 | | |
| | | | 200 | | | | | | | | | |
| 25 | | SILT (ML) with small gravel, olive, moist, firm to stiff; | | 25 | | | 3 | 1550 | 13 | 109 | | |
| | | | 195 | | | | | | | | | |
| 30 | | with some fine sand at 30 feet. | | 30 | | | 5 | 1550 | 11 | 115 | | |
| | | | 190 | | | | | | | | | |
| 35 | | CLAYEY SAND (SC), fine, brown, moist, medium dense. | | 35 | | | 6 | 1550 | 15 | 116 | | |
| | | | 185 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 25

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.25

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | | SILTY SAND (SM), fine, brown, moist, medium dense. | 180 | 45 | | | 5 | 1550 | | | | |
| | | | | | | | 14 | 1550 | | | | |
| 50 | | LEAN CLAY (CL), grayish-brown, moist to wet, firm. | 175 | 50 | | | 10 | 850 | | | | |
| 55 | SAN PEDRO FM (Qsp), siltstone | SILT (ML), olive, moist, stiff; becoming gray in color below 57 feet. | 170 | 55 | | | 25 | 850 | | | | |
| 60 | | | 165 | 60 | | | 35 | 850 | | | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 25

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.25

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 230±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH 50.0 ELEVATION 180.0
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 56 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/4/96

REMARKS

Bottom at 56 feet
Water at 50 feet, no caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | COLLUVIUM/OLDER ALLUVIUM (Qclo/Qoal) | SILTY SAND (SM), fine, light brown, damp, loose. | 230 | 0 | | | | | | | | |
| 5 | | | 225 | 5 | | | 2 | 2400 | 5 | 101 | | |
| 10 | | SILT (ML), with fine sand, light brown, damp, firm. | 220 | 10 | | | 2 | 2400 | 8 | 106 | | |
| 15 | | | 215 | 15 | | | 2 | 2400 | 9 | 105 | | |
| 20 | | SILTY SAND (SM), fine, with small to medium gravel, light brown, damp, medium dense. | 210 | 20 | | | 2 | 2400 | 8 | 107 | | |
| | | SILT (ML) with fine sand, light brown, damp, firm; | | | | | | | | | | |
| 25 | | becoming stiff below 25 feet. | 205 | 25 | | | 4 | 1550 | 7 | 108 | | |
| 30 | | | 200 | 30 | | | 5 | 1550 | 4 | 114 | | |
| | | SILTY SAND (SM), fine, light brown, damp, medium dense. | | | | | | | | | | |
| 35 | | | 195 | 35 | | | 7 | 1550 | 8 | 111 | | |
| | | | 190 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 26

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.26

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LEAN CLAY (CL) with fine sand, brown, moist, firm to stiff. | 190 | | | | 4 | 1550 | 16 | 105 | | |
| 45 | | SILTY SAND (SM), fine, light brown, damp, medium dense; becoming moist below 46 feet; seepage at 50 feet. | 185 | 45 | | | 11 | 1550 | 10 | 97 | | |
| 50 | SAN PEDRO FM (Qsp), siltstone | SILT (ML) with fine sand, olive brown, wet, stiff; mottled olive-grey below 52 feet | 180 | 50 | | | 20 | 850 | 26 | 97 | | |
| 55 | | | 175 | 55 | | | 11 | 850 | 25 | 98 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 26

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.26

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 205± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH 20.0 ELEVATION 185.0
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 41 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/18/96

REMARKS

Bottom at 41 feet
Seepage at 20 feet, caving below 20 feet
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FILL (Qaf) | SILTY SAND (SM), fine, damp to moist, loose to medium dense. | 205 | | | | 4 | 1550 | | | | |
| 5 | COLLUVIUM/OLDER ALLUVIUM (Qccol/Qoal) | FAT CLAY (CH), dark brown, moist, firm; | 200 | 5 | | | P | 2400 | 17 | 99 | | CN |
| | | light yellow brown at 7 feet. | | | | | | | | | | |
| 10 | | SILT (ML), light brown, moist, firm; | 195 | 10 | | | 1 | 2400 | 17 | 102 | | CN |
| | | very moist, yellow brown at 12 feet; | | | | | | | | | | |
| 15 | | becoming brown in color at 15 feet; | 190 | 15 | | | 1 | 2400 | 17 | 107 | | |
| 20 | | moist to wet below 20 feet, seepage at 20 feet. | 185 | 20 | | | 1 | 2400 | 22 | 99 | | |
| 25 | | LEAN CLAY (CL), yellowish brown, wet, stiff. | 180 | 25 | | | | | 20 | 108 | | |
| 30 | | | 175 | 30 | | | 1 | 1550 | 19 | 109 | | |
| | | LEAN CLAY (CL), yellowish brown, wet, stiff. | | | | | | | | | | |
| 35 | | | 170 | 35 | | | 2 | 1550 | 25 | 98 | | |
| | | | 165 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 27

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.27

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA | | | TEST DATA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
| | | | 165 | | | ■ | 9 | 1550 | 20 | 107 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 27

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.27

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 295± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 31 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/18/96

REMARKS

Bottom at 31 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FILL (Qaf) | SILT (ML) with fine sand, light brown, dry to damp, loose; | 295 | 0 | | | | | | | | |
| 5 | | with some coarse grain sand at 5 feet; | 290 | 5 | | | P | 2400 | 7 | 98 | | |
| 10 | | roots and organic debris at 9 feet. | 285 | 10 | | | | | | | | |
| 15 | COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal) | SILT (ML) with clay, olive brown, moist, firm; | 280 | 15 | | | P | 2400 | 15 | 102 | | |
| 20 | SAN PEDRO FM (Qsp), siltstone | SILT (ML), olive, moist, stiff; | 275 | 20 | | | 5 | 2400 | 20 | 106 | | |
| 25 | | becoming olive gray below 28 feet. | 270 | 25 | | | | | | | | |
| 30 | | | 265 | 30 | | | 12 | 1550 | 24 | 102 | | |

LEGEND ON PLATE A-3

SHEET 1 OF 1

# LOG OF DRILL HOLE

DH 29

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.29

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 265± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/19/96

REMARKS

Bottom at 51 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TOPSOIL, brown, very moist clay, soft to firm | FAT CLAY (CH), dark brown, moist, firm. | 265 | | | | | | | | | |
| 5 | LANDSLIDE DEBRIS (Qls), highly weathered, slightly porous silt | SILT (ML) with clay, light brown, moist, firm. | 260 | 5 | | | | | | | | |
| 10 | rootlets to 10 feet | SILTY SAND (SM), fine, olive, damp, medium dense. | 255 | 10 | | | 5 | 2400 | 16 | 98 | | |
| 15 | silt with fine sand, no discernable bedding at 14 feet<br>1 foot thick dark gray clay shear with slicken sides, S-N60W, 22NE, at 18 feet | LEAN CLAY (CL), olive, moist, firm. | 250 | 15 | | | 3 | 2400 | 25 | 96 | | |
| 20 | SAN PEDRO FM (Qsp), siltstone, massive bedding | SILT (ML) with clay, olive-gray, moist, stiff. | 245 | 20 | | | 5 | 2400 | 24 | 99 | | |
| 25 | light gray, medium grained sand, slightly friable, B-N35W, 20NE at 26 feet | WELL GRADED SAND (SW), orange-brown, damp to moist, dense. | 240 | 25 | | | 17 | 1550 | 24 | 98 | | |
| 30 | | | 235 | 30 | | | 9 | 1550 | 10 | 111 | | |
| 35 | gray, fine sand B-N25W, 20NE, at 32 feet<br>orange-brown, silty fine sand below 37 feet | POORLY GRADED SAND (SP), fine, gray, damp, dense. | 230 | 35 | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 32

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.32

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SILTY SAND (SM), fine, orange-brown, damp, dense. | 225 | | | | | | | | | |
| 45 | | | 220 | 45 | | | 17 | 1550 | 10 | 108 | | |
| 50 | | | 215 | 50 | | | | | 11 | 98 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 32

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.32

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 247± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/20/96

REMARKS

Bottom at 51 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FILL (Qaf), asphalt at surface, dark brown clay | SILTY SAND (SW), very fine, light brown, damp to moist, loose. | 245 | | | | | | | | | |
| 5 | SAN PEDRO FM (Qsp), or LANDSLIDE DEBRIS (Qls), olive siltstone firm, massive bedding<br>becoming firmer at 7 feet | SILT (ML) with fine sand, light brown, damp, firm;<br>becoming light olive in color below 8 feet;<br>becoming stiff below 10 feet. | 240 | 5 | | | | | | | | |
| 10 | | | | 10 | | | 8 | 2400 | 15 | 104 | | |
| | B-N55E, 8NW, at 12 feet thinnly bedded below 12 feet | | 235 | | | | | | | | | |
| 15 | B-N45E, 30NW, at 15 feet | | 230 | 15 | | | | | | | | |
| 20 | possible rupture surface, 4" thick clay shear, S-N40E, 30NW | | | 20 | | | 5 | 2400 | 25 | 99 | | |
| | SAN PEDRO FM (Qsp), siltstone, becoming stiffer below 22 feet | | 225 | | | | | | | | | |
| 25 | | | 220 | 25 | | | | | | | | |
| 30 | | LEAN CLAY (CL), olive, moist, stiff. | 215 | 30 | | | 14 | 1550 | 23 | 103 | | |
| 35 | | SILT (ML), olive, moist, stiff. | 210 | 35 | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 34

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.34

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LEAN CLAY (CL), olive, moist, stiff. | 205 | | | | 12 | 1550 | 22 | 104 | | |
| 45 | slightly friable sand below 44 feet, B-N20E, 20NW, at 44 feet | SILTY SAND (SM), fine, light olive, damp to moist, dense. | | 45 | | | | | | | | |
| | large rounded gravel at 48 feet<br>silty clay at 49 feet | POORLY GRADED SAND (SP), fine, light olive, damp, dense. | 200 | | | | | | | | | |
| 50 | | LEAN CLAY (CL), dark olive, moist, very stiff. | | 50 | | | 40 | 850 | 23 | 102 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 34

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.34

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 245± FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/20/96

REMARKS

Bottom at 51 feet
No water or caving
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FILL (Qaf), loose, silty sand with rootlets, wood, wire, and asphalt debris dispersed thru-out fill | SILTY SAND (SM), fine, brown, moist, loose. | 245 | | | | | | | | | |
| | 1 | SILT (ML), light olive, damp to moist, firm. | | | | | | | | | | |
| 5 | SAN PEDRO FM (Qsp), olive color very fine grained sandstone, massively bedded to 12 feet | SILT (ML), light olive, damp to moist, firm; with fine sand at 8 feet. | 240 | 5 | | | | | | | | |
| 10 | thinnly beded siltstone, B-N10E, 10SE, at 12 feet very fine grained sandstone below 13 feet | SILTY SAND (SM), fine, tan to light brown, damp, medium dense. | 235 | 10 | | | 8 | 2400 | 6 | 104 | | |
| 15 | friable fine sand below 15 feet | POORLY GRADED SAND (SP), fine, orange-brown, damp to moist, medium dense. | 230 | 15 | | | | | | | | |
| | well graded sand with rounded gravel at 17 feet sharp contact with olive gray silt at 18 feet | SILT (ML), olive, moist, stiff. | | | | | | | | | | |
| 20 | F-N15W, 75SW, at 19 feet, 1 foot seperation of upper sand and lower silt | | 225 | 20 | | | 6 | 2400 | 3 | 108 | | |
| | | WELL GRADED SAND (SW), orange-brown, damp, medium dense. | | | | | | | | | | |
| 25 | silt becoming very stiff below 23 feet | LEAN CLAY (CL), olive-gray, moist, stiff with rust staining. | 220 | 25 | | | | | | | | |
| 30 | | | 215 | 30 | | | 10 | 1550 | 23 | 101 | | |
| | | SILT (ML), olive-gray, moist, stiff. | | | | | | | | | | |
| 35 | seepage along 2" thick clay gouge zone, F-N35W, 75SW, at 34 feet | | 210 | 35 | | | | | | | | |
| | | | 205 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 35

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.35

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LEAN CLAY (CL), olive-gray, moist, stiff; | 205 | | | | 10 | 1550 | 25 | 99 | | |
| 45 | | becoming gray in color below 46 feet. | 200 | 45 | | | | | | | | |
| 50 | | | 195 | 50 | | | 30/10" | 850 | 23 | 101 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 35

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.35

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 250±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 41 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/20/96

REMARKS

Bottom at 41 feet
No water or caving
Petroleum odor at 29 feet
Hole backfilled

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA: SAMPLE | SAMPLE DATA: NUMBER OF BLOWS | SAMPLE DATA: DRIVING WEIGHT (pounds) | TEST DATA: MOISTURE CONTENT | TEST DATA: DRY DENSITY (pcf) | TEST DATA: RELATIVE COMPACT. | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | FILL (Gaf) | SILTY SAND (SM), fine, brown, moist, loose. | 250 | | | | | | | | | |
| | | SILT (ML), light olive, moist, firm; | | | | | | | | | | |
| 5 | | | 245 | 5 | | | | | | | | |
| | COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal), no visual log due to petroleum fumes | SILT (ML), light olive, moist, firm. | | | | | | | | | | |
| 10 | | | 240 | 10 | | | P | 2400 | 19 | 106 | | |
| 15 | | | 235 | 15 | | | | | | | | |
| | | SILT (ML) with fine sand, olive, moist, firm; | | | | | | | | | | |
| 20 | | with some clay at 20 feet; | 230 | 20 | | | P | 2400 | 19 | 100 | | |
| | SAN PEDRO FM (Qsp) | becoming very moist at 24 feet. | | | | | | | | | | |
| 25 | | LEAN CLAY (CL), gray, moist, firm; | 225 | 25 | | | | | | | | |
| 30 | | with some dark gray fine sand, and petroleum odor at 29 feet; stiff below 30 feet. | 220 | 30 | | | 8 | 1550 | 26 | 98 | | |
| 35 | | | 215 | 35 | | | | | | | | |
| | | | 210 | | | | | | | | | |

LEGEND ON PLATE A-3

SHEET 1 OF 2

# LOG OF DRILL HOLE

DH 36

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.36

| DEPTH | GEOLOGICAL CLASSIFICATION DESCRIPTION | ENGINEERING CLASSIFICATION AND DESCRIPTION | ELEVATION | DEPTH | SOIL SYMBOL | SAMPLE DATA | | | TEST DATA | | | ADDITIONAL TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAMPLE | NUMBER OF BLOWS | DRIVING WEIGHT (pounds) | MOISTURE CONTENT | DRY DENSITY (pcf) | RELATIVE COMPACT. | |
| | | | 210 | | | ■ | 12 | 1550 | 24 | 101 | | |

LEGEND ON PLATE A-3

SHEET 2 OF 2

# LOG OF DRILL HOLE

DH 36

PROJECT 96-01

**Goffman, McCormick & Urban, Inc.**

PLATE A-1.36

# *Appendix C*
# *Laboratory Test Results*

## *APPENDIX C*

### ***Laboratory Test Results***

The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on driven samples obtained from the test borings. The results of these tests are presented in the boring logs.

Grain Size Distribution/Fines Content: Representative samples were dried, weighed, and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve was dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve).

| Sample Location | Description | % Passing # 200 Sieve |
|---|---|---|
| HS-3 @ 20 ft | Clayey Sand with Gravel | 45 |
| HS-5 @ 10 ft | Sandy Clay | 62 |
| HS-5 @ 38 ft | Sandy Clay | 54 |
| HS-11 @ 35 ft | Silty Sand | 34 |
| HS-11 @ 40 ft | Silty-Clayey Sand | 42 |
| HS-12 @ 20 ft | Silty Sand | 36 |
| HS-13 @ 15 ft | Silty Sand | 28 |
| HS-13 @ 25 ft | Silty Sand | 28 |
| HS-13 @ 35 ft | Silty-Clayey Sand | 44 |
| HS-13 @ 40 ft | Silty-Clayey Sand | 36 |
| HS-14 @ 35 ft | Clayey Sand | 40 |
| HS-14 @ 45 ft | Clayey Sand | 29 |
| HS-15 @ 20 ft | Clayey Sand | 15 |
| HS-16 @ 15 ft | Sandy Clay | 51 |
| HS-16 @ 25 ft | Clay with Sand | 75 |
| HS-16 @ 35 ft | Silt with Sand | 84 |
| HS-17 @ 5-7 ft | Sandy Clay | 51 |
| HS-17 @ 15 ft | Silty Sand | 25 |
| HS-17 @ 30 ft | Silty Sand | 44 |
| HS-17 @ 40 ft | Sand with Silt | 7 |
| B-3 @ 30-33 ft | Sandy Clay | 51 |
| B-4 @ 35-40 ft | Silty Sand | 20 |

## ***Laboratory Test Results***

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined per ASTM D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plots are provided in this Appendix.

| Sample Location | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | USCS Soil Classification |
|---|---|---|---|---|
| HS-3 @ 10 ft | 27 | 14 | 13 | CL |
| HS-3 @ 15 ft | 25 | 15 | 10 | CL |
| HS-3 @ 25 ft | 39 | 16 | 23 | CL |
| HS-11 @ 40 ft | 24 | 20 | 4 | CL-ML |
| HS-12 @ 40 ft | 37 | 14 | 23 | CL |
| HS-12 @ 50 ft | 42 | 20 | 22 | CL |
| HS-13 @ 15 ft | 21 | 20 | 1 | ML |
| HS-13 @ 35 ft | 24 | 20 | 4 | CL-ML |
| HS-14 @ 10 ft | 39 | 16 | 23 | CL |
| HS-14 @ 20 ft | 25 | 15 | 10 | CL |
| HS-15 @ 20 ft | 67 | 19 | 48 | CH |
| HS-15 @ 25 ft | 42 | 21 | 21 | CL |
| HS-16 @ 20 ft | 36 | 19 | 17 | CL |
| HS-16 @ 35 ft | 38 | 27 | 11 | ML |
| HS-17 @ 5-7 ft | 31 | 16 | 15 | CL |
| HS-17 @ 20 ft | 42 | 20 | 22 | CL |
| HS-17 @ 25 ft | 32 | 17 | 15 | CL |
| B-1 @ 30 ft | 44 | 24 | 20 | CL |
| B-3 @ 30-33 ft | 33 | 23 | 10 | CL |
| B-4 @ 40 ft | NP | NP | NP | ML |
| B-4 @ 35-40 ft | NP | NP | NP | SM |
| B-4 @ 60 ft | 49 | 23 | 26 | CL |
| B-6 @ 10 feet | 64 | 28 | 36 | CH |
| B-6 @ 51 feet | 45 | 27 | 18 | CL |
| B-6 @ 86 feet | 47 | 28 | 19 | CL/ML |

Direct Shear: Direct shear tests were performed on selected driven and remolded samples, which were soaked for a minimum of 24 hours prior to testing. The samples were tested under various normal loads using a motor-driven, strain-controlled, direct-shear testing apparatus (ASTM D3080). The plots are provided in this Appendix.

## ***Laboratory Test Results***

Torsional Ring Shear for Residual Shear Strength: A drained, residual torsional ring shear test was performed on site clay grab sample (B-6 @ 10 ft). The sample was tested under various normal loads (1, 2.5 and 5 ksf) using a torsional ring-shear testing apparatus (ASTM D6467). The plot is presented in this Appendix.

Torsional Ring Shear for Fully Softened Shear Strength: A drained, fully softened torsional ring shear test was performed on site clay grab samples (B-6 @ 86 ft). The sample was tested under various normal loads (4, 8 and 12 ksf) using a torsional ring-shear testing apparatus (ASTM D7608). The plot is presented in this Appendix.

Consolidation: Consolidation tests were performed per ASTM D2435. Samples (2.4 inches in diameter and 1 inch in height) were placed in a consolidometer and increasing loads were applied. The samples were allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ratio of the amount of vertical compression to the original sample height. The consolidation pressure curves are provided in this Appendix.

Expansion Index: The expansion potential of selected representative samples was evaluated by the Expansion Index Test per ASTM D4829.

| Sample Location | Expansion Index | Expansion Potential* |
|---|---|---|
| HS-1 @ 30 ft | 15 | Very Low |
| HS-6 @ 23-28 ft | 37 | Low |
| B-1 @ 5-8 ft | 36 | Low |

* Per ASTM D4829

Laboratory Compaction: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of these tests are presented in the table below.

| Sample Location | Sample Description | Maximum Dry Density (pcf) | Optimum Moisture Content (%) |
|---|---|---|---|
| HS-1 @ 40-45 ft | Light Olive Brown Silty Sand | 125.5 | 10.5 |
| HS-3 @ 15-20 ft | Olive Brown Silty Sand with Gravel | 140.0* | 5.5* |
| HS-17 @ 5-7 ft | Olive Brown Sandy Clay | 127.0* | 9.0* |
| B-3 @ 30-33 ft | Light Olive Brown Sandy Clay | 115.0 | 14.5 |
| B-4 @ 35-40 ft | Light Olive Brown Silty Sand | 120.0 | 11.5 |

*Includes oversize rock correction factor

## ***Laboratory Test Results***

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The test results are presented in the table below.

| Sample Location | Sulfate Content |
|---|---|
| HS-1 @ 30 ft | 0.013% |
| HS-6 @ 23-28 ft | 0.050% |
| B-1 @ 5-8 ft | 0.011% |

Chloride Content: Chloride content was tested per CTM 422. The results are presented below.

| Sample Location | Chloride Content, ppm |
|---|---|
| HS-1 @ 30 ft | 75 |
| HS-6 @ 23-28 ft | 175 |
| B-1 @ 5-8 ft | 33 |

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

| Sample Location | pH | Minimum Resistivity (ohms-cm) |
|---|---|---|
| HS-1 @ 30 ft | 8.2 | 1,075 |
| HS-6 @ 23-28 ft | 7.8 | 478 |
| B-1 @ 5-8 ft | 7.6 | 1,898 |

# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 08/07/14 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 08/11/14 |
| Boring No.: | HS-3 | Checked By: | J. Ward | | |
| Sample No.: | R-3 | Depth (ft.) | 10.0 | | |
| Soil Identification: | Dark grayish brown lean clay (CL) | | | | |

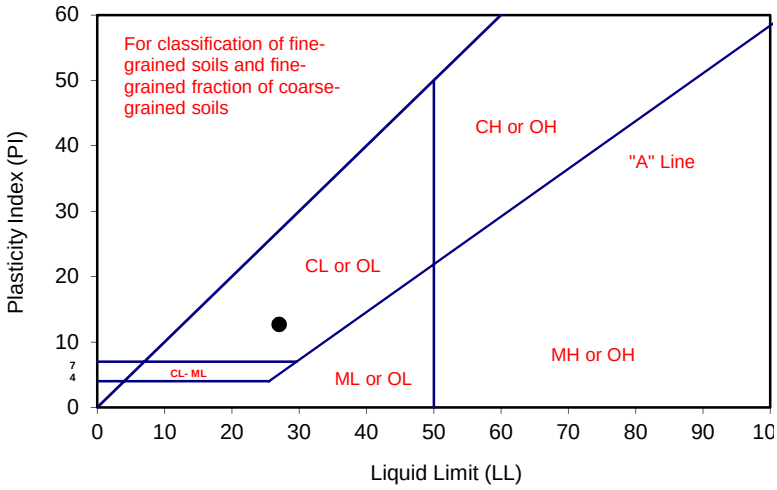
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 29 | 22 | 17 |
| Wet Wt. of Soil + Cont. (g) | 20.57 | 19.92 | 29.15 | 27.75 | 27.08 | 26.16 |
| Dry Wt. of Soil + Cont. (g) | 19.43 | 18.89 | 25.92 | 24.78 | 24.20 | 23.43 |
| Wt. of Container (g) | 11.50 | 11.65 | 13.59 | 13.61 | 13.58 | 13.62 |
| Moisture Content (%) [Wn] | 14.38 | 14.23 | 26.20 | 26.59 | 27.12 | 27.83 |

| | |
|---|---|
| **Liquid Limit** | **27** |
| **Plastic Limit** | **14** |
| **Plasticity Index** | **13** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 5.11

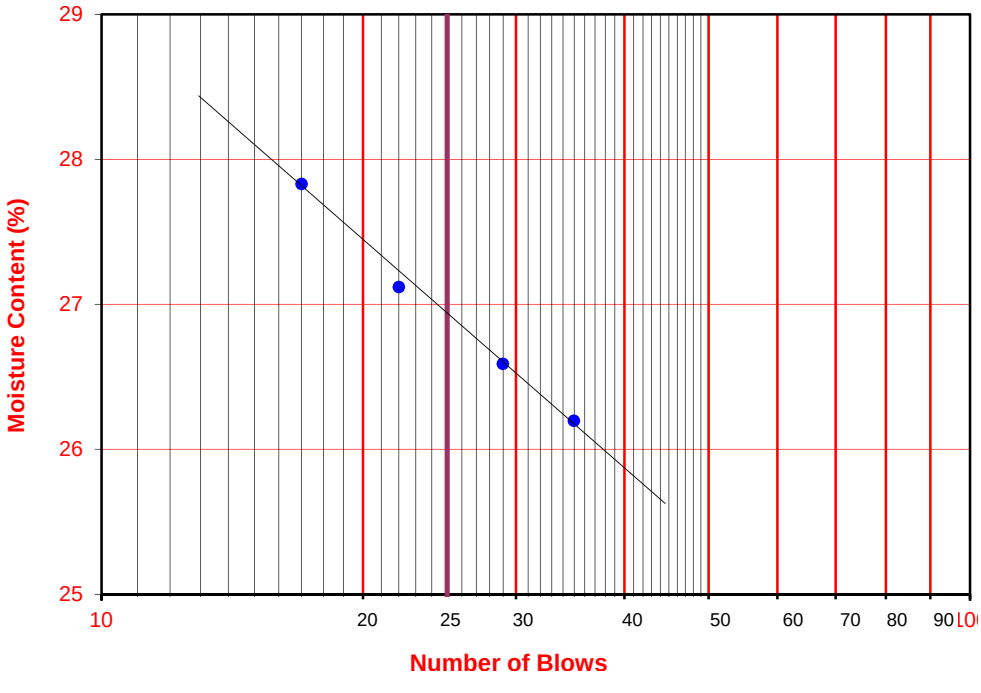
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

| | |
|---|---|
| ☐ | Wet Preparation |
| | Multipoint - Wet |
| X | Dry Preparation |
| | Multipoint - Dry |
| X | Procedure A |
| | Multipoint Test |
| ☐ | Procedure B |
| | One-point Test |



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 08/11/14 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 08/15/14 |
| Boring No.: | HS-3 | Checked By: | J. Ward | | |
| Sample No.: | R-4 | Depth (ft.) | 15.0 | | |
| Soil Identification: | Dark yellowish brown sandy lean clay s(CL) | | | | |

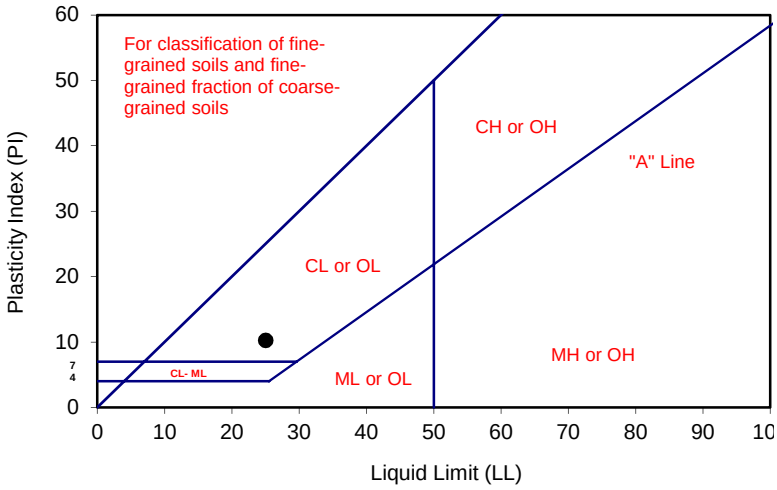
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 26 | 20 | |
| Wet Wt. of Soil + Cont. (g) | 26.29 | 24.43 | 28.49 | 29.36 | 29.42 | |
| Dry Wt. of Soil + Cont. (g) | 24.65 | 22.79 | 25.61 | 26.23 | 26.16 | |
| Wt. of Container (g) | 13.56 | 11.65 | 13.50 | 13.63 | 13.55 | |
| Moisture Content (%) [Wn] | 14.79 | 14.72 | 23.78 | 24.84 | 25.85 | |

| | |
|---|---|
| **Liquid Limit** | **25** |
| **Plastic Limit** | **15** |
| **Plasticity Index** | **10** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 3.65

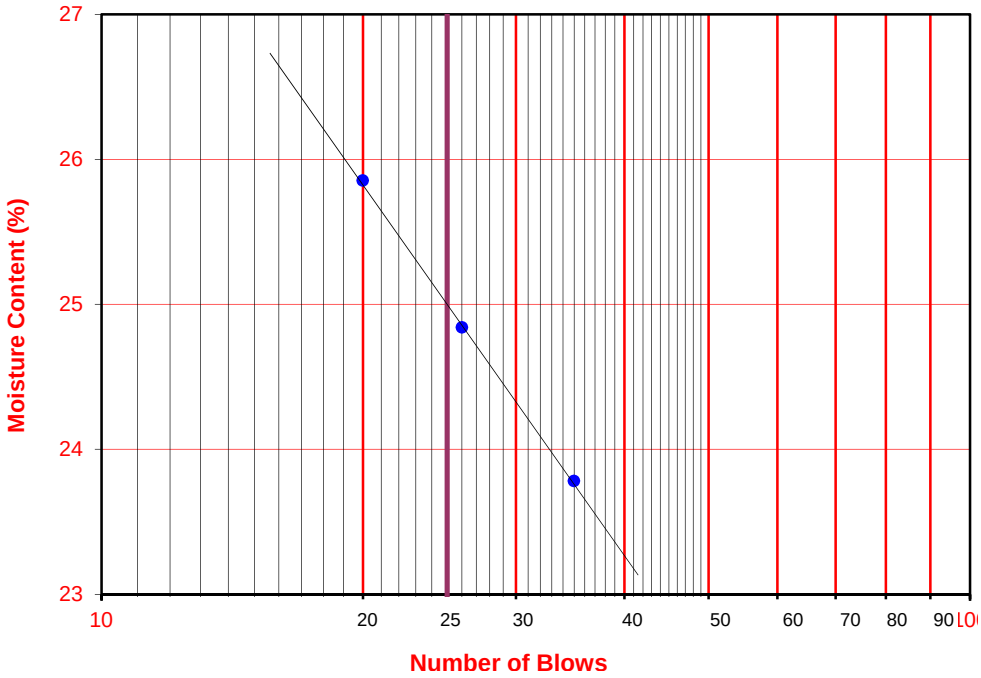
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

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



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 08/11/14 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 08/15/14 |
| Boring No.: | HS-3 | Checked By: | J. Ward | | |
| Sample No.: | R-6 | Depth (ft.) | 25.0 | | |
| Soil Identification: | Dark yellowish brown lean clay (CL) | | | | |

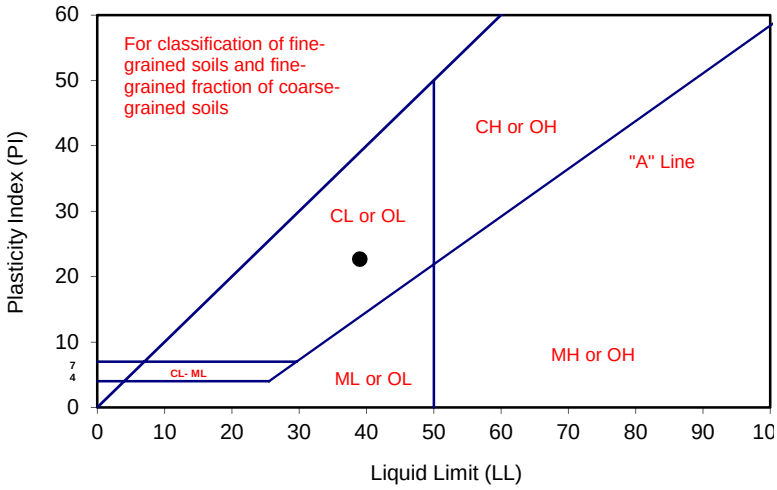
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 27 | 19 | |
| Wet Wt. of Soil + Cont. (g) | 26.58 | 25.13 | 25.97 | 27.30 | 30.10 | |
| Dry Wt. of Soil + Cont. (g) | 24.76 | 23.52 | 22.64 | 23.51 | 25.34 | |
| Wt. of Container (g) | 13.63 | 13.64 | 13.62 | 13.56 | 13.50 | |
| Moisture Content (%) [Wn] | 16.35 | 16.30 | 36.92 | 38.09 | 40.20 | |

| | |
|---|---|
| **Liquid Limit** | **39** |
| **Plastic Limit** | **16** |
| **Plasticity Index** | **23** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 13.87

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



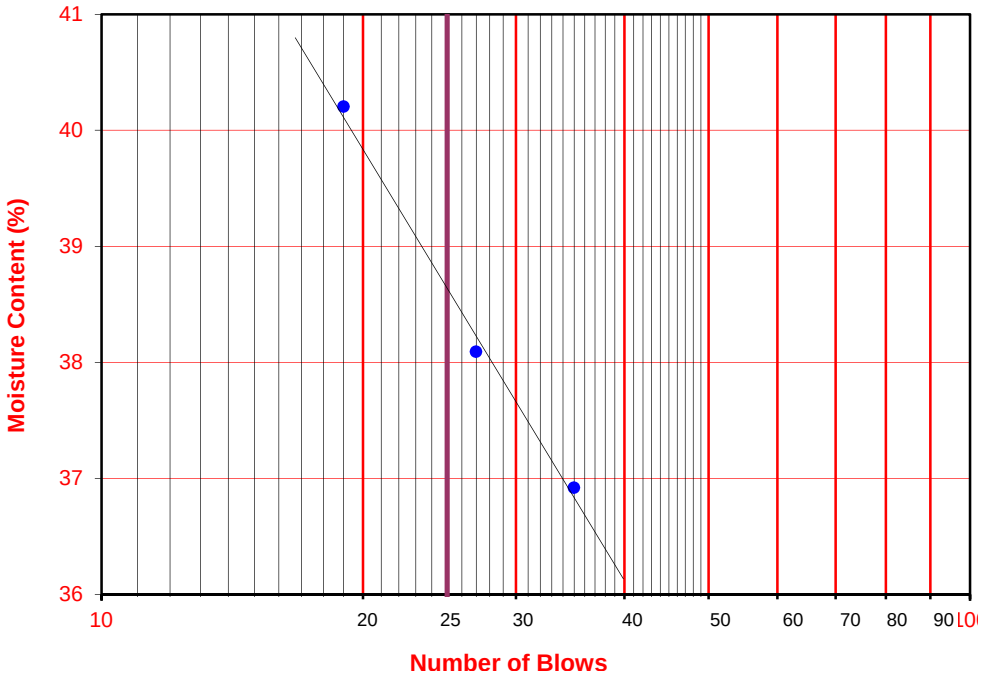

**PROCEDURES USED**

☐ Wet Preparation
Multipoint - Wet

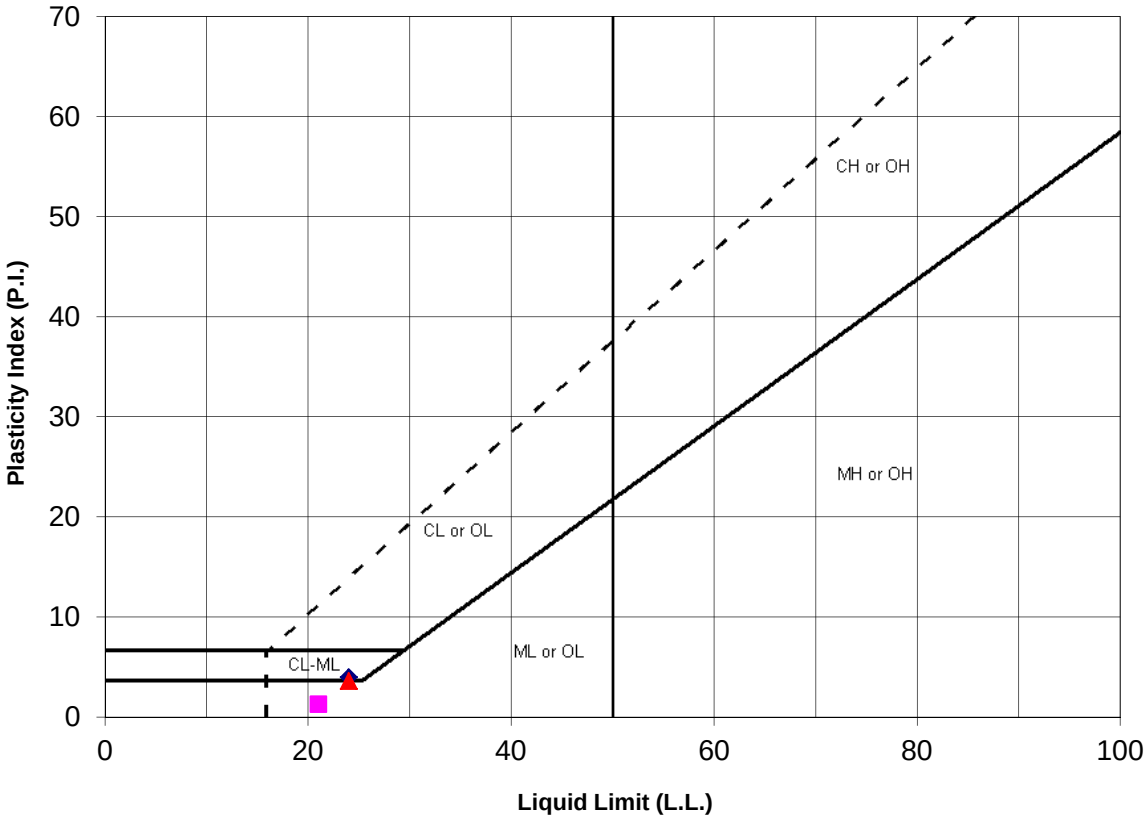
☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test



PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS




| Symbol | Location.: | Sample No.: | Depth (ft) | Passing No. 200 Sieve (%) | Liquid Limit (%) LL | Plastic Limit (%) PL | Plasticity Index (%) PI | USCS |
|---|---|---|---|---|---|---|---|---|
| ◆ | HS-11 | R-5 | 40 | 42 | 24 | 20 | 4 | CL-ML |
| ■ | HS-13 | R-2 | 15 | 28 | 21 | 20 | 1 | ML |
| ▲ | HS-13 | R-6 | 35 | 44 | 24 | 20 | 4 | CL-ML |
| | | | | | | | | |
| | | | | | | | | |

LGC Geotechnical, Inc.

**ATTERBERG LIMITS**
(ASTM D 4318)

**Project Number:** 14057-01
**Date:** Aug-14

**Westridge**

# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 08/12/14 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 08/15/14 |
| Boring No.: | HS-12 | Checked By: | J. Ward | | |
| Sample No.: | R-4 | Depth (ft.) | 40.0 | | |
| Soil Identification: | Dark grayish brown lean clay with sand (CL)s | | | | |

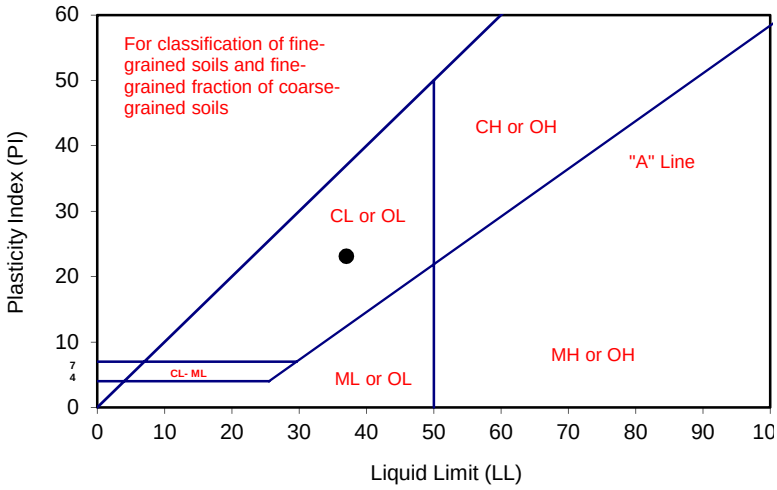
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 26 | 21 | 16 |
| Wet Wt. of Soil + Cont. (g) | 19.92 | 21.42 | 27.77 | 31.25 | 31.04 | 31.02 |
| Dry Wt. of Soil + Cont. (g) | 18.89 | 20.23 | 24.17 | 26.53 | 26.21 | 25.96 |
| Wt. of Container (g) | 11.49 | 11.65 | 13.62 | 13.62 | 13.58 | 13.59 |
| Moisture Content (%) [Wn] | 13.92 | 13.87 | 34.12 | 36.56 | 38.24 | 40.91 |

| | |
|---|---|
| **Liquid Limit** | **37** |
| **Plastic Limit** | **14** |
| **Plasticity Index** | **23** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 12.41

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

☐ Wet Preparation

Multipoint - Wet

☒ Dry Preparation

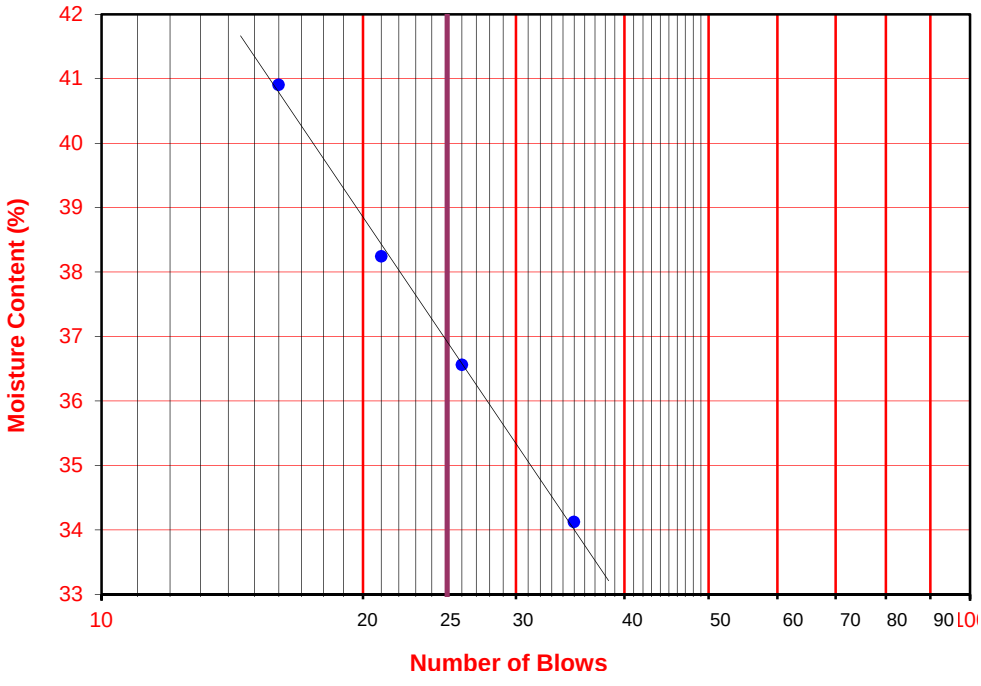
Multipoint - Dry

☒ Procedure A

Multipoint Test

☐ Procedure B

One-point Test



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 08/12/14 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 08/15/14 |
| Boring No.: | HS-12 | Checked By: | J. Ward | | |
| Sample No.: | R-6 | Depth (ft.) | 50.0 | | |
| Soil Identification: | Olive gray lean clay (CL) | | | | |

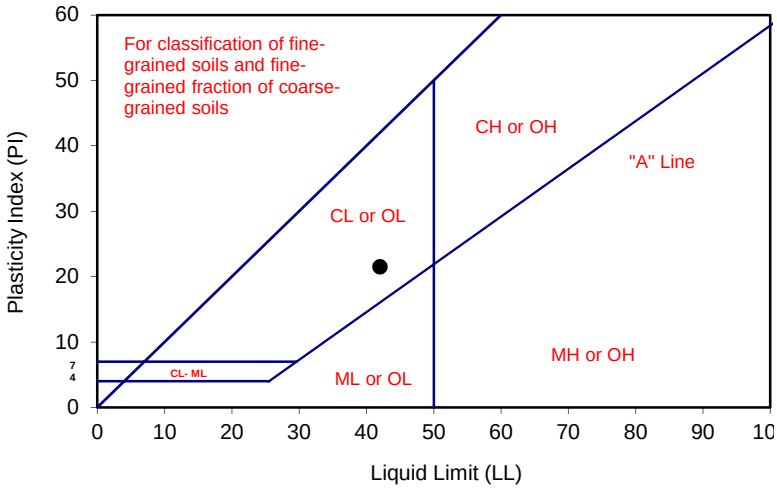
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 25 | 16 | |
| Wet Wt. of Soil + Cont. (g) | 18.08 | 21.91 | 27.32 | 27.07 | 27.68 | |
| Dry Wt. of Soil + Cont. (g) | 16.97 | 20.15 | 23.37 | 23.05 | 23.34 | |
| Wt. of Container (g) | 11.50 | 11.65 | 13.54 | 13.55 | 13.64 | |
| Moisture Content (%) [Wn] | 20.29 | 20.71 | 40.18 | 42.32 | 44.74 | |

| | |
|---|---|
| **Liquid Limit** | **42** |
| **Plastic Limit** | **20** |
| **Plasticity Index** | **22** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 16.06

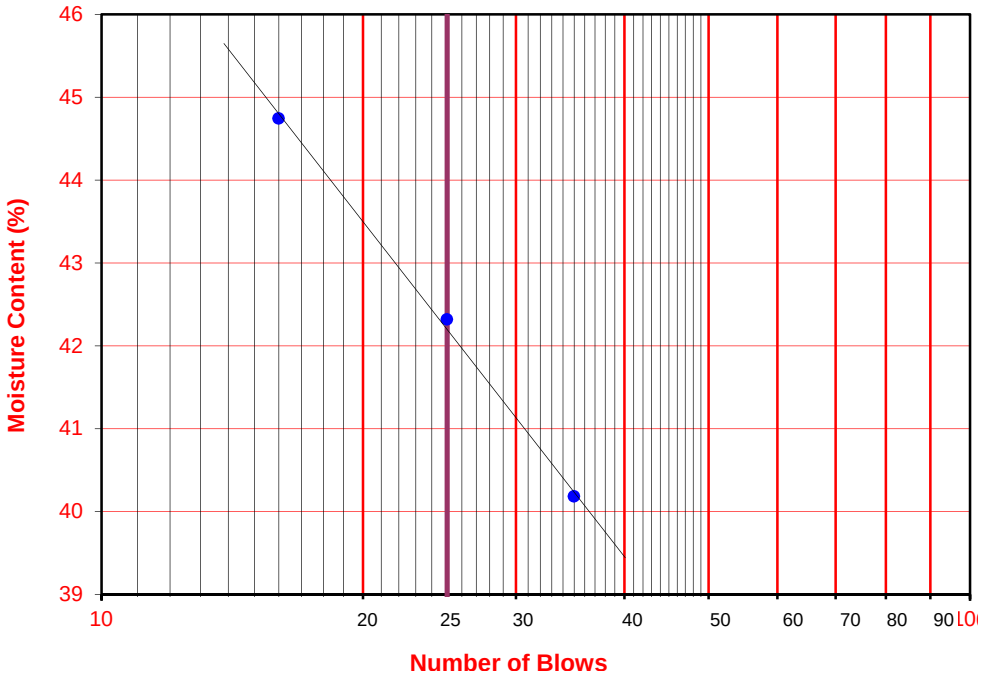
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

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



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 08/13/14 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 08/15/14 |
| Boring No.: | HS-14 | Checked By: | J. Ward | | |
| Sample No.: | R-2 | Depth (ft.) | 10.0 | | |
| Soil Identification: | Dark olive gray lean clay (CL) | | | | |

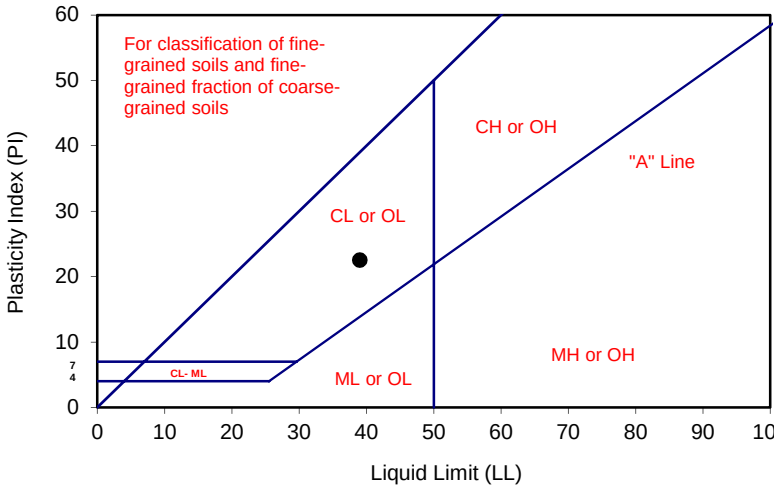
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 28 | 19 | |
| Wet Wt. of Soil + Cont. (g) | 23.31 | 24.20 | 27.49 | 29.16 | 29.79 | |
| Dry Wt. of Soil + Cont. (g) | 21.95 | 22.68 | 23.77 | 24.82 | 25.07 | |
| Wt. of Container (g) | 13.57 | 13.59 | 13.63 | 13.59 | 13.50 | |
| Moisture Content (%) [Wn] | 16.23 | 16.72 | 36.69 | 38.65 | 40.80 | |

| | |
|---|---|
| **Liquid Limit** | **39** |
| **Plastic Limit** | **16** |
| **Plasticity Index** | **23** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 13.87

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



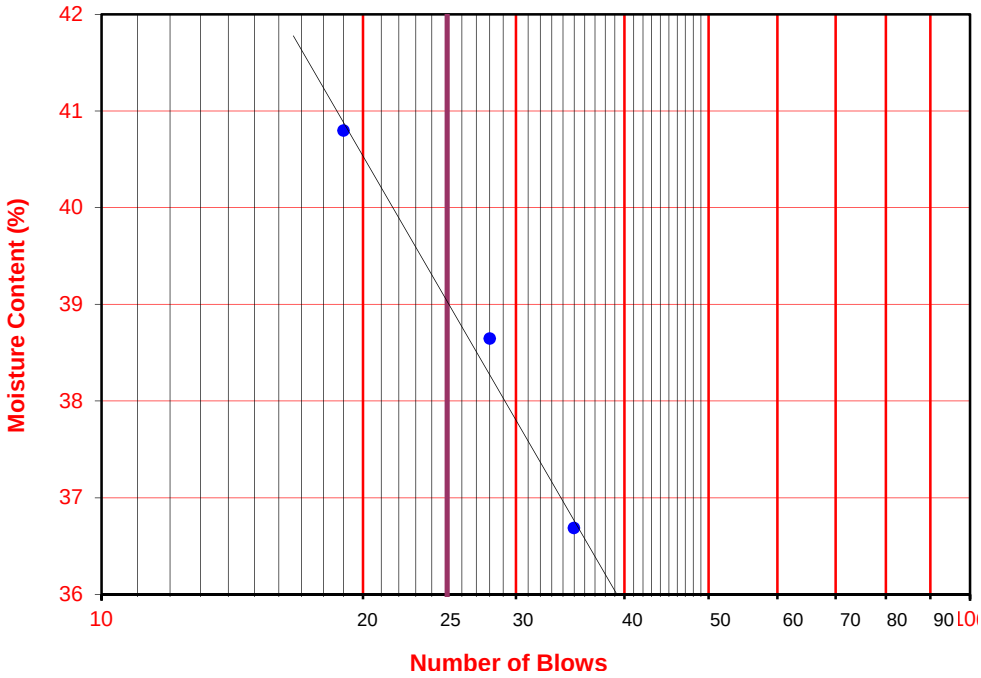

**PROCEDURES USED**

☐ Wet Preparation
Multipoint - Wet

☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 08/14/14 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 08/15/14 |
| Boring No.: | HS-14 | Checked By: | J. Ward | | |
| Sample No.: | R-4 | Depth (ft.) | 20.0 | | |
| Soil Identification: | Olive brown clayey sand (SC) | | | | |

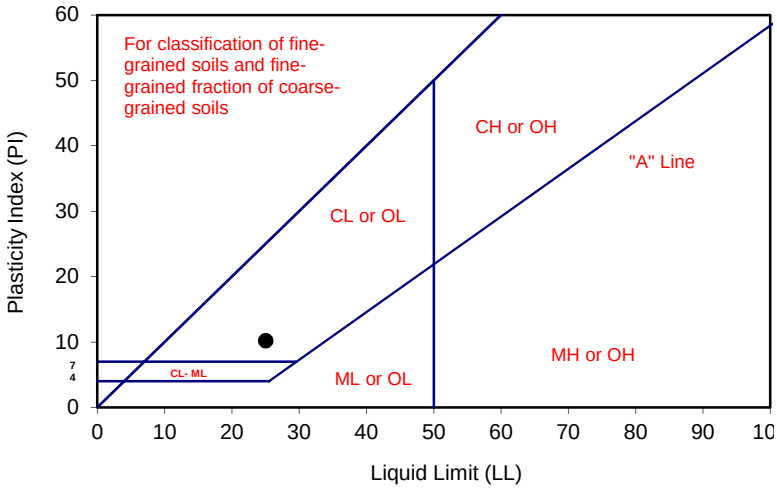
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 31 | 26 | 17 | |
| Wet Wt. of Soil + Cont. (g) | 23.92 | 22.64 | 28.00 | 26.93 | 27.22 | |
| Dry Wt. of Soil + Cont. (g) | 22.32 | 21.22 | 25.24 | 24.28 | 24.38 | |
| Wt. of Container (g) | 11.50 | 11.64 | 13.60 | 13.50 | 13.58 | |
| Moisture Content (%) [Wn] | 14.79 | 14.82 | 23.71 | 24.58 | 26.30 | |

| | |
|---|---|
| **Liquid Limit** | **25** |
| **Plastic Limit** | **15** |
| **Plasticity Index** | **10** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 3.65

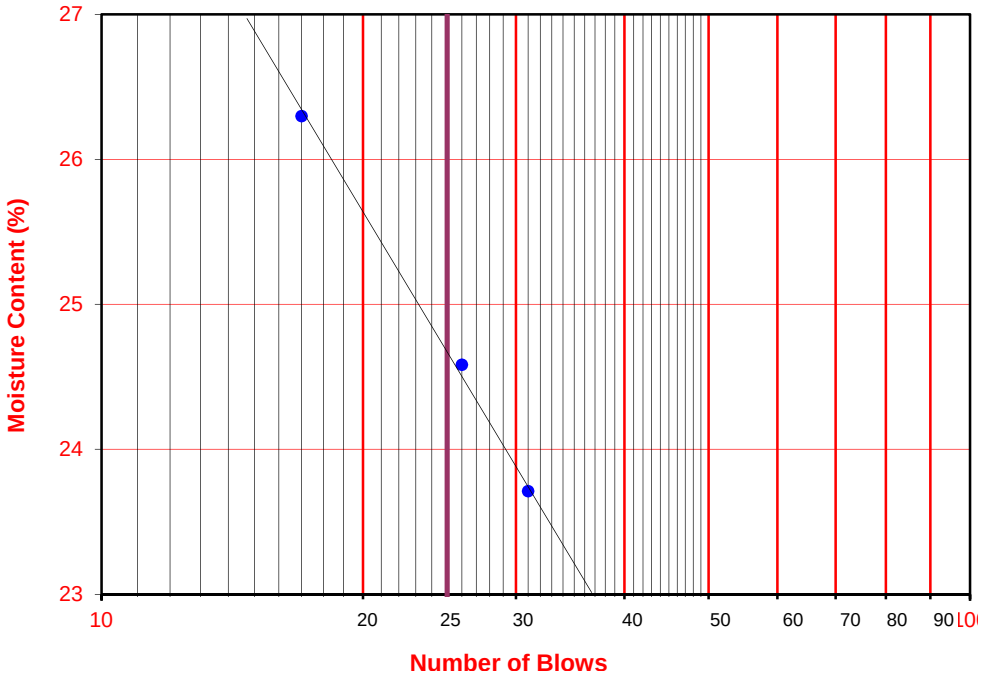
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$

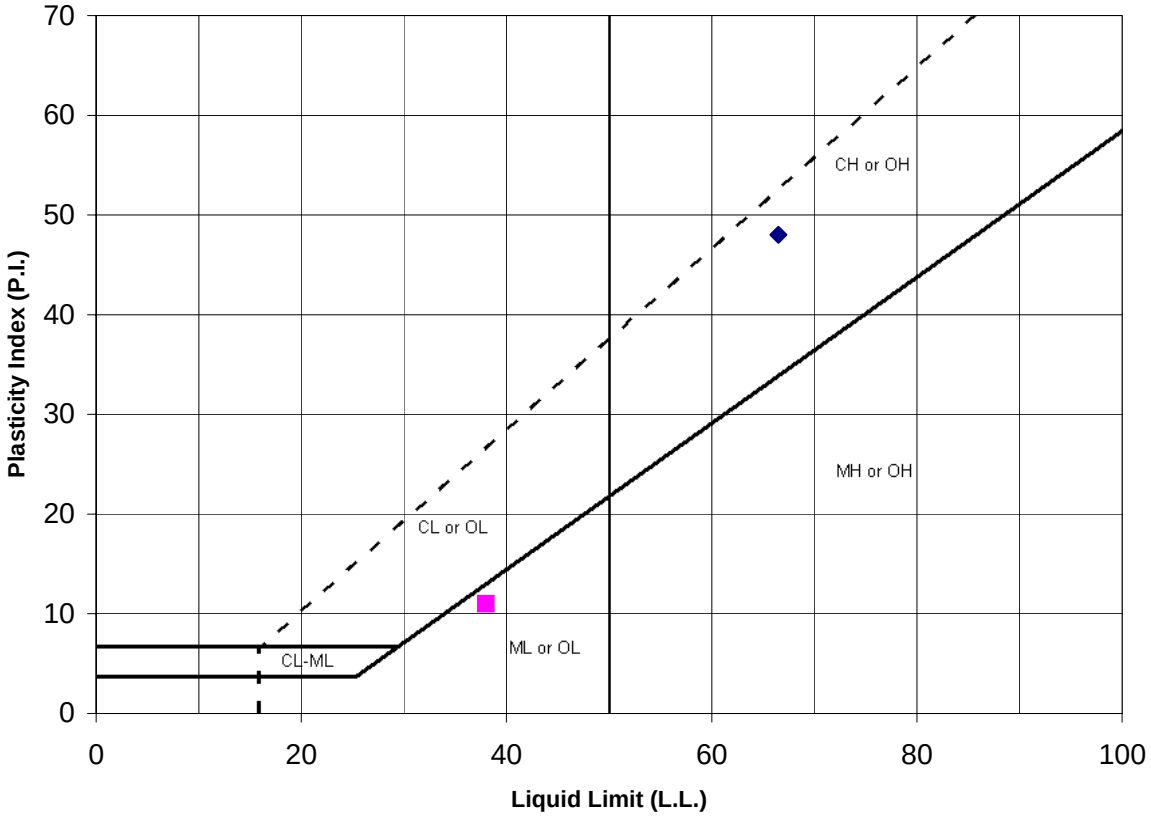



**PROCEDURES USED**

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



PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS




| Symbol | Location.: | Sample No.: | Depth (ft) | Passing No. 200 Sieve (%) | Liquid Limit (%) LL | Plastic Limit (%) PL | Plasticity Index (%) PI | USCS |
|---|---|---|---|---|---|---|---|---|
| ◆ | HS-15 | R-4 | 20 | 15 | 67 | 19 | 48 | CH |
| ■ | HS-16 | R-7 | 35 | 84 | 38 | 27 | 11 | ML |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

LGC Geotechnical, Inc.

**ATTERBERG LIMITS**
(ASTM D 4318)

**Project Number:** 14057-01
**Date:** Feb-15

**La Habra - Westridge**

# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | S. Felter | Date: | 03/09/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/13/15 |
| Boring No.: | HS-15 | Checked By: | J. Ward | | |
| Sample No.: | R-5 | Depth (ft.) | 25.0 | | |
| Soil Identification: | Olive brown clayey sand (SC) | | | | |

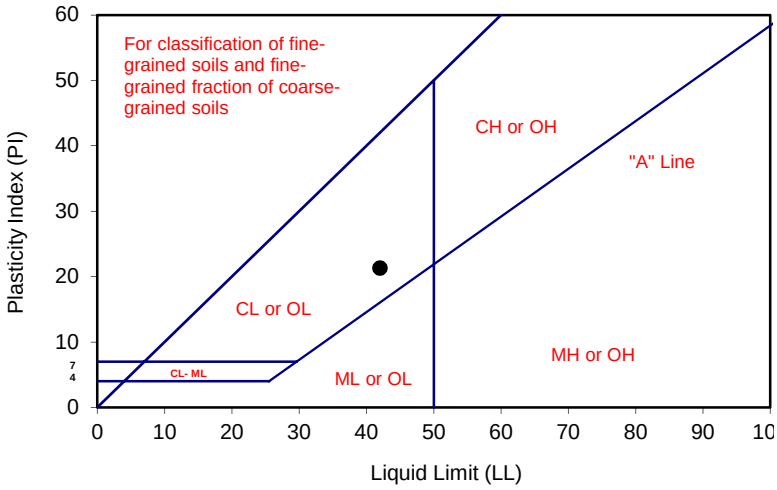
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 33 | 27 | 20 | |
| Wet Wt. of Soil + Cont. (g) | 23.69 | 23.74 | 35.36 | 35.28 | 36.64 | |
| Dry Wt. of Soil + Cont. (g) | 21.96 | 21.99 | 29.24 | 28.96 | 29.63 | |
| Wt. of Container (g) | 13.56 | 13.59 | 13.60 | 13.58 | 13.55 | |
| Moisture Content (%) [Wn] | 20.60 | 20.83 | 39.13 | 41.09 | 43.59 | |

| | |
|---|---|
| **Liquid Limit** | **42** |
| **Plastic Limit** | **21** |
| **Plasticity Index** | **21** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 16.06

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



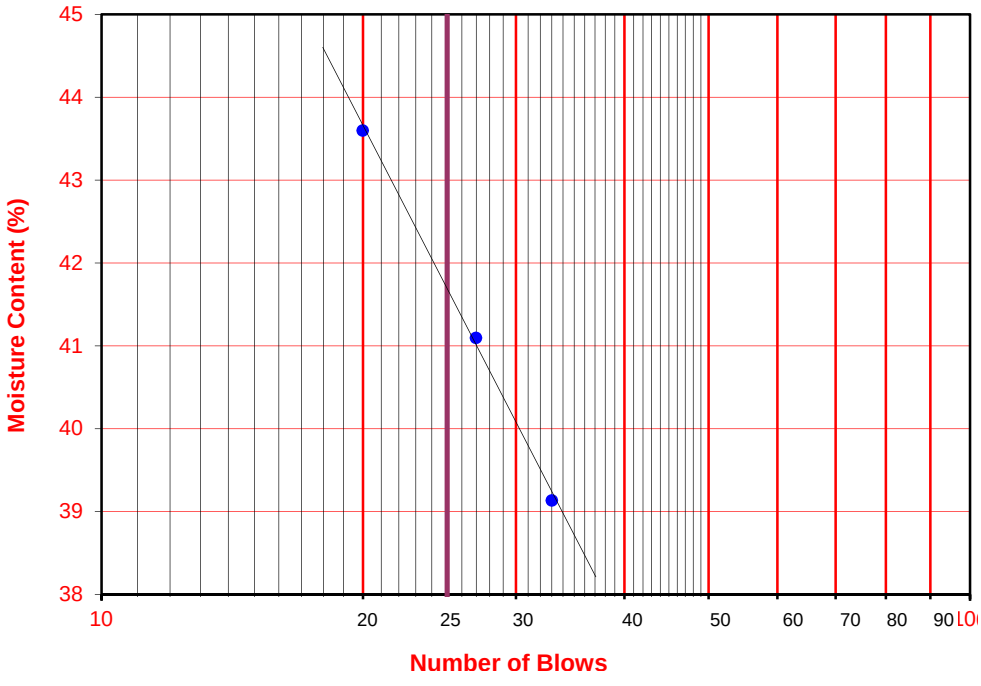

**PROCEDURES USED**

☐ Wet Preparation
Multipoint - Wet

☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | S. Felter | Date: | 03/10/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/13/15 |
| Boring No.: | HS-16 | Checked By: | J. Ward | | |
| Sample No.: | R-4 | Depth (ft.) | 20.0 | | |
| Soil Identification: | Brown lean clay (CL) | | | | |

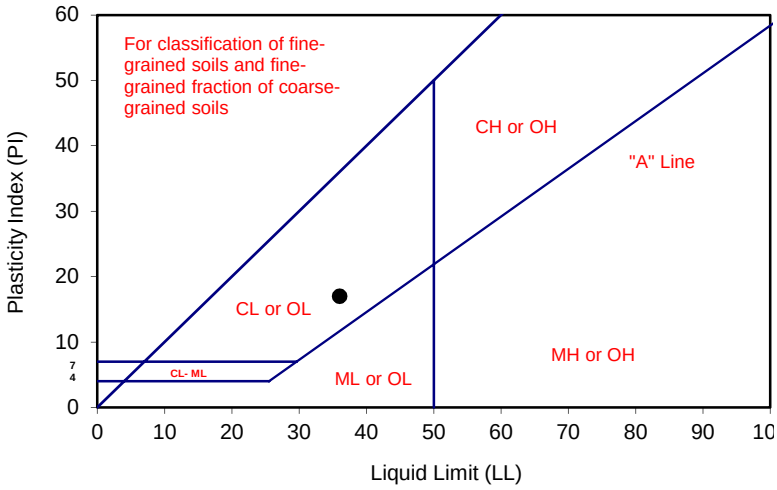
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 28 | 19 | |
| Wet Wt. of Soil + Cont. (g) | 23.59 | 23.76 | 35.34 | 35.91 | 37.07 | |
| Dry Wt. of Soil + Cont. (g) | 22.00 | 22.11 | 29.62 | 29.95 | 30.76 | |
| Wt. of Container (g) | 13.52 | 13.56 | 13.63 | 13.54 | 13.62 | |
| Moisture Content (%) [Wn] | 18.75 | 19.30 | 35.77 | 36.32 | 36.81 | |

| | |
|---|---|
| **Liquid Limit** | **36** |
| **Plastic Limit** | **19** |
| **Plasticity Index** | **17** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 11.68

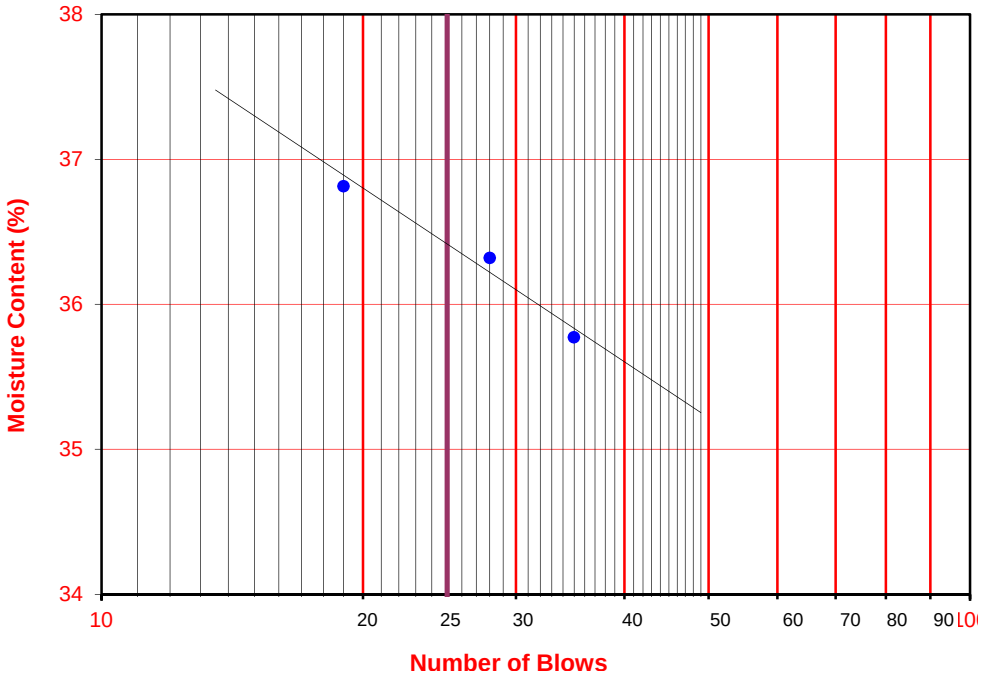
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

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



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 02/15/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 02/16/15 |
| Boring No.: | HS-17 | Checked By: | J. Ward | | |
| Sample No.: | B-1 | Depth (ft.) | 5-7 | | |
| Soil Identification: | Olive brown sandy lean clay s(CL) | | | | |

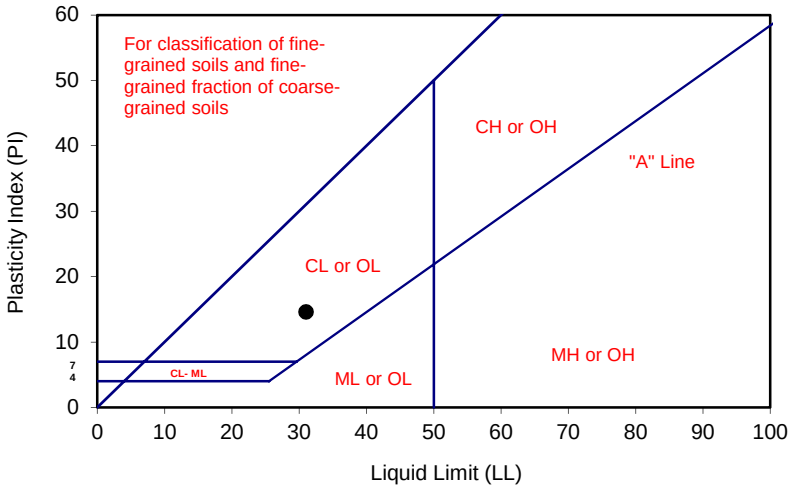
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 33 | 24 | 17 | |
| Wet Wt. of Soil + Cont. (g) | 21.08 | 19.93 | 27.88 | 30.56 | 29.08 | |
| Dry Wt. of Soil + Cont. (g) | 19.72 | 18.77 | 24.62 | 26.57 | 25.29 | |
| Wt. of Container (g) | 11.50 | 11.65 | 13.57 | 13.63 | 13.56 | |
| Moisture Content (%) [Wn] | 16.55 | 16.29 | 29.50 | 30.83 | 32.31 | |

| | |
|---|---|
| **Liquid Limit** | **31** |
| **Plastic Limit** | **16** |
| **Plasticity Index** | **15** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 8.03

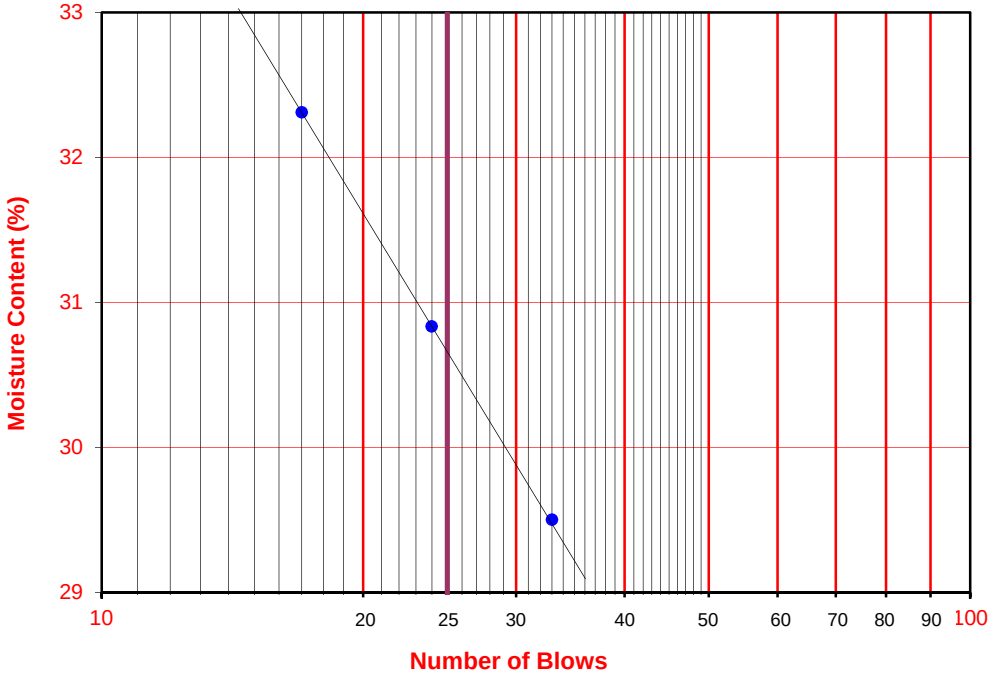
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

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



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | S. Felter | Date: | 03/10/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/13/15 |
| Boring No.: | HS-17 | Checked By: | J. Ward | | |
| Sample No.: | R-4 | Depth (ft.) | 20.0 | | |
| Soil Identification: | Yellowish brown lean clay (CL) | | | | |

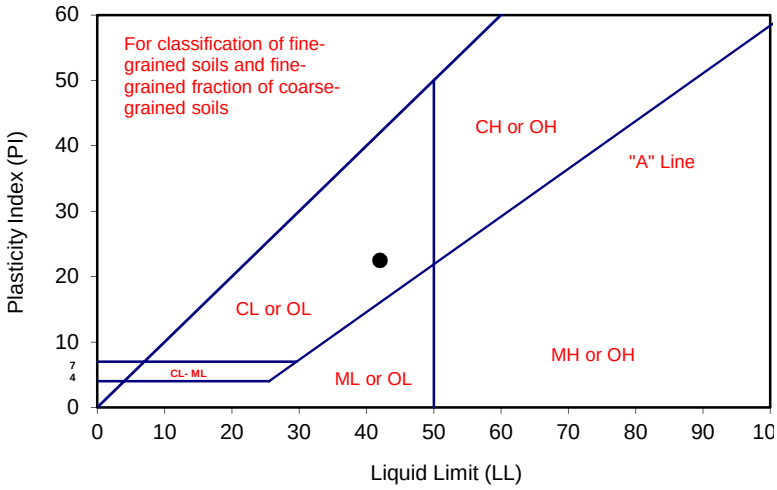
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 35 | 27 | 19 | |
| Wet Wt. of Soil + Cont. (g) | 23.80 | 24.58 | 34.59 | 35.15 | 35.69 | |
| Dry Wt. of Soil + Cont. (g) | 22.11 | 22.81 | 28.63 | 28.88 | 29.03 | |
| Wt. of Container (g) | 13.57 | 13.60 | 13.61 | 13.57 | 13.58 | |
| Moisture Content (%) [Wn] | 19.79 | 19.22 | 39.68 | 40.95 | 43.11 | |

| | |
|---|---|
| **Liquid Limit** | **42** |
| **Plastic Limit** | **20** |
| **Plasticity Index** | **22** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 16.06

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



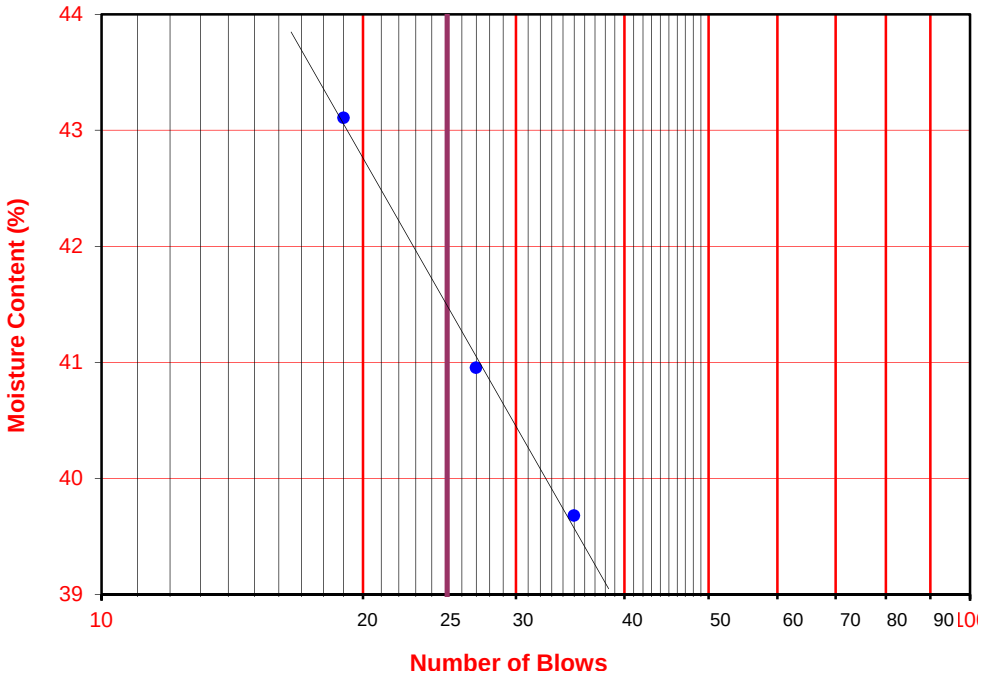

**PROCEDURES USED**

☐ Wet Preparation
Multipoint - Wet

☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | S. Felter | Date: | 03/10/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/13/15 |
| Boring No.: | HS-17 | Checked By: | J. Ward | | |
| Sample No.: | R-5 | Depth (ft.) | 25.0 | | |
| Soil Identification: | Dark yellowish brown lean clay (CL) | | | | |

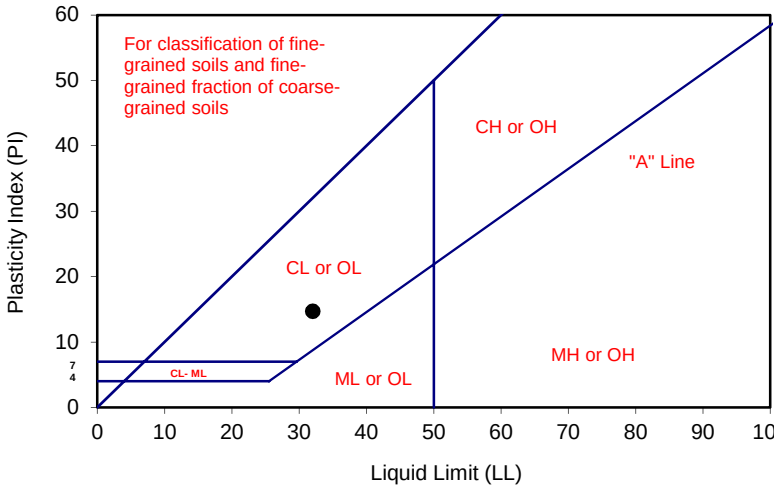
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 34 | 25 | 19 | |
| Wet Wt. of Soil + Cont. (g) | 23.85 | 24.02 | 36.89 | 35.23 | 34.57 | |
| Dry Wt. of Soil + Cont. (g) | 22.35 | 22.46 | 31.49 | 30.08 | 29.36 | |
| Wt. of Container (g) | 13.62 | 13.52 | 13.50 | 13.55 | 13.64 | |
| Moisture Content (%) [Wn] | 17.18 | 17.45 | 30.02 | 31.16 | 33.14 | |

| | |
|---|---|
| **Liquid Limit** | **32** |
| **Plastic Limit** | **17** |
| **Plasticity Index** | **15** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 8.76

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



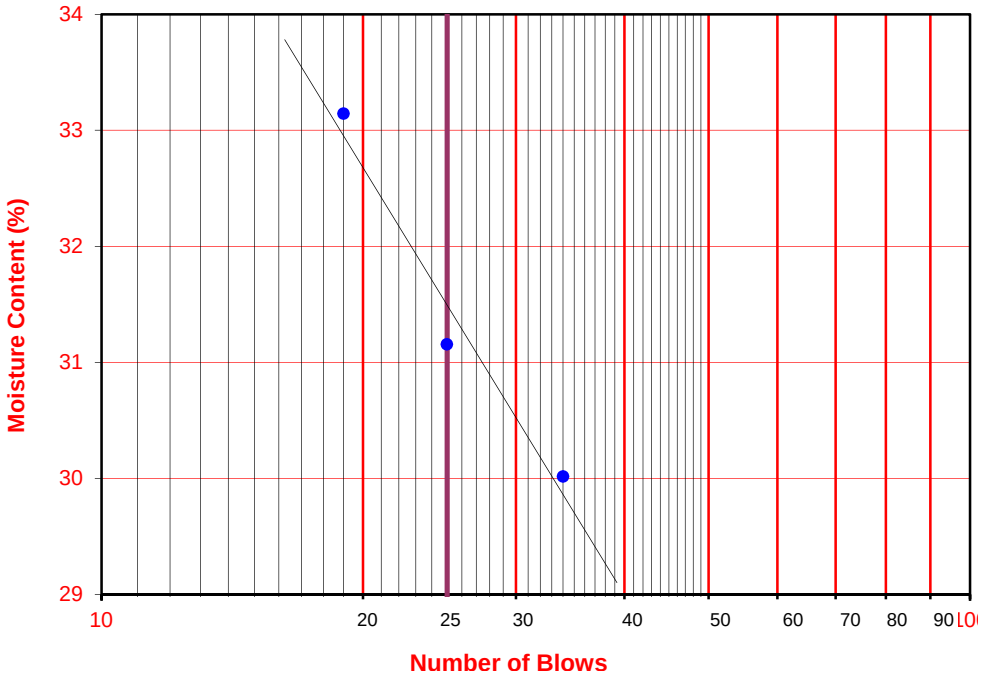

**PROCEDURES USED**

☐ Wet Preparation
Multipoint - Wet

☒ Dry Preparation
Multipoint - Dry

☒ Procedure A
Multipoint Test

☐ Procedure B
One-point Test



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 03/26/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/27/15 |
| Boring No.: | B-1 | Checked By: | J. Ward | | |
| Sample No.: | R-3 | Depth (ft.) | 30.0 | | |
| Soil Identification: | Dark olive gray lean clay'stone' (CL) | | | | |

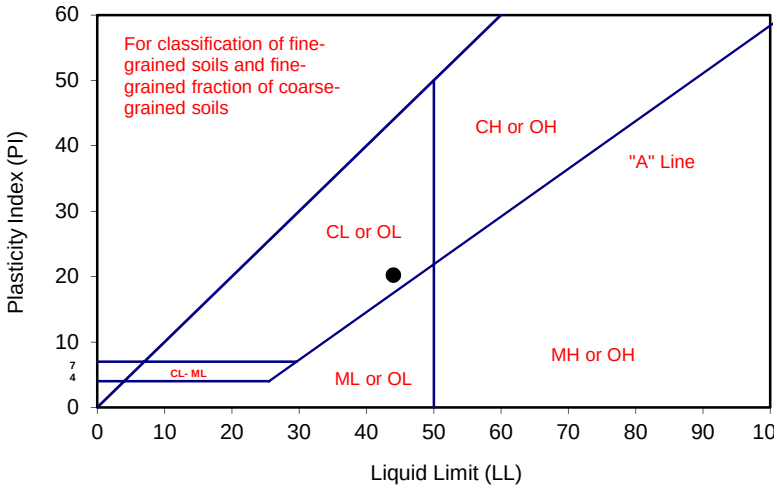
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 34 | 29 | 23 | 15 |
| Wet Wt. of Soil + Cont. (g) | 22.15 | 22.14 | 25.17 | 24.93 | 25.30 | 25.60 |
| Dry Wt. of Soil + Cont. (g) | 20.10 | 20.13 | 21.76 | 21.48 | 21.68 | 21.76 |
| Wt. of Container (g) | 11.50 | 11.66 | 13.63 | 13.53 | 13.53 | 13.63 |
| Moisture Content (%) [Wn] | 23.84 | 23.73 | 41.94 | 43.40 | 44.42 | 47.23 |

| | |
|---|---|
| **Liquid Limit** | **44** |
| **Plastic Limit** | **24** |
| **Plasticity Index** | **20** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 17.52

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

☐ Wet Preparation

Multipoint - Wet

☒ Dry Preparation

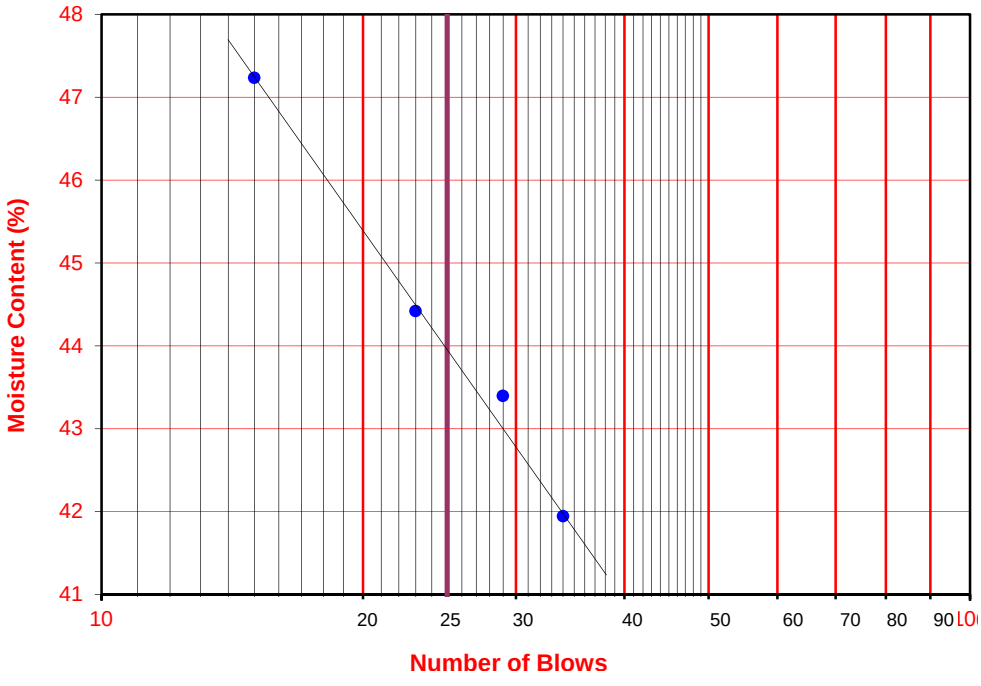
Multipoint - Dry

☒ Procedure A

Multipoint Test

☐ Procedure B

One-point Test



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 02/10/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 02/16/15 |
| Boring No.: | B-3 | Checked By: | J. Ward | | |
| Sample No.: | B-1 | Depth (ft.) | 30-33 | | |
| Soil Identification: | Light olive brown sandy lean clay s(CL) | | | | |

| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | |
|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | |
| Number of Blows [N] | | | 20 | 22 | Trial 1 = 33 |
| Wet Wt. of Soil + Cont. (g) | 22.37 | 22.56 | 27.55 | 28.64 | Trial 2 = 33 |
| Dry Wt. of Soil + Cont. (g) | 20.34 | 20.54 | 24.02 | 24.84 | Ave. LL = **33** |
| Wt. of Container (g) | 11.50 | 11.65 | 13.64 | 13.55 | (see equation below) |
| Moisture Content (%) [Wn] | 22.96 | 22.72 | 34.01 | 33.66 | |

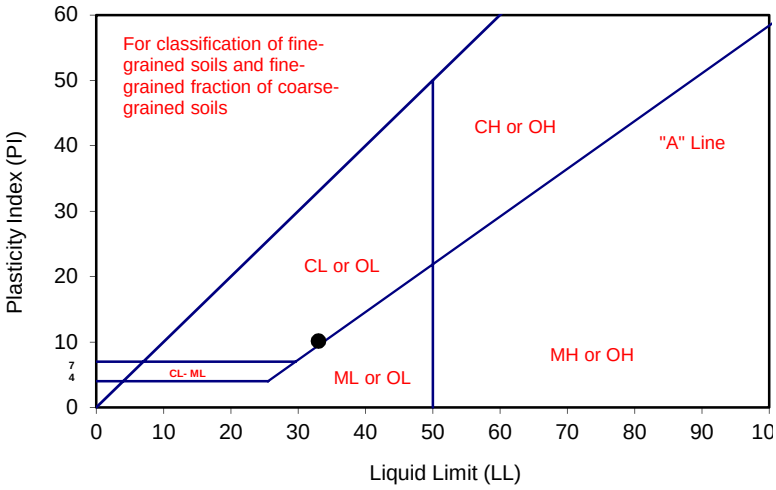
| | |
|---|---|
| **Liquid Limit** | **33** |
| **Plastic Limit** | **23** |
| **Plasticity Index** | **10** |
| **Classification** | **CL** |

PI at "A" - Line = 0.73(LL-20) 9.49

One - Point Liquid Limit Calculation

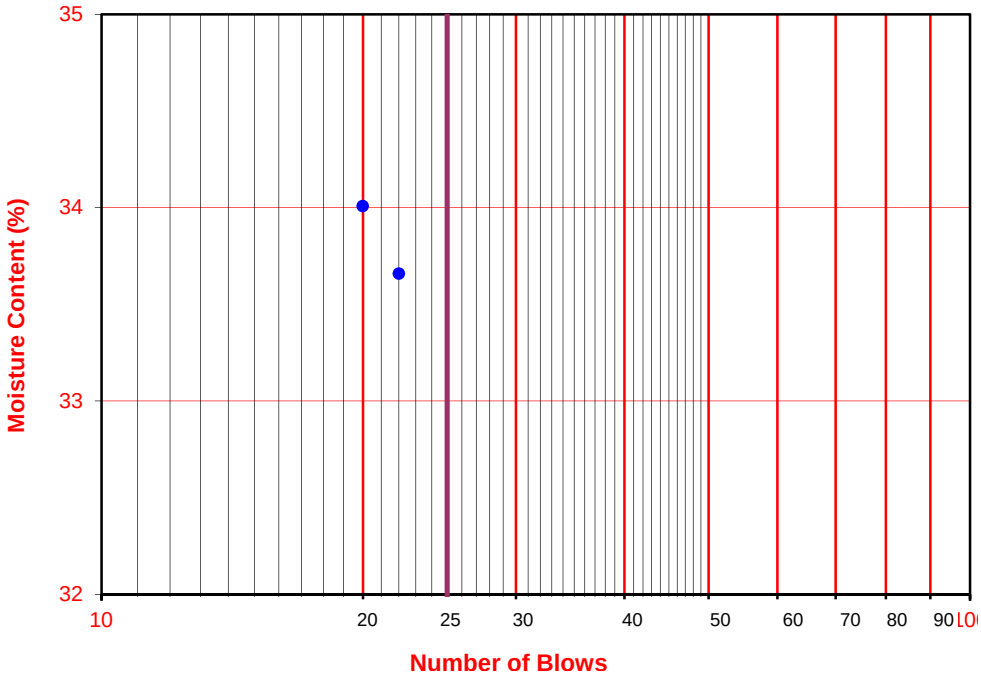
$LL = Wn(N/25)^{0.121}$

(Wn = water content, N = number of blows)




**PROCEDURES USED**

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



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 03/26/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/27/15 |
| Boring No.: | B-4 | Checked By: | J. Ward | | |
| Sample No.: | R-4 | Depth (ft.) | 40.0 | | |
| Soil Identification: | Brownish yellow sandy silt s(ML) | | | | |

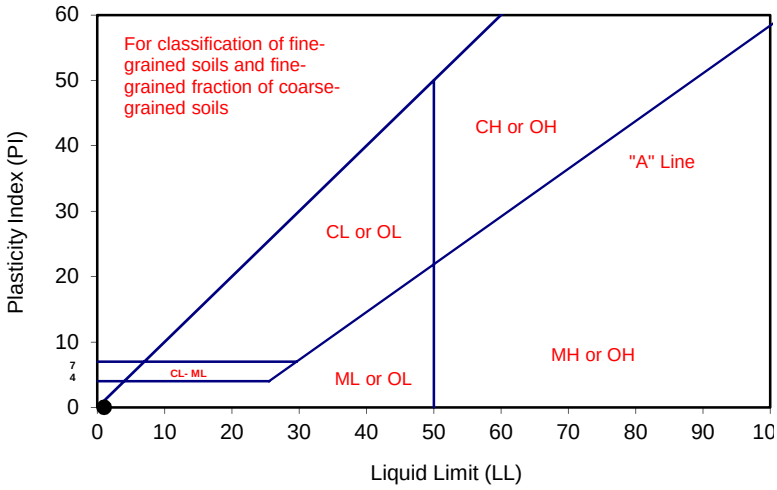
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 8 | | | |
| Wet Wt. of Soil + Cont. (g) | **Cannot be rolled:** | | 31.41 | **Cannot get more than 8 blows:** | | |
| Dry Wt. of Soil + Cont. (g) | **NonPlastic** | | 27.25 | **NonPlastic** | | |
| Wt. of Container (g) | | | 13.55 | | | |
| Moisture Content (%) [Wn] | | | 30.36 | | | |

| | |
|---|---|
| **Liquid Limit** | **NP** |
| **Plastic Limit** | **NP** |
| **Plasticity Index** | **NP** |
| **Classification** | **NP** |

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

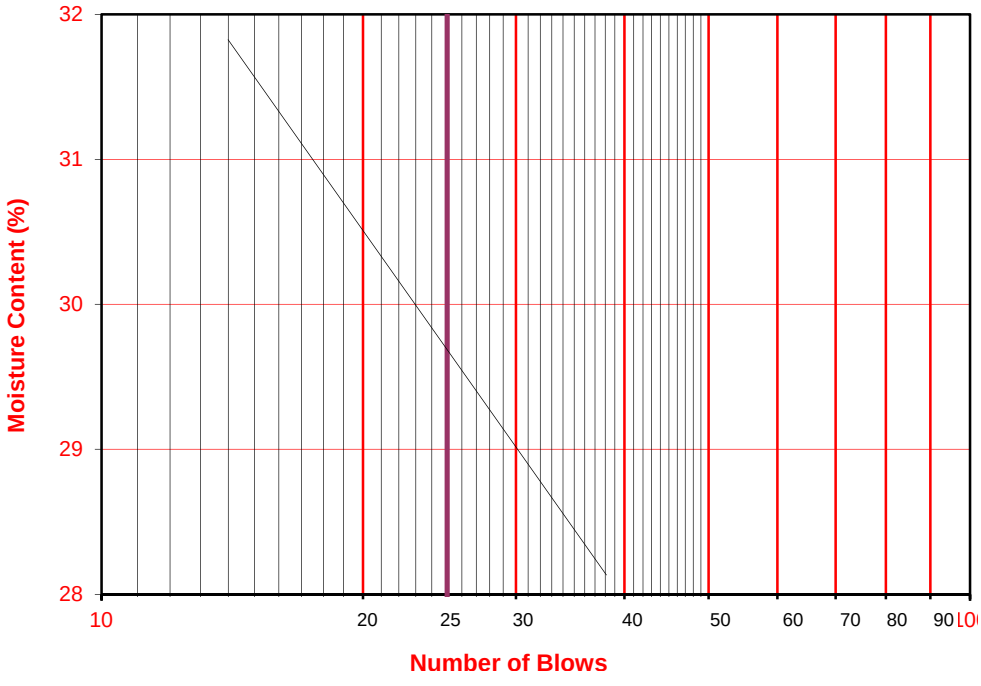
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

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



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | A. Santos | Date: | 03/01/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/11/15 |
| Boring No.: | B-4 | Checked By: | J. Ward | | |
| Sample No.: | B-1 | Depth (ft.) | 35-40 | | |
| Soil Identification: | Light olive brown silty sand (SM) | | | | |

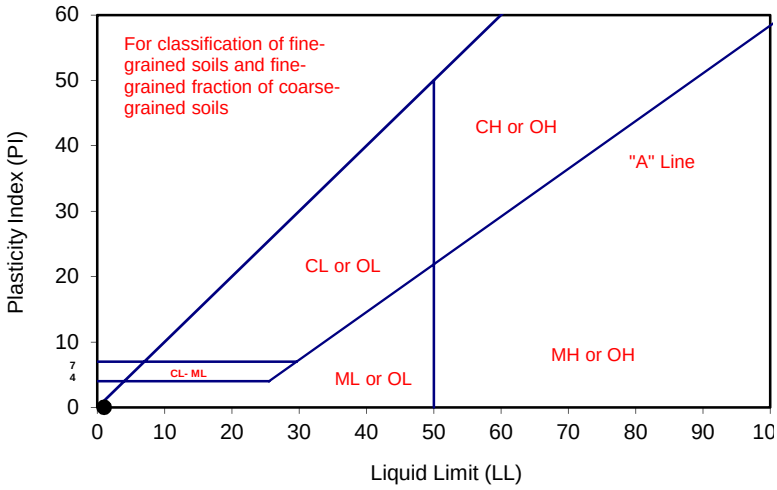
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 5 | | | |
| Wet Wt. of Soil + Cont. (g) | **Cannot be rolled:** | | 23.75 | **Cannot get more than 5 blows:** | | |
| Dry Wt. of Soil + Cont. (g) | **NonPlastic** | | 19.41 | **NonPlastic** | | |
| Wt. of Container (g) | | | 1.07 | | | |
| Moisture Content (%) [Wn] | | | 23.66 | | | |

| | |
|---|---|
| **Liquid Limit** | **NP** |
| **Plastic Limit** | **NP** |
| **Plasticity Index** | **NP** |
| **Classification** | **NP** |

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

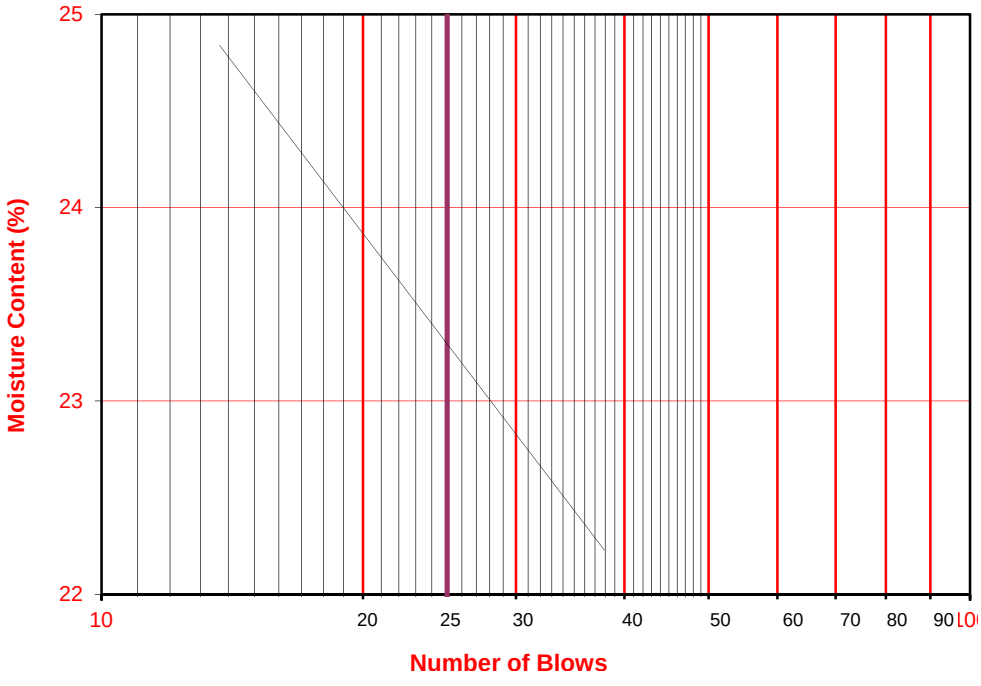
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$




**PROCEDURES USED**

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



# ATTERBERG LIMITS

## ASTM D 4318

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | G. Bathala | Date: | 02/27/15 |
| Project No. : | 14057-01 | Input By: | J. Ward | Date: | 03/11/15 |
| Boring No.: | B-4 | Checked By: | J. Ward | | |
| Sample No.: | R-6 | Depth (ft.) | 60.0 | | |
| Soil Identification: | Olive lean clay (CL) | | | | |

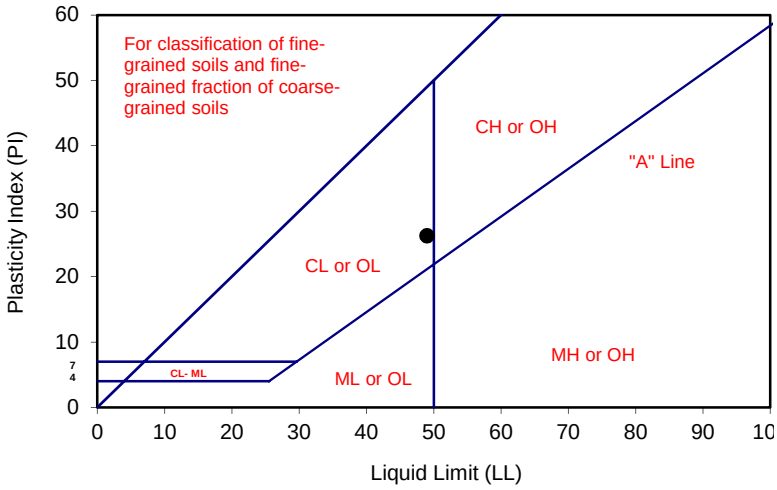
| TEST | PLASTIC LIMIT | | LIQUID LIMIT | | | |
|---|---|---|---|---|---|---|
| NO. | 1 | 2 | 1 | 2 | 3 | 4 |
| Number of Blows [N] | | | 34 | 27 | 21 | 15 |
| Wet Wt. of Soil + Cont. (g) | 21.11 | 22.34 | 24.08 | 24.82 | 26.28 | 26.20 |
| Dry Wt. of Soil + Cont. (g) | 19.31 | 20.38 | 20.74 | 21.14 | 22.03 | 21.84 |
| Wt. of Container (g) | 11.50 | 11.65 | 13.57 | 13.54 | 13.55 | 13.59 |
| Moisture Content (%) [Wn] | 23.05 | 22.45 | 46.58 | 48.42 | 50.12 | 52.85 |

| | |
|---|---|
| **Liquid Limit** | **49** |
| **Plastic Limit** | **23** |
| **Plasticity Index** | **26** |
| **Classification** | **CL** |

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

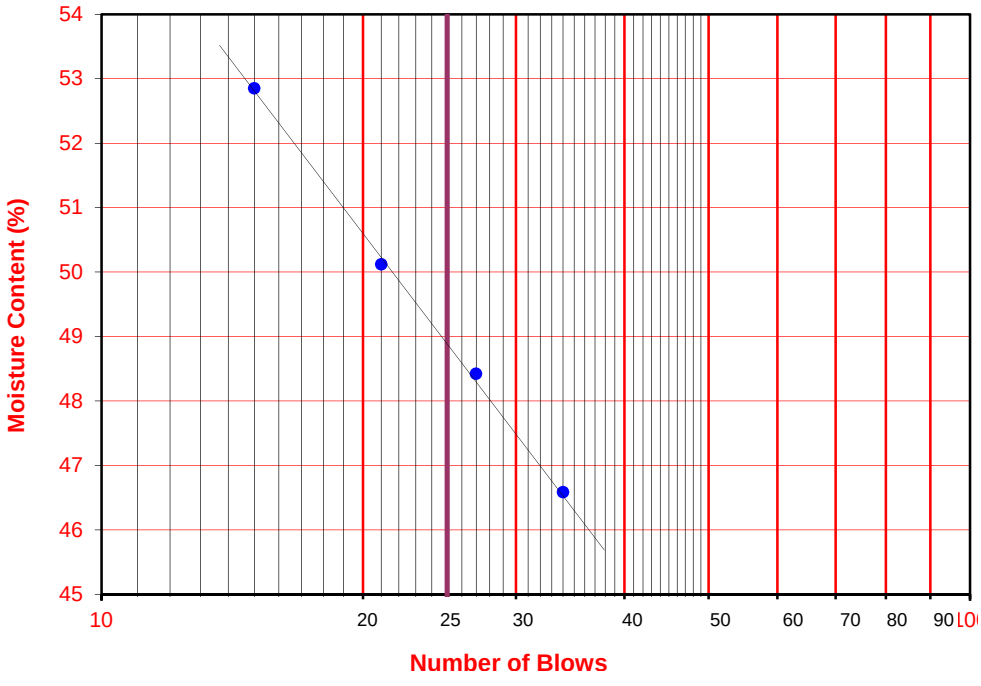
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$

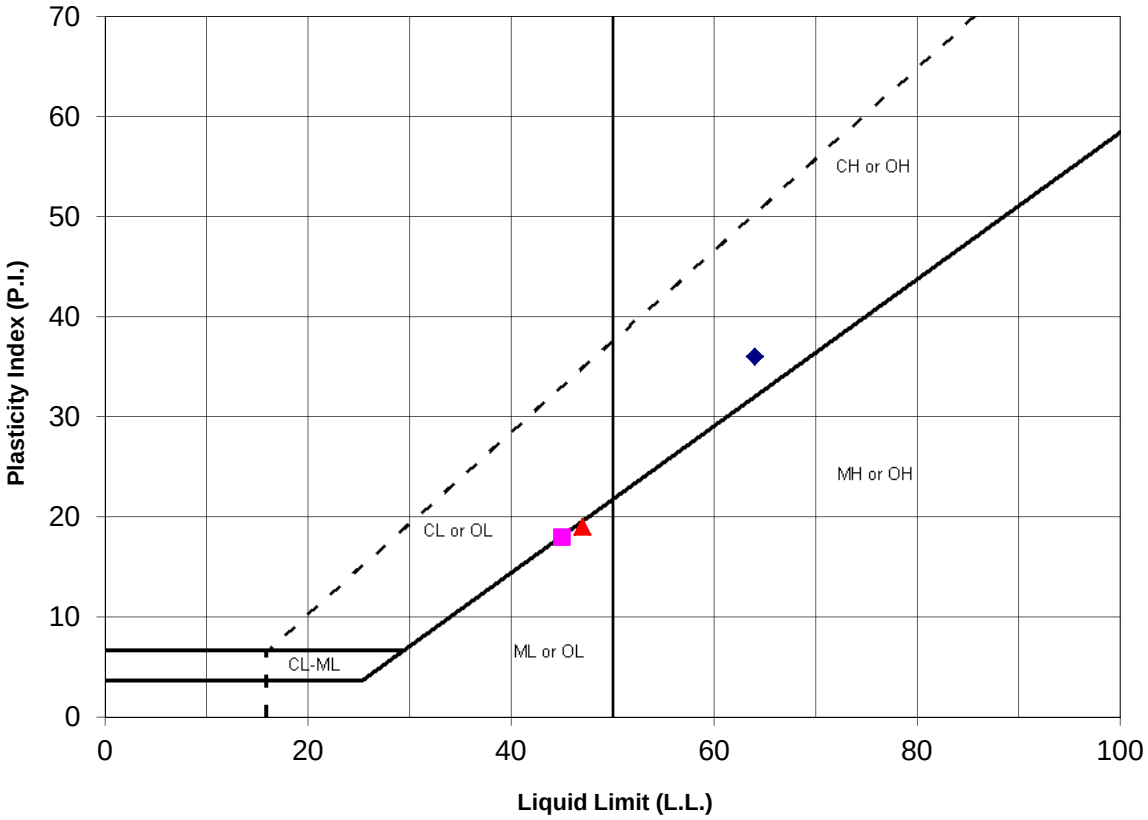



**PROCEDURES USED**

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



PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



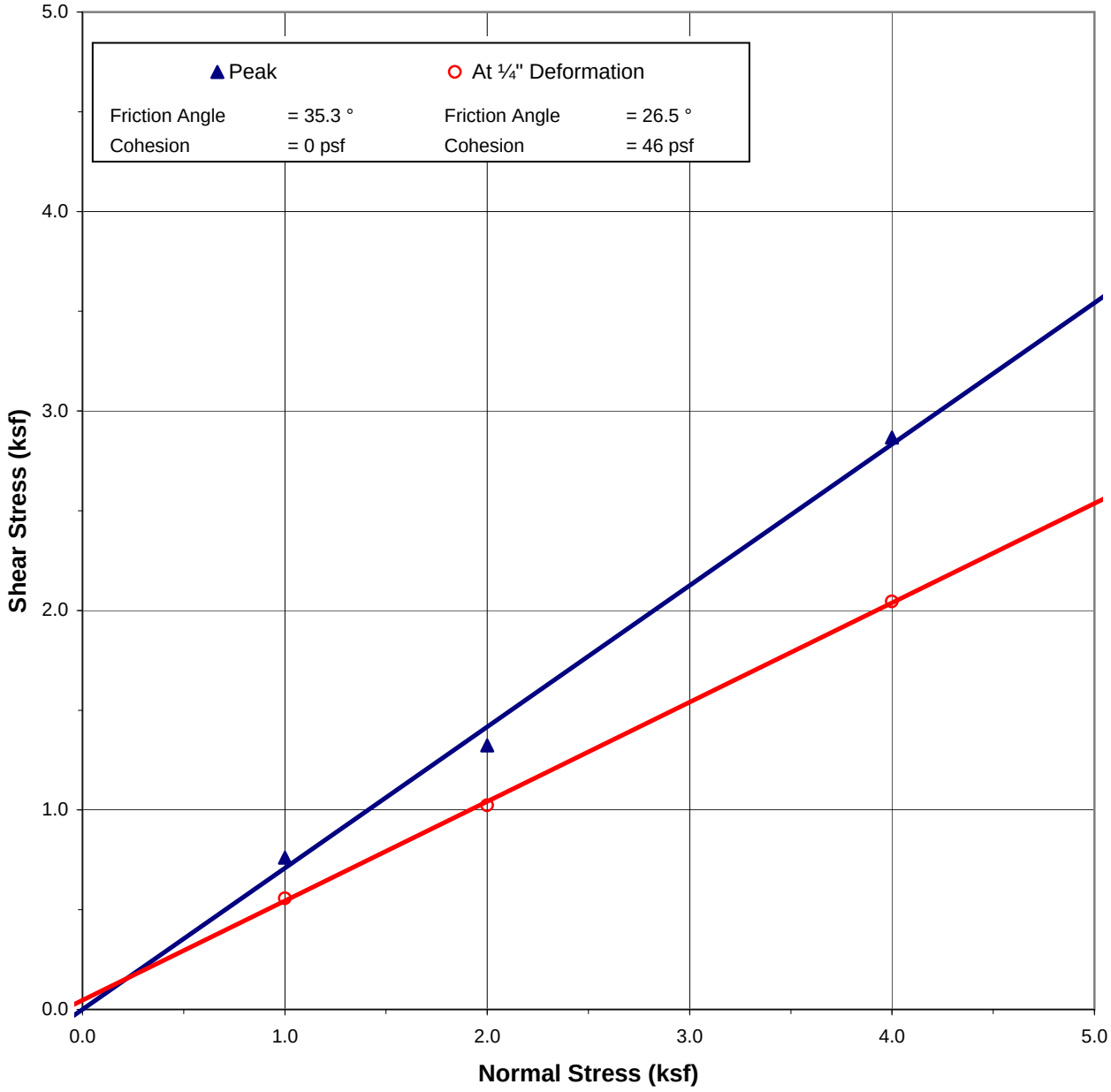

| Symbol | Location.: | Sample No.: | Depth (ft) | Passing No. 200 Sieve (%) | Liquid Limit (%) LL | Plastic Limit (%) PL | Plasticity Index (%) PI | USCS |
|---|---|---|---|---|---|---|---|---|
| ◆ | B-6 | GB-4 | 10 | - | 64 | 28 | 36 | CH |
| ■ | B-6 | GB-1 | 51 | - | 45 | 27 | 18 | CL |
| ▲ | B-6 | GB-2 | 86 | - | 47 | 28 | 19 | CL/ML |
| | | | | | | | | |
| | | | | | | | | |

LGC Geotechnical, Inc.

**ATTERBERG LIMITS**
(ASTM D 4318)

**Project Number:** 14057-01
**Date:** Dec-16

**Rancho La Habra**




| Location: | Sample No.: | Depth (ft) | Sample Type | Shear Rate (inch/min) | Dry Density (pcf) | Initial Moisture Content (%) | Final Moisture Content (%) |
|---|---|---|---|---|---|---|---|
| **B-1** | **R-2** | **20'** | **Ring** | **0.0005** | **109.6** | **18.2** | **24.0** |

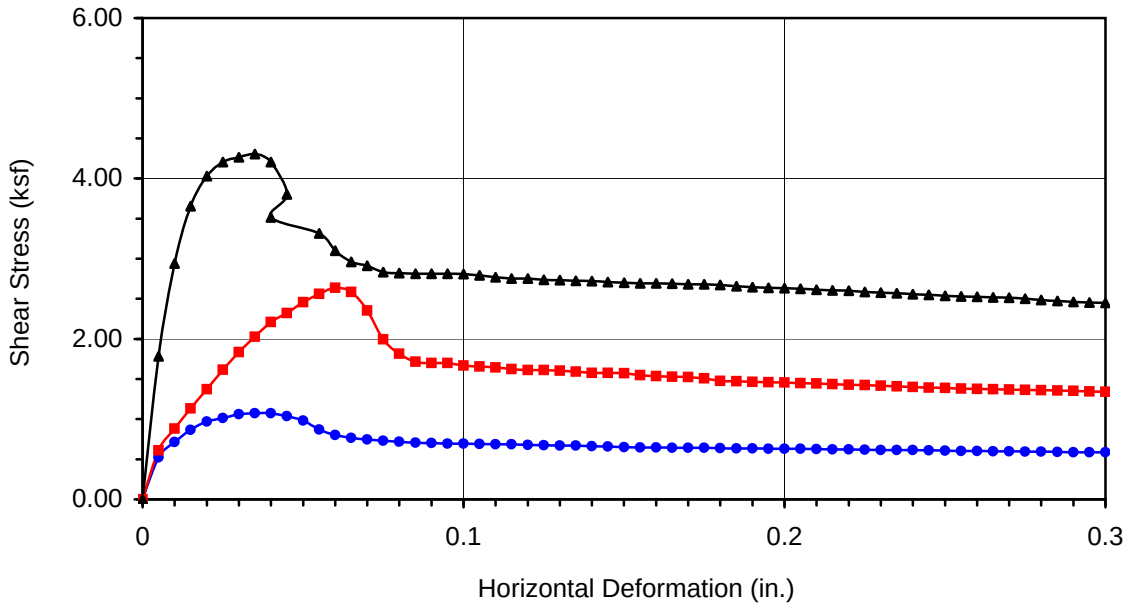
Sample Description: Fine sandy siltstone

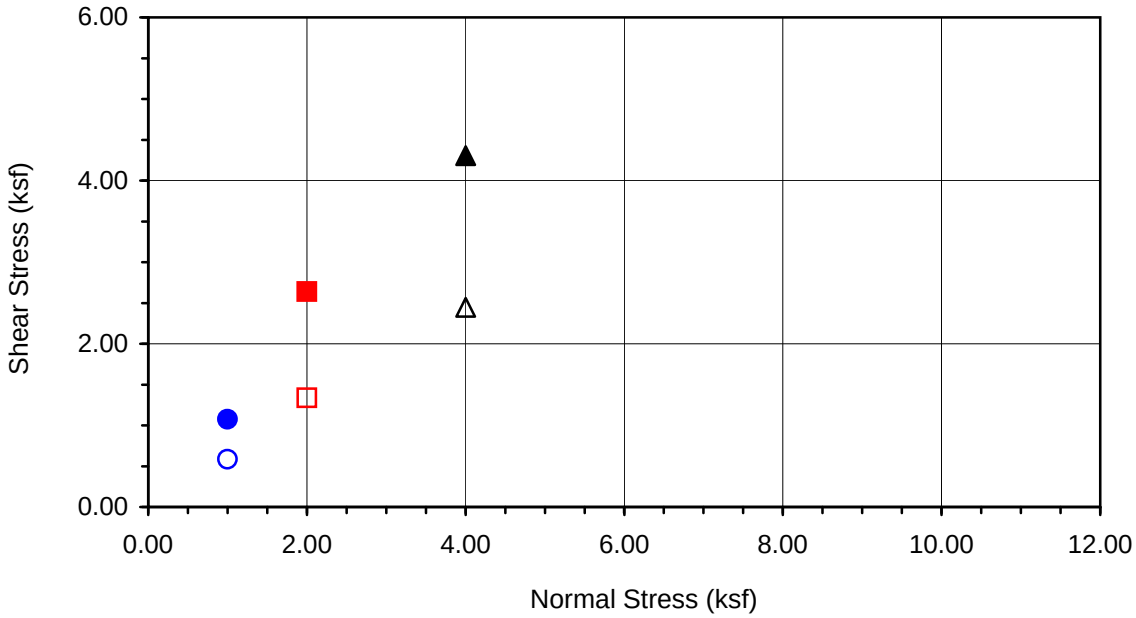
LGC Geotechnical, Inc.

**DIRECT SHEAR PLOT**

**Project Number:** 14057-01
**Date:** Aug-14

**Westridge**




| | |
|---|---|
| **Boring No.** | **B-1** |
| **Sample No.** | **R-3** |
| **Depth (ft)** | **30** |
| Sample Type: Ring | |
| Soil Identification: Dark olive gray clay stone (CL) | |

| Normal Stress (kip/ft²) | 1.000 | 2.000 | 4.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 1.075 | ■ 2.638 | ▲ 4.304 |
| Shear Stress @ End of Test (ksf) | ○ 0.585 | □ 1.339 | △ 2.449 |
| Deformation Rate (in./min.) | 0.0017 | 0.0017 | 0.0017 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 20.26 | 20.26 | 20.26 |
| Dry Density (pcf) | 97.3 | 103.4 | 105.0 |
| Saturation (%) | 74.8 | 86.9 | 90.4 |
| Soil Height Before Shearing (in.) | 0.9956 | 0.9908 | 0.9872 |
| Final Moisture Content (%) | 27.5 | 25.2 | 24.6 |

**DIRECT SHEAR TEST RESULTS**

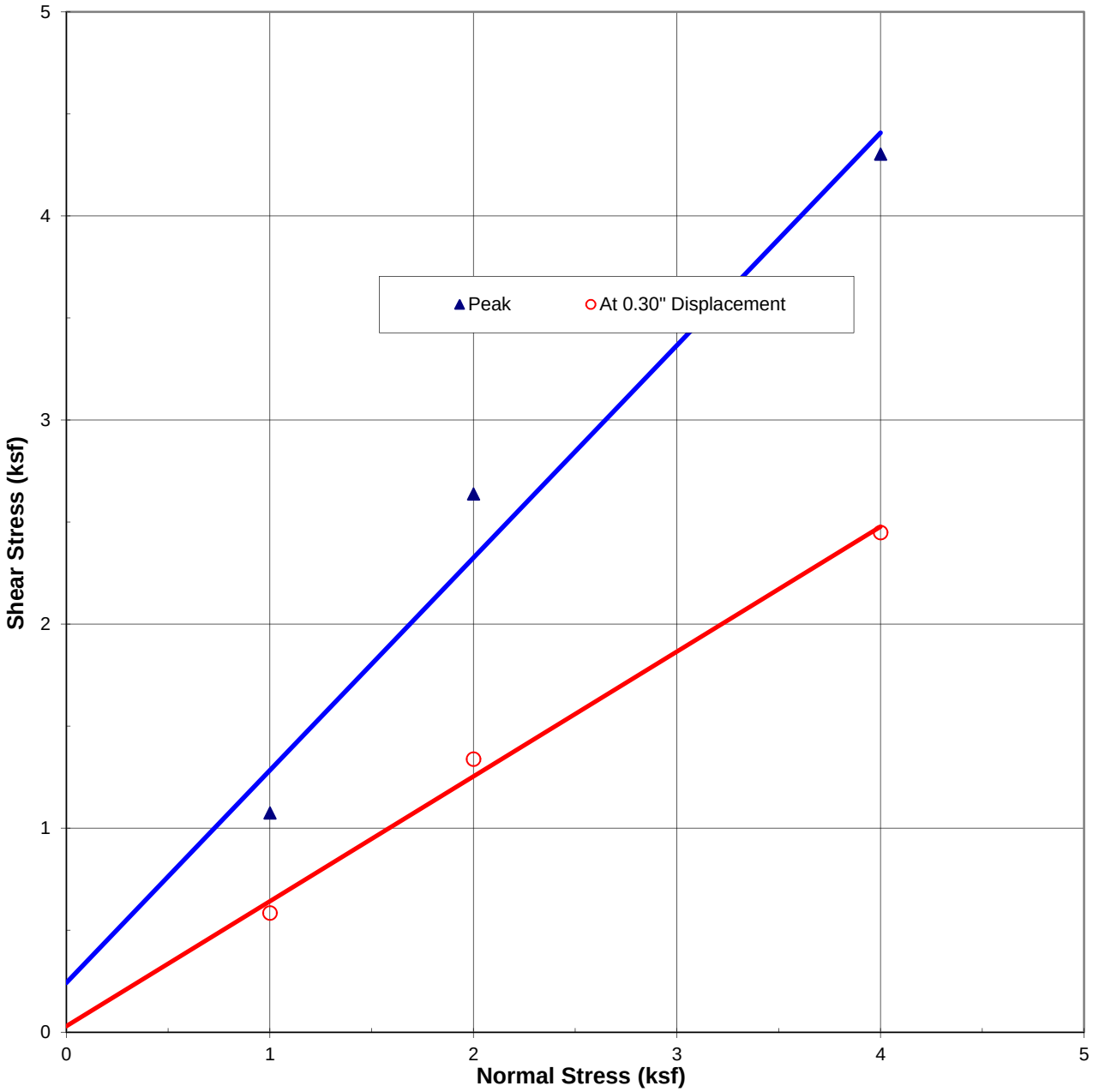
**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

12-14

*DS B-1, R-3 @ 30*




Tested Sample:
B-1 at 30 ft

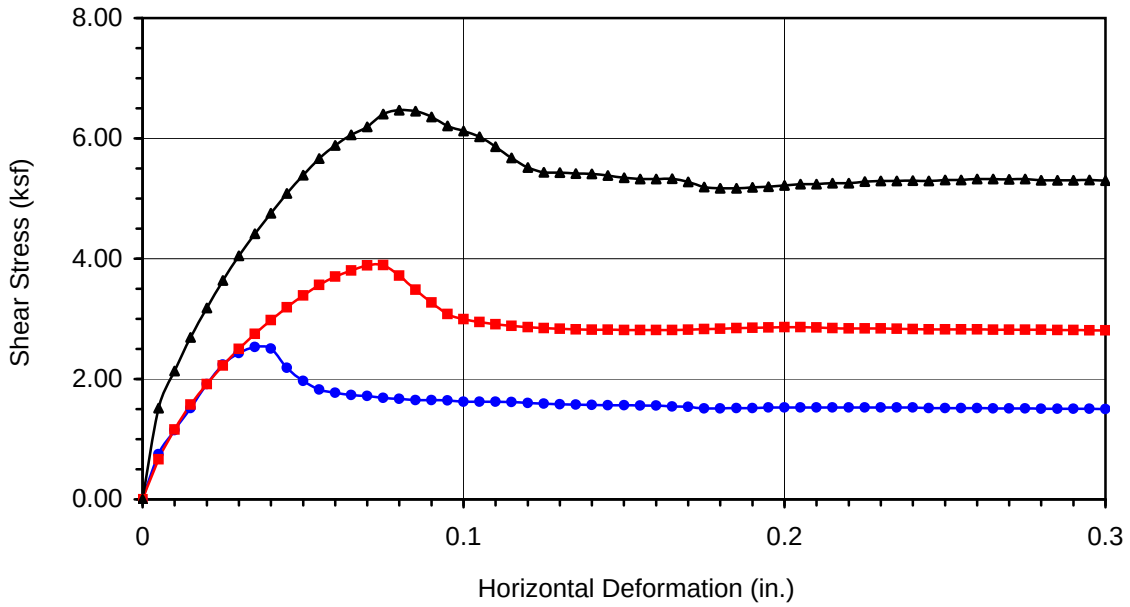
| Peak: | | At 0.30" Displacement: | |
|---|---|---|---|
| 46.2 | Degrees | 31.5 | Degrees |
| 0 | ksf | 0.03 | ksf |

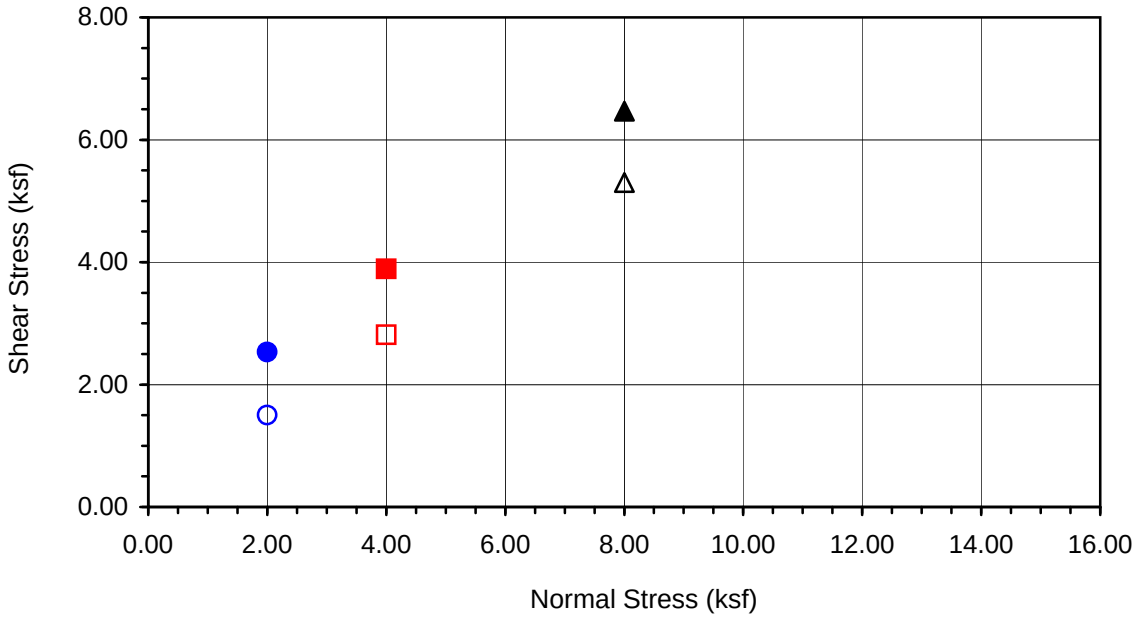
LGC Geotechnical, Inc.

**DIRECT SHEAR PLOT**

**Project Number:** 14057-01
**Date:** Dec-14

**Westridge / La Habra**




| | |
|---|---|
| **Boring No.** | **B-1** |
| **Sample No.** | **R-4** |
| **Depth (ft)** | **40** |
| Sample Type: | |
| Ring | |
| Soil Identification: | |
| Dark olive gray silty clay stone (CL-ML) | |

| Normal Stress (kip/ft²) | 2.000 | 4.000 | 8.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 2.531 | ■ 3.892 | ▲ 6.467 |
| Shear Stress @ End of Test (ksf) | ○ 1.500 | □ 2.811 | △ 5.300 |
| Deformation Rate (in./min.) | 0.0017 | 0.0017 | 0.0017 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 17.51 | 17.51 | 17.51 |
| Dry Density (pcf) | 100.0 | 105.1 | 106.9 |
| Saturation (%) | 68.9 | 78.3 | 81.9 |
| Soil Height Before Shearing (in.) | 0.9898 | 0.9829 | 0.9698 |
| Final Moisture Content (%) | 22.2 | 21.3 | 23.6 |

**DIRECT SHEAR TEST RESULTS**

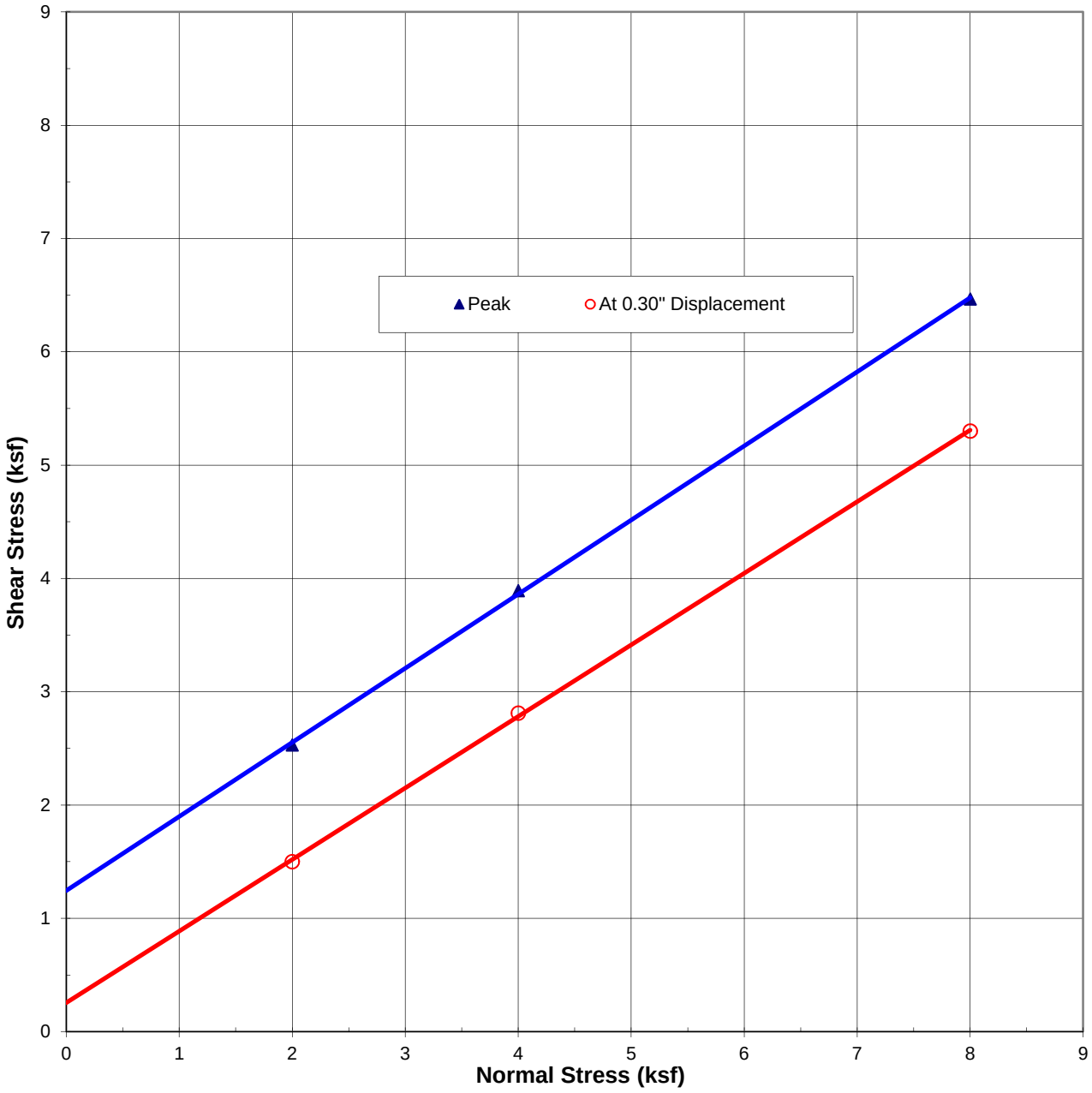
**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

12-14

*DS B-1, R-4 @ 40*




Tested Sample:
B-1 at 40 ft

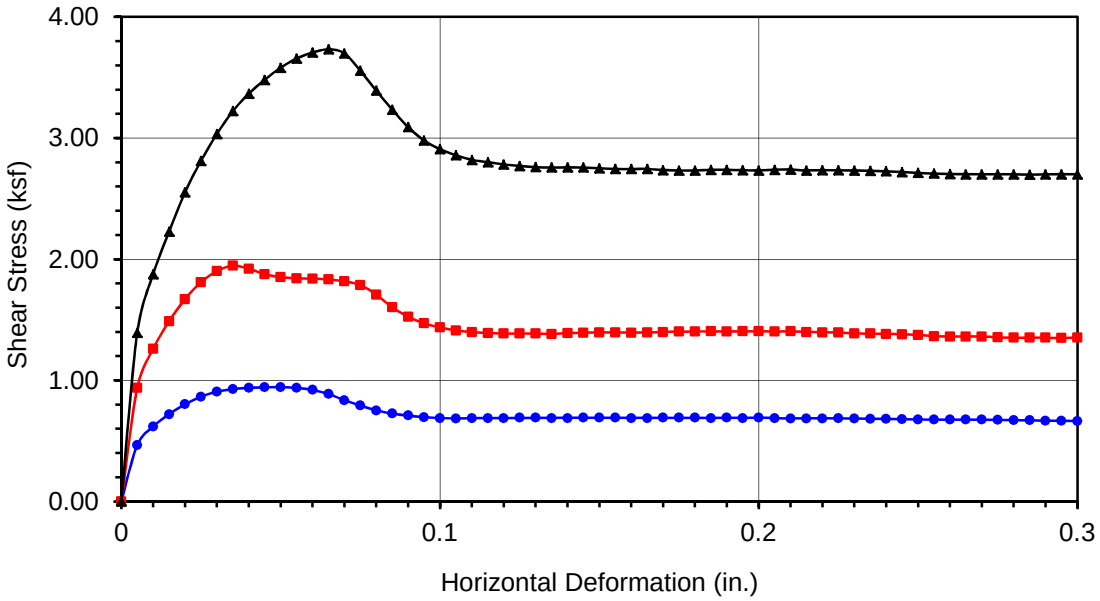
| Peak: | | At 0.30" Displacement: | |
|---|---|---|---|
| 33.2 | Degrees | 32.3 | Degrees |
| 1.2 | ksf | 0.26 | ksf |

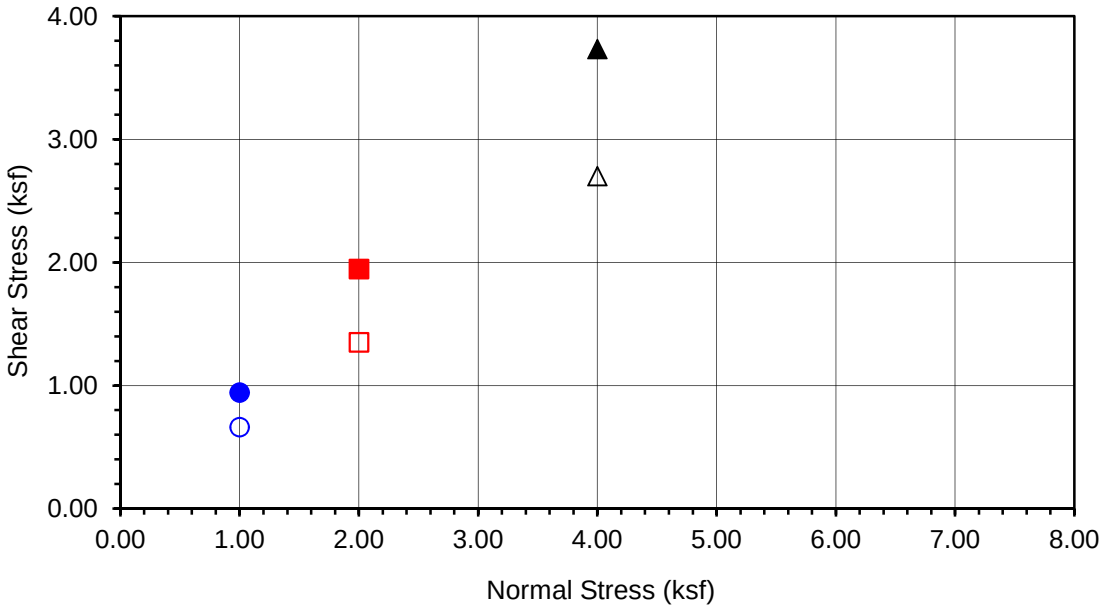
LGC Geotechnical, Inc.

**DIRECT SHEAR PLOT**

**Project Number:** 14057-01
**Date:** Dec-14

**Westridge / La Habra**




| | |
|---|---|
| **Boring No.** | **B-4** |
| **Sample No.** | **R-4** |
| **Depth (ft)** | **40** |
| Sample Type: | |
| Ring | |
| Soil Identification: | |
| Brownish yellow sandy silt s(ML) | |

| Normal Stress (kip/ft²) | 1.000 | 2.000 | 4.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 0.943 | ■ 1.946 | ▲ 3.732 |
| Shear Stress @ End of Test (ksf) | ○ 0.663 | □ 1.352 | △ 2.701 |
| Deformation Rate (in./min.) | 0.0025 | 0.0025 | 0.0025 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 4.23 | 4.23 | 4.23 |
| Dry Density (pcf) | 101.2 | 104.1 | 107.2 |
| Saturation (%) | 17.2 | 18.5 | 20.0 |
| Soil Height Before Shearing (in.) | 0.9959 | 0.9935 | 0.9844 |
| Final Moisture Content (%) | 23.0 | 20.8 | 20.4 |

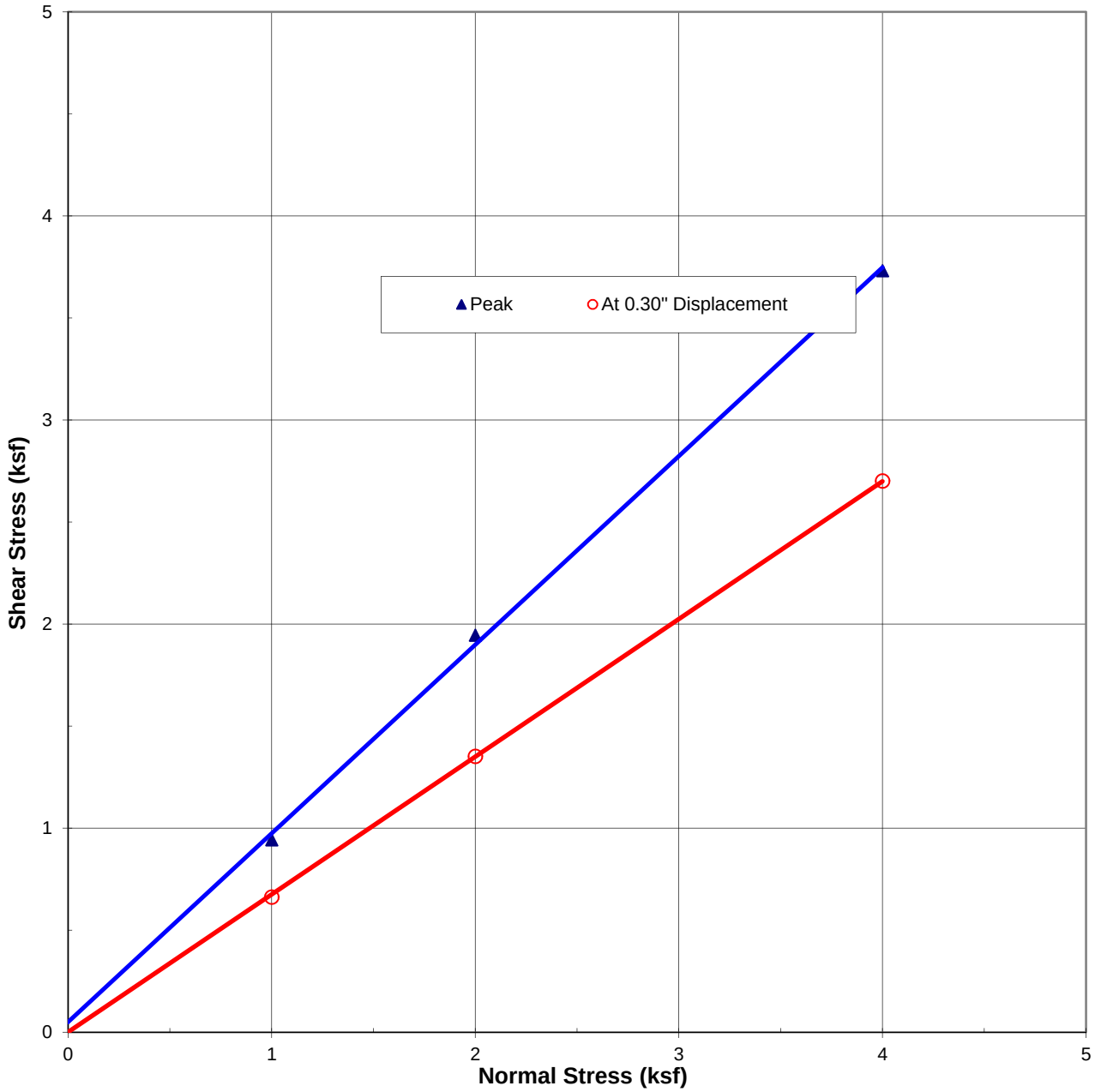
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

02-15




Tested Sample:
B-4 at 40 ft

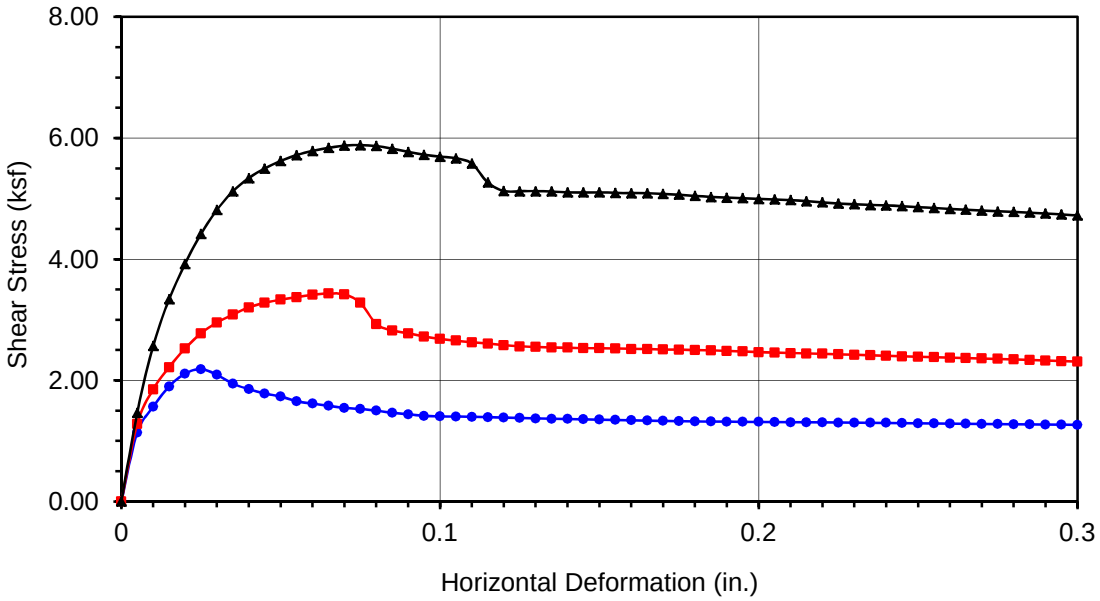
| Peak: | At 0.30" Displacement: |
|---|---|
| 42.8 Degrees | 34.0 Degrees |
| 0 ksf | 0 ksf |

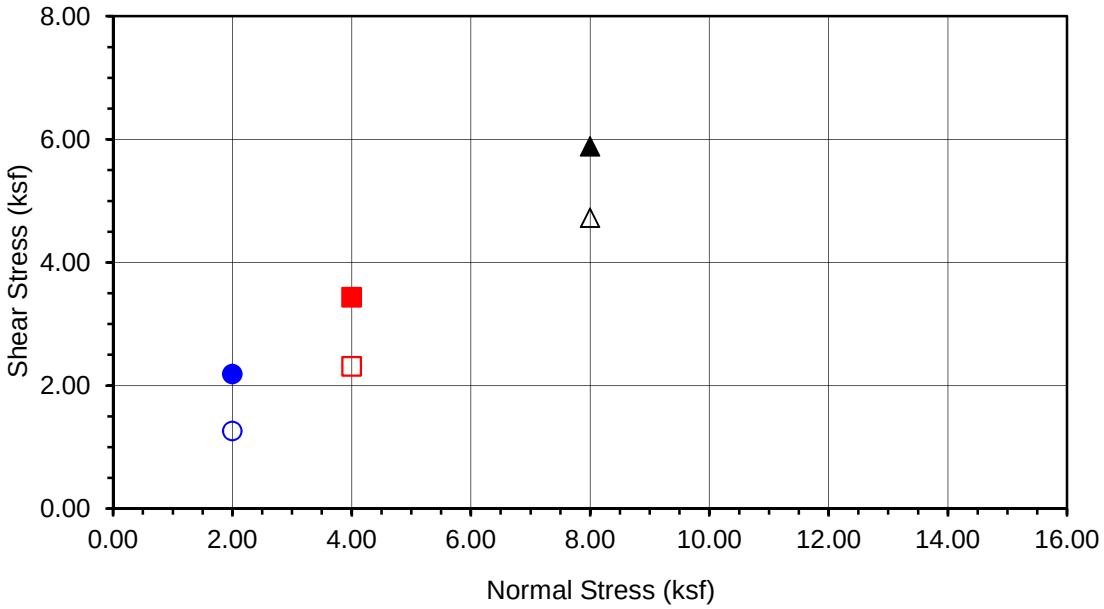
LGC Geotechnical, Inc.

**DIRECT SHEAR PLOT**

**Project Number:** 14057-01
**Date:** Mar-14

**Westridge / La Habra**




| | |
|---|---|
| **Boring No.** | **B-4** |
| **Sample No.** | **R-6** |
| **Depth (ft)** | **60** |
| Sample Type: | |
| Ring | |
| Soil Identification: | |
| Olive silty clay (CL-ML) | |

| Normal Stress (kip/ft²) | 2.000 | 4.000 | 8.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 2.185 | ■ 3.433 | ▲ 5.882 |
| Shear Stress @ End of Test (ksf) | ○ 1.264 | □ 2.311 | △ 4.725 |
| Deformation Rate (in./min.) | 0.0017 | 0.0017 | 0.0017 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 23.28 | 23.28 | 23.28 |
| Dry Density (pcf) | 101.7 | 102.2 | 102.4 |
| Saturation (%) | 95.7 | 96.8 | 97.2 |
| Soil Height Before Shearing (in.) | 0.9932 | 0.9886 | 0.9764 |
| Final Moisture Content (%) | 27.0 | 25.3 | 24.1 |

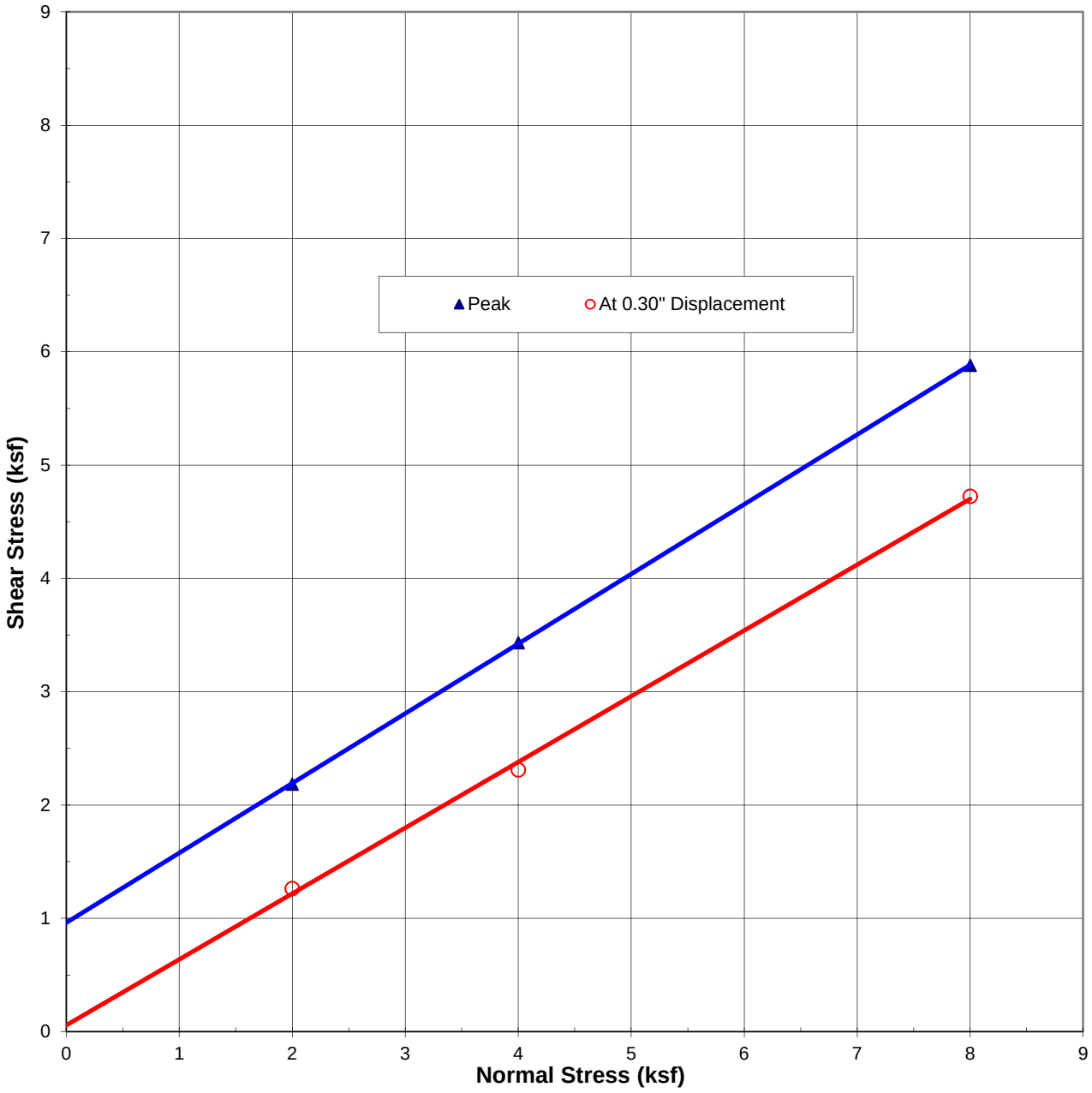
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

02-15




Tested Sample:

B-4 at 60 ft

| Peak: | | At 0.30" Displacement: | |
|---|---|---|---|
| 31.6 | Degrees | 30.1 | Degrees |
| 1.0 | ksf | 0.06 | ksf |

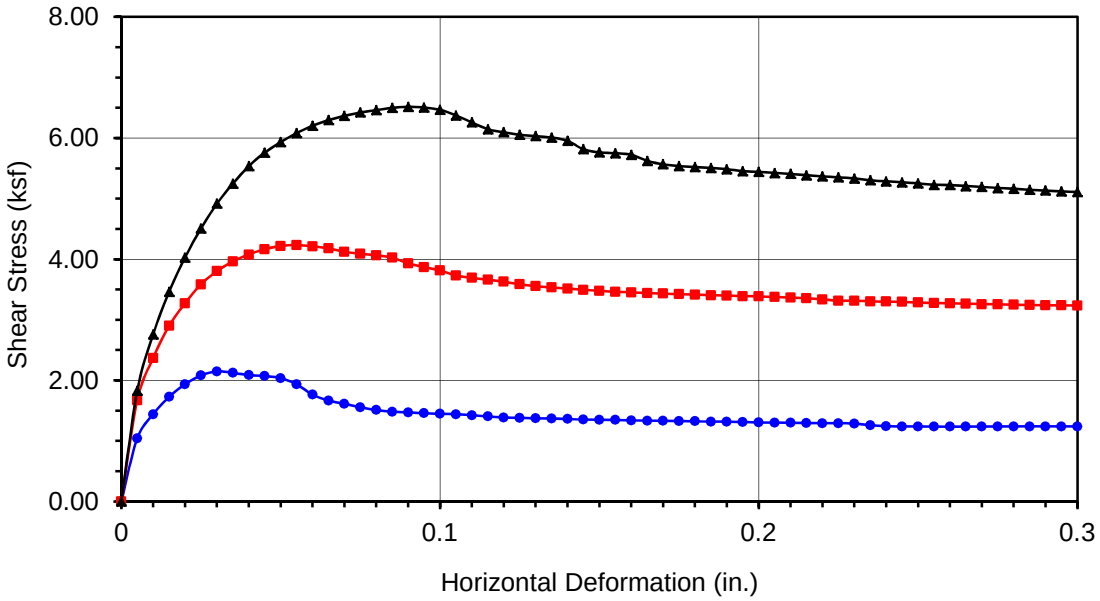
LGC Geotechnical, Inc.

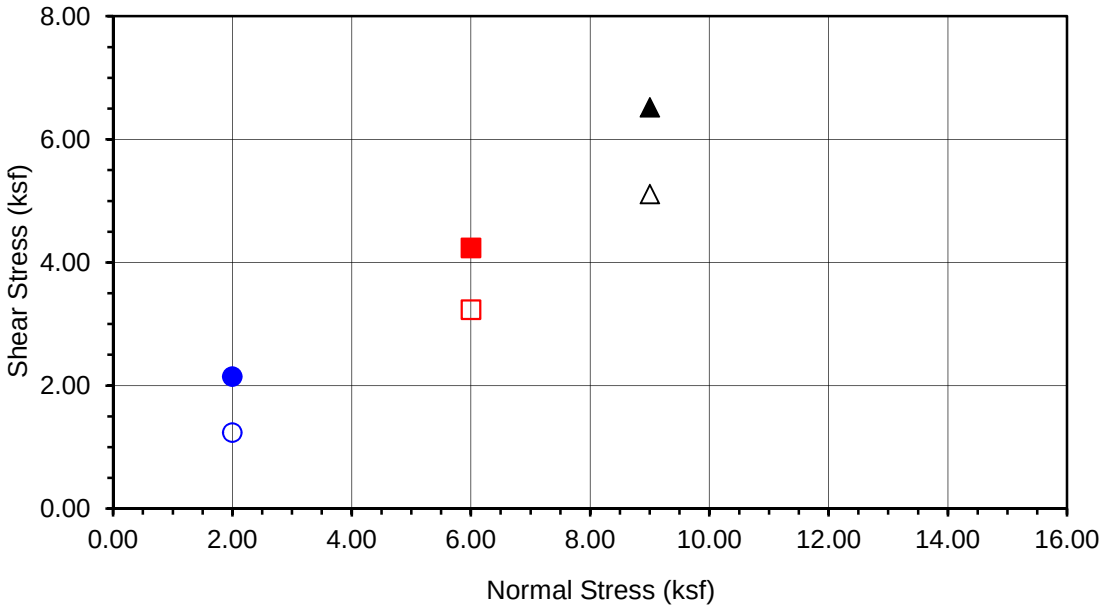
**DIRECT SHEAR PLOT**

**Project Number:** 14057-01

**Date:** Mar-15

**Westridge / La Habra**




| | |
|---|---|
| **Boring No.** | **B-4** |
| **Sample No.** | **R-7** |
| **Depth (ft)** | **70** |
| Sample Type: | |
| Ring | |
| Soil Identification: | |
| Olive lean clay'stone' (CL) | |

| Normal Stress (kip/ft²) | 2.000 | 6.000 | 9.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 2.147 | ■ 4.235 | ▲ 6.517 |
| Shear Stress @ End of Test (ksf) | ○ 1.236 | □ 3.232 | △ 5.109 |
| Deformation Rate (in./min.) | 0.0017 | 0.0017 | 0.0017 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 22.88 | 22.88 | 22.88 |
| Dry Density (pcf) | 102.0 | 102.5 | 102.7 |
| Saturation (%) | 94.7 | 95.9 | 96.4 |
| Soil Height Before Shearing (in.) | 0.9936 | 0.9846 | 0.9705 |
| Final Moisture Content (%) | 25.2 | 24.5 | 23.8 |

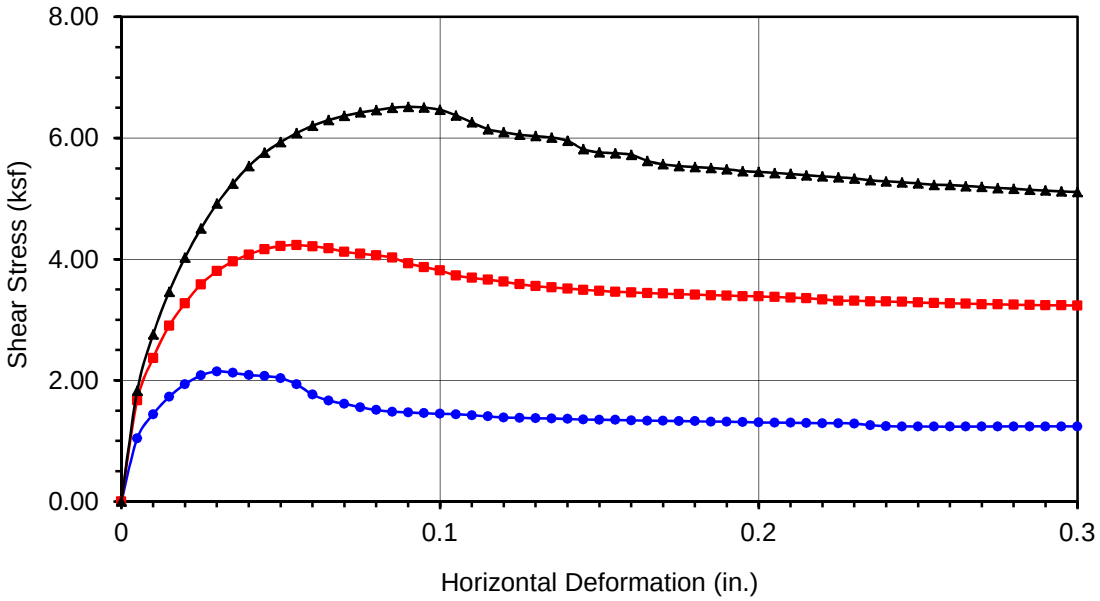
**DIRECT SHEAR TEST RESULTS**

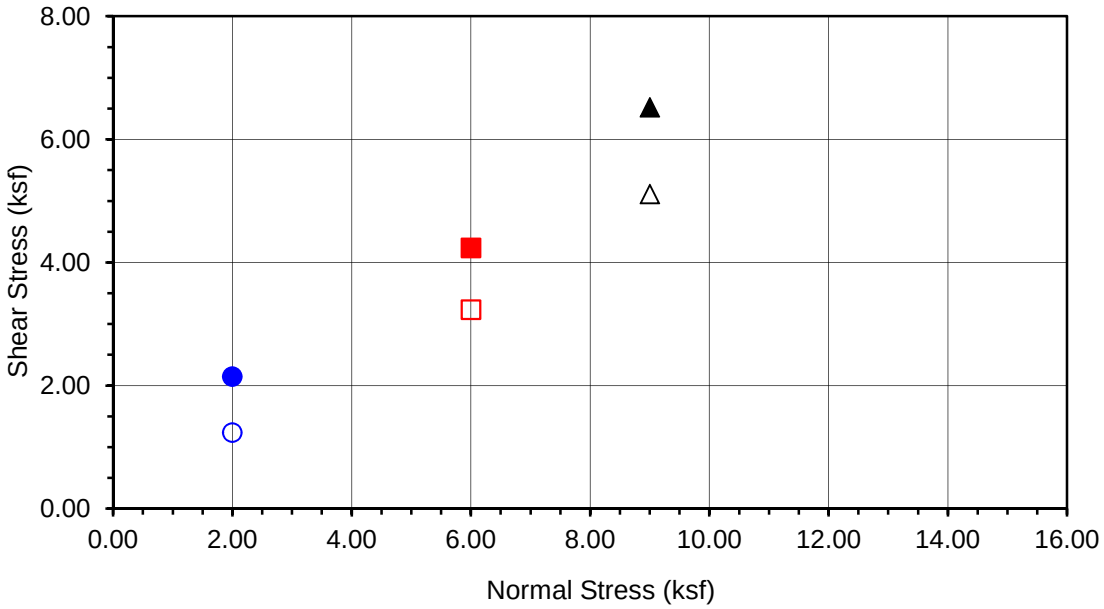
**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

02-15




| | |
|---|---|
| **Boring No.** | **B-4** |
| **Sample No.** | **R-7** |
| **Depth (ft)** | **70** |
| Sample Type: | |
| Ring | |
| Soil Identification: | |
| Olive lean clay'stone' (CL) | |

| Normal Stress (kip/ft²) | 2.000 | 6.000 | 9.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 2.147 | ■ 4.235 | ▲ 6.517 |
| Shear Stress @ End of Test (ksf) | ○ 1.236 | □ 3.232 | △ 5.109 |
| Deformation Rate (in./min.) | 0.0017 | 0.0017 | 0.0017 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 22.88 | 22.88 | 22.88 |
| Dry Density (pcf) | 102.0 | 102.5 | 102.7 |
| Saturation (%) | 94.7 | 95.9 | 96.4 |
| Soil Height Before Shearing (in.) | 0.9936 | 0.9846 | 0.9705 |
| Final Moisture Content (%) | 25.2 | 24.5 | 23.8 |

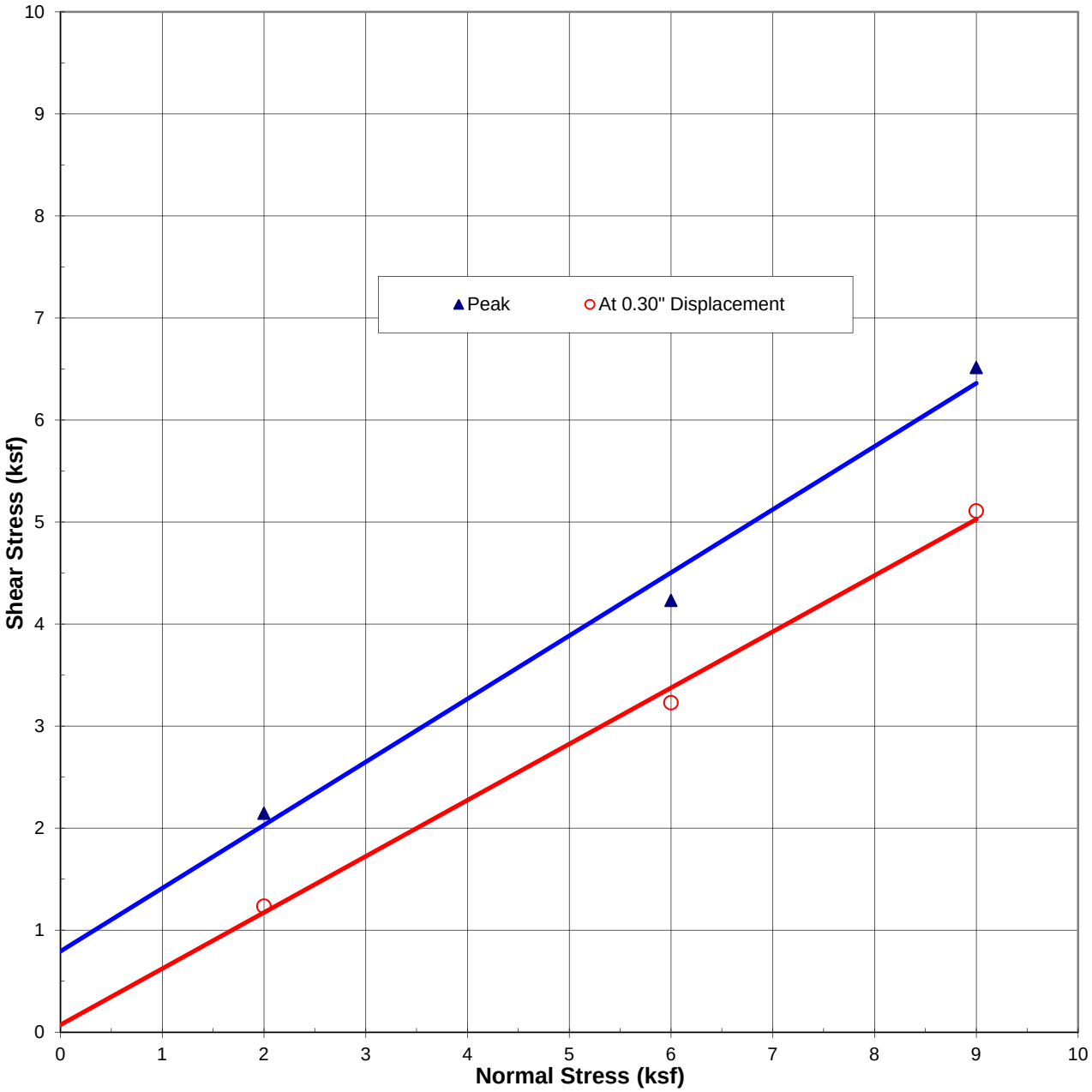
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

02-15




Tested Sample:
B-4 at 70 ft

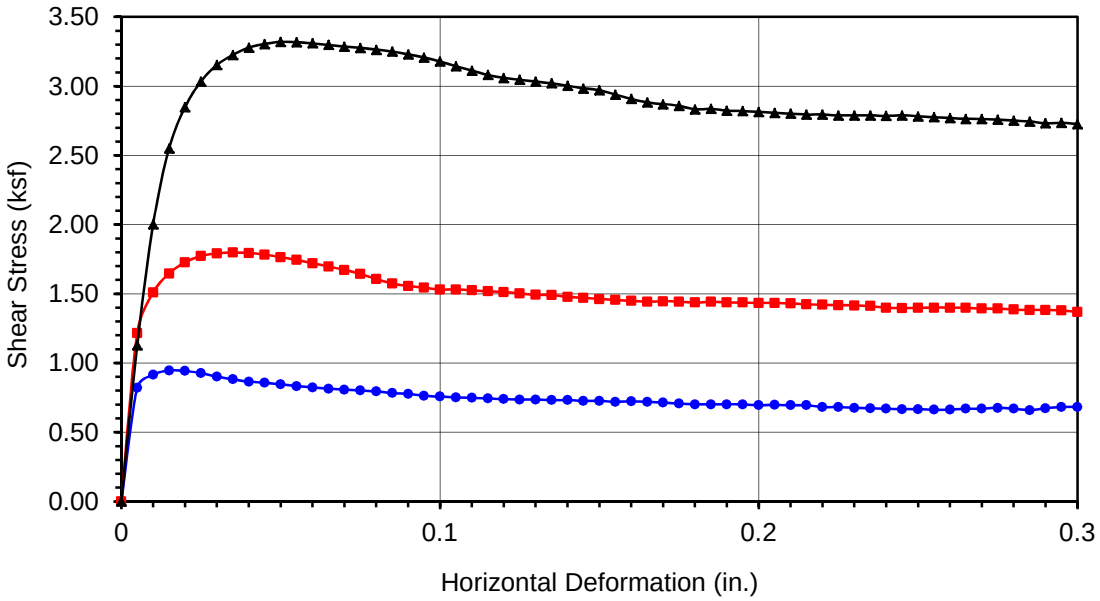
| Peak: | | At 0.30" Displacement: | |
|---|---|---|---|
| 31.7 | Degrees | 28.8 | Degrees |
| 0.8 | ksf | 0.07 | ksf |

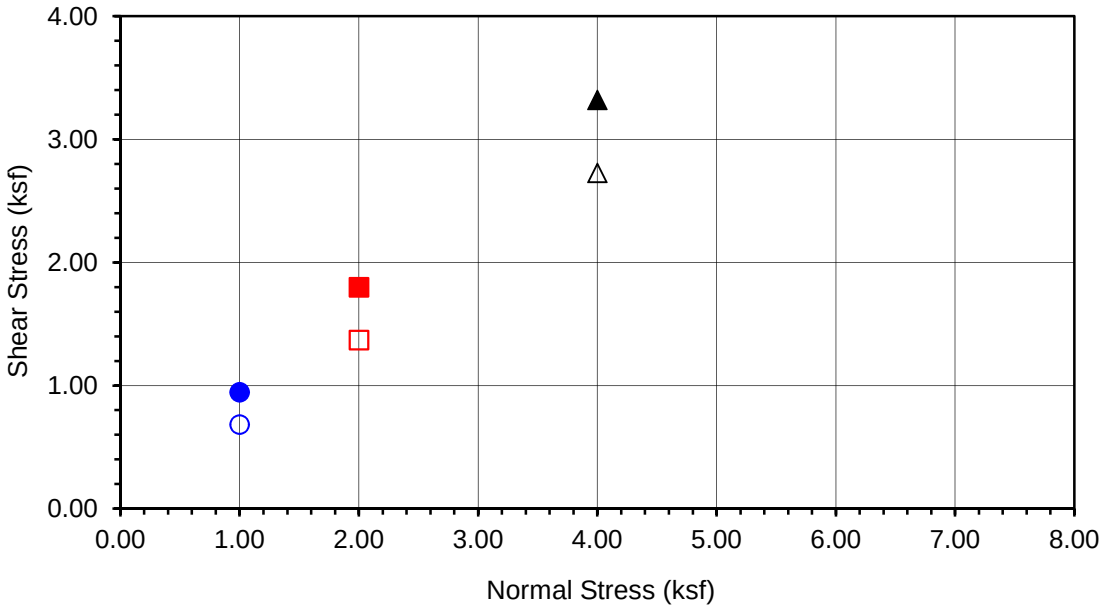
LGC Geotechnical, Inc.

**DIRECT SHEAR PLOT**

**Project Number:** 14057-01
**Date:** Mar-15

**Westridge / La Habra**




| | |
|---|---|
| **Boring No.** | **HS-1** |
| **Sample No.** | **B-2** |
| **Depth (ft)** | **40-45** |
| Sample Type: 90% Remold | |
| Soil Identification: Light olive brown silty sand (SM) | |

| Normal Stress (kip/ft²) | 1.000 | 2.000 | 4.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 0.946 | ■ 1.798 | ▲ 3.320 |
| Shear Stress @ End of Test (ksf) | ○ 0.682 | □ 1.368 | △ 2.726 |
| Deformation Rate (in./min.) | 0.0025 | 0.0025 | 0.0025 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 10.30 | 10.30 | 10.30 |
| Dry Density (pcf) | 113.3 | 113.2 | 113.2 |
| Saturation (%) | 57.0 | 56.9 | 56.9 |
| Soil Height Before Shearing (in.) | 0.9960 | 0.9897 | 0.9844 |
| Final Moisture Content (%) | 14.8 | 14.5 | 14.4 |

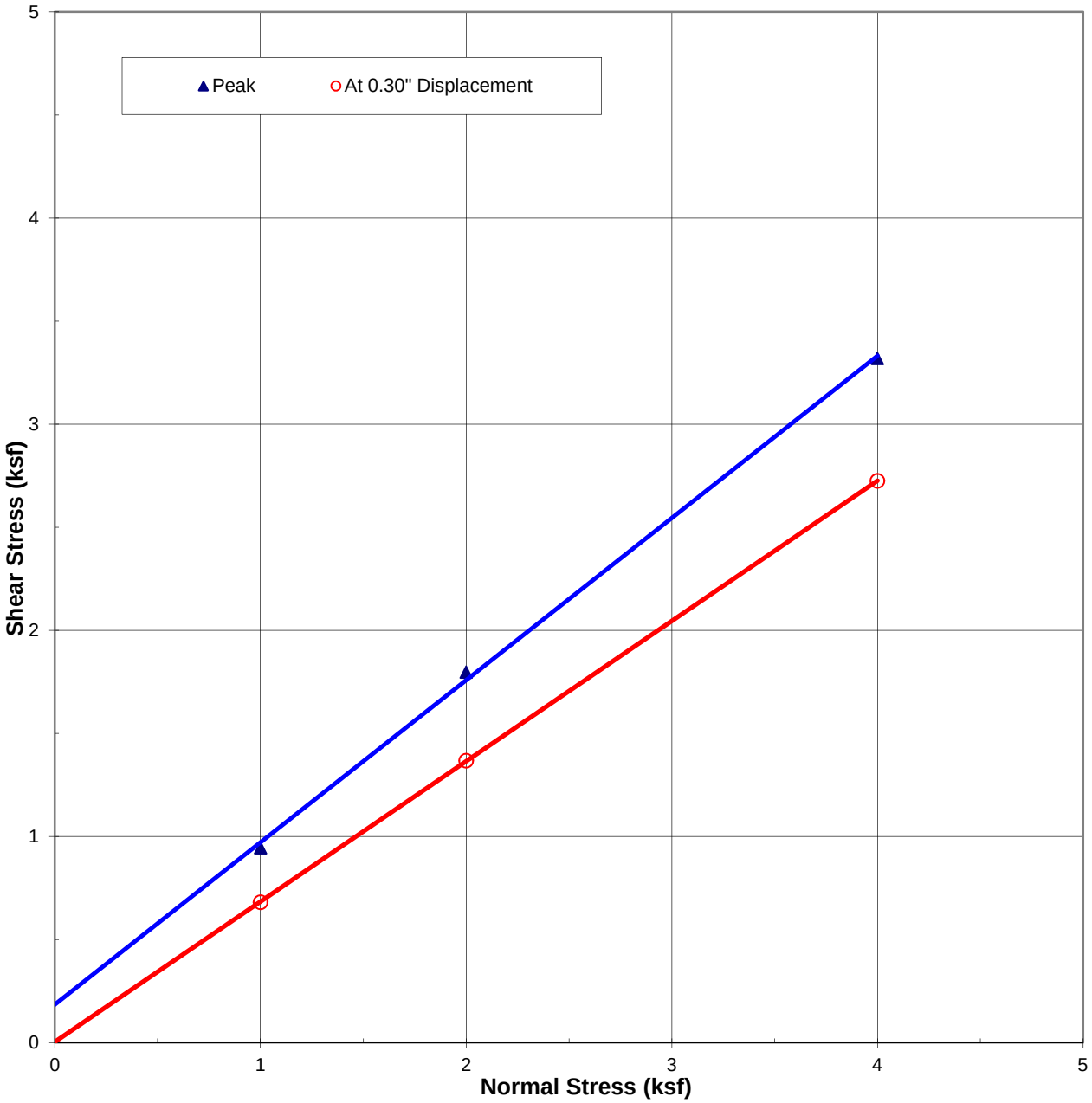
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

10-05



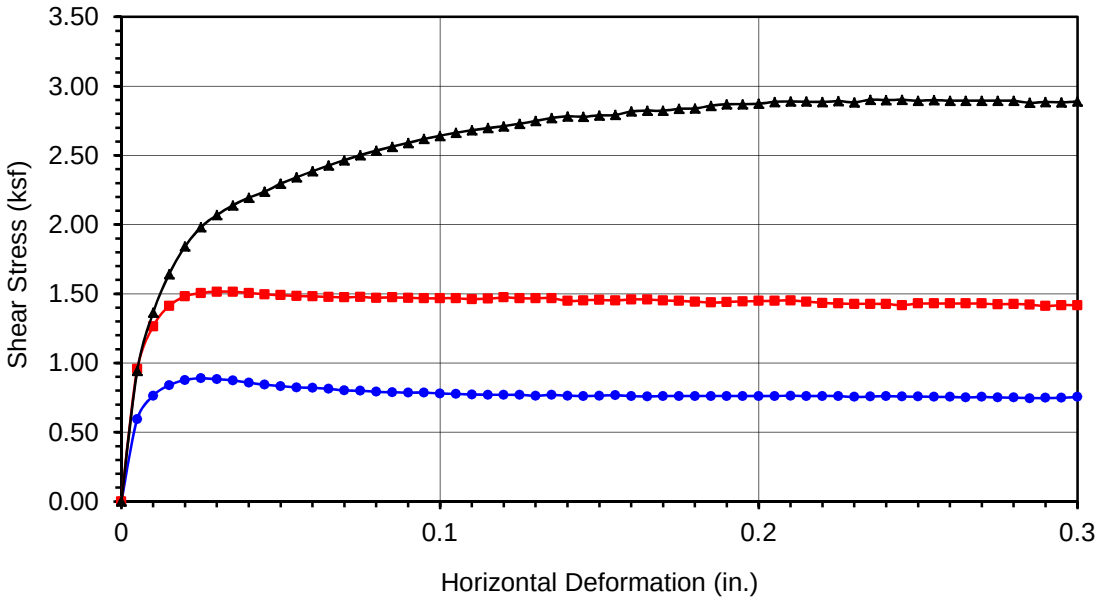

Tested Sample:

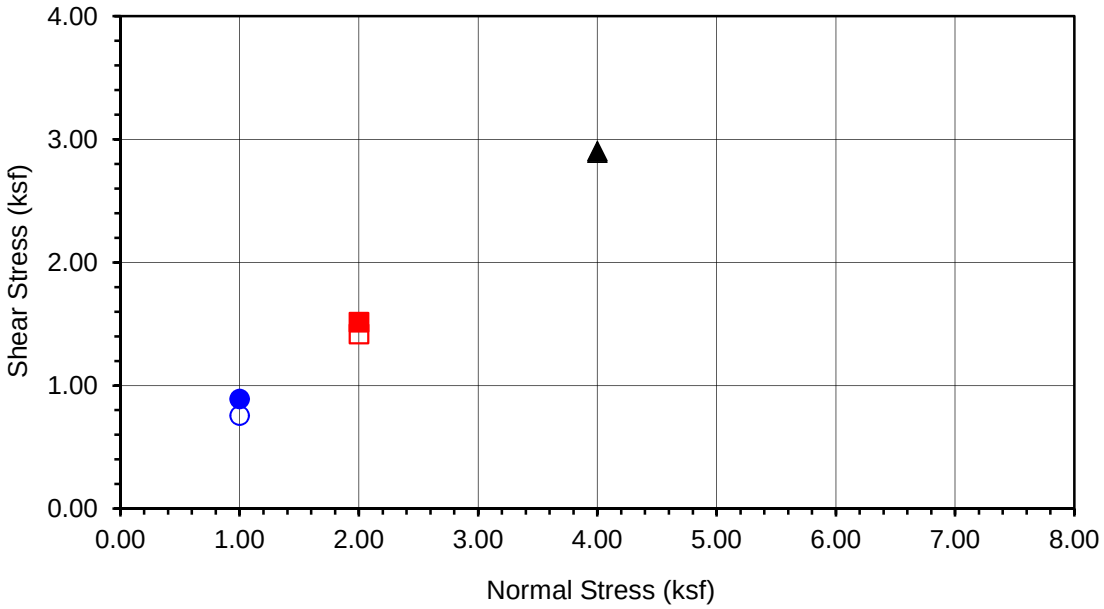
HS-1 at 40-45 ft (Af)

| Peak: | | At 0.30" Displacement: | |
|---|---|---|---|
| 38.2 | Degrees | 34.3 | Degrees |
| 0.19 | ksf | 0.0 | ksf |

Samples Remolded to 90% R.C.

| | | |
|---|---|---|
| LGC Geotechnical, Inc. | **DIRECT SHEAR PLOT** | **Project Number:** 14057-01<br>**Date:** Jan-15 |
| | | **Westridge / La Habra** |




| | |
|---|---|
| **Boring No.** | **HS-3** |
| **Sample No.** | **B-1** |
| **Depth (ft)** | **15-20** |
| Sample Type: 90% Remold | |
| Soil Identification: Olive brown silty sand with gravel (SM)g | |

| Normal Stress (kip/ft²) | 1.000 | 2.000 | 4.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 0.890 | ■ 1.515 | ▲ 2.902 |
| Shear Stress @ End of Test (ksf) | ○ 0.755 | □ 1.418 | △ 2.889 |
| Deformation Rate (in./min.) | 0.0025 | 0.0025 | 0.0025 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 6.77 | 6.77 | 6.77 |
| Dry Density (pcf) | 119.2 | 119.2 | 119.2 |
| Saturation (%) | 44.2 | 44.2 | 44.1 |
| Soil Height Before Shearing (in.) | 0.9939 | 0.9904 | 0.9820 |
| Final Moisture Content (%) | 12.6 | 12.2 | 11.8 |

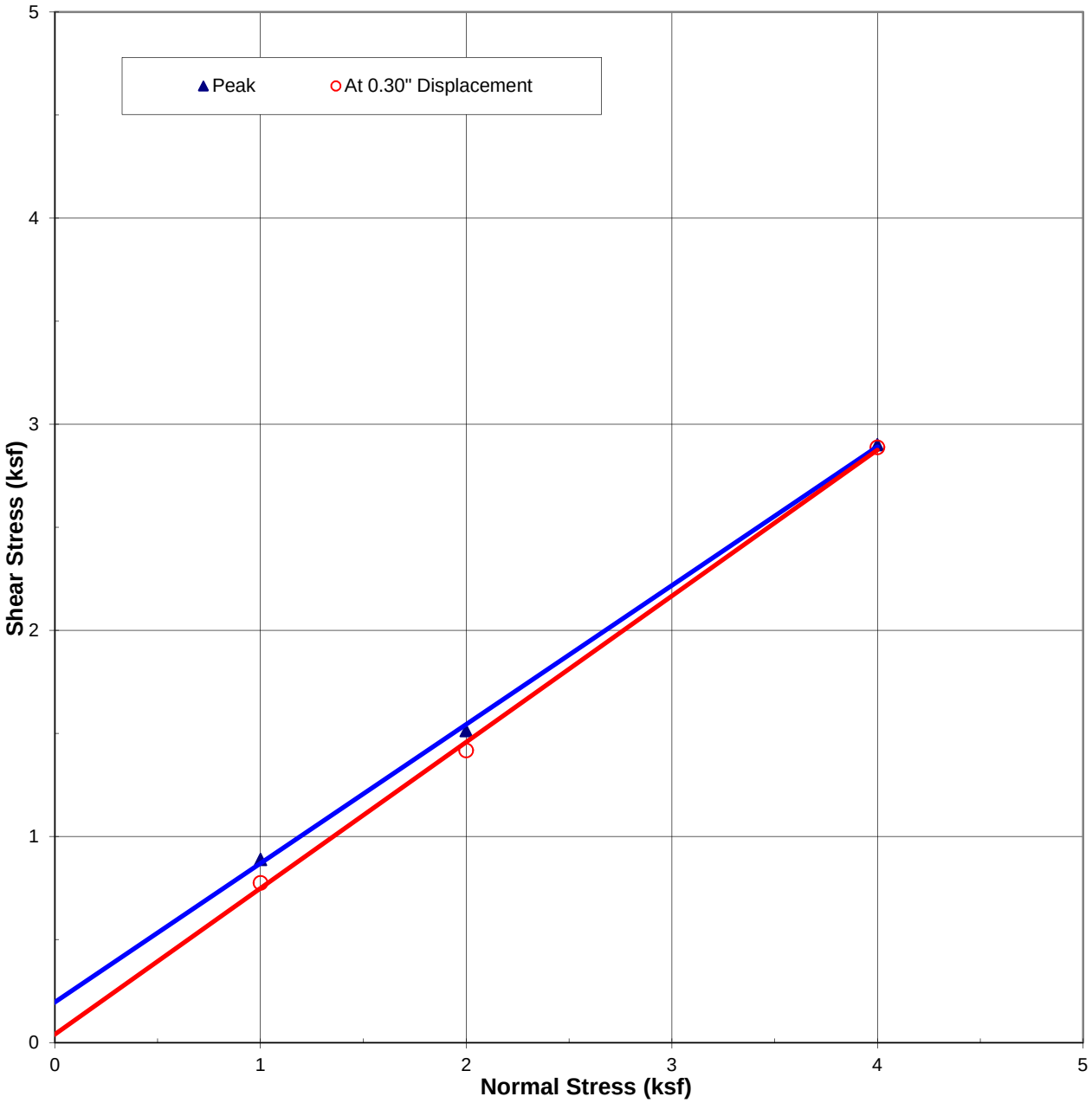
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

01-15




Tested Sample:

HS-3 at 15-20 ft (Af)

| | Peak: | At 0.30" Displacement: |
|---|---|---|
| | 34.0 Degrees | 35.3 Degrees |
| | 0.20 ksf | 0.0 ksf |

Samples Remolded to 90% R.C.

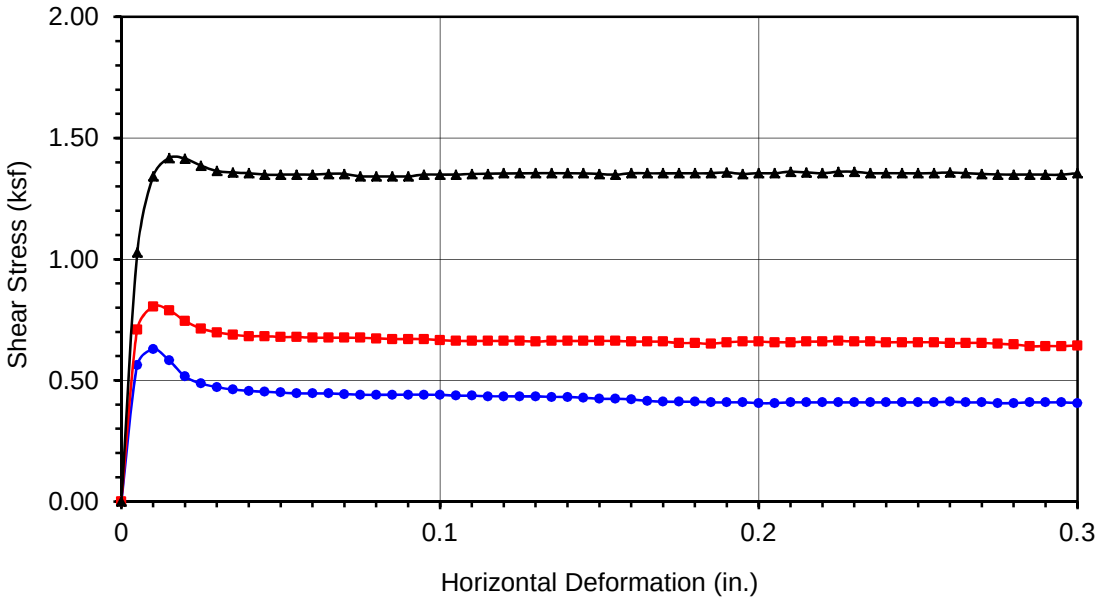
LGC Geotechnical, Inc.

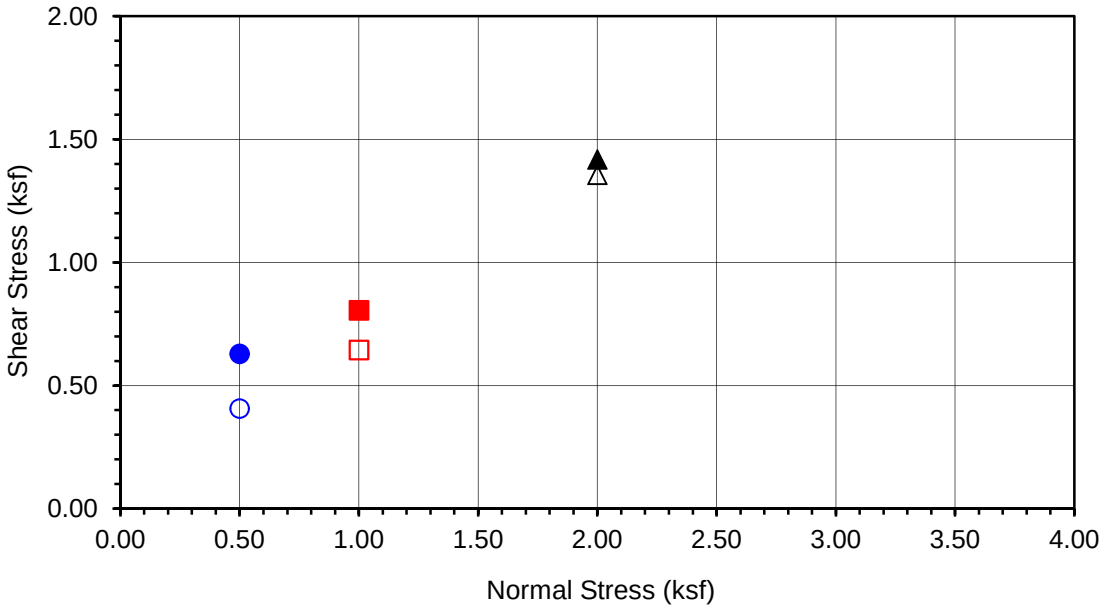
**DIRECT SHEAR PLOT**

**Project Number:** 14057-01

**Date:** Jan-15

**Westridge / La Habra**




| | |
|---|---|
| **Boring No.** | **HS-17** |
| **Sample No.** | **B-1** |
| **Depth (ft)** | **5-7** |
| Sample Type: 90% Remold | |
| Soil Identification: Olive brown sandy lean clay s(CL) | |

| Normal Stress (kip/ft²) | 0.500 | 1.000 | 2.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 0.629 | ■ 0.805 | ▲ 1.418 |
| Shear Stress @ End of Test (ksf) | ○ 0.406 | □ 0.644 | △ 1.355 |
| Deformation Rate (in./min.) | 0.0017 | 0.0017 | 0.0017 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 9.51 | 9.51 | 9.51 |
| Dry Density (pcf) | 113.1 | 113.1 | 113.0 |
| Saturation (%) | 52.3 | 52.3 | 52.2 |
| Soil Height Before Shearing (in.) | 1.0059 | 0.9997 | 0.9901 |
| Final Moisture Content (%) | 16.8 | 16.5 | 16.1 |

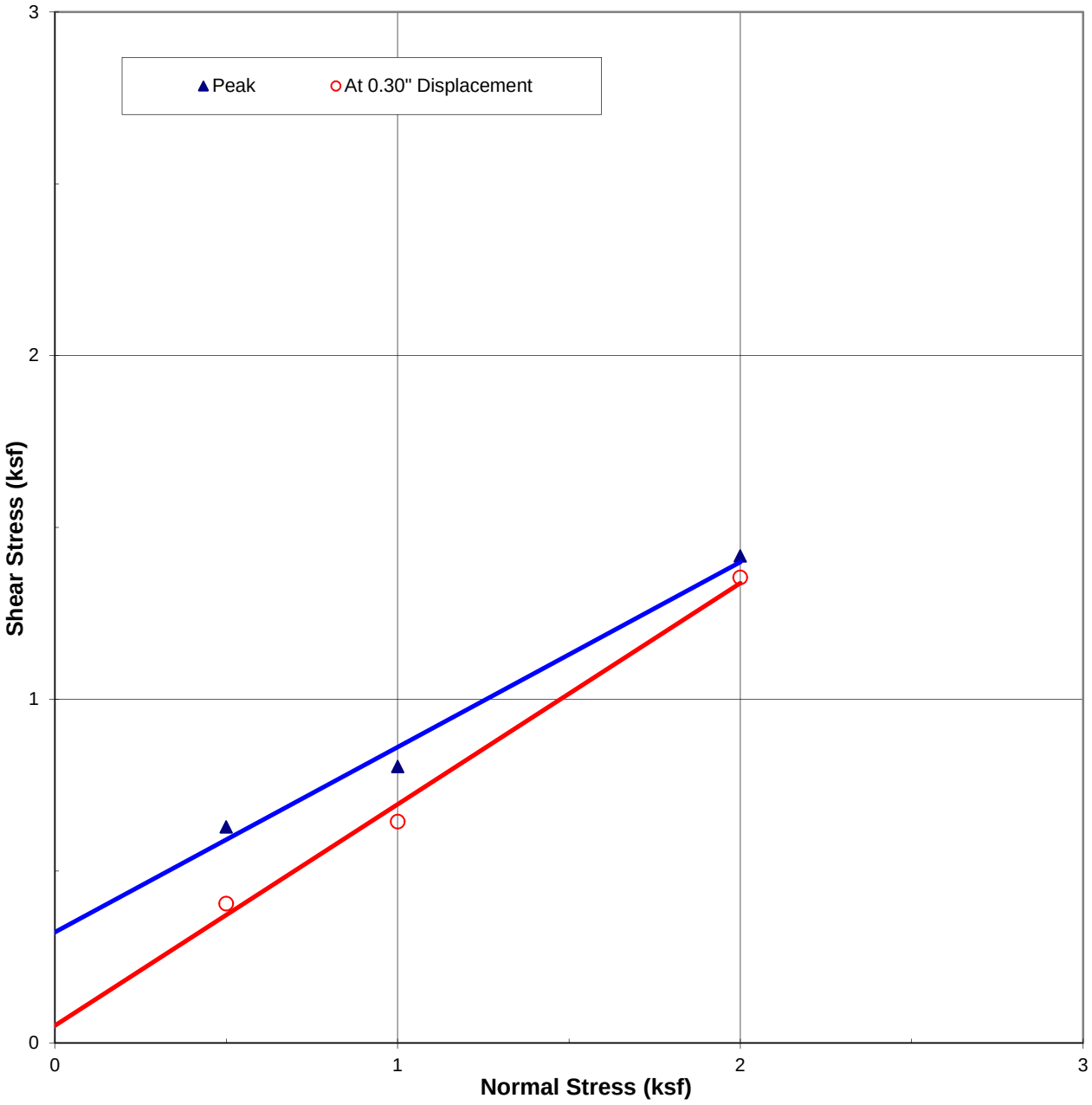
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

02-15

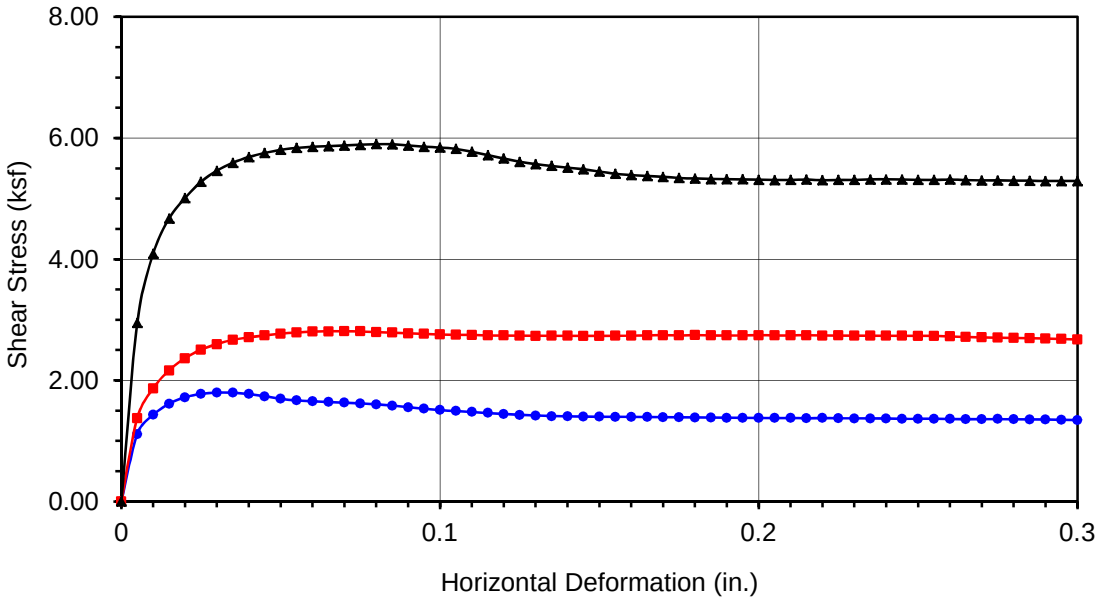


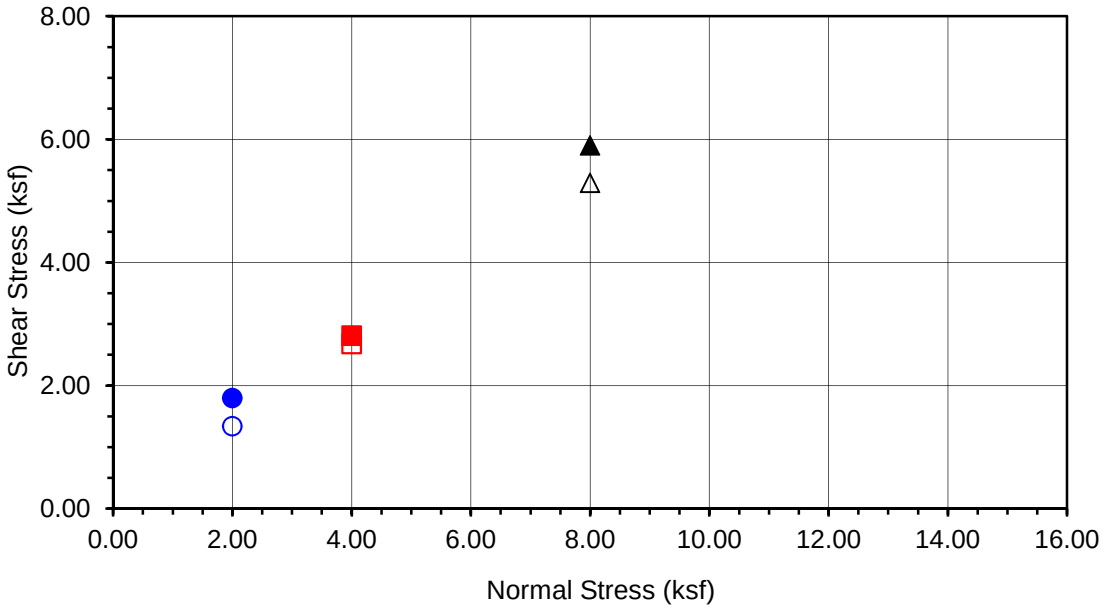

Tested Sample:
HS-17 at 5-7 ft (Af)

| | Peak: | At 0.30" Displacement: |
|---|---|---|
| | 28.3 Degrees | 32.8 Degrees |
| | 0.32 ksf | 0.05 ksf |

Samples Remolded to 90% R.C.

| | | |
|---|---|---|
| LGC Geotechnical, Inc. | **DIRECT SHEAR PLOT** | **Project Number:** 14057-01<br>**Date:** Feb-15 |
| | | **Westridge / La Habra** |




| | |
|---|---|
| **Boring No.** | **B-3** |
| **Sample No.** | **B-1** |
| **Depth (ft)** | **30-33** |
| Sample Type: 90% Remold | |
| Soil Identification: Light olive brown sandy lean clay s(CL) | |

| Normal Stress (kip/ft²) | 2.000 | 4.000 | 8.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 1.795 | ■ 2.811 | ▲ 5.901 |
| Shear Stress @ End of Test (ksf) | ○ 1.342 | □ 2.675 | △ 5.291 |
| Deformation Rate (in./min.) | 0.0017 | 0.0017 | 0.0017 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 14.58 | 14.58 | 14.58 |
| Dry Density (pcf) | 103.5 | 103.5 | 103.5 |
| Saturation (%) | 62.6 | 62.6 | 62.6 |
| Soil Height Before Shearing (in.) | 0.9922 | 0.9862 | 0.9804 |
| Final Moisture Content (%) | 21.3 | 20.7 | 19.6 |

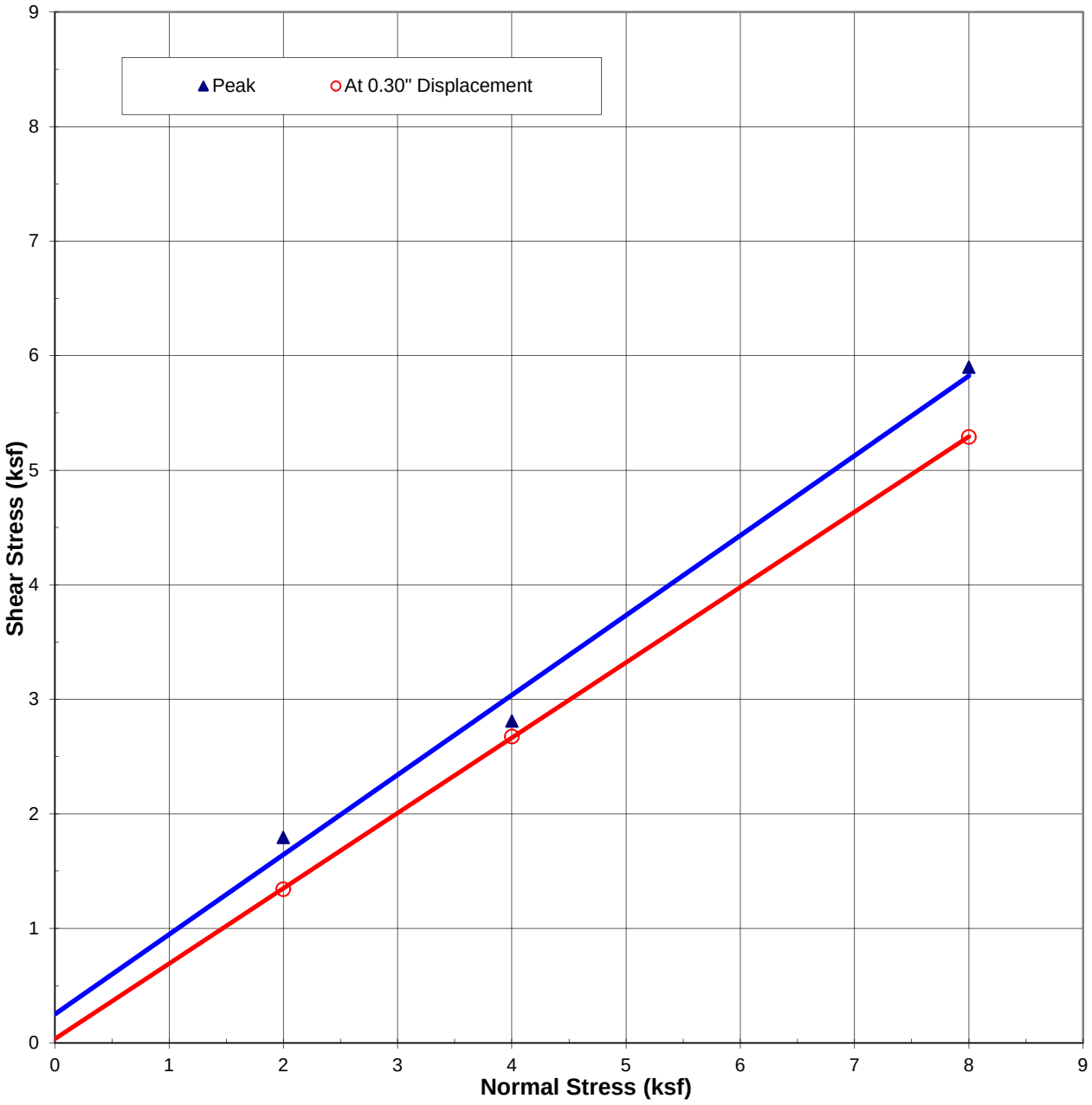
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

02-15




Tested Sample:

B-3 at 30-33 ft (Af)

| Peak: | | At 0.30" Displacement: | |
|---|---|---|---|
| 34.9 | Degrees | 33.3 | Degrees |
| 0.25 | ksf | 0.03 | ksf |

Samples Remolded to 90% R.C.

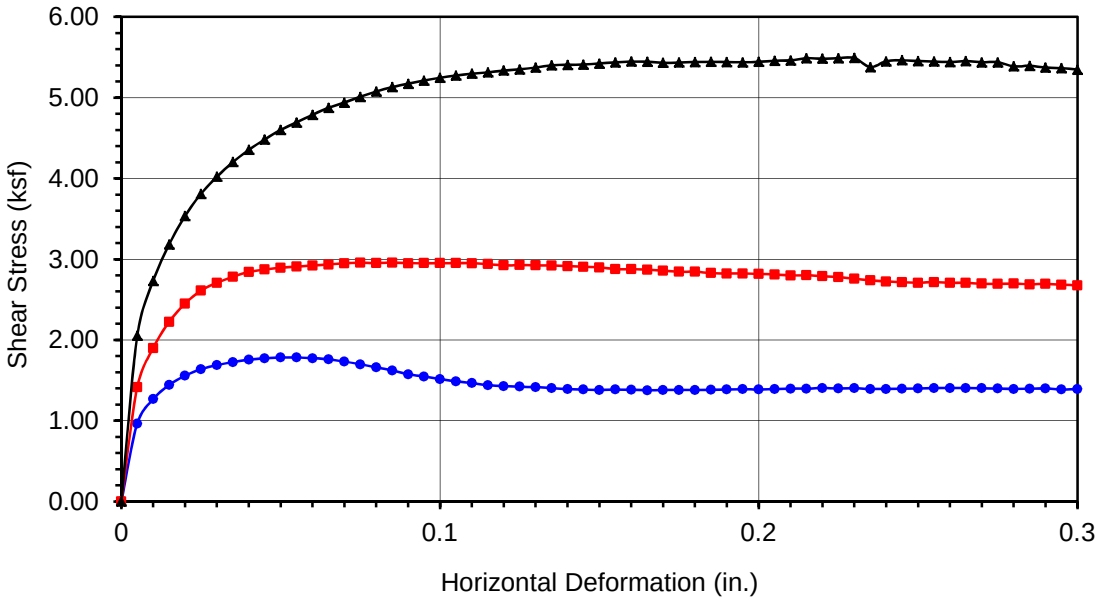
LGC Geotechnical, Inc.

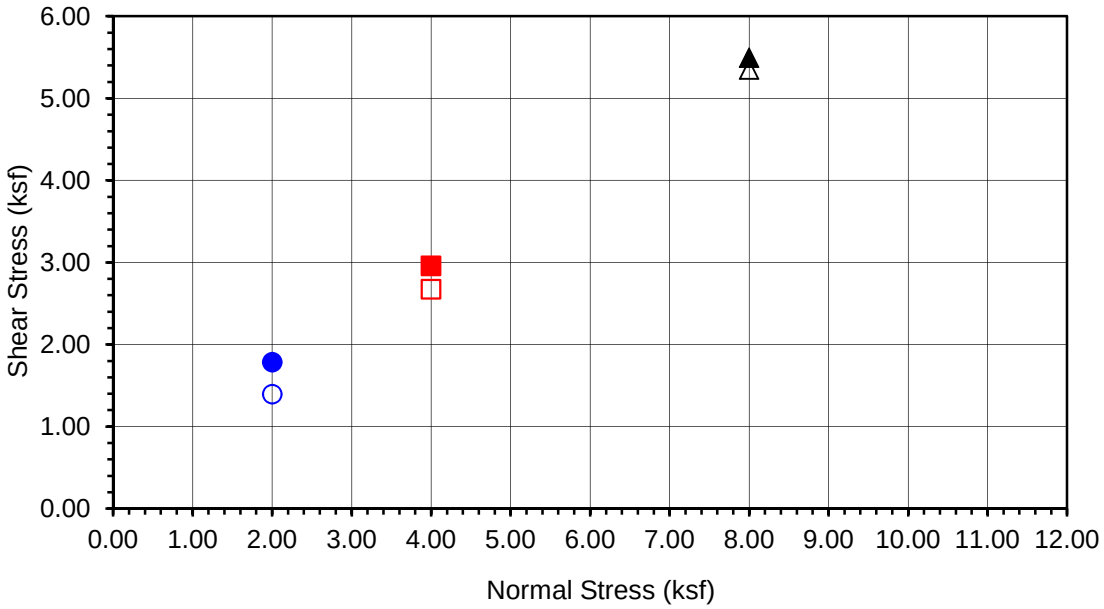
**DIRECT SHEAR PLOT**

**Project Number:** 14057-01

**Date:** Feb-15

**Westridge / La Habra**




| | |
|---|---|
| **Boring No.** | **B-4** |
| **Sample No.** | **B-1** |
| **Depth (ft)** | **35-40** |
| Sample Type: 90% Remold | |
| Soil Identification: Light olive brown silty sand (SM) | |

| Normal Stress (kip/ft²) | 2.000 | 4.000 | 8.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 1.783 | ■ 2.958 | ▲ 5.492 |
| Shear Stress @ End of Test (ksf) | ○ 1.393 | □ 2.675 | △ 5.348 |
| Deformation Rate (in./min.) | 0.0033 | 0.0033 | 0.0033 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 11.62 | 11.62 | 11.62 |
| Dry Density (pcf) | 108.0 | 108.0 | 108.0 |
| Saturation (%) | 55.9 | 55.9 | 55.9 |
| Soil Height Before Shearing (in.) | 0.9892 | 0.9851 | 0.9711 |
| Final Moisture Content (%) | 16.9 | 16.3 | 15.4 |

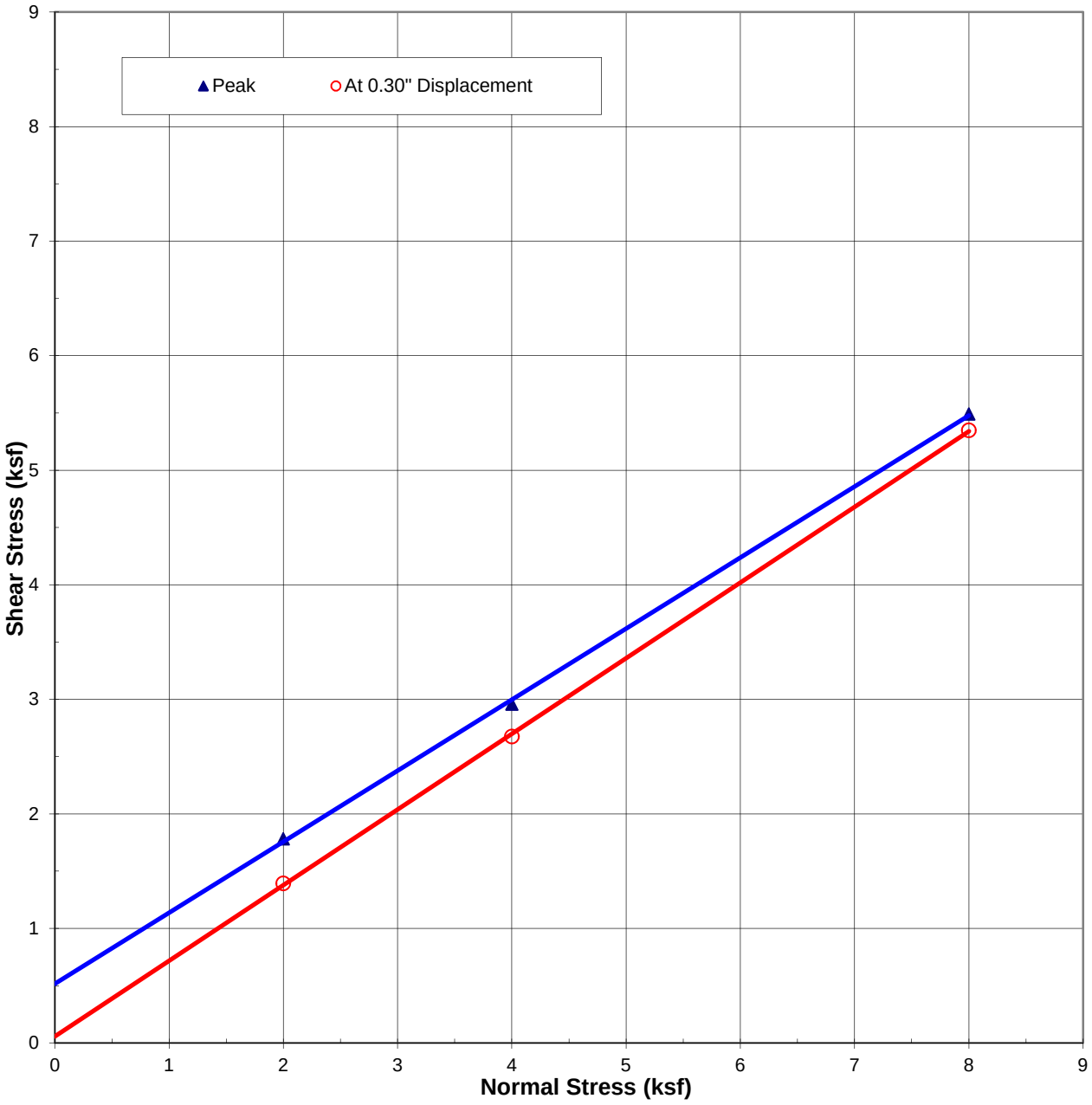
**DIRECT SHEAR TEST RESULTS**

**Consolidated Drained - ASTM D 3080**

Project No.: 14057-01

La Habra

03-15




Tested Sample:

B-4 at 35-40 ft (Af)

| | Peak: | At 0.30" Displacement: |
|---|---|---|
| | 31.8 Degrees | 33.4 Degrees |
| | 0.52 ksf | 0.06 ksf |

Samples Remolded to 90% R.C.

LGC Geotechnical, Inc.

**DIRECT SHEAR PLOT**

**Project Number:** 14057-01

**Date:** Mar-15

**Westridge / La Habra**

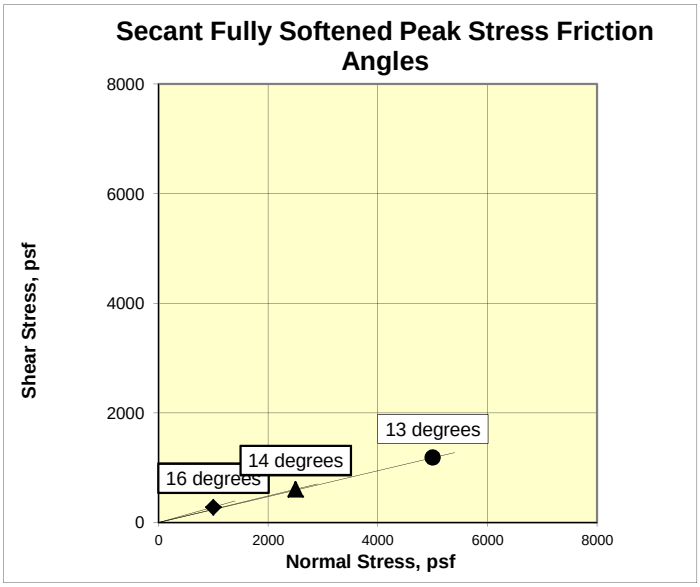
# Drained Residual Torsional Shear Strength (ASTM D6467)

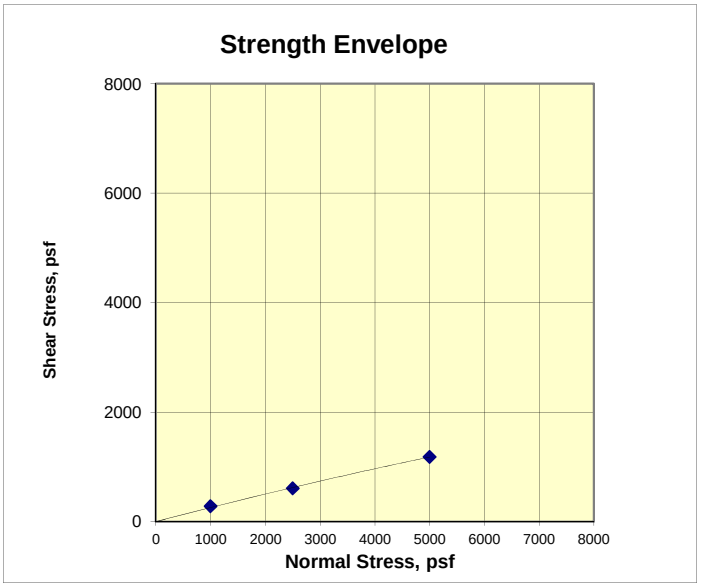
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CTL Job No.:** | 749-009 | **Boring:** | B-6 | **Date:** | 12/15/2016 | **Clay, %:** | |
| **Client:** | LGC Geotechnical | **Sample:** | | **By:** | PJ | **LL:** | 64 |
| **Project Name:** | Rancho LaHabra | **Depth (ft):** | 10 | **Checked:** | DC | **PL:** | 28 |
| **Project Number:** | 14057-01 | **Test Type:** | Fully Softened Residual | | | | |

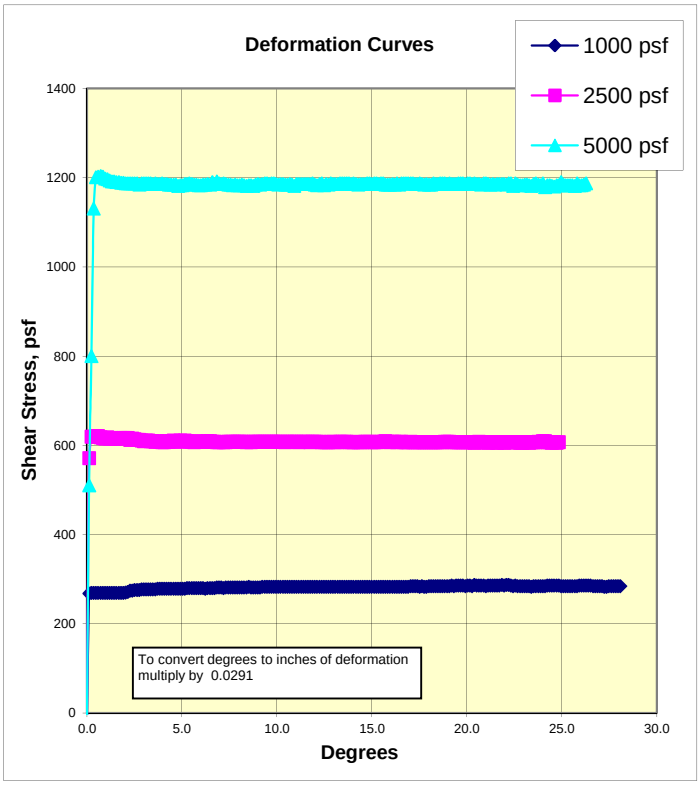
**Soil Type:** Gray Fat CLAY w/ Sand

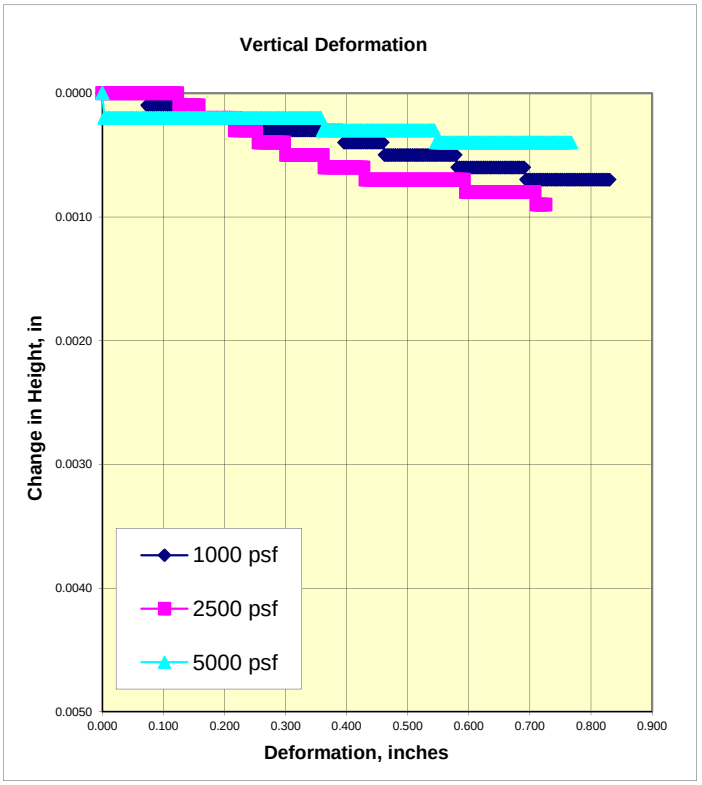
| **Normal Stress, psf:** | 1000 | 2500 | 5000 |
|---|---|---|---|
| **Secant Phi, deg.:** | 16 | 14 | 13 |

Remarks: A small friction correction was applied to each point.



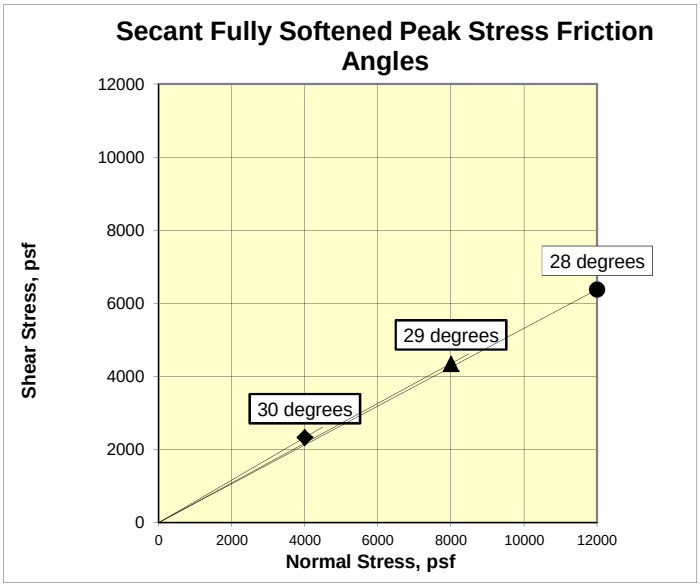



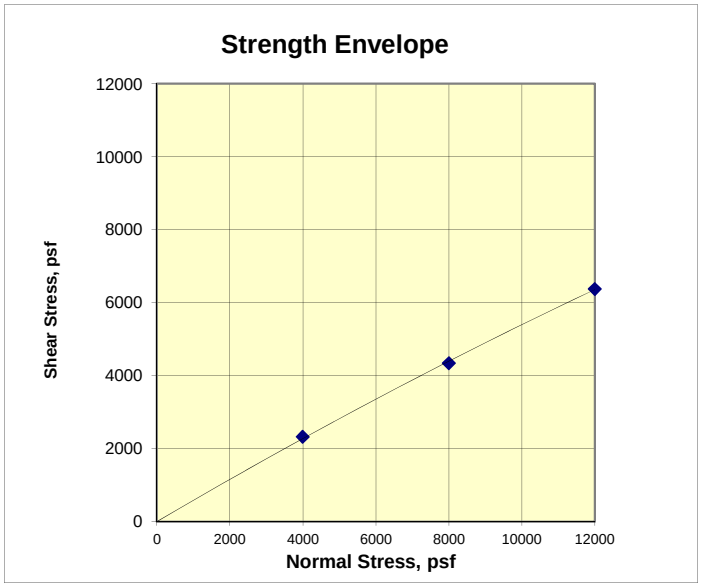



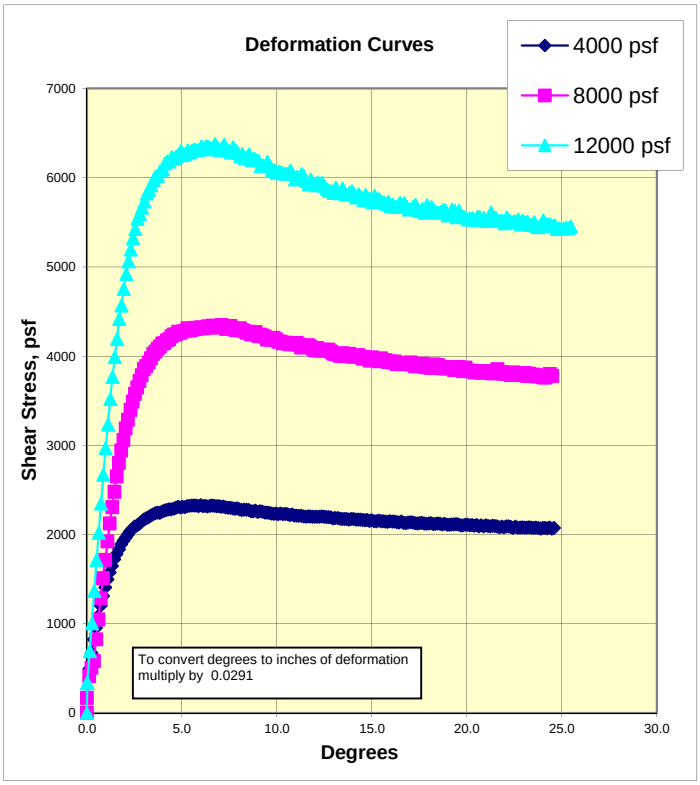
# Drained Fully Softened Peak Torsional Shear Strength (ASTM D7608)

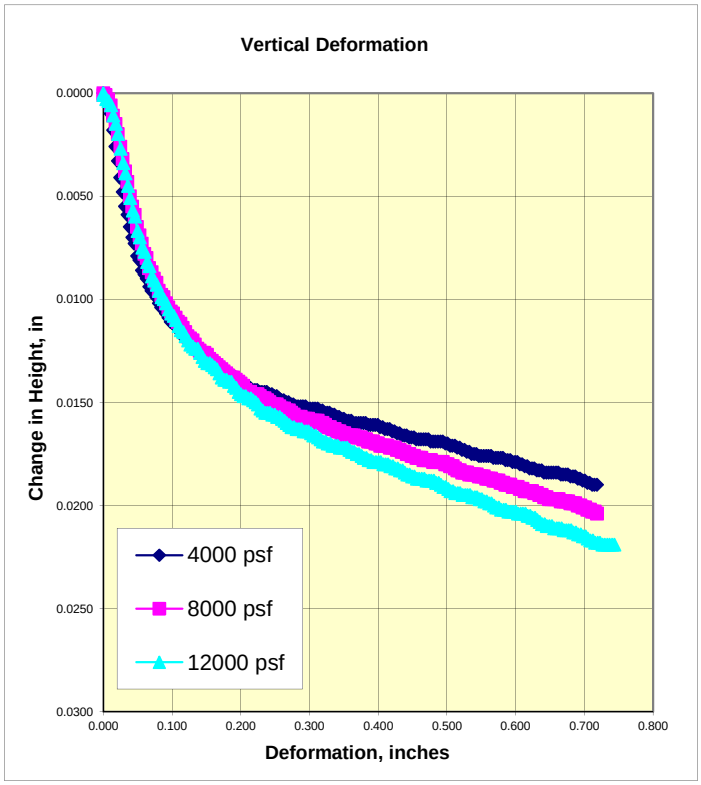
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CTL Job No.:** | 749-009 | **Boring:** | B-6 | **Date:** | 12/12/2016 | **Clay, %:** | |
| **Client:** | LGC Geotechnical | **Sample:** | | **By:** | PJ | **LL:** | 47 |
| **Project Name:** | Rancho LaHabra | **Depth (ft):** | 86 | **Checked:** | DC | **PL:** | 28 |
| **Project Number:** | 14057-01 | **Test Type:** | Fully Softened Peak | | | | |
| **Soil Type:** | Bluish Gray SILT w/ Sand | | | Remarks: | | | |

| | | | |
|---|---|---|---|
| **Normal Stress, psf:** | 4000 | 8000 | 12000 |
| **Secant Phi, deg.:** | 30 | 29 | 28 |

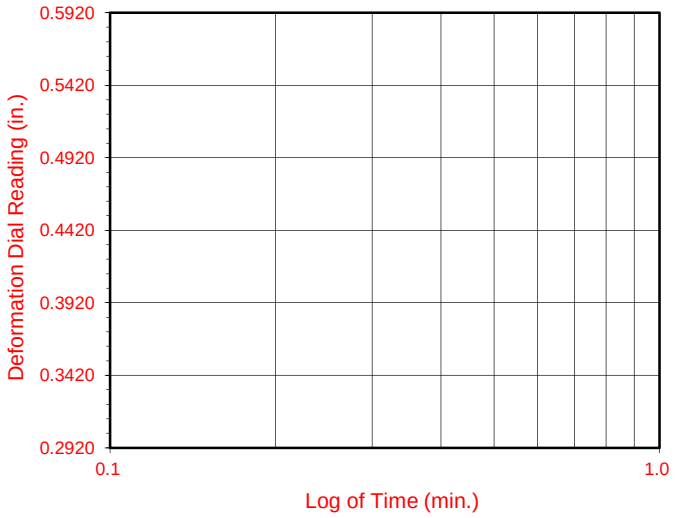


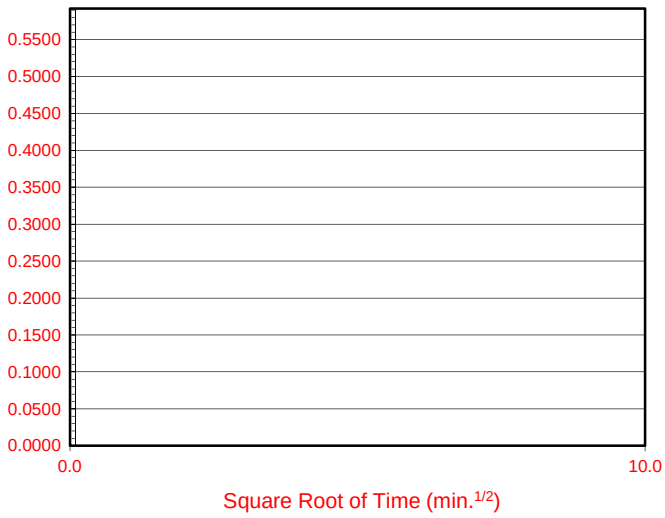



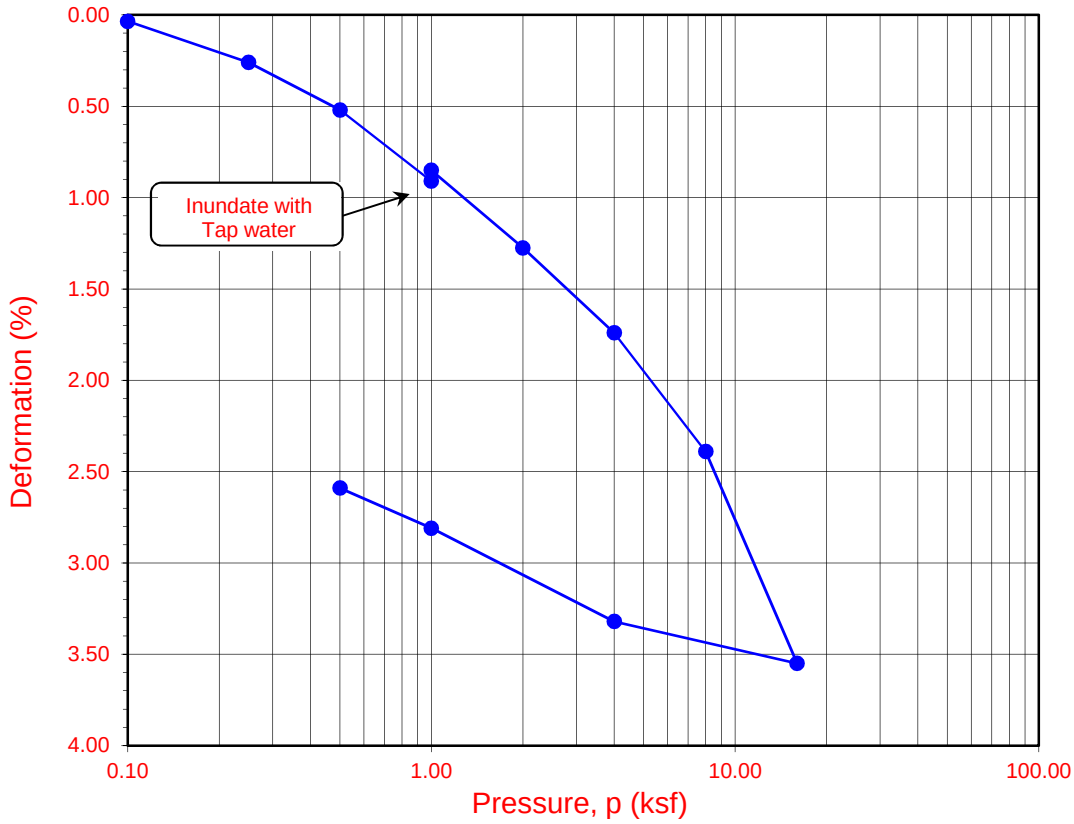



No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-3** | **R-3** | **10.0** | **11.6** | **13.2** | **118.1** | **120.9** | **0.428** | **0.391** | **73** | **91** |

Soil Identification: Dark grayish brown lean clay (CL)

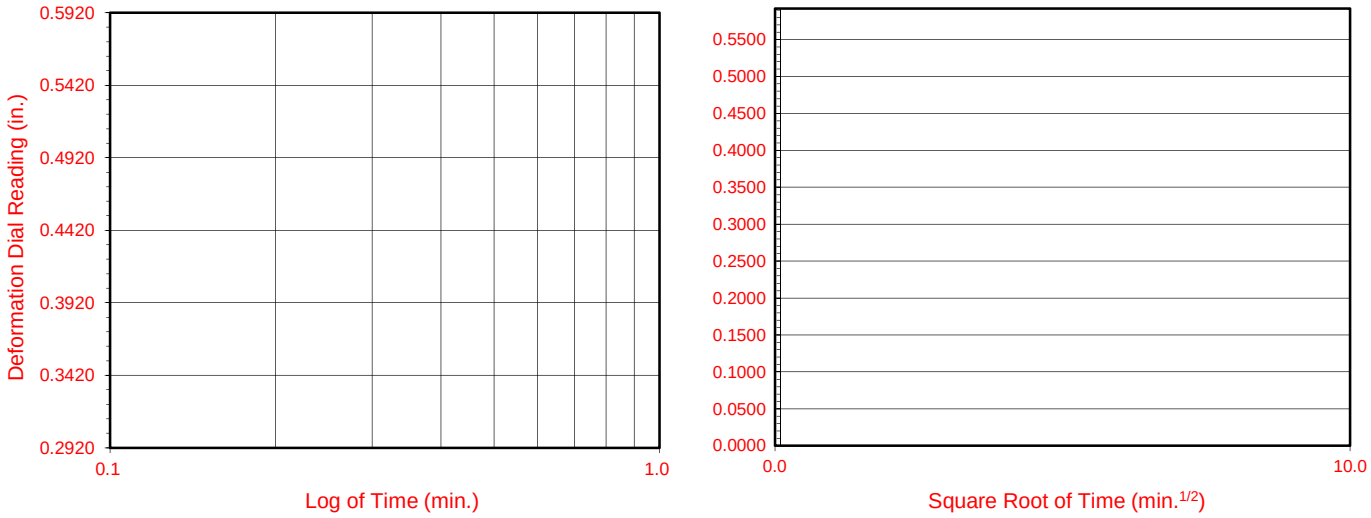
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

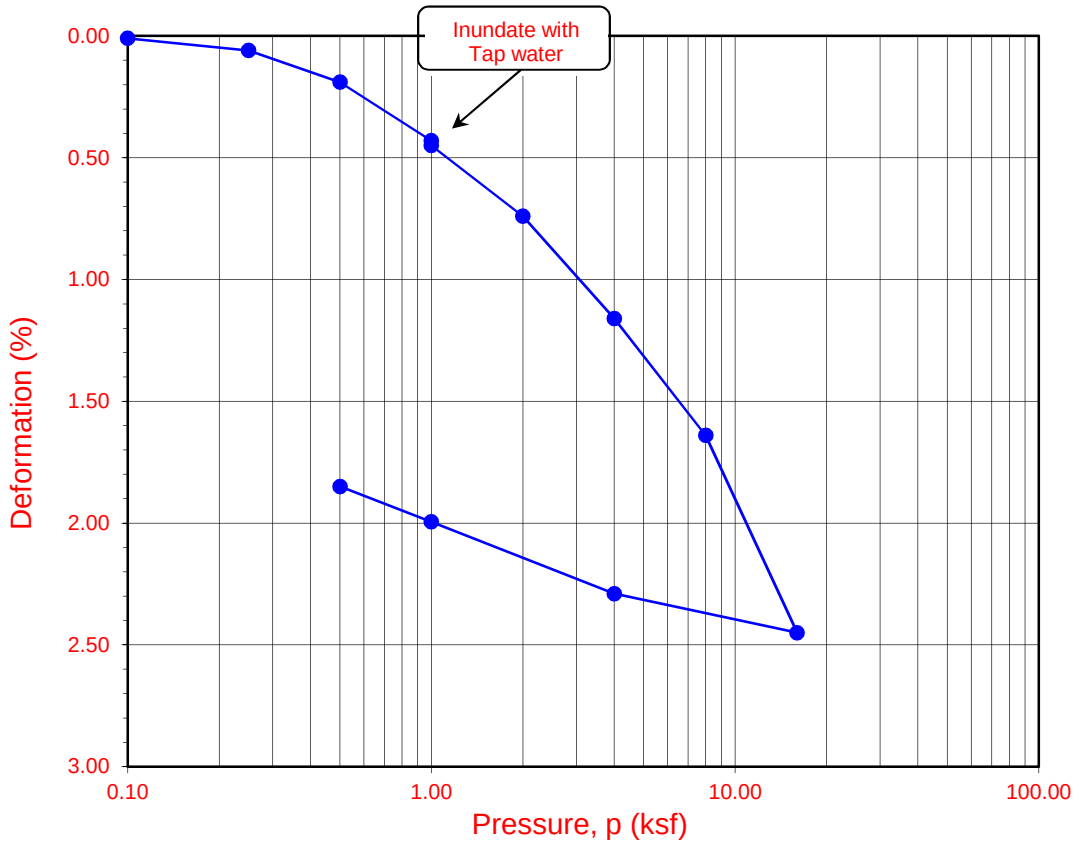
Project No.: 14057-01

La Habra

08-14

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-3** | **R-4** | **15.0** | **9.7** | **13.1** | **115.1** | **118.1** | **0.464** | **0.437** | **57** | **83** |

Soil Identification: Dark yellowish brown sandy lean clay s(CL)

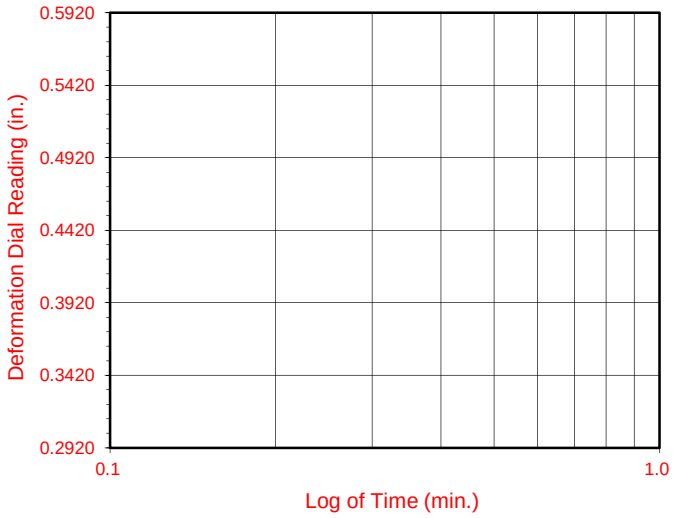
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

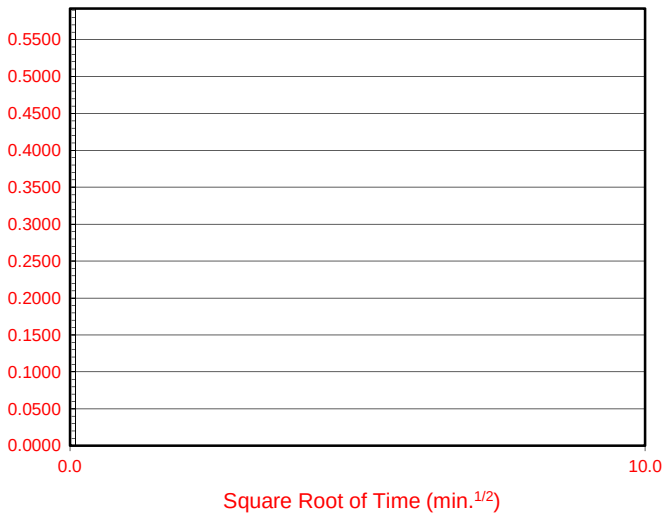
Project No.: 14057-01

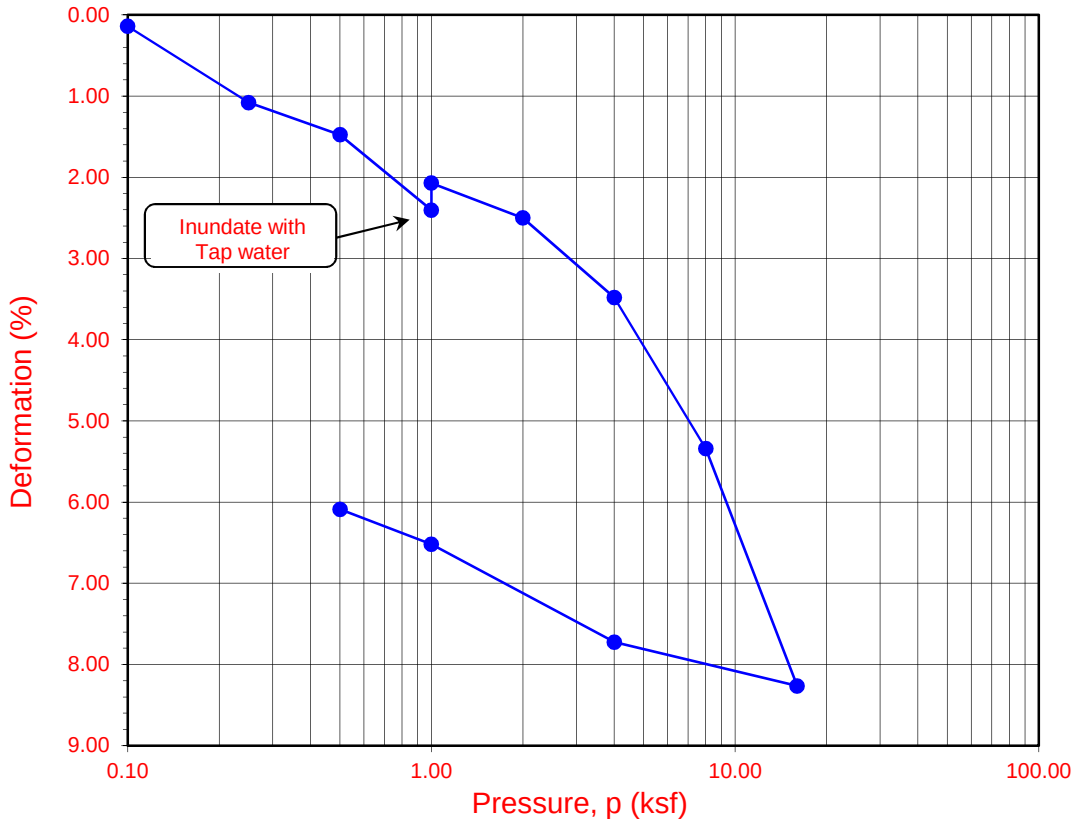
La Habra

08-14

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-3** | **R-6** | **25.0** | **21.3** | **19.5** | **103.2** | **109.7** | **0.634** | **0.535** | **91** | **98** |

Soil Identification: Dark yellowish brown lean clay (CL)

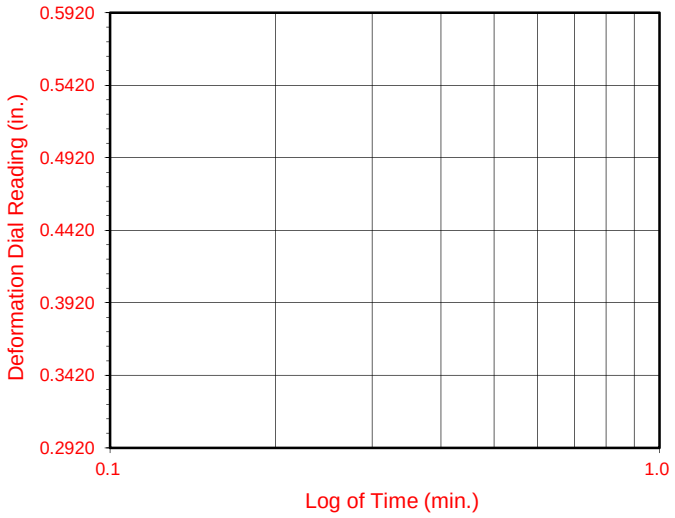
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

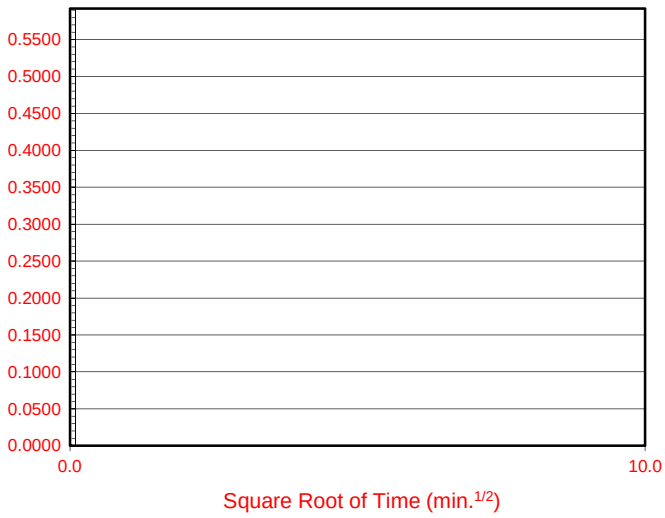
Project No.: 14057-01

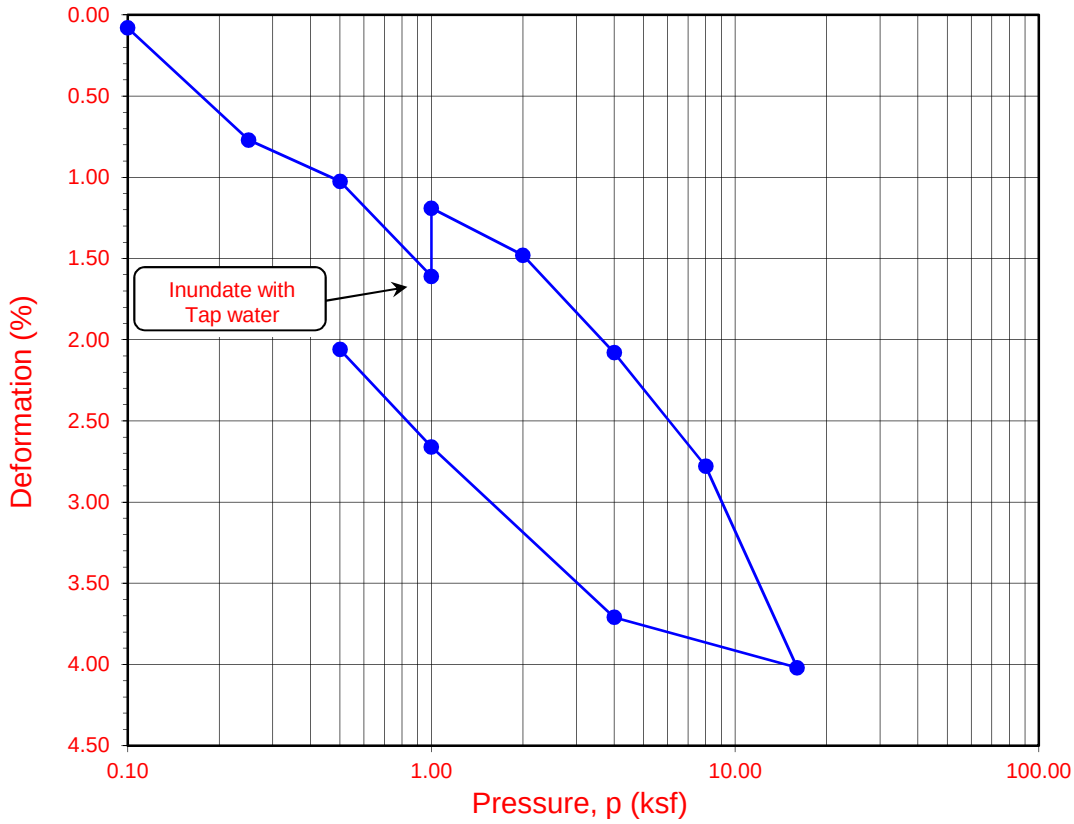
La Habra

08-14

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-12** | **R-4** | **40.0** | **14.8** | **15.1** | **115.7** | **117.8** | **0.457** | **0.427** | **88** | **95** |

Soil Identification: Dark grayish brown lean clay with sand (CL)s

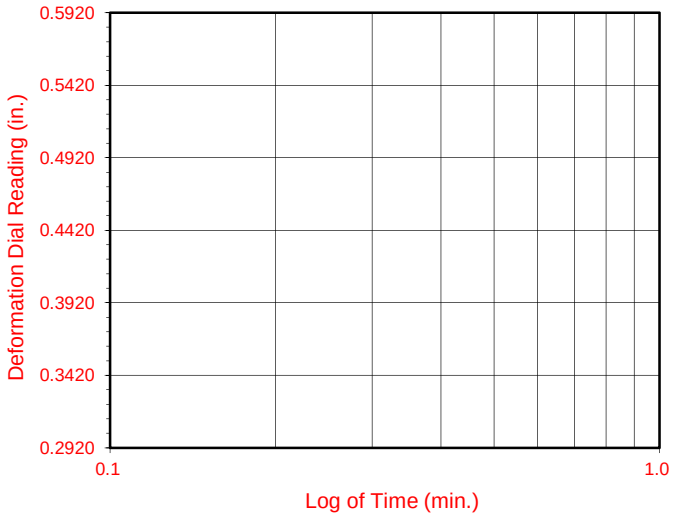
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

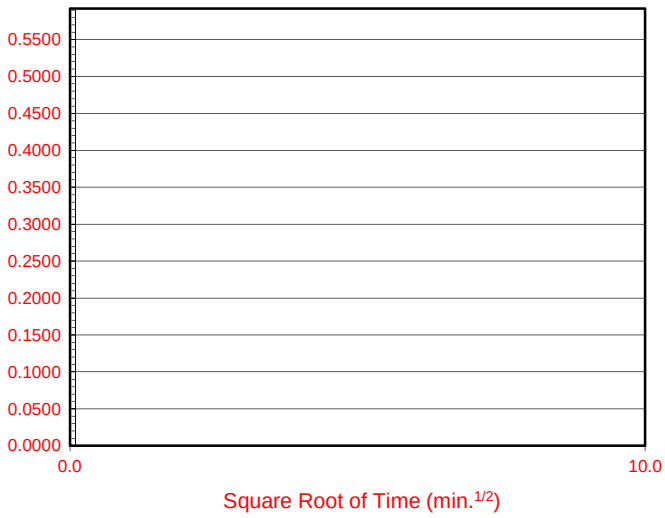
Project No.: 14057-01

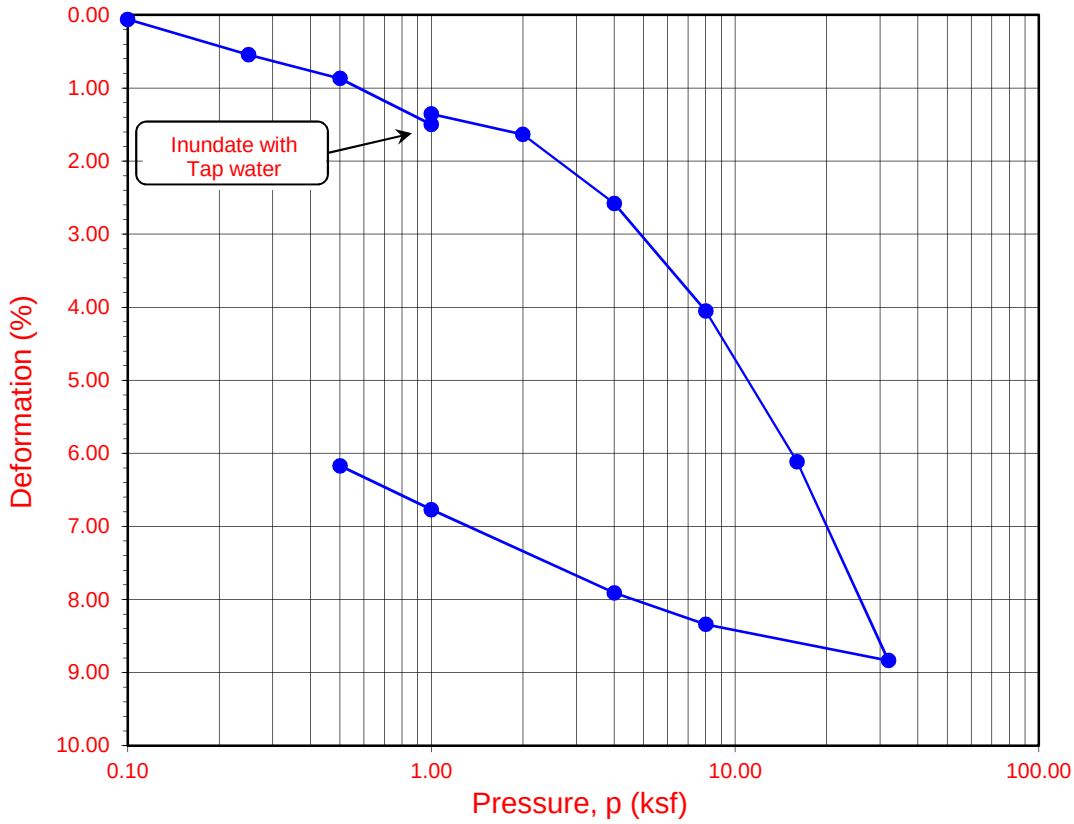
La Habra

08-14

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-12** | **R-6** | **50.0** | **25.7** | **22.6** | **97.5** | **103.7** | **0.729** | **0.623** | **95** | **98** |

Soil Identification: Olive gray lean clay (CL)

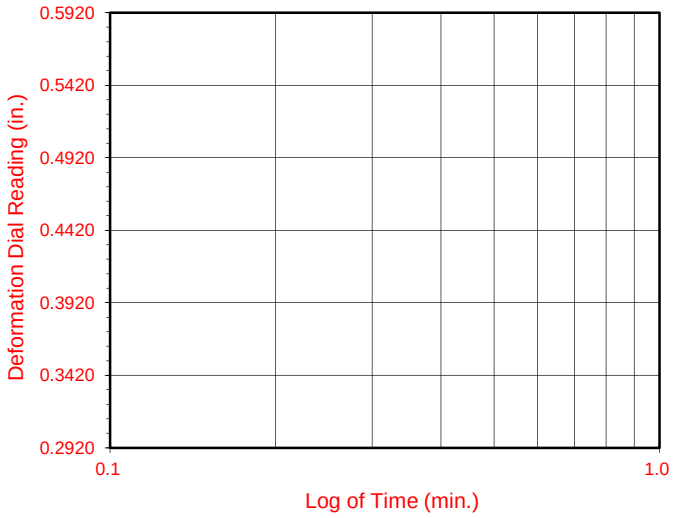
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

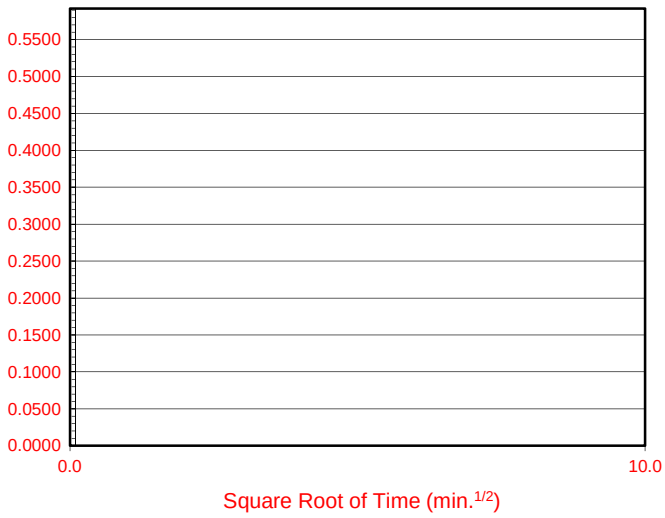
Project No.: 14057-01

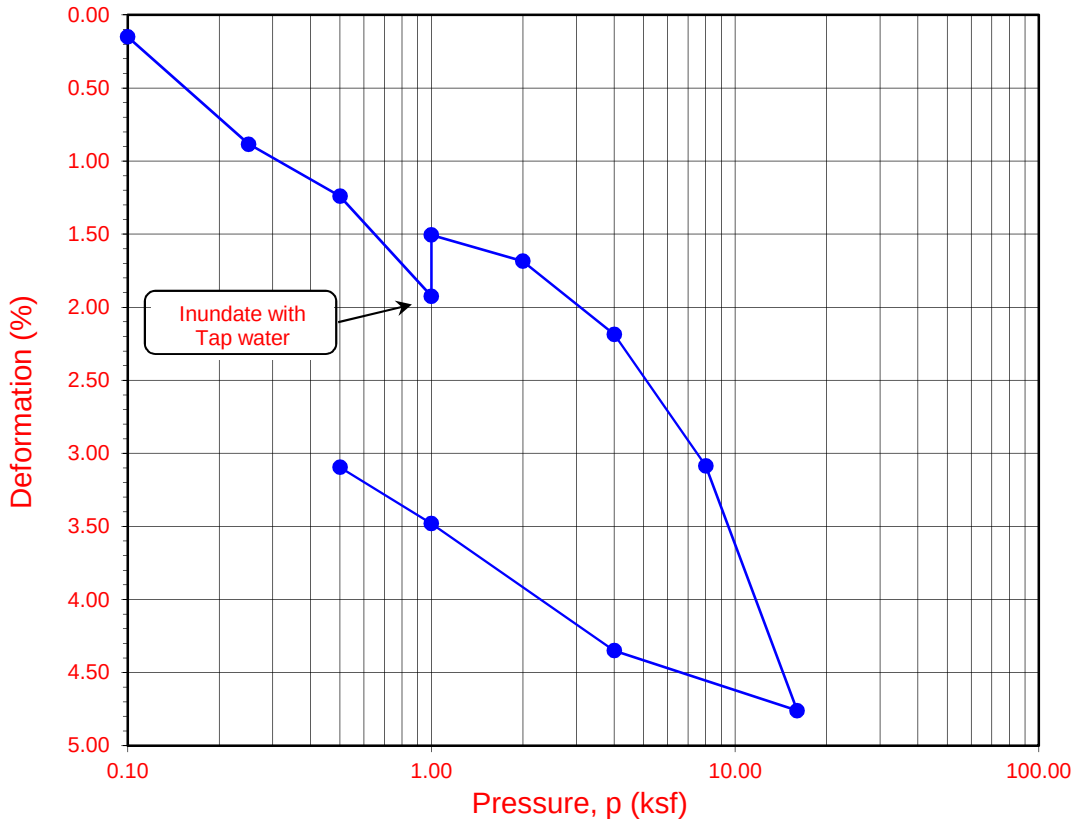
La Habra

08-14

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-14** | **R-2** | **10.0** | **21.4** | **18.5** | **107.5** | **112.5** | **0.580** | **0.531** | **100** | **99** |

Soil Identification: Dark olive gray lean clay (CL)

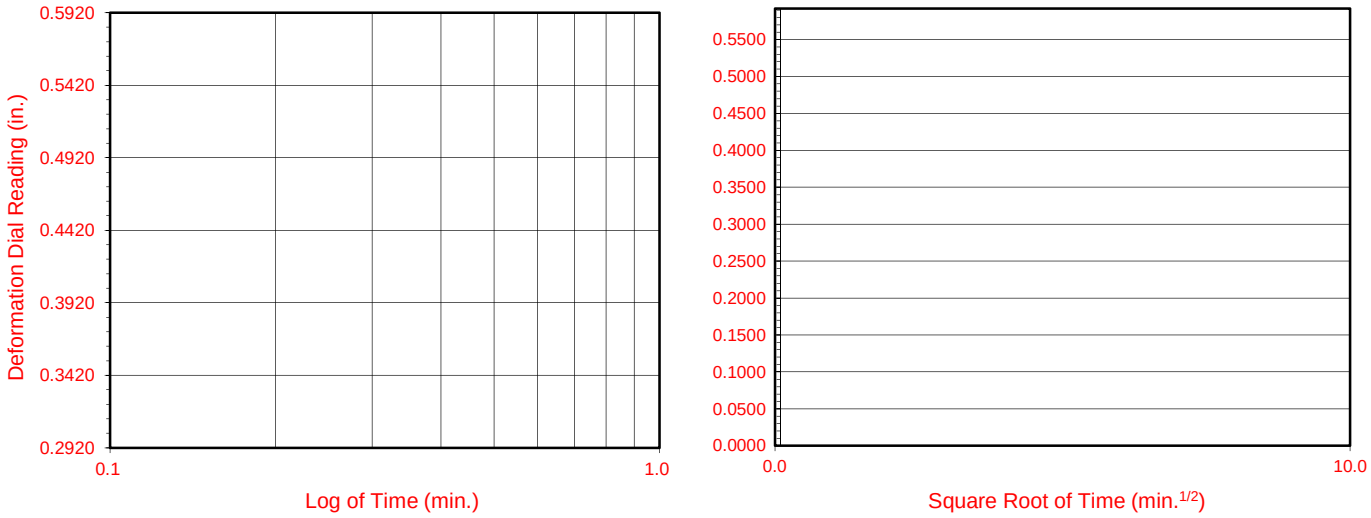
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

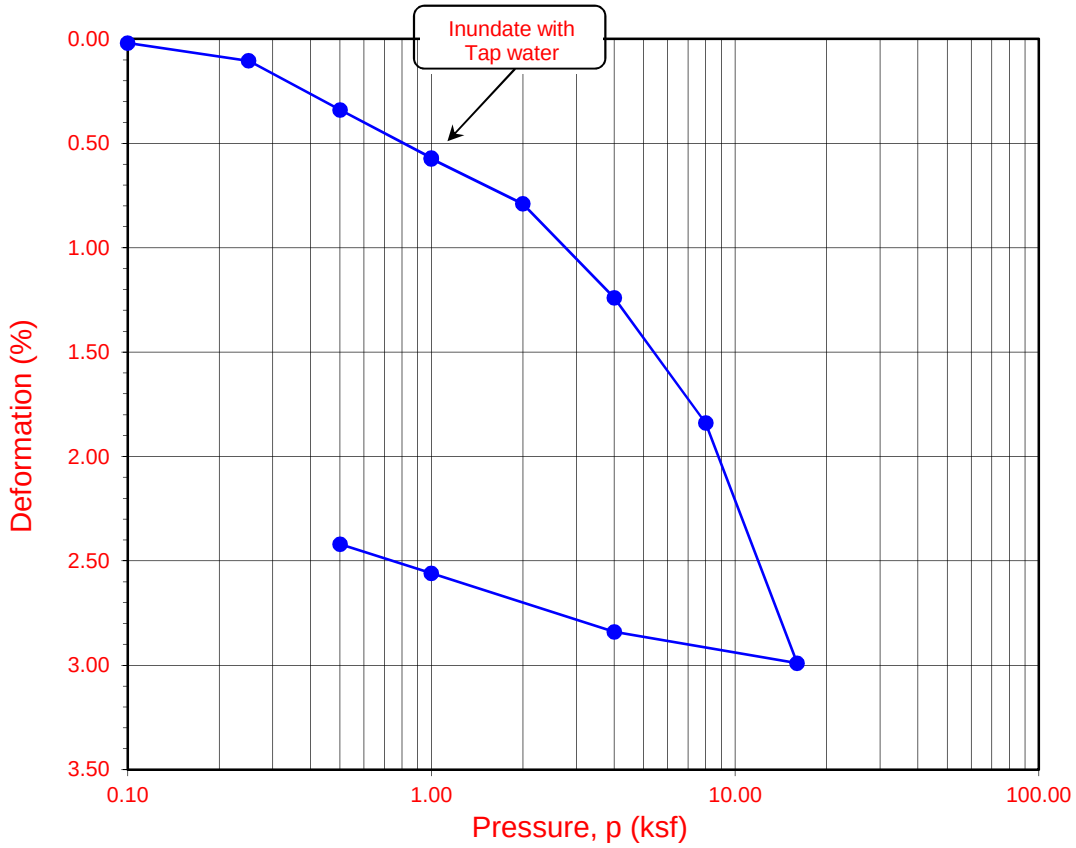
Project No.: 14057-01

La Habra

08-14

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-14** | **R-4** | **20.0** | **9.1** | **13.4** | **115.3** | **117.8** | **0.462** | **0.427** | **53** | **84** |

Soil Identification: Olive brown clayey sand (SC)

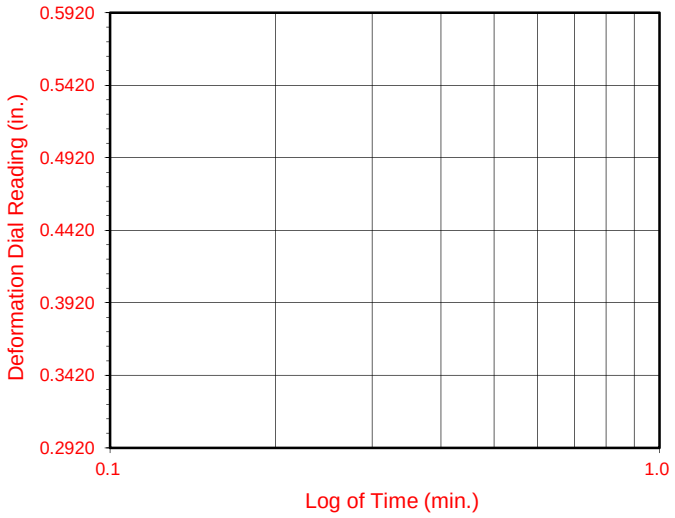
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

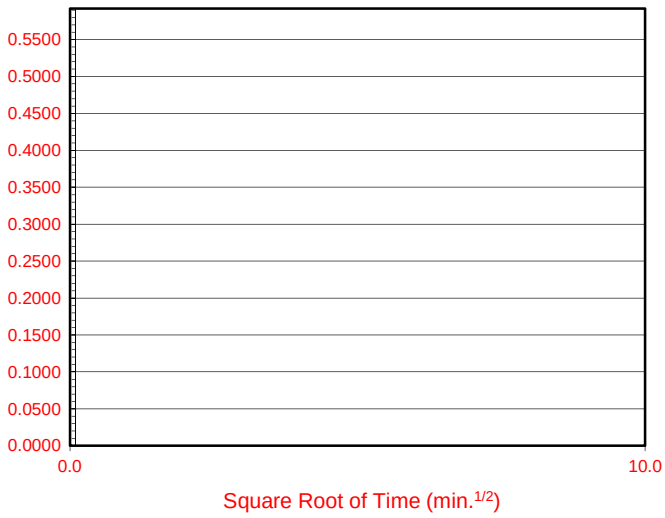
Project No.: 14057-01

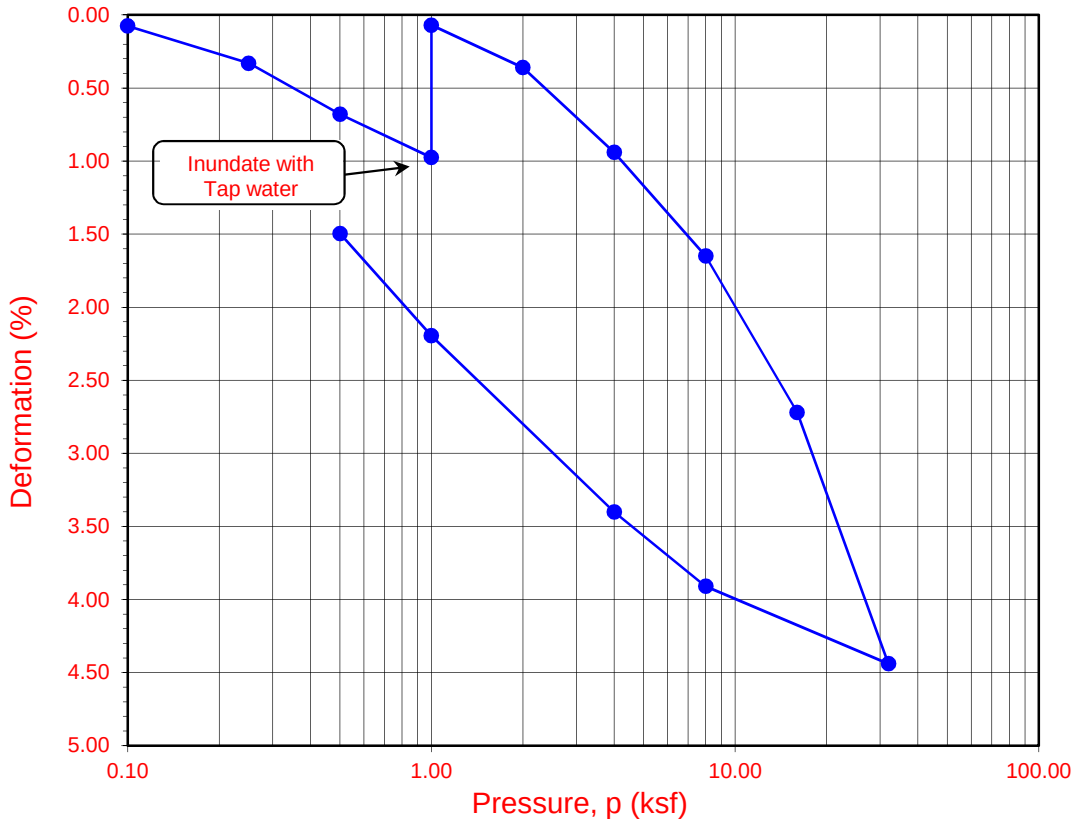
La Habra

08-14

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-15** | **R-5** | **25.0** | **13.4** | **14.8** | **119.2** | **120.5** | **0.414** | **0.393** | **88** | **100** |

Soil Identification: Olive brown clayey sand (SC)

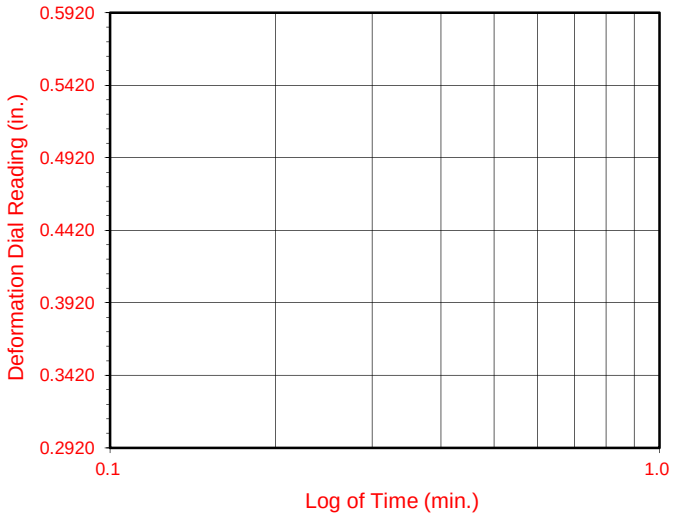
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

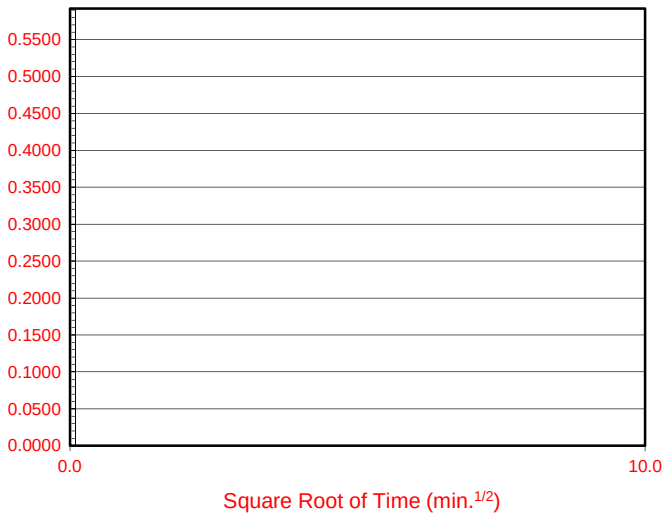
Project No.: 14057-01

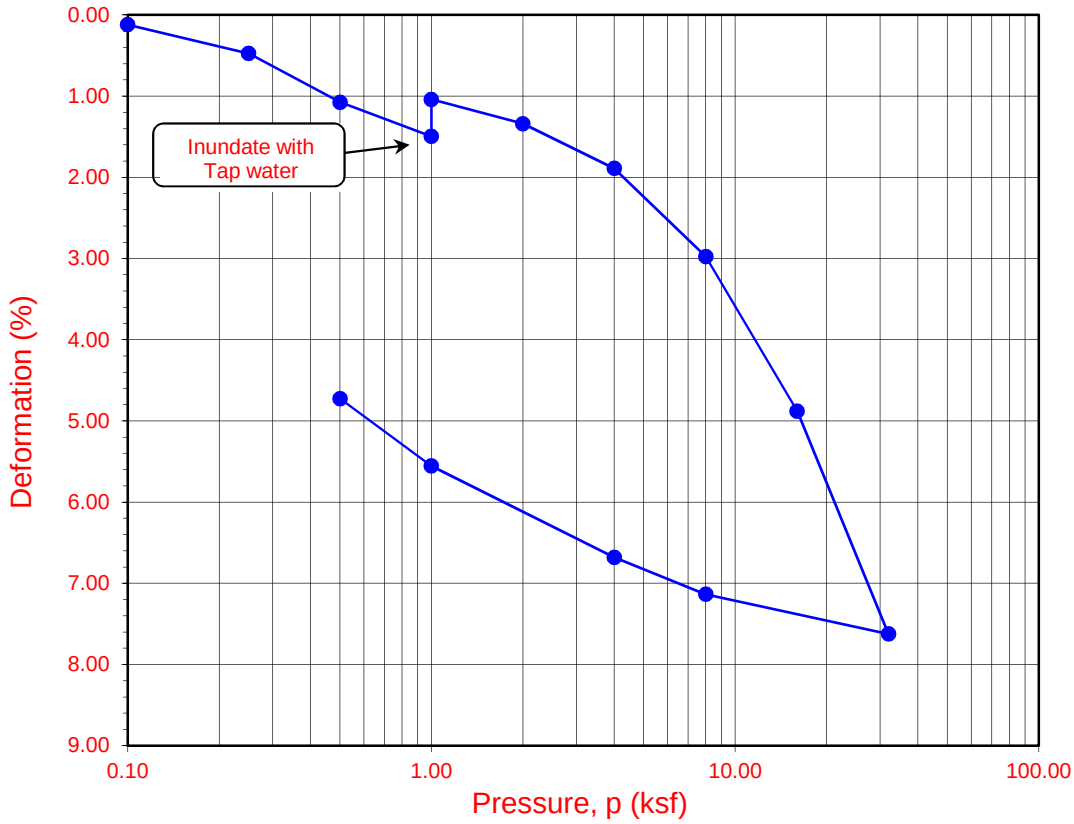
La Habra

03-15

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-16** | **R-4** | **20.0** | **16.4** | **16.4** | **112.0** | **116.9** | **0.505** | **0.434** | **88** | **100** |

Soil Identification: Brown lean clay (CL)

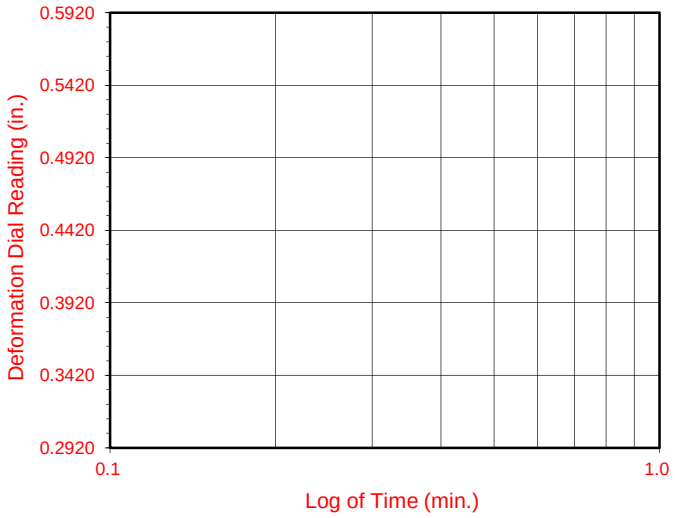
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

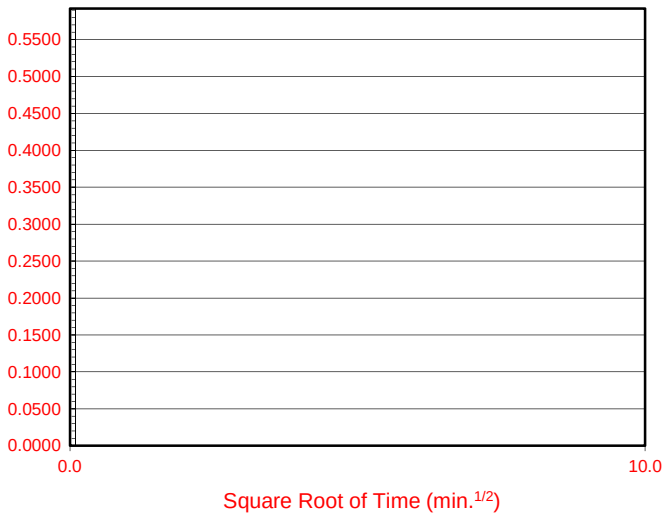
Project No.: 14057-01

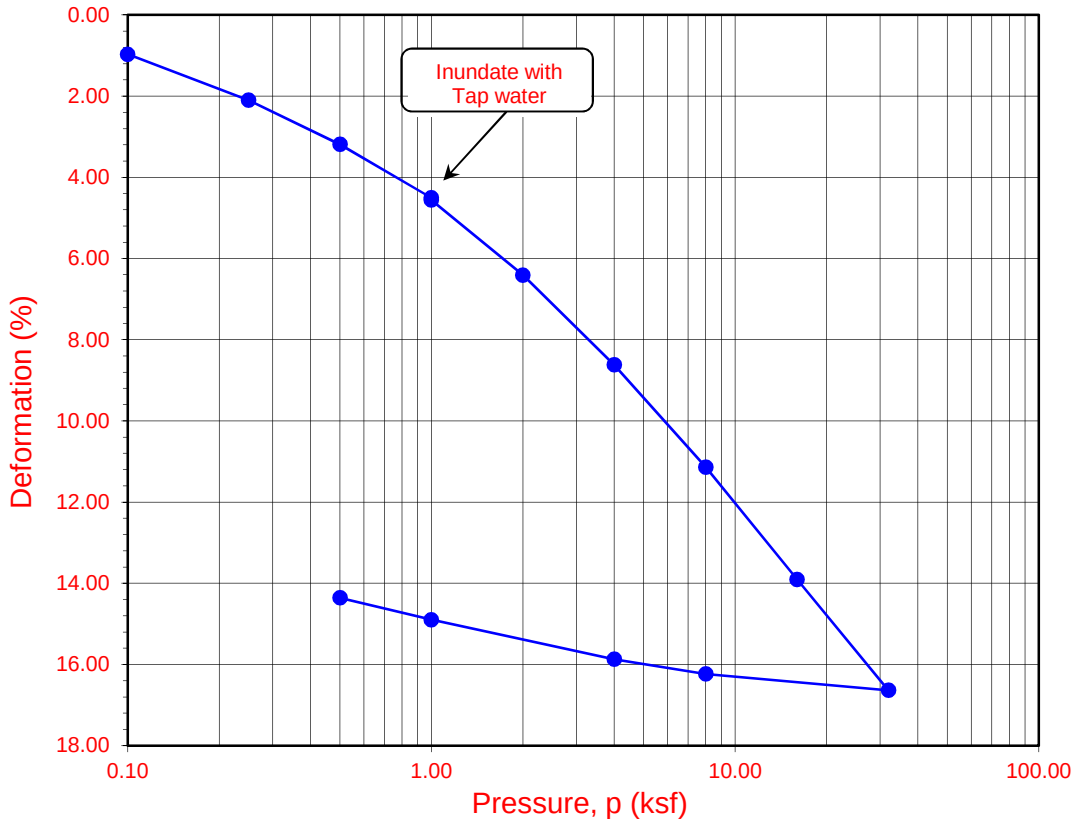
La Habra

03-15

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-17** | **R-4** | **20.0** | **26.3** | **17.6** | **97.6** | **113.8** | **0.728** | **0.480** | **98** | **99** |

Soil Identification: Yellowish brown lean clay (CL)

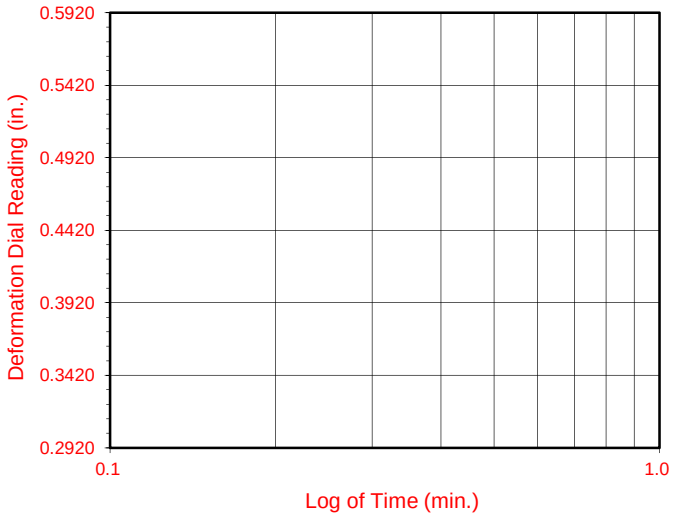
**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

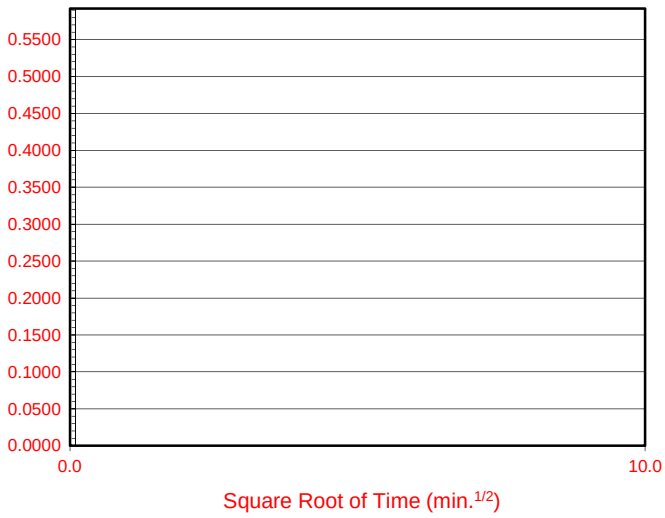
Project No.: 14057-01

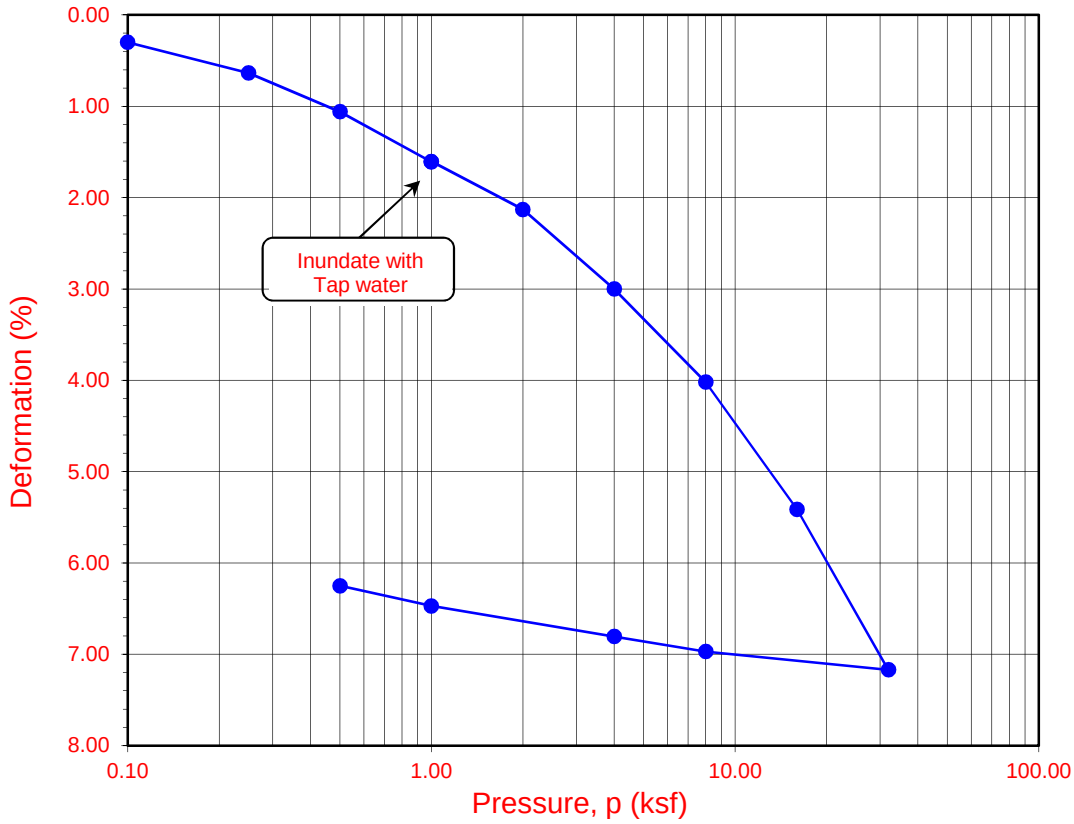
La Habra

03-15

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **HS-17** | **R-5** | **25.0** | **18.2** | **15.9** | **112.0** | **118.8** | **0.522** | **0.427** | **95** | **100** |

Soil Identification: Dark yellowish brown lean clay (CL)

**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

Project No.: 14057-01

La Habra

03-15

# EXPANSION INDEX of SOILS

**ASTM D 4829**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | S. Felter | Date: | 08/06/14 |
| Project No.: | 14057-01 | Checked By: | J. Ward | Date: | 08/11/14 |
| Boring No.: | B-1 | Depth (ft.): | 5-8 | | |
| Sample No.: | B-1 | | | | |
| Soil Identification: | Olive silt (ML) | | | | |

| | | |
|---|---|---|
| Dry Wt. of Soil + Cont. | (g) | 1000.00 |
| Wt. of Container No. | (g) | 0.00 |
| Dry Wt. of Soil | (g) | 1000.00 |
| Weight Soil Retained on #4 Sieve | | 0.00 |
| Percent Passing # 4 | | 100.00 |

| **MOLDED SPECIMEN** | | Before Test | After Test |
|---|---|---|---|
| Specimen Diameter | (in.) | 4.01 | 4.01 |
| Specimen Height | (in.) | 1.0000 | 1.0355 |
| Wt. Comp. Soil + Mold | (g) | 585.10 | 414.29 |
| Wt. of Mold | (g) | 207.50 | 0.00 |
| Specific Gravity (Assumed) | | 2.70 | 2.70 |
| Container No. | | O | O |
| Wet Wt. of Soil + Cont. | (g) | 757.60 | 621.79 |
| Dry Wt. of Soil + Cont. | (g) | 675.80 | 544.34 |
| Wt. of Container | (g) | 0.00 | 207.50 |
| Moisture Content | (%) | 12.10 | 22.99 |
| Wet Density | (pcf) | 113.9 | 120.7 |
| Dry Density | (pcf) | 101.6 | 98.1 |
| Void Ratio | | 0.659 | 0.718 |
| Total Porosity | | 0.397 | 0.418 |
| Pore Volume | (cc) | 82.2 | 89.6 |
| Degree of Saturation (%) [ $S_{meas}$] | | **49.6** | 86.5 |

**SPECIMEN INUNDATION** in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

| Date | Time | Pressure (psi) | Elapsed Time (min.) | Dial Readings (in.) |
|---|---|---|---|---|
| 08/06/14 | 13:44 | 1.0 | 0 | 0.1945 |
| 08/06/14 | 13:54 | 1.0 | 10 | 0.1940 |
| Add Distilled Water to the Specimen | | | | |
| 08/06/14 | 14:32 | 1.0 | 38 | 0.2250 |
| 08/07/14 | 6:11 | 1.0 | 977 | 0.2300 |
| 08/07/14 | 7:46 | 1.0 | 1072 | 0.2300 |
| | | | | |

| | |
|---|---|
| Expansion Index ($EI_{meas}$) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000 | **36** |

# EXPANSION INDEX of SOILS

**ASTM D 4829**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | S. Felter | Date: | 08/06/14 |
| Project No.: | 14057-01 | Checked By: | J. Ward | Date: | 08/11/14 |
| Boring No.: | HS-1 | Depth (ft.): | 30.0 | | |
| Sample No.: | B-1 | | | | |
| Soil Identification: | Dark brown clayey sand (SC) | | | | |

| | | |
|---|---|---|
| Dry Wt. of Soil + Cont. | (g) | 1000.00 |
| Wt. of Container No. | (g) | 0.00 |
| Dry Wt. of Soil | (g) | 1000.00 |
| Weight Soil Retained on #4 Sieve | | 0.00 |
| Percent Passing # 4 | | 100.00 |

| **MOLDED SPECIMEN** | | Before Test | After Test |
|---|---|---|---|
| Specimen Diameter | (in.) | 4.01 | 4.01 |
| Specimen Height | (in.) | 1.0000 | 1.0145 |
| Wt. Comp. Soil + Mold | (g) | 622.40 | 433.28 |
| Wt. of Mold | (g) | 208.40 | 0.00 |
| Specific Gravity (Assumed) | | 2.70 | 2.70 |
| Container No. | | O | O |
| Wet Wt. of Soil + Cont. | (g) | 821.80 | 641.68 |
| Dry Wt. of Soil + Cont. | (g) | 754.70 | 588.60 |
| Wt. of Container | (g) | 0.00 | 208.40 |
| Moisture Content | (%) | 8.89 | 13.96 |
| Wet Density | (pcf) | 124.9 | 128.8 |
| Dry Density | (pcf) | 114.7 | 113.0 |
| Void Ratio | | 0.470 | 0.491 |
| Total Porosity | | 0.320 | 0.329 |
| Pore Volume | (cc) | 66.2 | 69.2 |
| Degree of Saturation (%) [ $S_{meas}$] | | **51.1** | 76.7 |

**SPECIMEN INUNDATION** in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

| Date | Time | Pressure (psi) | Elapsed Time (min.) | Dial Readings (in.) |
|---|---|---|---|---|
| 08/06/14 | 11:38 | 1.0 | 0 | 0.0180 |
| 08/06/14 | 11:48 | 1.0 | 10 | 0.0175 |
| Add Distilled Water to the Specimen | | | | |
| 08/06/14 | 14:30 | 1.0 | 162 | 0.0325 |
| 08/07/14 | 6:13 | 1.0 | 1105 | 0.0325 |
| 08/07/14 | 7:42 | 1.0 | 1194 | 0.0325 |
| | | | | |

| | |
|---|---|
| Expansion Index ($EI_{meas}$) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000 | **15** |

# EXPANSION INDEX of SOILS

**ASTM D 4829**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | S. Felter | Date: | 08/06/14 |
| Project No.: | 14057-01 | Checked By: | J. Ward | Date: | 08/11/14 |
| Boring No.: | HS-6 | Depth (ft.): | 23-28 | | |
| Sample No.: | B-1 | | | | |
| Soil Identification: | Dark brown clayey sand (SC) | | | | |

| | | |
|---|---|---|
| Dry Wt. of Soil + Cont. | (g) | 1000.00 |
| Wt. of Container No. | (g) | 0.00 |
| Dry Wt. of Soil | (g) | 1000.00 |
| Weight Soil Retained on #4 Sieve | | 0.00 |
| Percent Passing # 4 | | 100.00 |

| **MOLDED SPECIMEN** | Before Test | After Test |
|---|---|---|
| Specimen Diameter (in.) | 4.01 | 4.01 |
| Specimen Height (in.) | 1.0000 | 1.0360 |
| Wt. Comp. Soil + Mold (g) | 568.20 | 436.16 |
| Wt. of Mold (g) | 166.50 | 0.00 |
| Specific Gravity (Assumed) | 2.70 | 2.70 |
| Container No. | O | O |
| Wet Wt. of Soil + Cont. (g) | 800.20 | 602.66 |
| Dry Wt. of Soil + Cont. (g) | 728.10 | 532.04 |
| Wt. of Container (g) | 0.00 | 166.50 |
| Moisture Content (%) | 9.90 | 19.32 |
| Wet Density (pcf) | 121.2 | 127.0 |
| Dry Density (pcf) | 110.3 | 106.4 |
| Void Ratio | 0.529 | 0.584 |
| Total Porosity | 0.346 | 0.369 |
| Pore Volume (cc) | 71.6 | 79.1 |
| Degree of Saturation (%) [ $S_{meas}$] | **50.5** | 89.3 |

**SPECIMEN INUNDATION** in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

| Date | Time | Pressure (psi) | Elapsed Time (min.) | Dial Readings (in.) |
|---|---|---|---|---|
| 08/06/14 | 13:12 | 1.0 | 0 | 0.1330 |
| 08/06/14 | 13:22 | 1.0 | 10 | 0.1320 |
| Add Distilled Water to the Specimen | | | | |
| 08/06/14 | 14:31 | 1.0 | 69 | 0.1650 |
| 08/07/14 | 6:12 | 1.0 | 1010 | 0.1690 |
| 08/07/14 | 7:44 | 1.0 | 1102 | 0.1690 |
| | | | | |

| | |
|---|---|
| Expansion Index ($EI_{meas}$) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000 | **37** |

# MODIFIED PROCTOR COMPACTION TEST

**ASTM D 1557**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | O. Figueroa | Date: | 01/09/15 |
| Project No.: | 14057-01 | Input By: | J. Ward | Date: | 01/12/15 |
| Boring No.: | HS-1 | Depth (ft.): | 40-45 | | |
| Sample No.: | B-2 | | | | |
| Soil Identification: | Light olive brown silty sand (SM) | | | | |

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

**Mold Volume (ft³)** 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

| TEST NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Compacted Soil + Mold (g) | 3788.0 | 3893.0 | 3964.0 | 3869.0 | | |
| Weight of Mold (g) | 1870.0 | 1870.0 | 1870.0 | 1870.0 | | |
| Net Weight of Soil (g) | 1918.0 | 2023.0 | 2094.0 | 1999.0 | | |
| Wet Weight of Soil + Cont. (g) | 396.90 | 402.30 | 410.60 | 461.50 | | |
| Dry Weight of Soil + Cont. (g) | 376.80 | 374.20 | 374.40 | 411.30 | | |
| Weight of Container (g) | 38.50 | 38.60 | 37.30 | 38.30 | | |
| Moisture Content (%) | 5.94 | 8.37 | 10.74 | 13.46 | | |
| Wet Density (pcf) | 127.0 | 133.9 | 138.6 | 132.3 | | |
| Dry Density (pcf) | 119.9 | 123.6 | 125.2 | 116.6 | | |

**Maximum Dry Density (pcf)** **125.5** **Optimum Moisture Content (%)** **10.5**

**PROCEDURE USED**

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

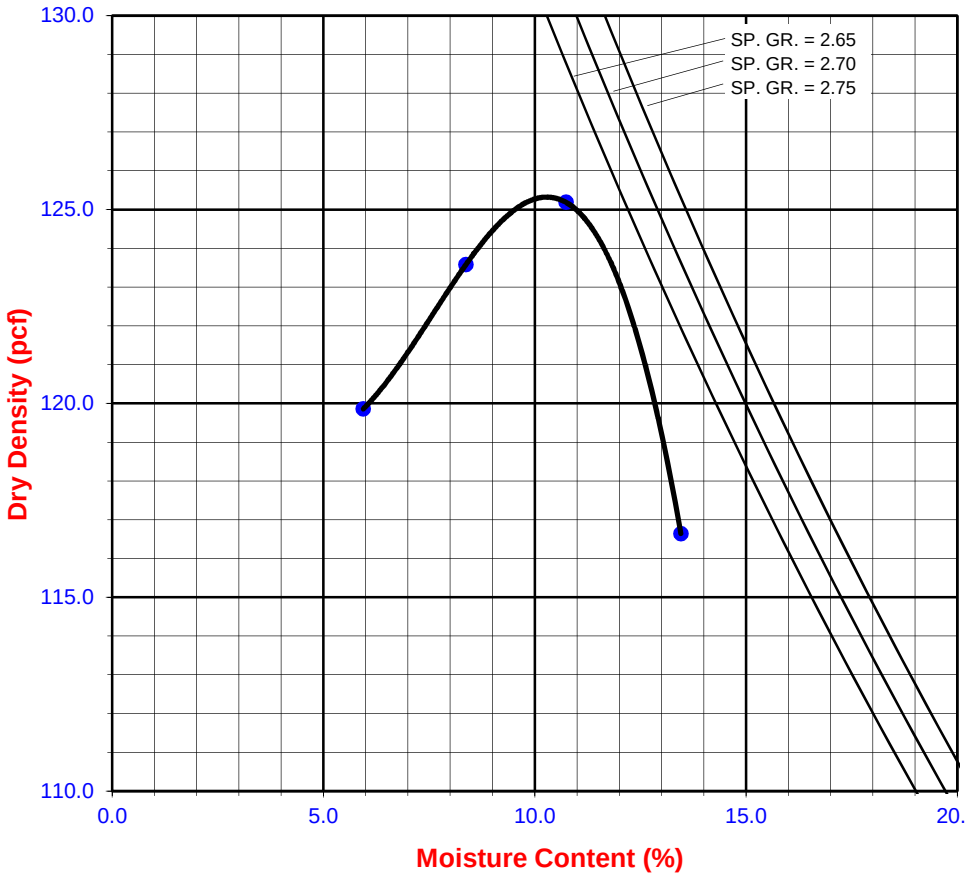
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

**Particle-Size Distribution:**

GR:SA:FI

**Atterberg Limits:**

LL,PL,PI




*MX HS-1, B-2 @ 40-45*

# MODIFIED PROCTOR COMPACTION TEST

**ASTM D 1557**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | O. Figueroa | Date: | 01/09/15 |
| Project No.: | 14057-01 | Input By: | J. Ward | Date: | 01/12/15 |
| Boring No.: | HS-3 | Depth (ft.): | 15-20 | | |
| Sample No.: | B-1 | | | | |
| Soil Identification: | Olive brown silty sand with gravel (SM)g | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Preparation Method: | X | Moist | Scalp Fraction (%) | | Rammer Weight (lb.) = 10.0 |
| | | Dry | #3/4 | | Height of Drop (in.) = 18.0 |
| Compaction Method | X | Mechanical Ram | #3/8 | | |
| | | Manual Ram | #4 | 26.5 | Mold Volume (ft³) 0.03330 |

| TEST NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Compacted Soil + Mold (g) | 3851.0 | 4007.0 | 3997.0 | | | |
| Weight of Mold (g) | 1880.0 | 1880.0 | 1880.0 | | | |
| Net Weight of Soil (g) | 1971.0 | 2127.0 | 2117.0 | | | |
| Wet Weight of Soil + Cont. (g) | 424.60 | 437.50 | 430.60 | | | |
| Dry Weight of Soil + Cont. (g) | 408.70 | 412.00 | 397.30 | | | |
| Weight of Container (g) | 37.60 | 38.20 | 37.90 | | | |
| Moisture Content (%) | 4.28 | 6.82 | 9.27 | | | |
| Wet Density (pcf) | 130.5 | 140.8 | 140.2 | | | |
| Dry Density (pcf) | 125.1 | 131.8 | 128.3 | | | |

| | | | |
|---|---|---|---|
| **Maximum Dry Density (pcf)** | **132.0** | **Optimum Moisture Content (%)** | **7.0** |
| **Corrected Dry Density (pcf)** | **140.0** | **Corrected Moisture Content (%)** | **5.5** |

**X Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

**☐ Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

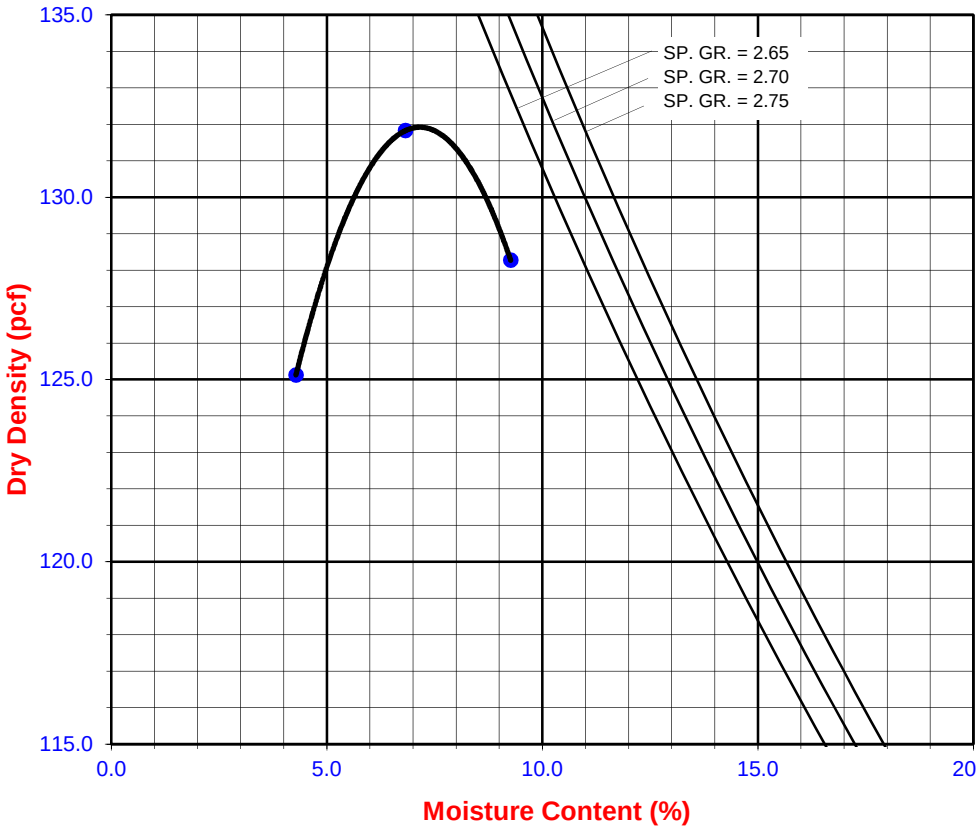
**☐ Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

**Particle-Size Distribution:**

GR:SA:FI

**Atterberg Limits:**

LL,PL,PI



# MODIFIED PROCTOR COMPACTION TEST

**ASTM D 1557**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | O. Figueroa | Date: | 02/09/15 |
| Project No.: | 14057-01 | Input By: | J. Ward | Date: | 02/16/15 |
| Boring No.: | HS-17 | Depth (ft.): | 5-7 | | |
| Sample No.: | B-1 | | | | |
| Soil Identification: | Olive brown sandy lean clay s(CL) | | | | |

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

| | | | | | | |
|---|---|---|---|---|---|---|
| Preparation Method: | X | Moist | Scalp Fraction (%) | | Rammer Weight (lb.) = | 10.0 |
| | | Dry | #3/4 | | Height of Drop (in.) = | 18.0 |
| Compaction Method | X | Mechanical Ram | #3/8 | | | |
| | | Manual Ram | #4 | 4.9 | Mold Volume (ft³) | 0.03330 |

| TEST NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Compacted Soil + Mold (g) | 3758.0 | 3876.0 | 3952.0 | 3918.0 | | |
| Weight of Mold (g) | 1870.0 | 1870.0 | 1870.0 | 1870.0 | | |
| Net Weight of Soil (g) | 1888.0 | 2006.0 | 2082.0 | 2048.0 | | |
| Wet Weight of Soil + Cont. (g) | 341.60 | 477.20 | 460.40 | 531.60 | | |
| Dry Weight of Soil + Cont. (g) | 327.80 | 447.40 | 423.10 | 477.40 | | |
| Weight of Container (g) | 37.60 | 38.10 | 38.80 | 37.80 | | |
| Moisture Content (%) | 4.76 | 7.28 | 9.71 | 12.33 | | |
| Wet Density (pcf) | 125.0 | 132.8 | 137.8 | 135.6 | | |
| Dry Density (pcf) | 119.3 | 123.8 | 125.6 | 120.7 | | |

| | | | |
|---|---|---|---|
| **Maximum Dry Density (pcf)** | **125.5** | **Optimum Moisture Content (%)** | **9.5** |
| **Corrected Dry Density (pcf)** | **127.0** | **Corrected Moisture Content (%)** | **9.0** |

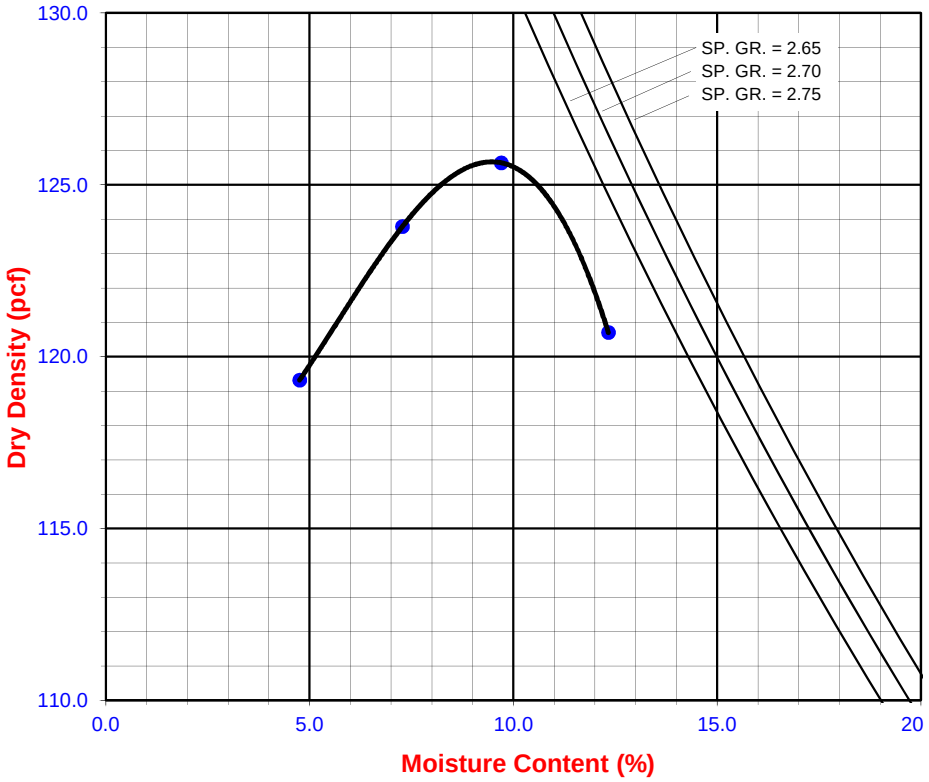
**X Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

**☐ Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

**☐ Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

**Particle-Size Distribution:**
**5:45:50**
GR:SA:FI

**Atterberg Limits:**
**31,16,15**
LL,PL,PI



# MODIFIED PROCTOR COMPACTION TEST

**ASTM D 1557**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | O. Figueroa | Date: | 02/08/15 |
| Project No.: | 14057-01 | Input By: | J. Ward | Date: | 02/09/15 |
| Boring No.: | B-3 | Depth (ft.): | 30-33 | | |
| Sample No.: | B-1 | | | | |
| Soil Identification: | Light olive brown sandy lean clay s(CL) | | | | |

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

**Mold Volume (ft³)** 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

| TEST NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Compacted Soil + Mold (g) | 3723.0 | 3791.0 | 3856.0 | 3817.0 | | |
| Weight of Mold (g) | 1870.0 | 1870.0 | 1870.0 | 1870.0 | | |
| Net Weight of Soil (g) | 1853.0 | 1921.0 | 1986.0 | 1947.0 | | |
| Wet Weight of Soil + Cont. (g) | 457.00 | 453.60 | 449.80 | 529.10 | | |
| Dry Weight of Soil + Cont. (g) | 422.10 | 411.10 | 399.90 | 459.50 | | |
| Weight of Container (g) | 54.60 | 55.70 | 53.10 | 54.70 | | |
| Moisture Content (%) | 9.50 | 11.96 | 14.39 | 17.19 | | |
| Wet Density (pcf) | 122.7 | 127.2 | 131.5 | 128.9 | | |
| Dry Density (pcf) | 112.0 | 113.6 | 114.9 | 110.0 | | |

**Maximum Dry Density (pcf)** 115.0 **Optimum Moisture Content (%)** 14.5

**PROCEDURE USED**

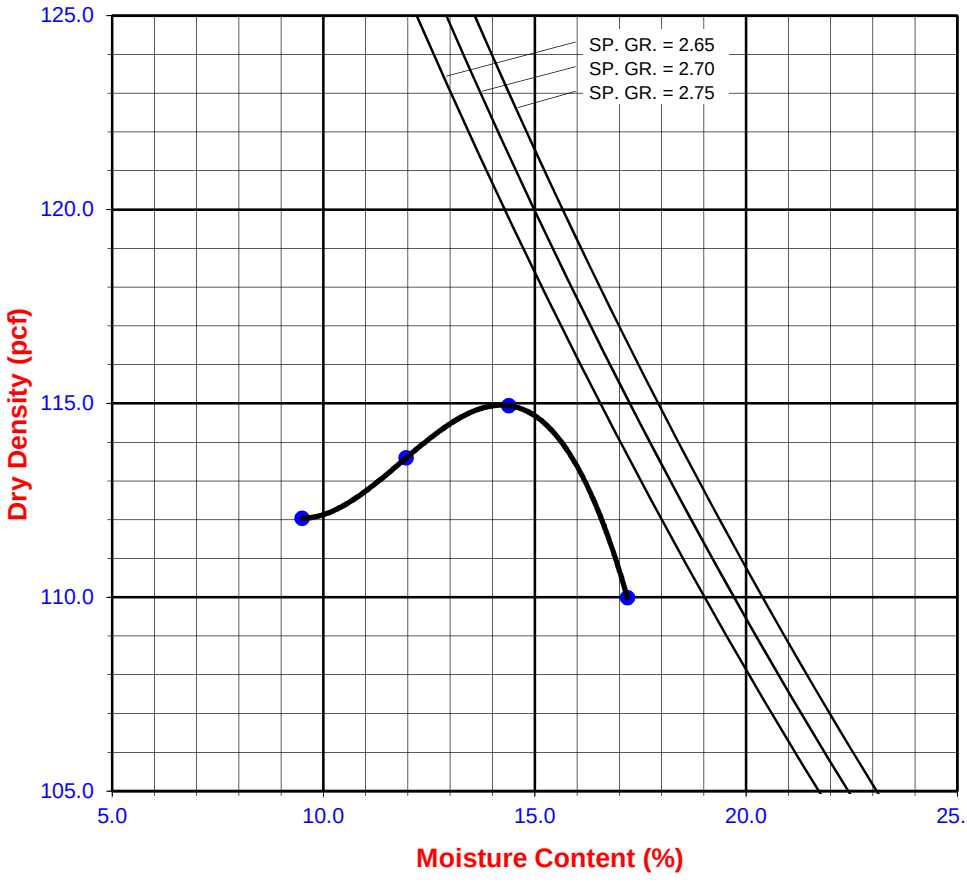
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

**Particle-Size Distribution:**
1:48:51
GR:SA:FI

**Atterberg Limits:**
33,23,10
LL,PL,PI




*MX B-3, B-1 @ 30-33*

# MODIFIED PROCTOR COMPACTION TEST

**ASTM D 1557**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | Tested By: | O. Figueroa | Date: | 02/25/15 |
| Project No.: | 14057-01 | Input By: | J. Ward | Date: | 02/27/15 |
| Boring No.: | B-4 | Depth (ft.): | 35-40 | | |
| Sample No.: | B-1 | | | | |
| Soil Identification: | Light olive brown silty sand (SM) | | | | |

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

**Mold Volume (ft³)** 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

| TEST NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Compacted Soil + Mold (g) | 3793.0 | 3882.0 | 3893.0 | | | |
| Weight of Mold (g) | 1870.0 | 1870.0 | 1870.0 | | | |
| Net Weight of Soil (g) | 1923.0 | 2012.0 | 2023.0 | | | |
| Wet Weight of Soil + Cont. (g) | 416.80 | 383.50 | 422.80 | | | |
| Dry Weight of Soil + Cont. (g) | 388.10 | 350.70 | 377.90 | | | |
| Weight of Container (g) | 54.70 | 54.60 | 51.30 | | | |
| Moisture Content (%) | 8.61 | 11.08 | 13.75 | | | |
| Wet Density (pcf) | 127.3 | 133.2 | 133.9 | | | |
| Dry Density (pcf) | 117.2 | 119.9 | 117.7 | | | |

**Maximum Dry Density (pcf)** **120.0** **Optimum Moisture Content (%)** **11.5**

**PROCEDURE USED**

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

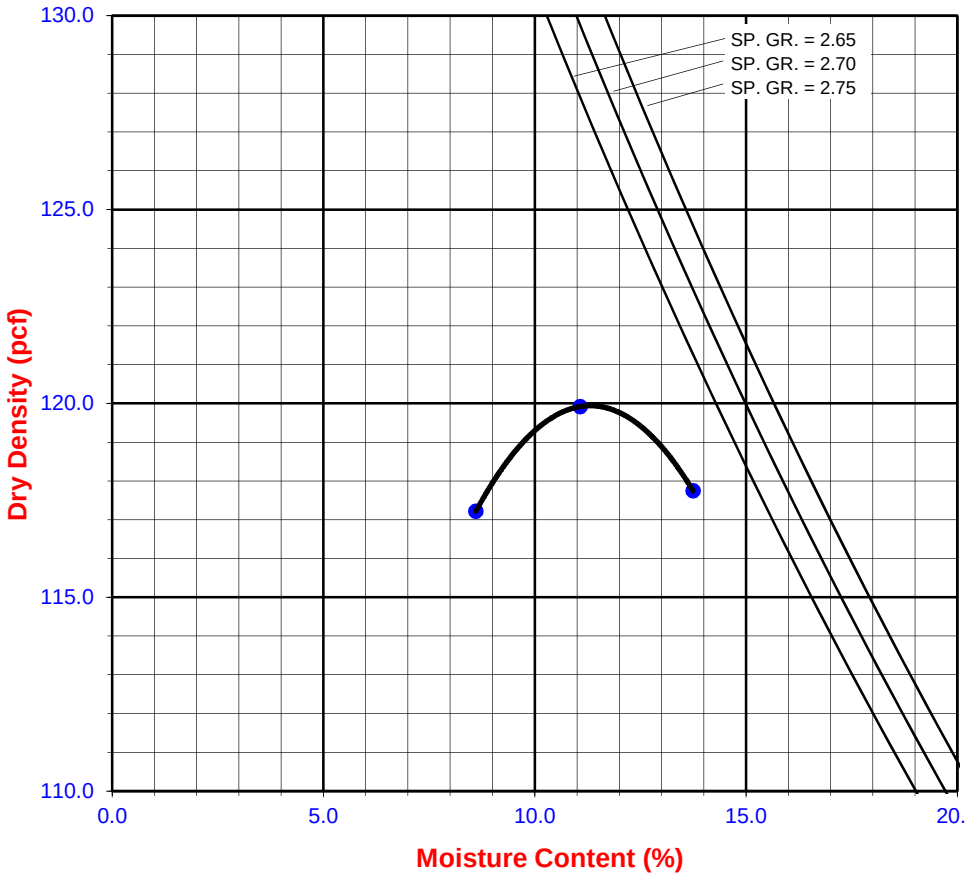
**Particle-Size Distribution:**

GR:SA:FI

**Atterberg Limits:**

**NP**

LL,PL,PI




*MX B-4, B-1 @ 35-40*

# TESTS for SULFATE CONTENT
# CHLORIDE CONTENT and pH of SOILS

Project Name: La Habra | Tested By : G. Berdy | Date: 08/05/14

Project No. : 14057-01 | Data Input By: J. Ward | Date: 08/11/14

| | | | | |
|---|---|---|---|---|
| Boring No. | HS-1 | HS-6 | B-1 | |
| Sample No. | B-1 | B-1 | B-1 | |
| Sample Depth (ft) | 30.0 | 23-28 | 5-8 | |
| Soil Identification: | Dark brown SC | Dark brown SC | Olive ML | |
| Wet Weight of Soil + Container (g) | 240.29 | 273.38 | 212.07 | |
| Dry Weight of Soil + Container (g) | 228.82 | 257.24 | 197.54 | |
| Weight of Container (g) | 60.29 | 67.29 | 55.98 | |
| Moisture Content (%) | 6.81 | 8.50 | 10.26 | |
| Weight of Soaked Soil (g) | 100.70 | 100.40 | 100.01 | |

**SULFATE CONTENT, DOT California Test 417, Part II**

| | | | | |
|---|---|---|---|---|
| Beaker No. | 26 | 36 | 40 | |
| Crucible No. | 15 | 18 | 20 | |
| Furnace Temperature (°C) | 840 | 840 | 840 | |
| Time In / Time Out | 10:35/11:20 | 10:35/11:20 | 10:35/11:20 | |
| Duration of Combustion (min) | 45 | 45 | 45 | |
| Wt. of Crucible + Residue (g) | 20.3232 | 19.7515 | 21.2331 | |
| Wt. of Crucible (g) | 20.3202 | 19.7403 | 21.2308 | |
| Wt. of Residue (g) (A) | 0.0030 | 0.0112 | 0.0023 | |
| PPM of Sulfate (A) x 41150 | 123.45 | 460.88 | 94.65 | |
| **PPM of Sulfate, Dry Weight Basis** | **132** | **504** | **105** | |

**CHLORIDE CONTENT, DOT California Test 422**

| | | | | |
|---|---|---|---|---|
| ml of Extract For Titration (B) | 30 | 15 | 30 | |
| ml of AgNO3 Soln. Used in Titration (C) | 0.9 | 1.0 | 0.5 | |
| PPM of Chloride (C -0.2) * 100 * 30 / B | 70 | 160 | 30 | |
| **PPM of Chloride, Dry Wt. Basis** | **75** | **175** | **33** | |

**pH TEST, DOT California Test 532/643**

| | | | | |
|---|---|---|---|---|
| **pH Value** | **8.16** | **7.81** | **7.60** | |
| **Temperature °C** | 22.2 | 22.2 | 22.2 | |

# SOIL RESISTIVITY TEST

## DOT CA TEST 532 / 643

Project Name: La Habra
Project No. : 14057-01
Boring No.: HS-1
Sample No. : B-1
Soil Identification:* Dark brown SC

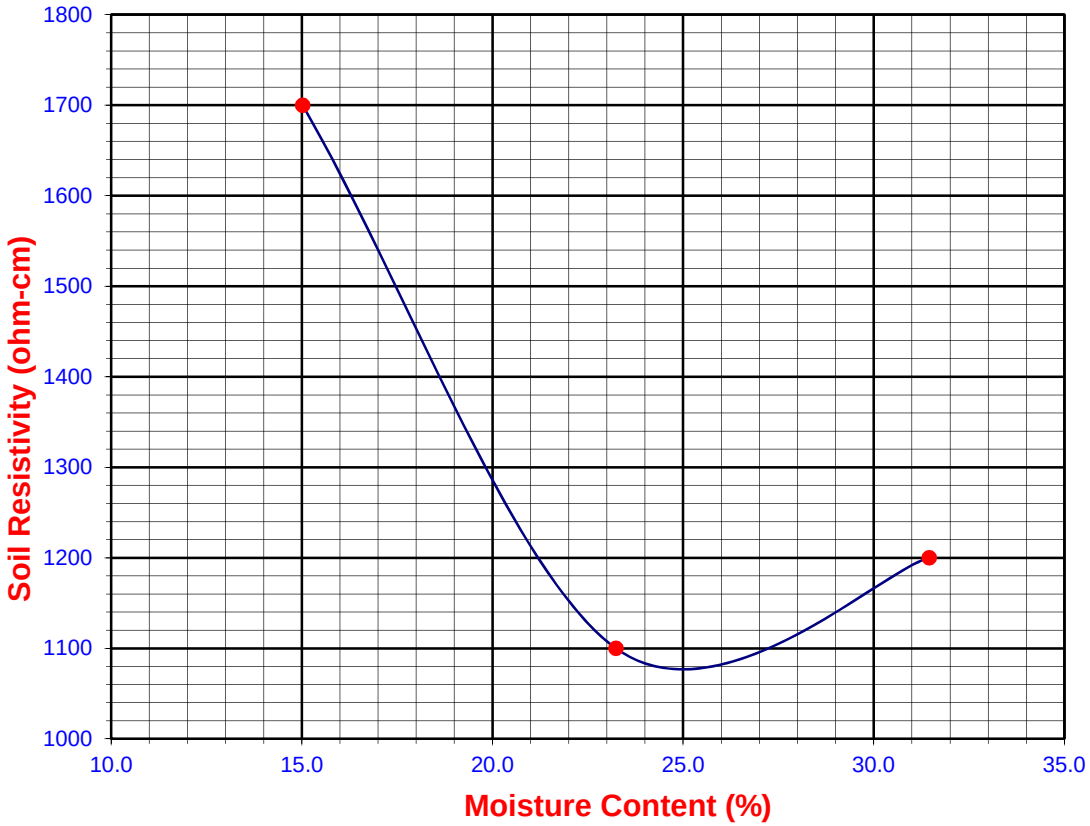
Tested By : G. Berdy Date: 08/07/14
Data Input By: J. Ward Date: 08/11/14
Depth (ft.) : 30.0

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

| Specimen No. | Water Added (ml) (Wa) | Adjusted Moisture Content (MC) | Resistance Reading (ohm) | Soil Resistivity (ohm-cm) |
|---|---|---|---|---|
| 1 | 10 | 15.02 | 1700 | 1700 |
| 2 | 20 | 23.24 | 1100 | 1100 |
| 3 | 30 | 31.45 | 1200 | 1200 |
| 4 | | | | |
| 5 | | | | |

| | |
|---|---|
| Moisture Content (%) (MCi) | 6.81 |
| Wet Wt. of Soil + Cont. (g) | 240.29 |
| Dry Wt. of Soil + Cont. (g) | 228.82 |
| Wt. of Container (g) | 60.29 |
| Container No. | |
| Initial Soil Wt. (g) (Wt) | 130.00 |
| Box Constant | 1.000 |
| 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 | |
| **1075** | **25.0** | **132** | **75** | **8.16** | **22.2** |



# SOIL RESISTIVITY TEST

## DOT CA TEST 532 / 643

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | | Tested By : | G. Berdy | Date: 08/07/14 |
| Project No. : | 14057-01 | | Data Input By: | J. Ward | Date: 08/11/14 |
| Boring No.: | HS-6 | | Depth (ft.) : | 23-28 | |
| Sample No. : | B-1 | | | | |

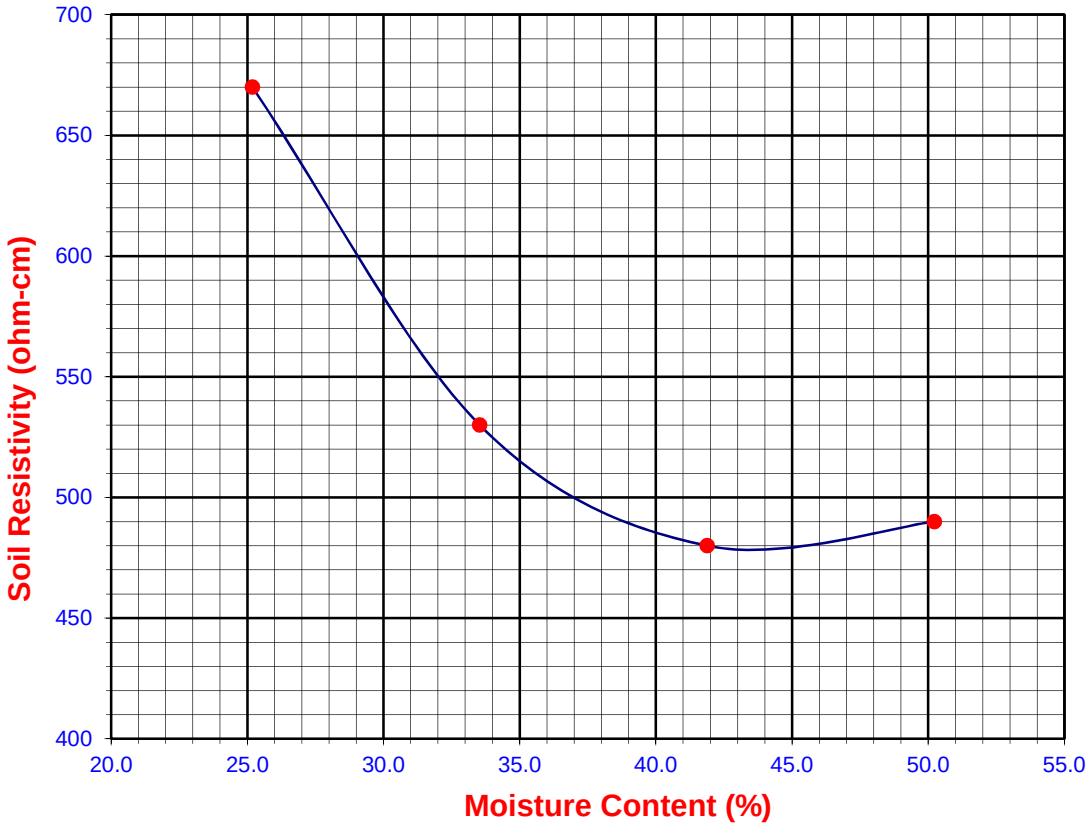
Soil Identification:* Dark brown SC

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

| Specimen No. | Water Added (ml) (Wa) | Adjusted Moisture Content (MC) | Resistance Reading (ohm) | Soil Resistivity (ohm-cm) |
|---|---|---|---|---|
| 1 | 20 | 25.19 | 670 | 670 |
| 2 | 30 | 33.53 | 530 | 530 |
| 3 | 40 | 41.88 | 480 | 480 |
| 4 | 50 | 50.23 | 490 | 490 |
| 5 | | | | |

| | |
|---|---|
| Moisture Content (%) (MCi) | 8.50 |
| Wet Wt. of Soil + Cont. (g) | 273.38 |
| Dry Wt. of Soil + Cont. (g) | 257.24 |
| Wt. of Container (g) | 67.29 |
| Container No. | |
| Initial Soil Wt. (g) (Wt) | 130.00 |
| Box Constant | 1.000 |
| 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 | |
| **478** | **43.5** | **504** | **175** | **7.81** | **22.2** |



# SOIL RESISTIVITY TEST

## DOT CA TEST 532 / 643

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | La Habra | | Tested By : | G. Berdy | Date: 08/08/14 |
| Project No. : | 14057-01 | | Data Input By: | J. Ward | Date: 08/11/14 |
| Boring No.: | B-1 | | Depth (ft.) : | 5-8 | |
| Sample No. : | B-1 | | | | |

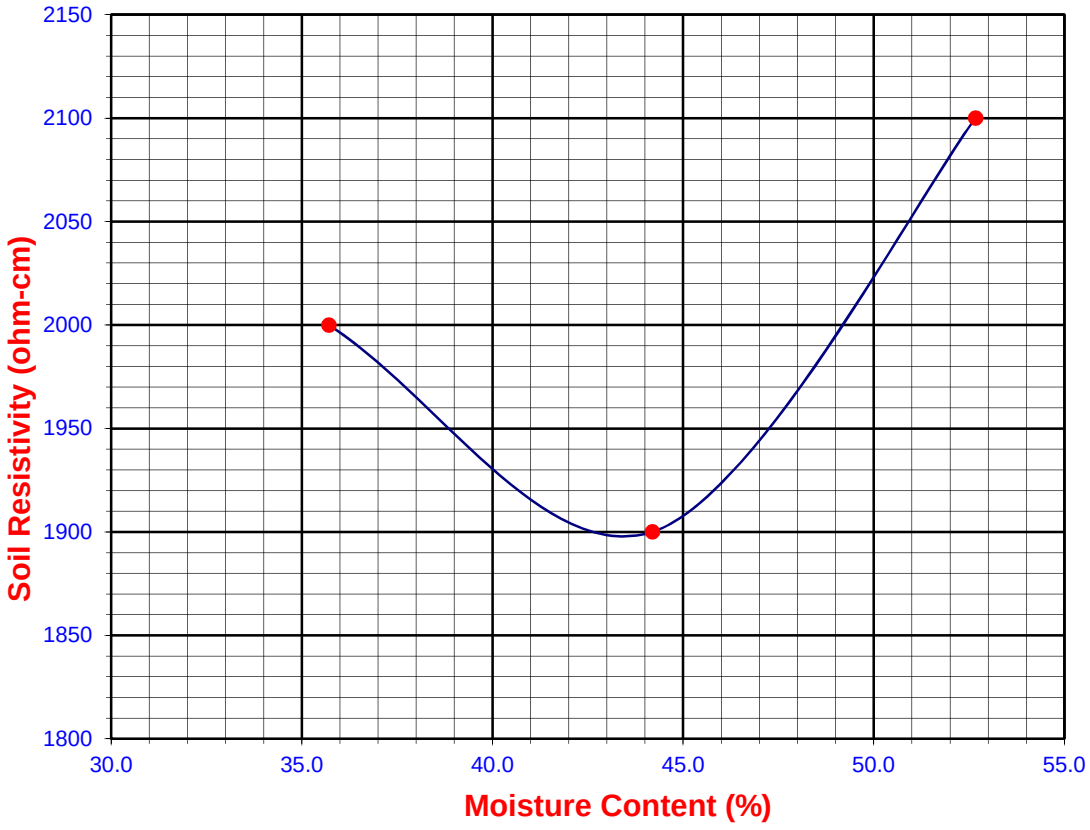
Soil Identification:* Olive ML

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

| Specimen No. | Water Added (ml) (Wa) | Adjusted Moisture Content (MC) | Resistance Reading (ohm) | Soil Resistivity (ohm-cm) |
|---|---|---|---|---|
| 1 | 30 | 35.71 | 2000 | 2000 |
| 2 | 40 | 44.19 | 1900 | 1900 |
| 3 | 50 | 52.67 | 2100 | 2100 |
| 4 | | | | |
| 5 | | | | |

| | |
|---|---|
| Moisture Content (%) (MCi) | 10.26 |
| Wet Wt. of Soil + Cont. (g) | 212.07 |
| Dry Wt. of Soil + Cont. (g) | 197.54 |
| Wt. of Container (g) | 55.98 |
| Container No. | |
| Initial Soil Wt. (g) (Wt) | 130.00 |
| Box Constant | 1.000 |
| 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 | |
| **1898** | **43.4** | **105** | **33** | **7.60** | **22.2** |



*From GMU, 1996*

# CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487
(Based on Unified Soil Classification System)

# SOIL ENGINEERING

| | | | Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests | Soil Classification: Group Symbol | Soil Classification: Group Name |
|---|---|---|---|---|---|
| Coarse-Grained Soils More than 50% retained on No. 200 sieve | Gravels More than 50% coarse fraction retained on No. 4 sieve | Clean Gravels Less than 5% fines[C] | $Cu \geq 4$ and $1 \leq Cc \leq 3$ | GW | Well graded gravel |
| | | | $Cu < 4$ and/or $1 > Cc > 3$ | GP | Poorly graded gravel |
| | | Gravels with Fines More than 12% fines[C] | Fines classify as ML or MH | GM | Silty gravel |
| | | | Fines classify as CL or CH | GC | Clayey gravel |
| | Sands 50% or more of coarse fraction passes No. 4 sieve | Clean Sands Less than 5% fines[D] | $Cu \geq 6$ and $1 \leq Cc \leq 3$ | SW | Well-graded sand |
| | | | $Cu < 6$ and/or $1 > Cc > 3$ | SP | Poorly graded sand |
| | | Sands with Fines More than 12% fines[D] | Fines classify as ML or MH | SM | Silty sand |
| | | | Fines classify as CL or CH | SC | Clayey sand |
| Fine-Grained Soils 50% or more passes the No. 200 sieve | Silts and Clays Liquid limit less than 50 | inorganic | PI > 7 and plots on or above "A" line[J] | CL | Lean clay |
| | | | PI < 4 or plots below "A" line[J] | ML | Silt |
| | | organic | $\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$ | OL | Organic clay<br>Organic silt |
| | Silts and Clays Liquid limit 50 or more | inorganic | PI plots on or above "A" line | CH | Fat clay |
| | | | PI plots below "A" line | MH | Elastic silt |
| | | organic | $\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$ | OH | Organic clay<br>Organic silt |
| Highly organic soils | | Primarily organic matter, dark in color, and organic odor | | PT | Peat |

## ADDITIONAL TESTS

| | |
|---|---|
| DS | Direct Shear Test |
| HY | Hydrometer Test |
| TC | Triaxial Compression Test |
| CN | Consolidation Test |
| (T) | Time Rate |
| EX | Expansion Test |
| CP | Compaction Test |
| GS | Grain Size Distribution |
| EI | Expansion Index |
| SE | Sand Equivalent Test |
| AL | Atterberg Limits |
| CH | Chemical Tests |
| RV | Resistance Value |
| (N) | Natural Undisturbed Sample |
| (R) | Remolded Sample |

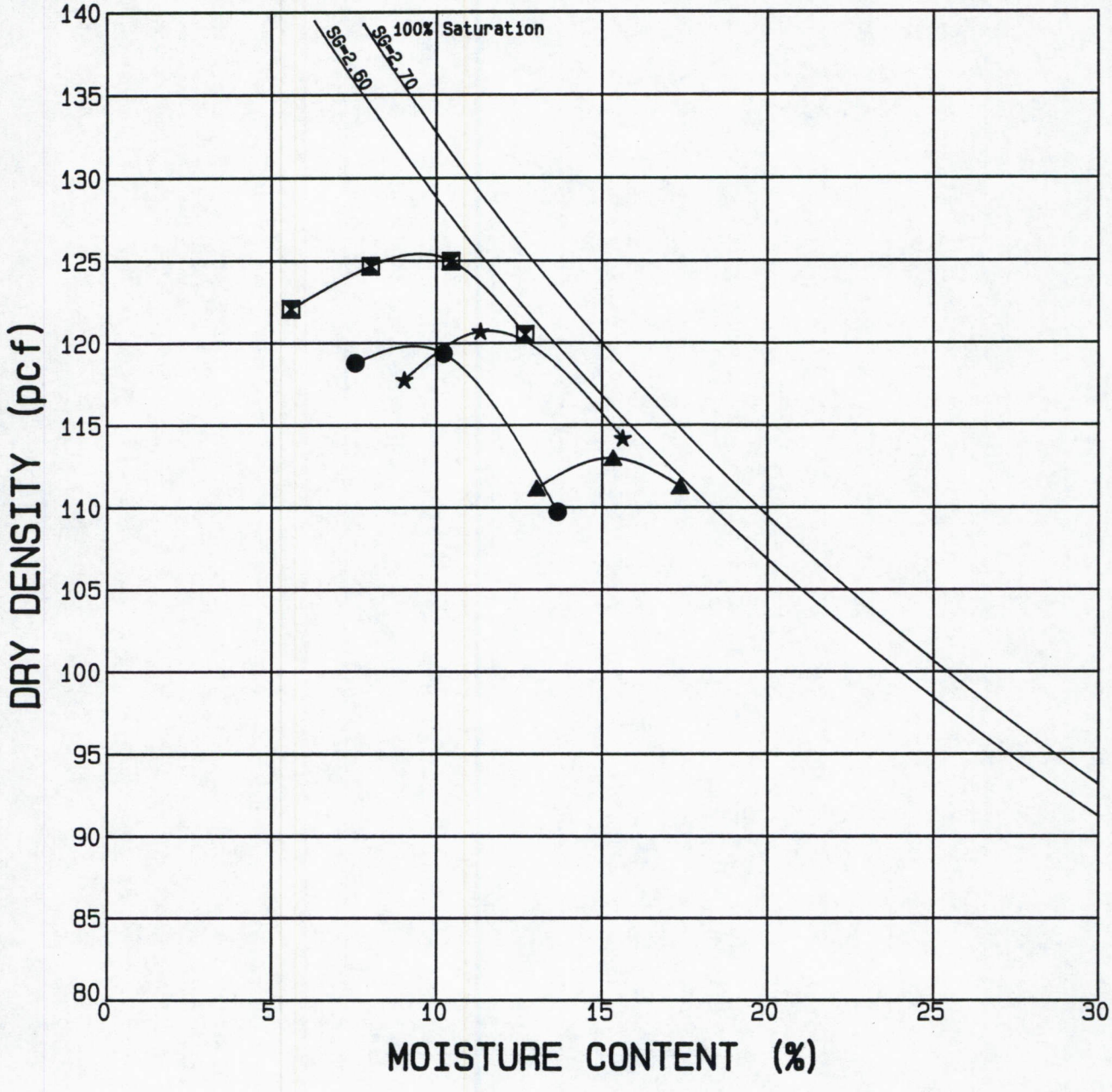
## SAMPLE SYMBOLS

- ■ Undisturbed Sample
- ⊠ Disturbed Sample
- ⊡ Unsuccessful Sampling Attempt

## GEOLOGIC STRUCTURE

| | |
|---|---|
| | B N75W 50S (B=Bedding) |
| STRIKE AND DIP | C N15E 75W (C=Contact) |
| | J N45W 85E (J=Jointing) |
| | S N30E 45W (S=Shear) |

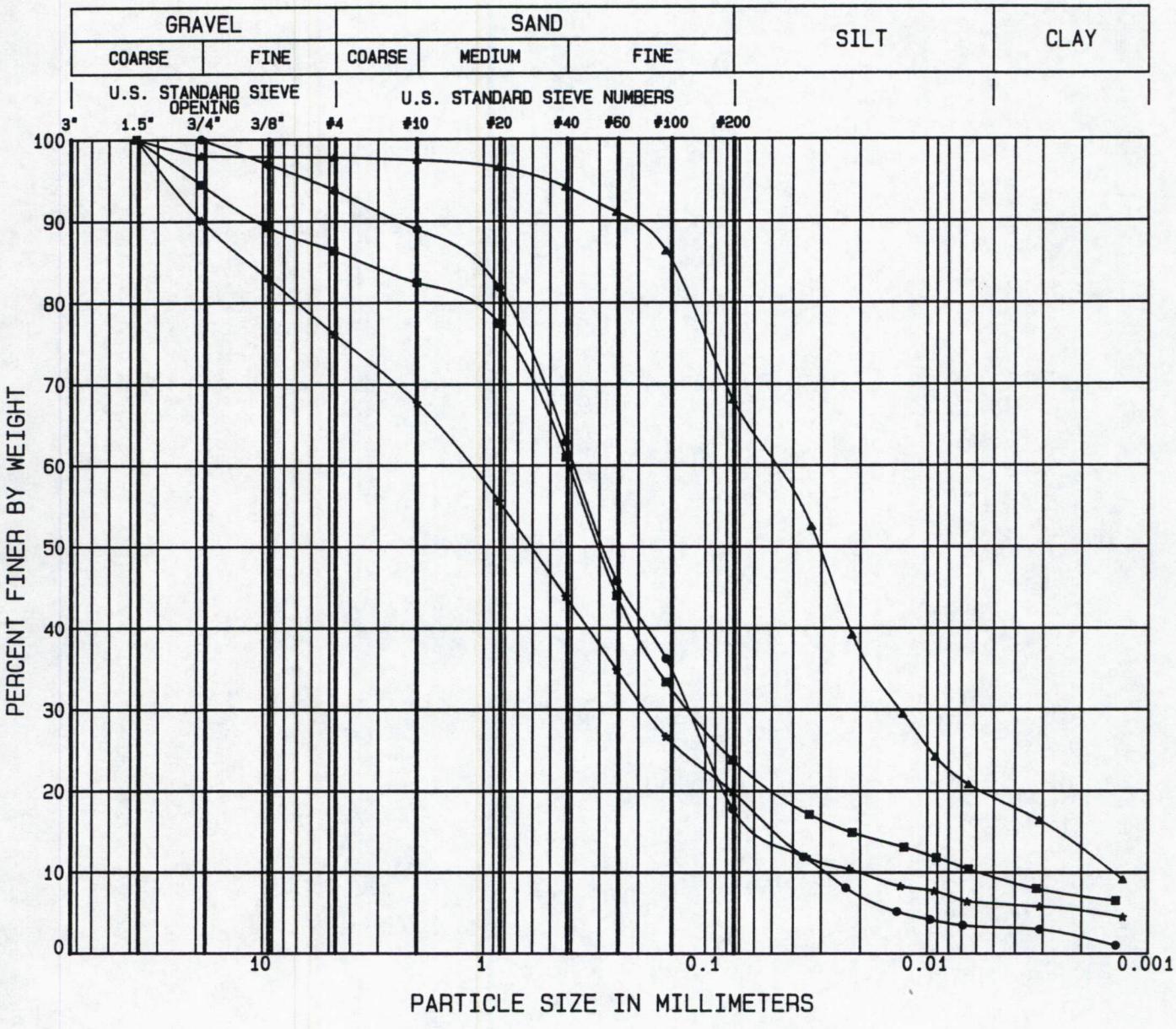
# LEGEND TO LOGS




| | SAMPLE LOCATION | SOURCE | MAXIMUM DRY DENSITY, pcf | OPTIMIUM MOISTURE CONTENT % |
|---|---|---|---|---|
| ● | DH 2 @ 16.00' | Qcol/Qoal | 120 | 9 |
| ⊠ | DH 11 @ 25.00' | Qsp | 125 | 10 |
| ▲ | DH 18 @ 20.00' | Qsp | 113 | 15 |
| ★ | DH 22 @ 35.00' | Qsp | 121 | 12 |

# COMPACTION TEST DATA

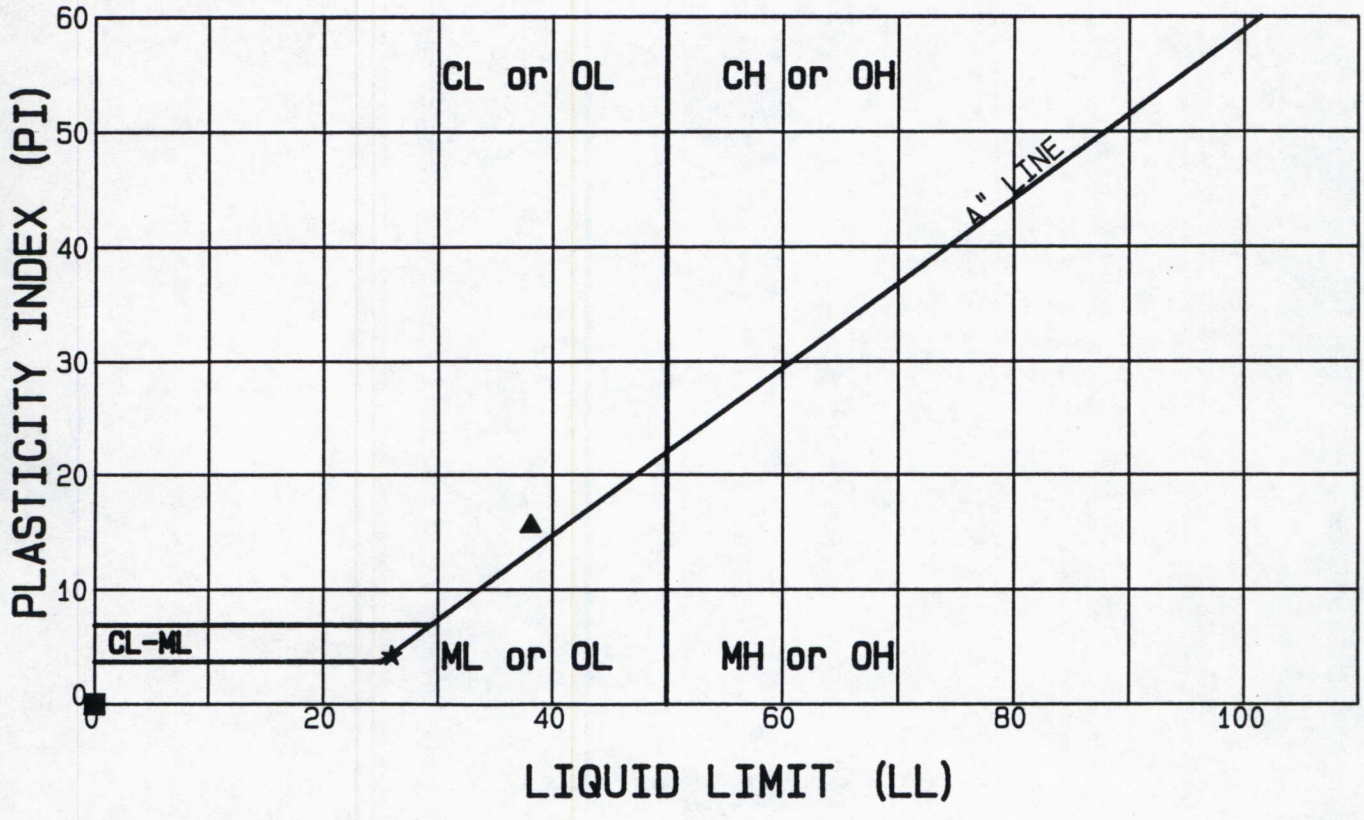
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-4




| SAMPLE LOCATION | SOURCE | CLASSIFICATION |
|---|---|---|
| ● DH 2 @ 16.00' | Qcol/Qoal | SILTY SAND (SM)<br>fine to medium, non-plastic |
| ⊠ DH 11 @ 25.00' | Qsp | SILTY SAND (SM)<br>fine to medium, non-plastic |
| ▲ DH 18 @ 20.00' | Qsp | SANDY LEAN CLAY (CL)<br>moderate plasticity, fine |
| ★ DH 22 @ 35.00' | Qsp | SILTY SAND with GRAVEL (SM)<br>fine to medium, low plasticity, fine to coarse |

# PARTICLE SIZE DISTRIBUTION

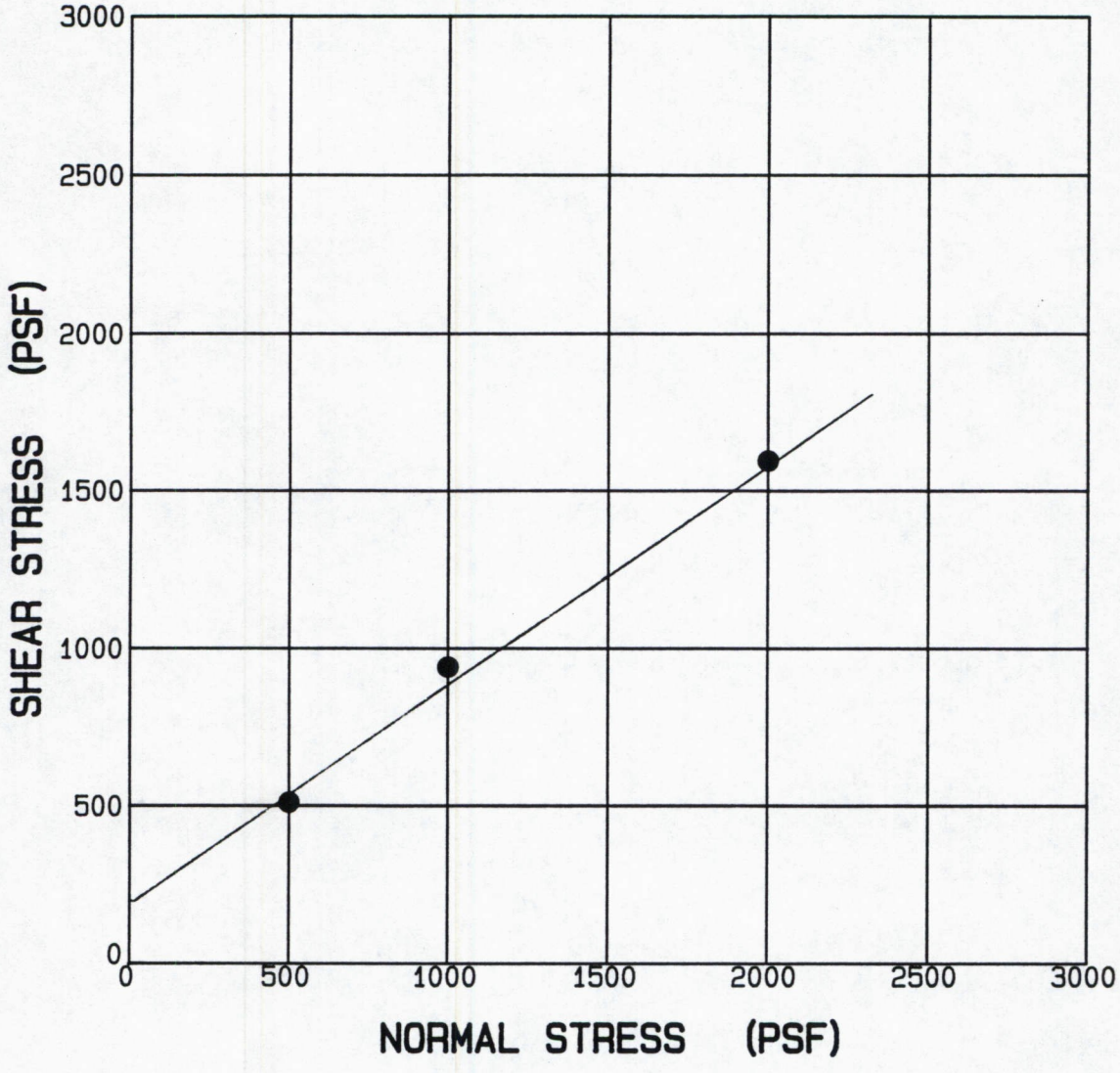
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-5




| | SAMPLE LOCATION | SOURCE | LL | PL | PI |
|---|---|---|---|---|---|
| ● | DH 2 @ 16.00' | Qcol/Qoal | NP | NP | NP |
| ⊠ | DH 11 @ 25.00' | Qsp | NP | NP | NP |
| ▲ | DH 18 @ 20.00' | Qsp | 38 | 22 | 16 |
| ★ | DH 22 @ 35.00' | Qsp | 26 | 22 | 4 |

# ATTERBERG LIMITS

PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-6

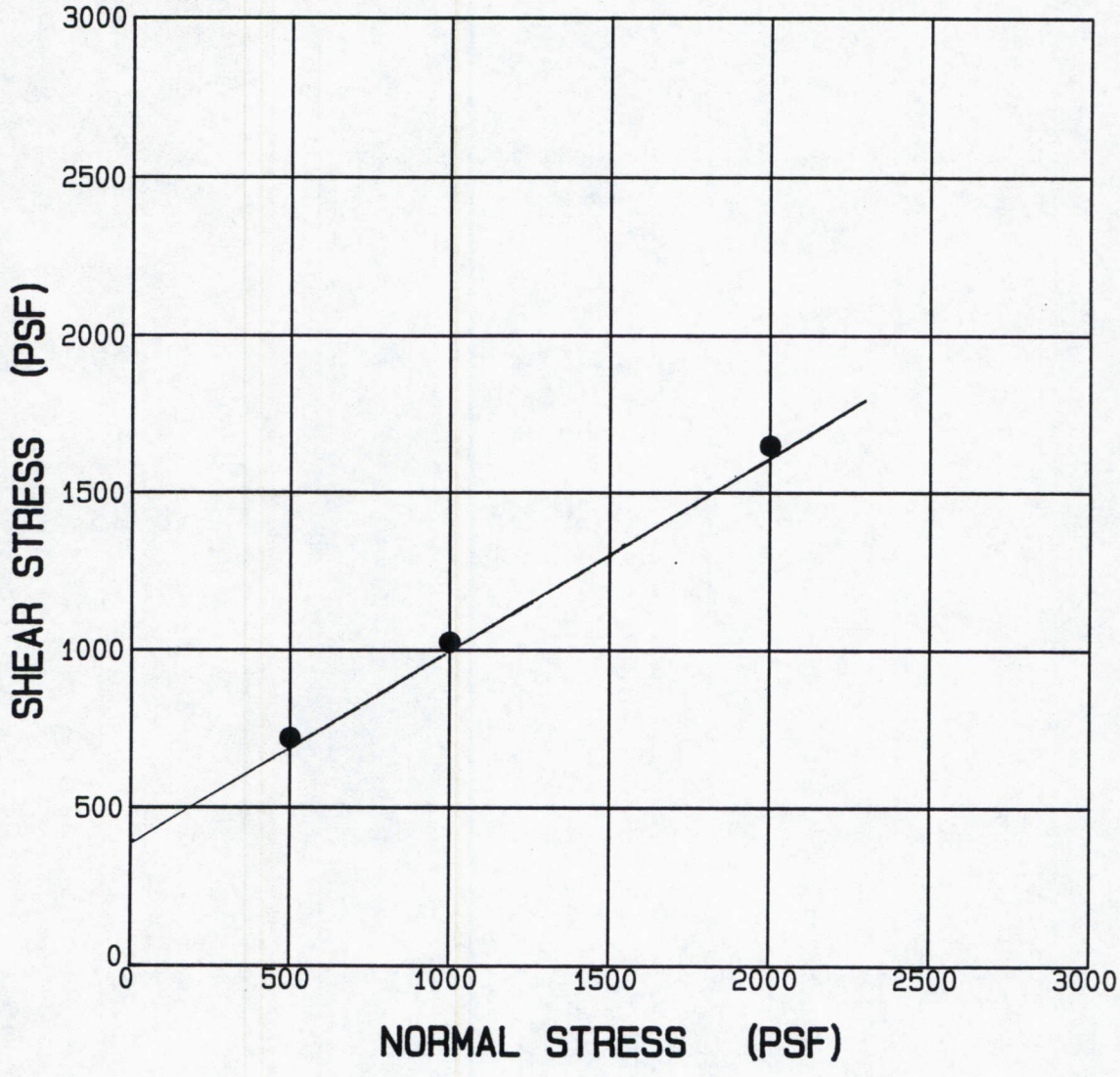



**SAMPLE AND TEST DESCRIPTION**

| | |
|---|---|
| SAMPLE LOCATION: | DH 2 @ 16.00' |
| SOURCE: | Qcol/Goal |
| TEST DESCRIPTION: | DIRECT SHEAR, STRAIN RATE: .10 IN/MIN |
| AVG.DRY DENSITY (PCF): 103 | AVG.MOISTURE CONTENT (%): 16 |
| AVG.SATURATION (%): 72 | AVG.VOID RATIO: 0.5994 |
| COHESION (PSF): 200 | FRICTION ANGLE (DEG): 34 |

# SHEAR TEST DATA

PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-7.1

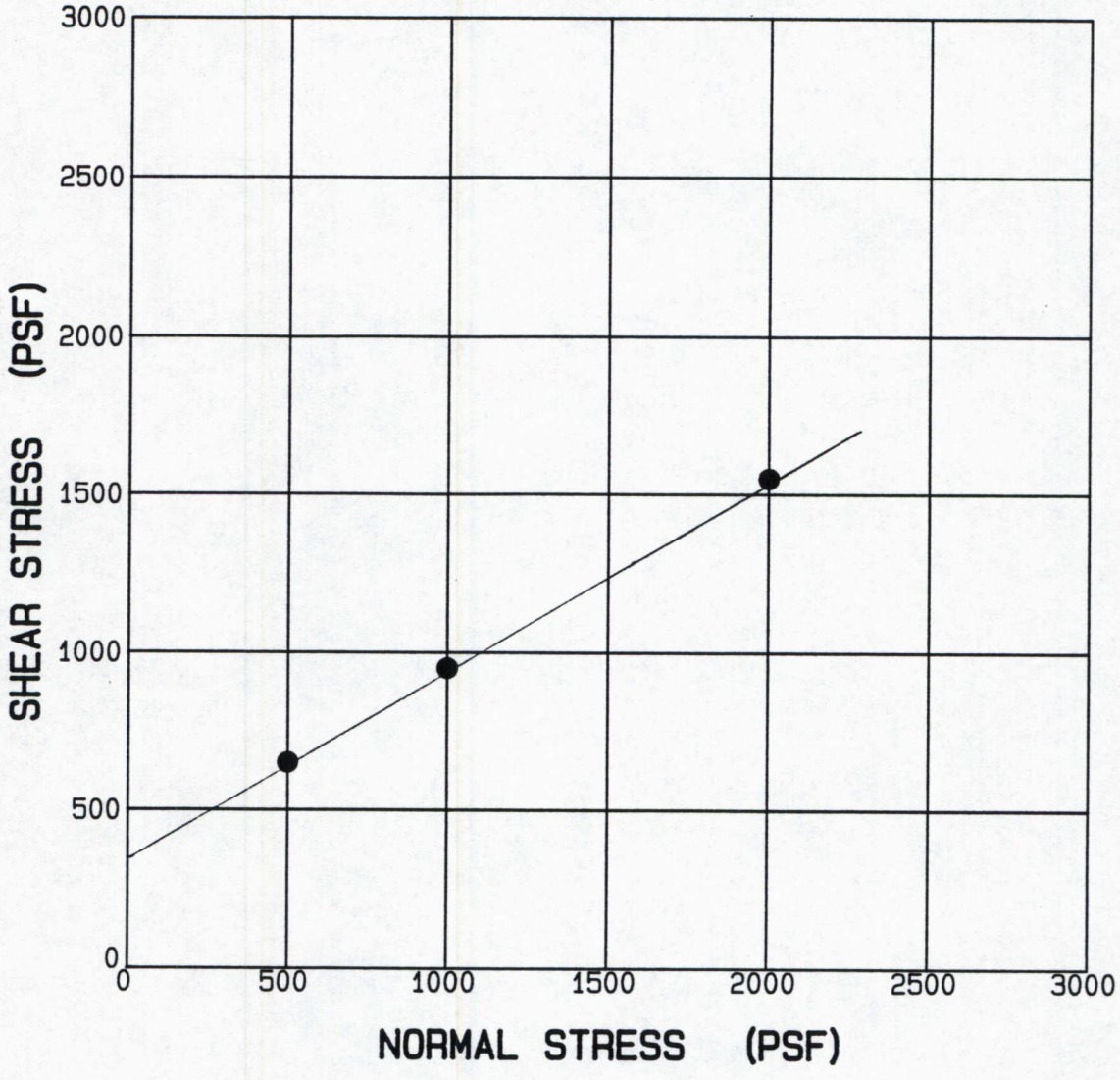



**SAMPLE AND TEST DESCRIPTION**

SAMPLE LOCATION: DH 18 @ 20.00'
SOURCE: Qsp
TEST DESCRIPTION: DIRECT SHEAR, STRAIN RATE: .01 IN/MIN
AVG.DRY DENSITY (PCF): 97 AVG.MOISTURE CONTENT (%): 24
AVG.SATURATION (%): 88 AVG.VOID RATIO: 0.7089
COHESION (PSF): 400 FRICTION ANGLE (DEG): 31

# SHEAR TEST DATA

PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-7.2

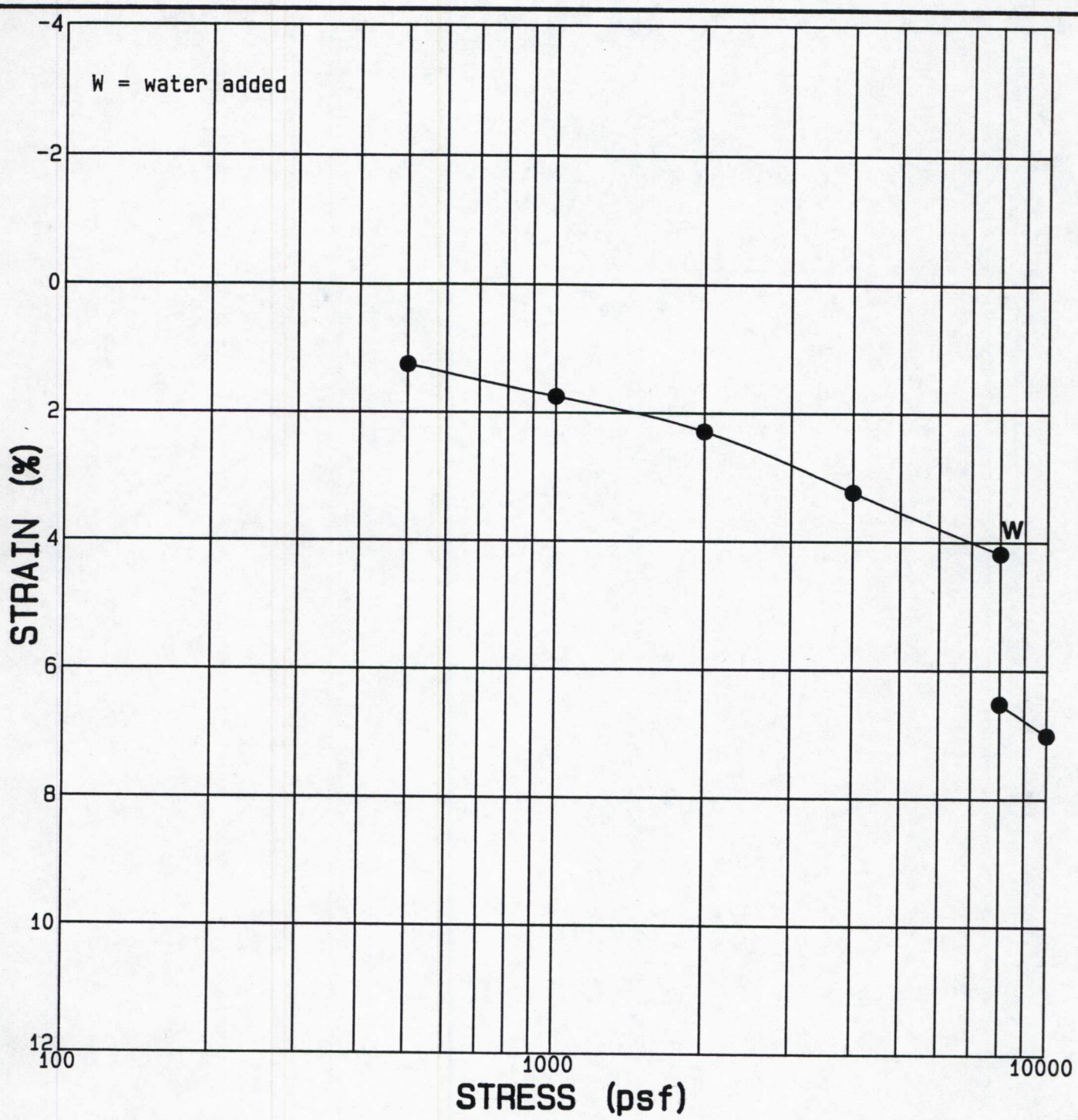



**SAMPLE AND TEST DESCRIPTION**

SAMPLE LOCATION: DH 22 @ 35.00'
SOURCE: Qsp
TEST DESCRIPTION: DIRECT SHEAR, STRAIN RATE: .01 IN/MIN
AVG.DRY DENSITY (PCF): 106 AVG.MOISTURE CONTENT (%): 19
AVG.SATURATION (%): 91 AVG.VOID RATIO: 0.5624
COHESION (PSF): 350 FRICTION ANGLE (DEG): 30

# SHEAR TEST DATA

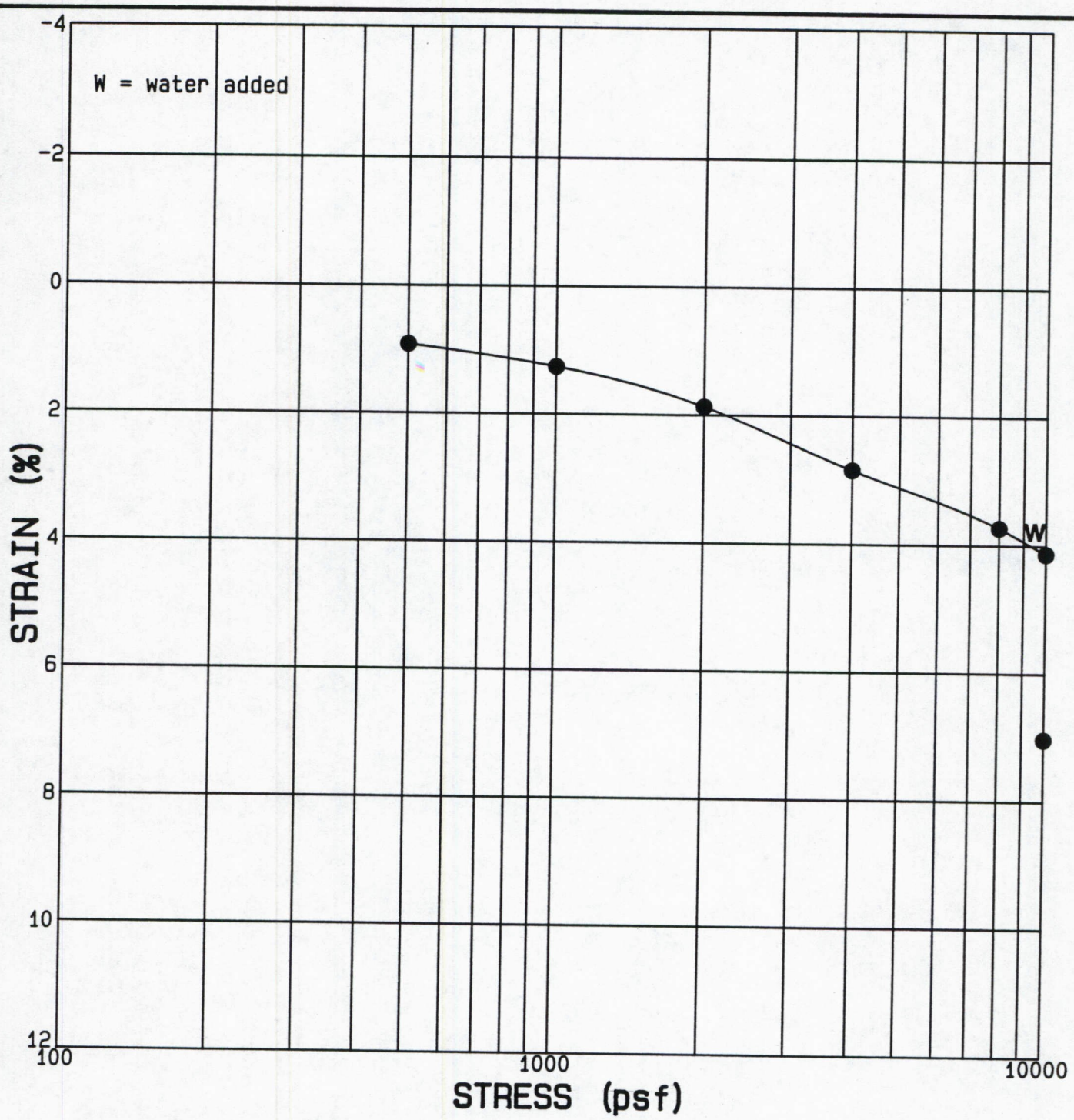
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-7.3




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 1 @ 10.00' | Qcol/Qoal | 0.5637 | 4 | 106 | |

# CONSOLIDATION TEST DATA

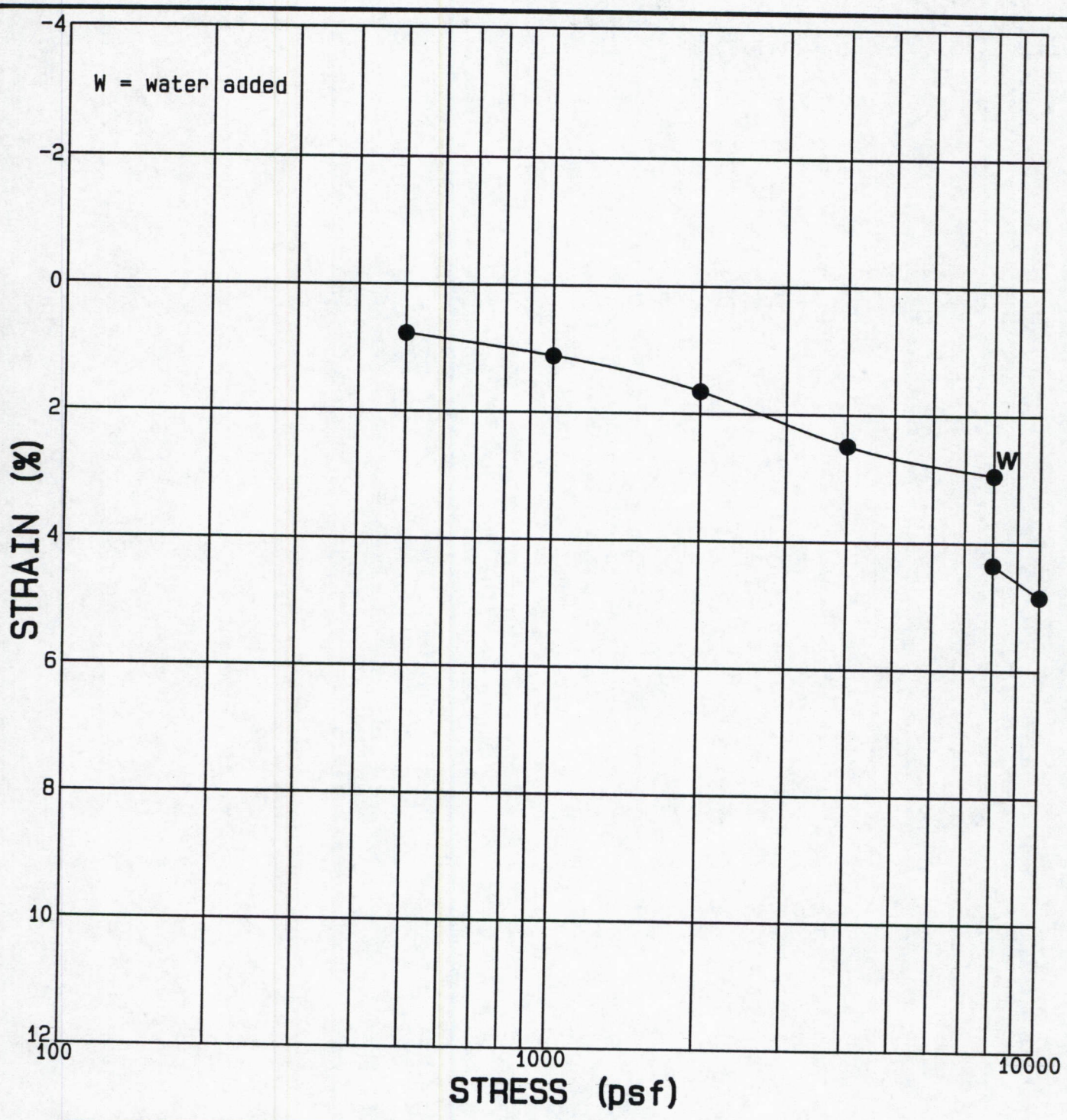
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.1




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 1 @ 20.00' | Qcol/Qoal | 0.5953 | 7 | 104 | |

# CONSOLIDATION TEST DATA

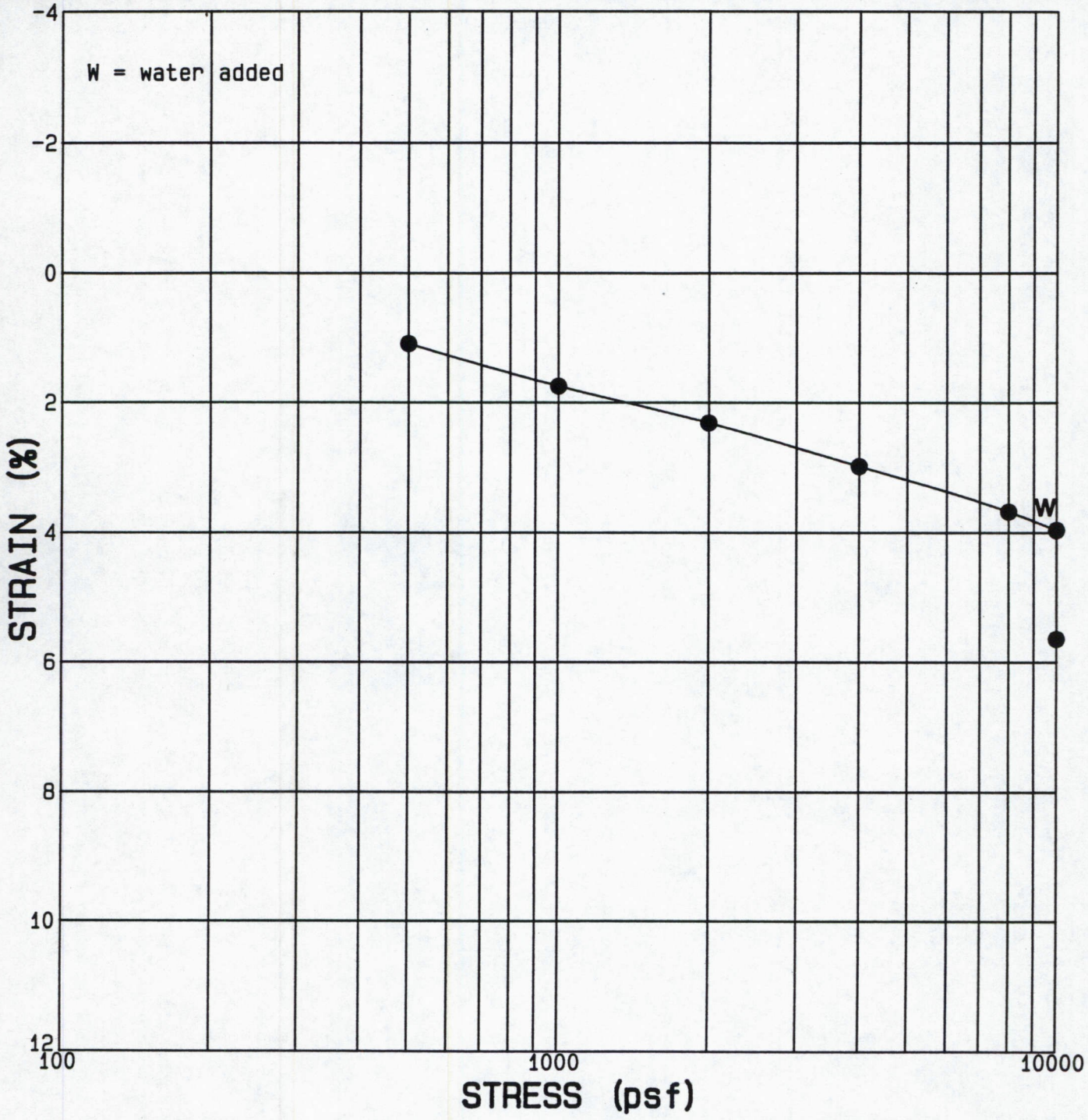
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.2




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 5 @ 25.00' | Qcol/Qoal | 0.4904 | 4 | 111 | |

# CONSOLIDATION TEST DATA

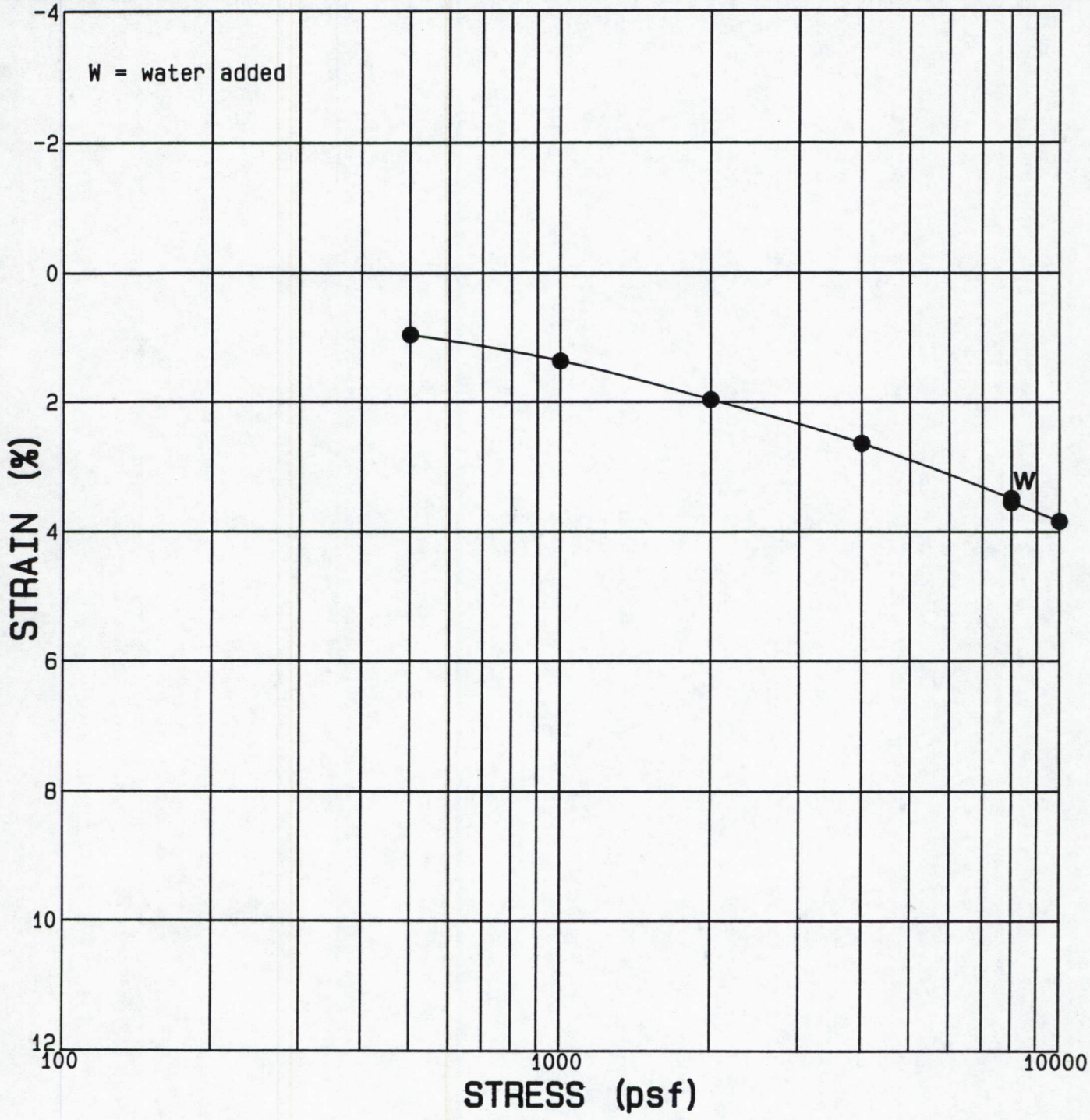
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.3




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 5 @ 40.00' | Qcol/Qoal | 0.3616 | 4 | 121 | |

# CONSOLIDATION TEST DATA

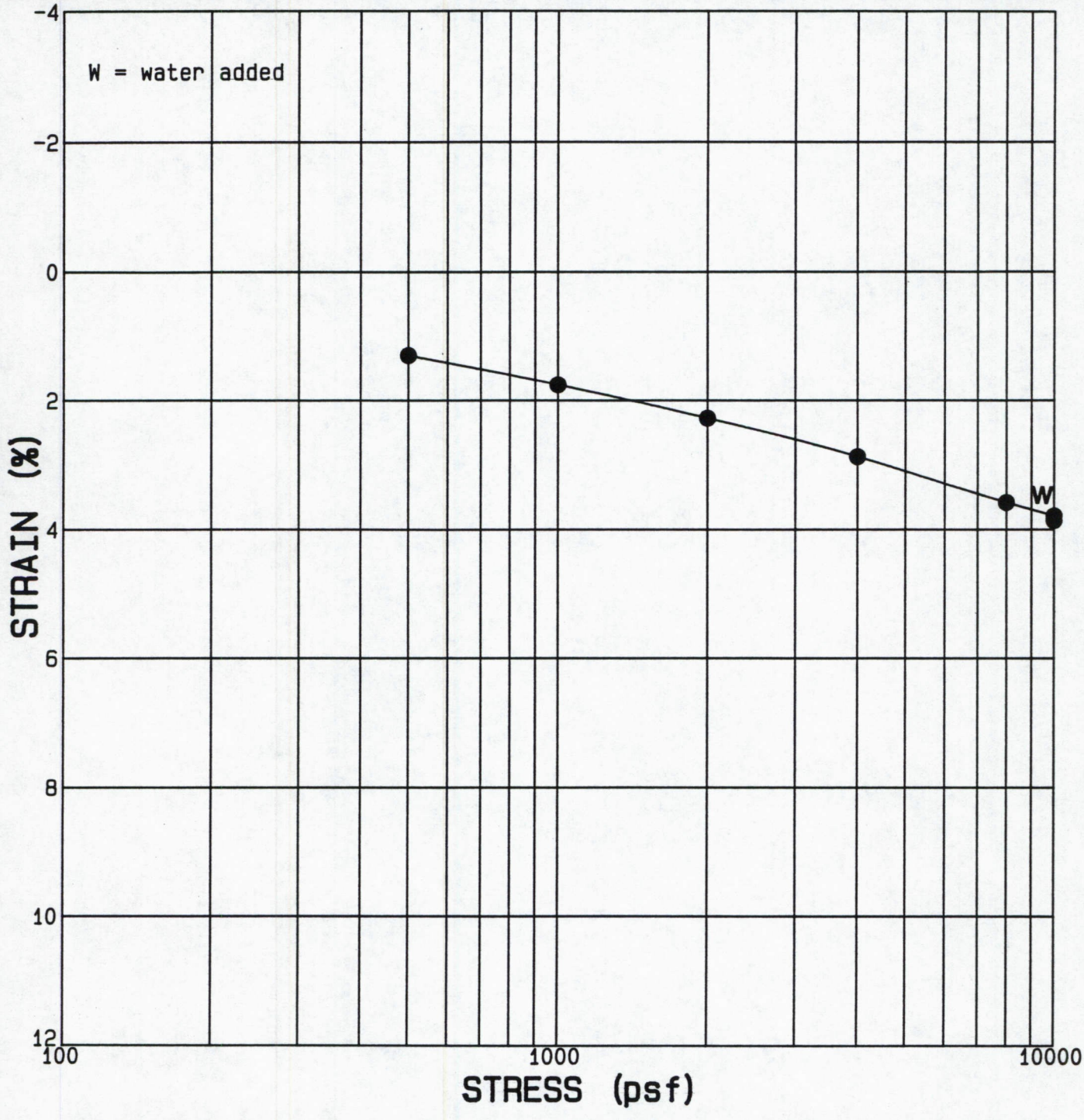
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.4




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 8 @ 15.00' | Qcol/Qoal | 0.3088 | 5 | 126 | |

# CONSOLIDATION TEST DATA

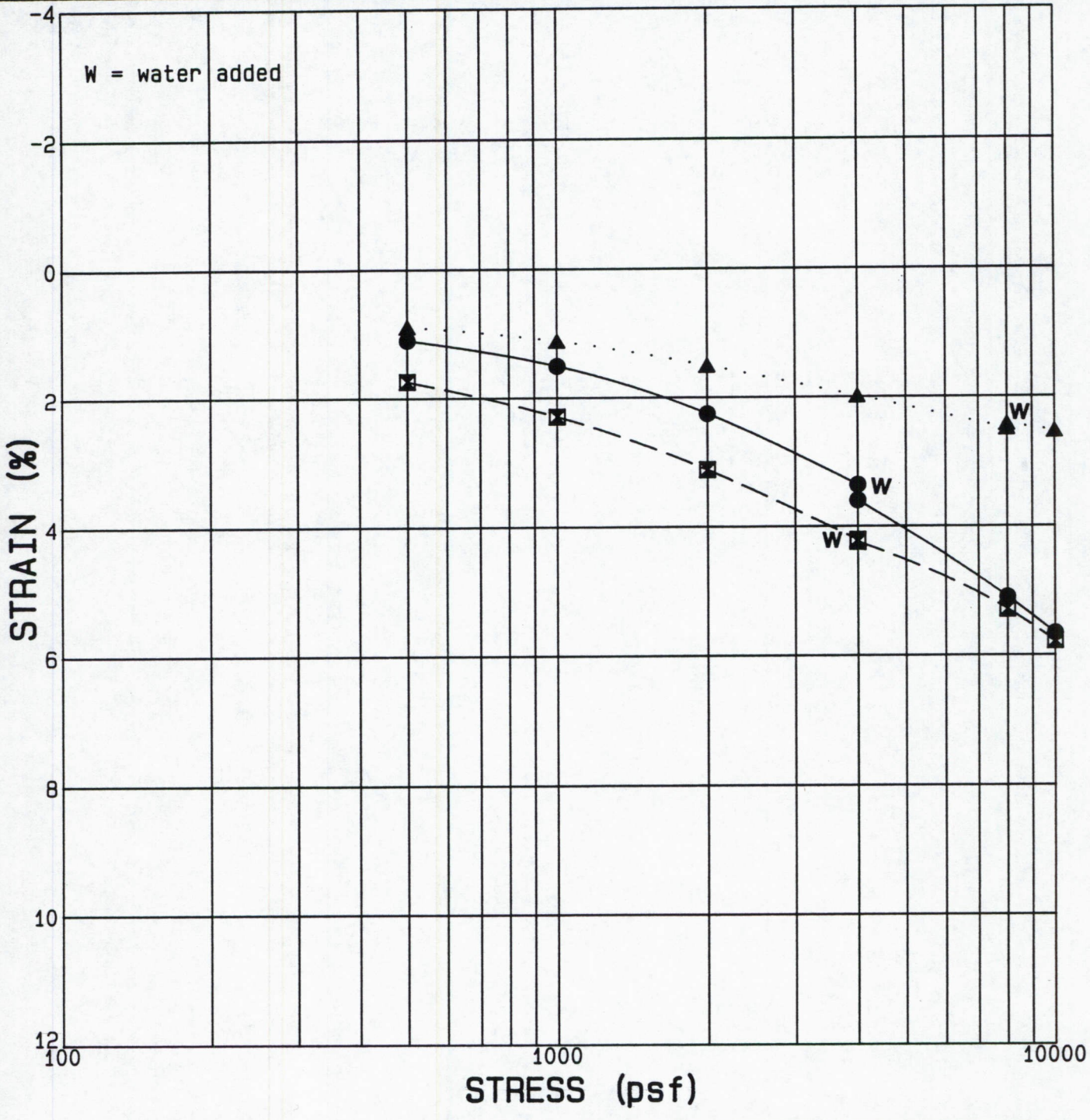
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.5




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 8 @ 25.00' | Qcol/Qoal | 0.4904 | 16 | 111 | |

# CONSOLIDATION TEST DATA

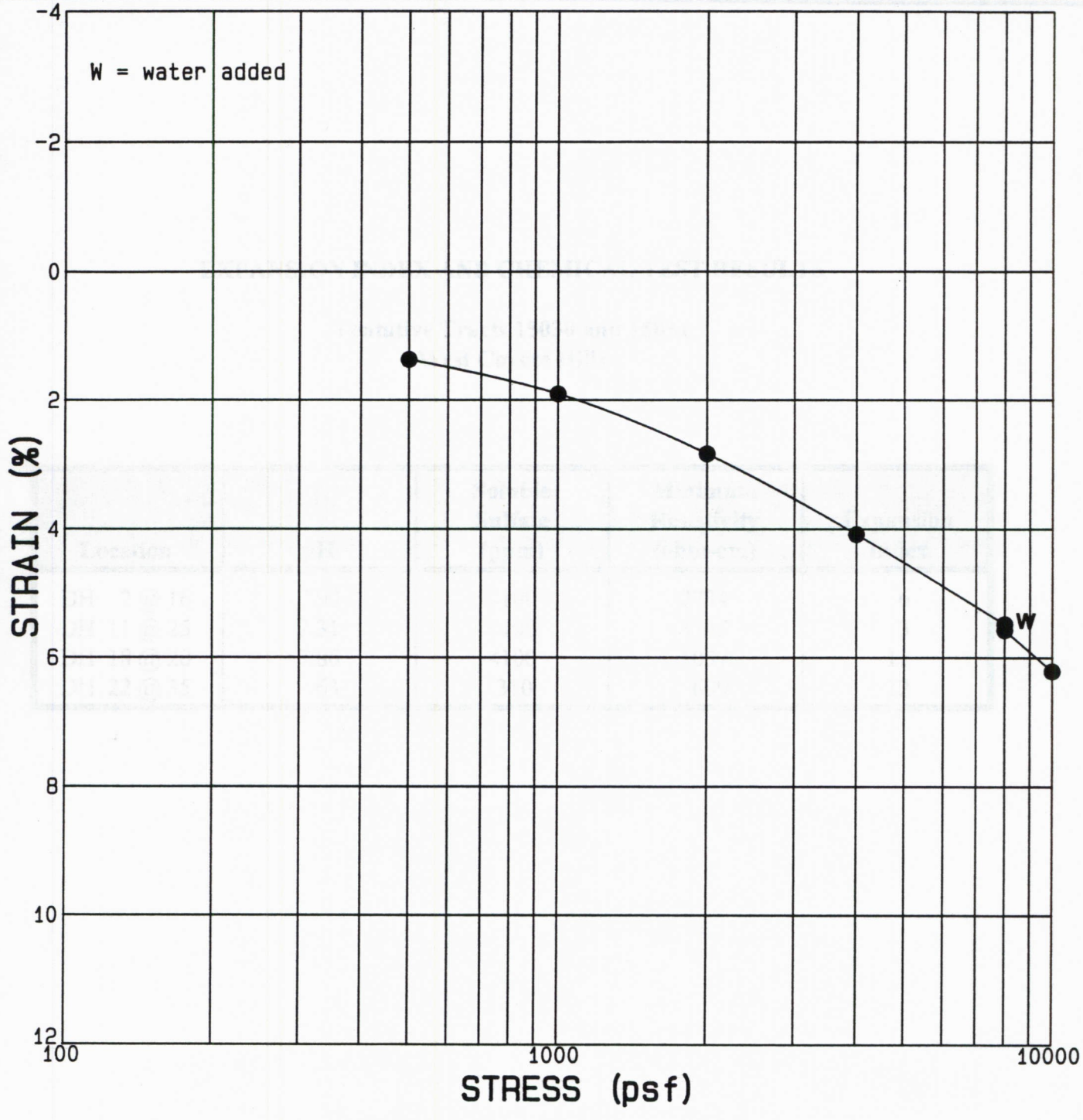
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.6




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 27 @ 5.00' | Qcol/Qoal | 0.5290 | 16 | 108 | |
| ⊠ | DH 27 @ 10.00' | Qcol/Qoal | 0.5476 | 18 | 107 | |
| ▲ | DH 28 @ 5.00' | Qcol/Qoal | 0.3309 | 9 | 124 | |

# CONSOLIDATION TEST DATA

PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.7




| | SAMPLE LOCATION | SOURCE | INITIAL VOID RATIO | MOIST. (%) | D.D. (pcf) | R.C. (%) |
|---|---|---|---|---|---|---|
| ● | DH 28 @ 10.00' | Qcol/Qoal | 0.4891 | 15 | 111 | |

# CONSOLIDATION TEST DATA

PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.8

# *Appendix D*
# *Liquefaction & Lateral Spreading Analysis*

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**TABLE 1**
**BRAY'S CRITERIA FOR LIQUEFIABLE FINE-GRAINED SOILS**

| | | Dry Unit Weight (pcf) | in-situ wc (%) | Total Unit Weight (pcf) | Satur (Gs=2.7) (%) | Atterberg Limits LL | PL | PI | Liquidty Index | Bray's Criteria (80% of LL) | Bray's Criteria for LL In Situ | Sat wc (%) | Bray's Criteria for LL Saturated | Fines (%) | Entire USCS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HS-3 | 10 | 118.1 | 11.6 | 131.8 | 73 | 27 | 14 | 13 | -0.2 | 21.6 | Not Susceptible | 15.8 | Not Susceptible | - | CL | |
| HS-3 | 15 | 115.1 | 9.7 | 126.3 | 56 | 25 | 15 | 10 | -0.5 | 20.0 | Not Susceptible | 17.2 | Not Susceptible | - | CL | |
| HS-3 | 25 | 103.2 | 21.3 | 125.2 | 91 | 39 | 16 | 23 | 0.2 | 31.2 | Not Susceptible | 23.4 | Not Susceptible | - | CL | |
| HS-11 | 40 | 119.2 | 4.6 | 124.7 | 30 | 24 | 20 | 4 | -3.9 | 19.2 | Not Susceptible | 15.3 | Not Susceptible | 42 | SC-SM | |
| HS-12 | 40 | 115.7 | 14.8 | 132.8 | 88 | 37 | 14 | 23 | 0.0 | 29.6 | Not Susceptible | 16.9 | Not Susceptible | - | CL | |
| HS-12 | 50 | 97.5 | 25.7 | 122.6 | 95 | 42 | 20 | 22 | 0.3 | 33.6 | Not Susceptible | 27.0 | Not Susceptible | - | CL | |
| HS-13 | 15 | 105.3 | 6.7 | 112.4 | 30 | 21 | 20 | 1 | -13.3 | 16.8 | Not Susceptible | 22.2 | Susceptible | 28 | SM | |
| HS-13 | 35 | 106.9 | 9.8 | 117.4 | 46 | 24 | 20 | 4 | -2.6 | 19.2 | Not Susceptible | 21.3 | Susceptible | 44 | SC-SM | |
| HS-14 | 10 | 107.5 | 21.4 | 130.5 | 100 | 39 | 16 | 23 | 0.2 | 31.2 | Not Susceptible | 21.0 | Not Susceptible | - | CL | |
| HS-14 | 20 | 115.3 | 9.1 | 125.8 | 53 | 25 | 15 | 10 | -0.6 | 20.0 | Not Susceptible | 17.1 | Not Susceptible | - | SC | |
| HS-15 | 20 | 124.2 | 7.6 | 133.6 | 58 | 67 | 19 | 48 | -0.2 | 53.6 | Not Susceptible | 13.2 | Not Susceptible | 15 | SC | |
| HS-15 | 25 | 119.2 | 13.4 | 135.2 | 88 | 42 | 21 | 21 | -0.4 | 33.6 | Not Susceptible | 15.3 | Not Susceptible | - | SC | |
| HS-16 | 20 | 111.7 | 16.4 | 130.0 | 87 | 36 | 19 | 17 | -0.2 | 28.8 | Not Susceptible | 18.8 | Not Susceptible | - | CL | |
| HS-16 | 35 | 104.1 | 21.7 | 126.7 | 95 | 38 | 27 | 11 | -0.5 | 30.4 | Not Susceptible | 22.9 | Not Susceptible | 84 | ML | |
| HS-17 | 20 | 99.0 | 26.3 | 125.0 | 100 | 42 | 20 | 22 | 0.3 | 33.6 | Not Susceptible | 26.0 | Not Susceptible | - | CL | |
| HS-17 | 25 | 110.4 | 18.2 | 130.5 | 93 | 32 | 17 | 15 | 0.1 | 25.6 | Not Susceptible | 19.5 | Not Susceptible | - | CL | |
| HS-11 | 45 | 119.9 | 6.5 | 127.7 | 43 | 24 | 20 | 4 | -3.4 | 19.2 | Not Susceptible | 15.0 | Not Susceptible | - | SC | PI From HS-11 @ 40 ft |
| HS-11 | 50 | 124.9 | 3.9 | 129.8 | 30 | 24 | 20 | 4 | -4.0 | 19.2 | Not Susceptible | 12.9 | Not Susceptible | - | SC | PI From HS-11 @ 40 ft |
| HS-14 | 25 | 116.8 | 8.6 | 126.8 | 52 | 25 | 15 | 10 | -0.6 | 20.0 | Not Susceptible | 16.4 | Not Susceptible | - | SC | PI From HS-14 @ 20 ft |
| HS-14 | 30 | 122.7 | 8.5 | 133.1 | 62 | 25 | 15 | 10 | -0.7 | 20.0 | Not Susceptible | 13.8 | Not Susceptible | - | SC | PI From HS-14 @ 20 ft |
| HS-14 | 35 | 116.1 | 8.7 | 126.2 | 52 | 25 | 15 | 10 | -0.6 | 20.0 | Not Susceptible | 16.7 | Not Susceptible | - | SC | PI From HS-14 @ 20 ft |

Reference:
Bray & Sancio, 2006, Assessment of the liquefaction susceptibilty of fine-grained soils, ASCE Journal of Geotechnical and Geoenvironmental Engineering, 1165-1177,September 2006

***TABLE 2***

***Summary of Over Consolidation Ratio (OCR)***

| **CPT** | **Average OCR** |
|---|---|
| CPT-1A | >10 |
| CPT-2 | >10 |
| CPT-3 | 8 |
| CPT-4 | 6 |
| CPT-5 | 7 |
| CPT-6 | >10 |
| CPT-10 | 8 |
| CPT-11B | 9 |

***TABLE 3***

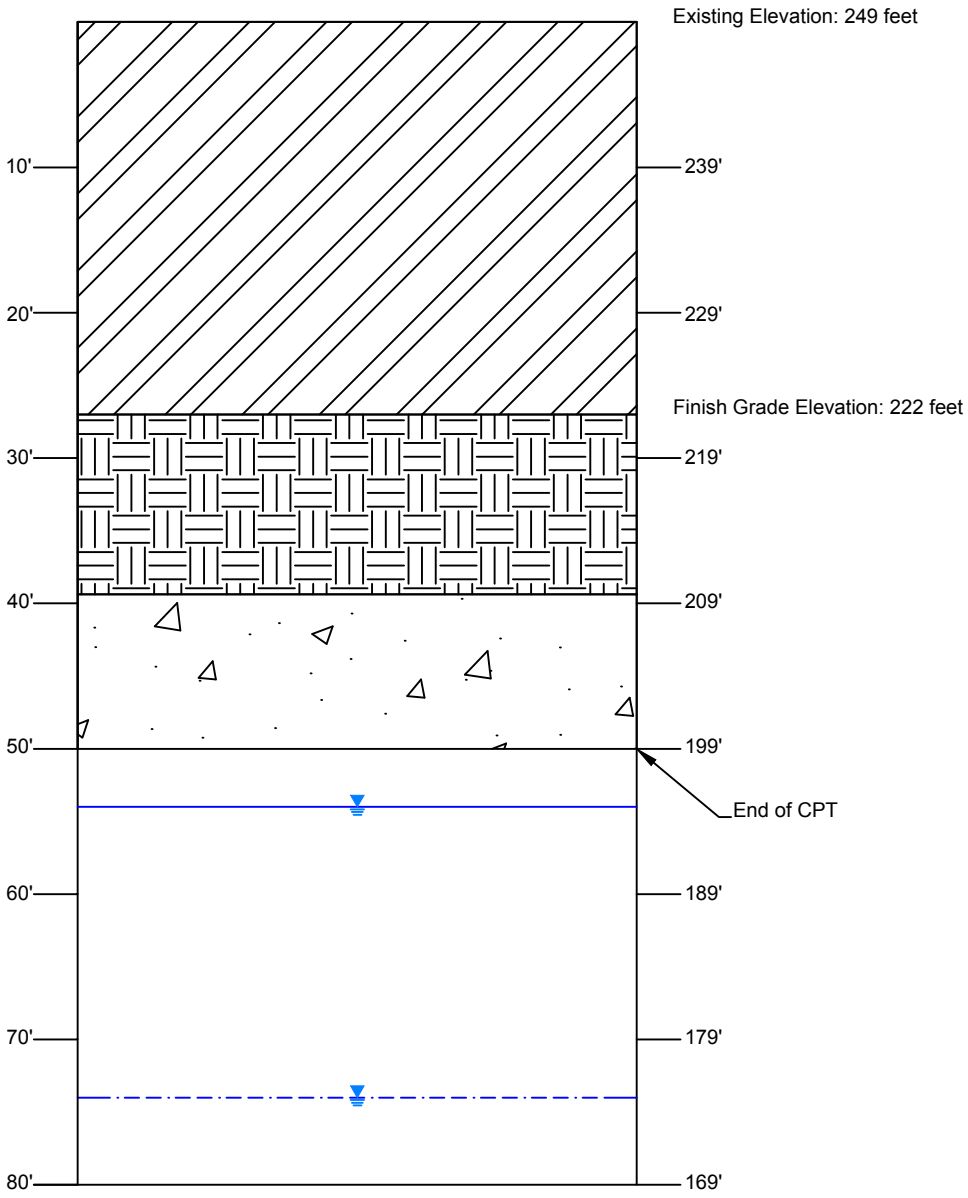
***Summary of Seismic Strength Loss***

| **CPT** | **Minimum Liquefied** $\frac{S_u}{\sigma_v'}$ |
|---|---|
| CPT-1A | N/A |
| CPT-2 | .67 |
| CPT-3 | .70 |
| CPT-4 | .70 |
| CPT-5 | N/A |
| CPT-6 | N/A |
| CPT-10 | .67 |
| CPT-11B | .67 |

***TABLE 4***

***Summary of Estimated Vertical Seismic Settlement***

| CPT | Estimated Vertical Settlement (in) |
|---|---|
| CPT-1A | 0 |
| CPT-2 | < ½” |
| CPT-3 | < 1 ½” |
| CPT-4 | < ½” |
| CPT-5 | 0 |
| CPT-6 | 0 |
| CPT-10 | 0 |
| CPT-11B | 0 |




## LEGEND

Soil to be Cut

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

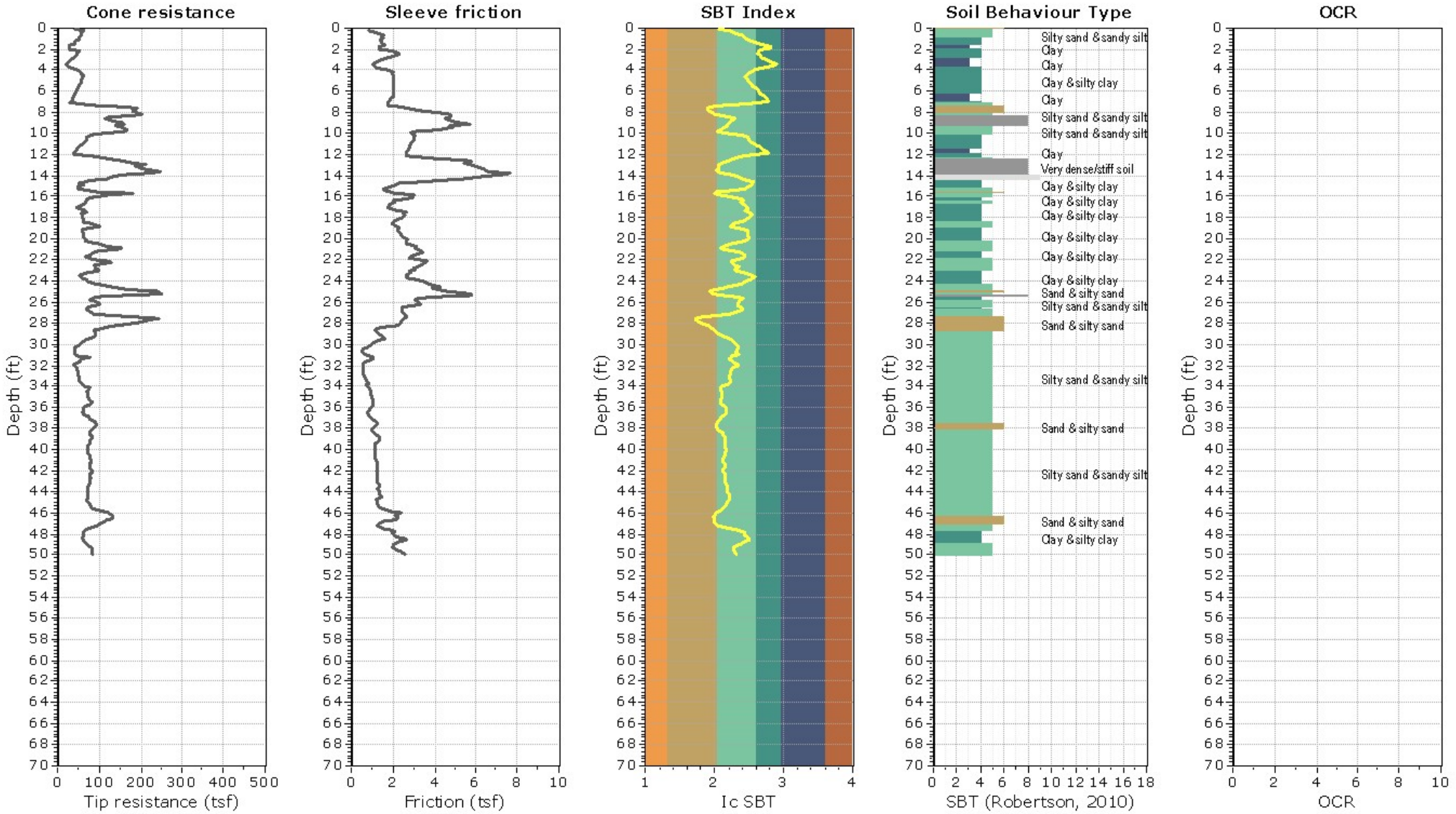
**CPT-1A**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

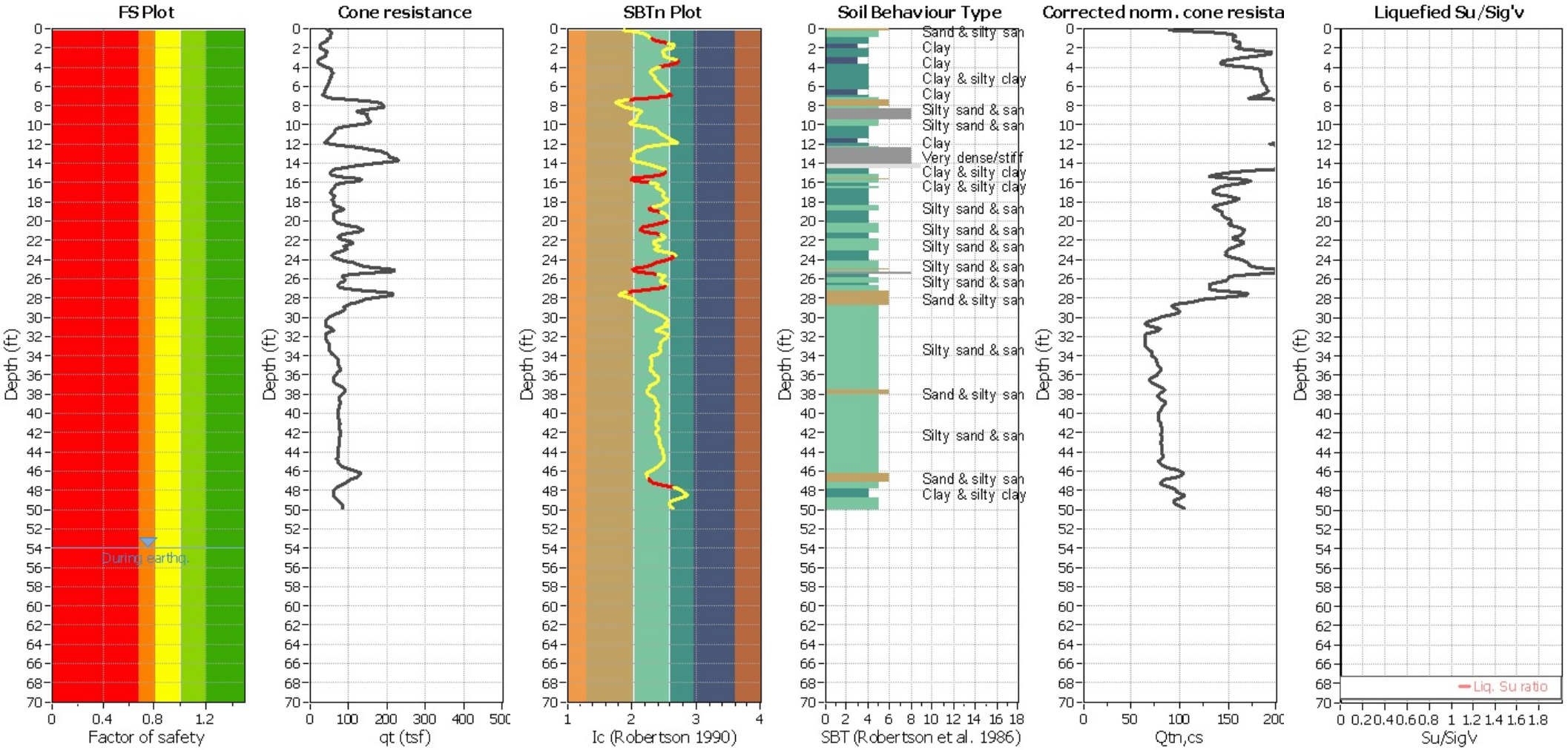
**CPT-1A**
Total depth: 49.88 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-1A**
Total depth: 49.88 ft

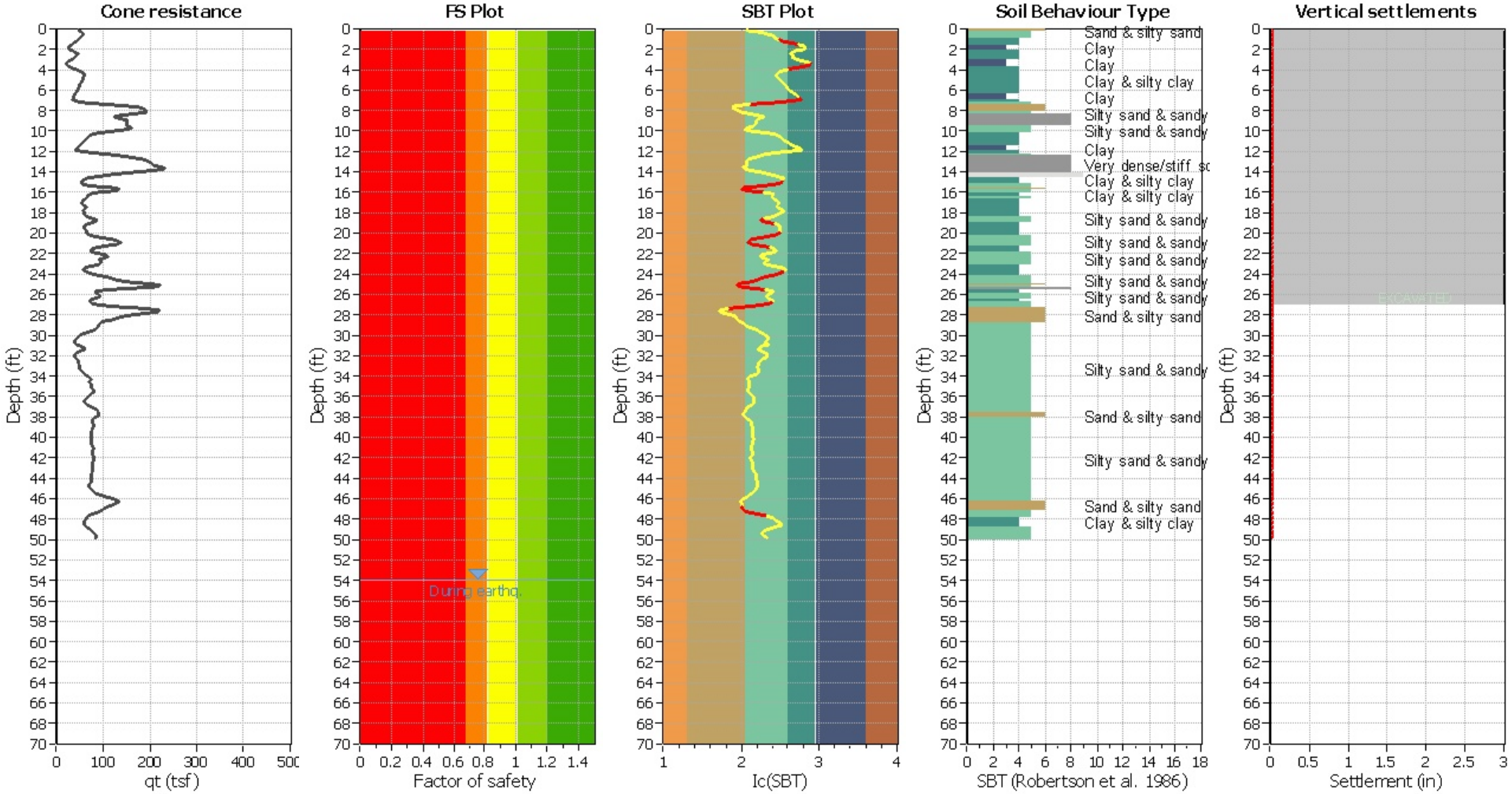



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 74.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 54.00 ft | Excavation depth: | 27.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

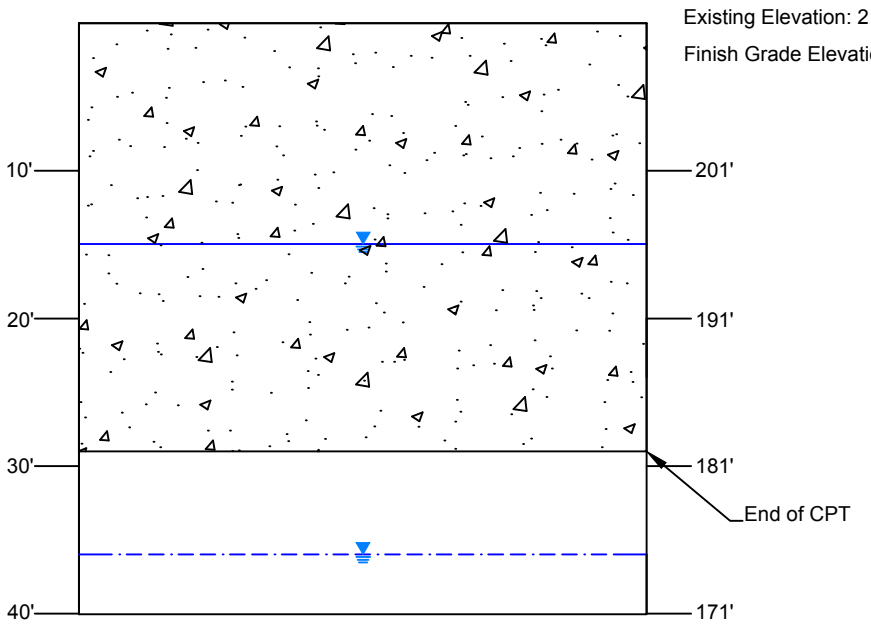
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-1A**
Total depth: 49.88 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 74.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 54.00 ft | Excavation depth: | 27.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

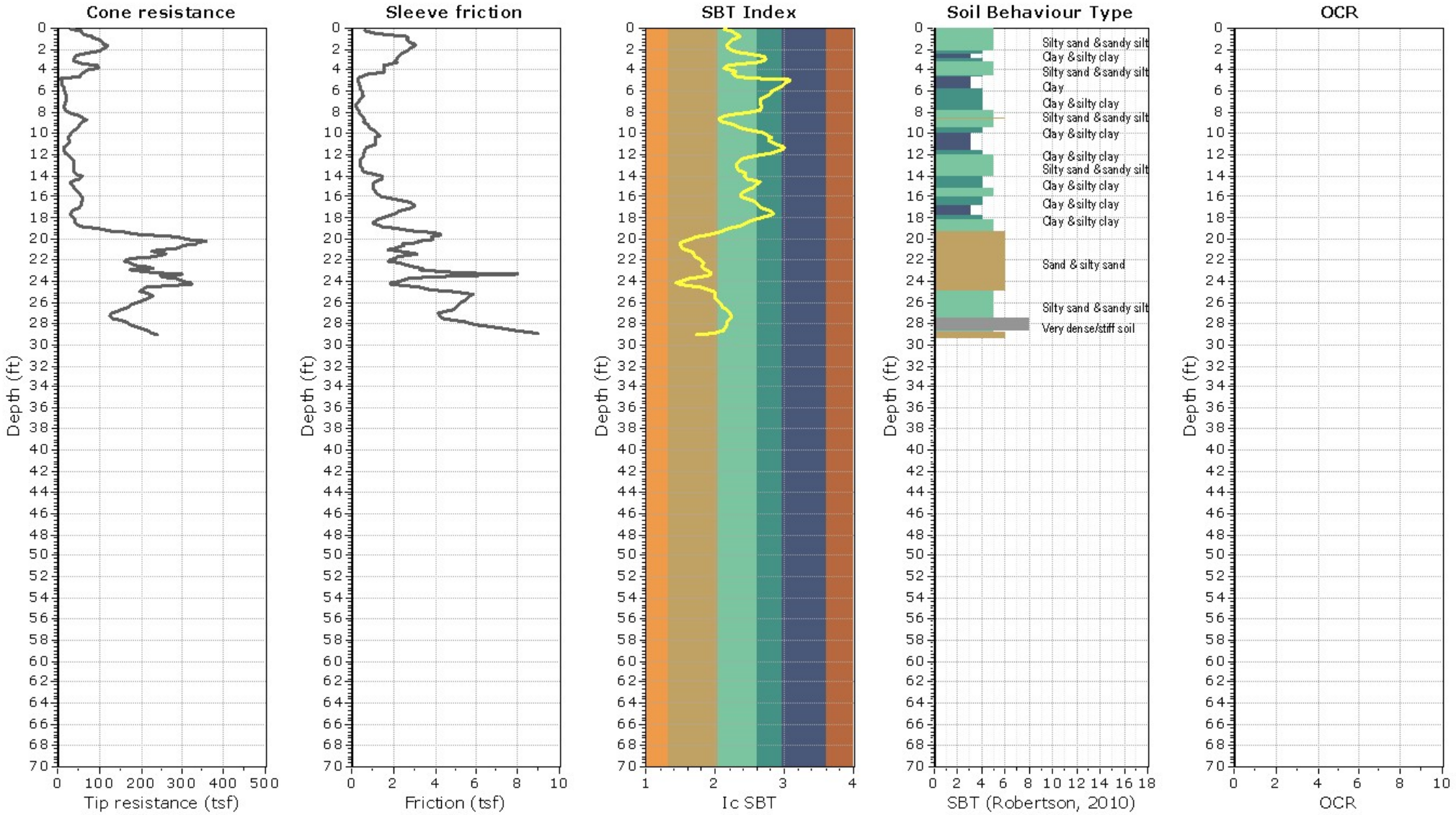
**CPT-2**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

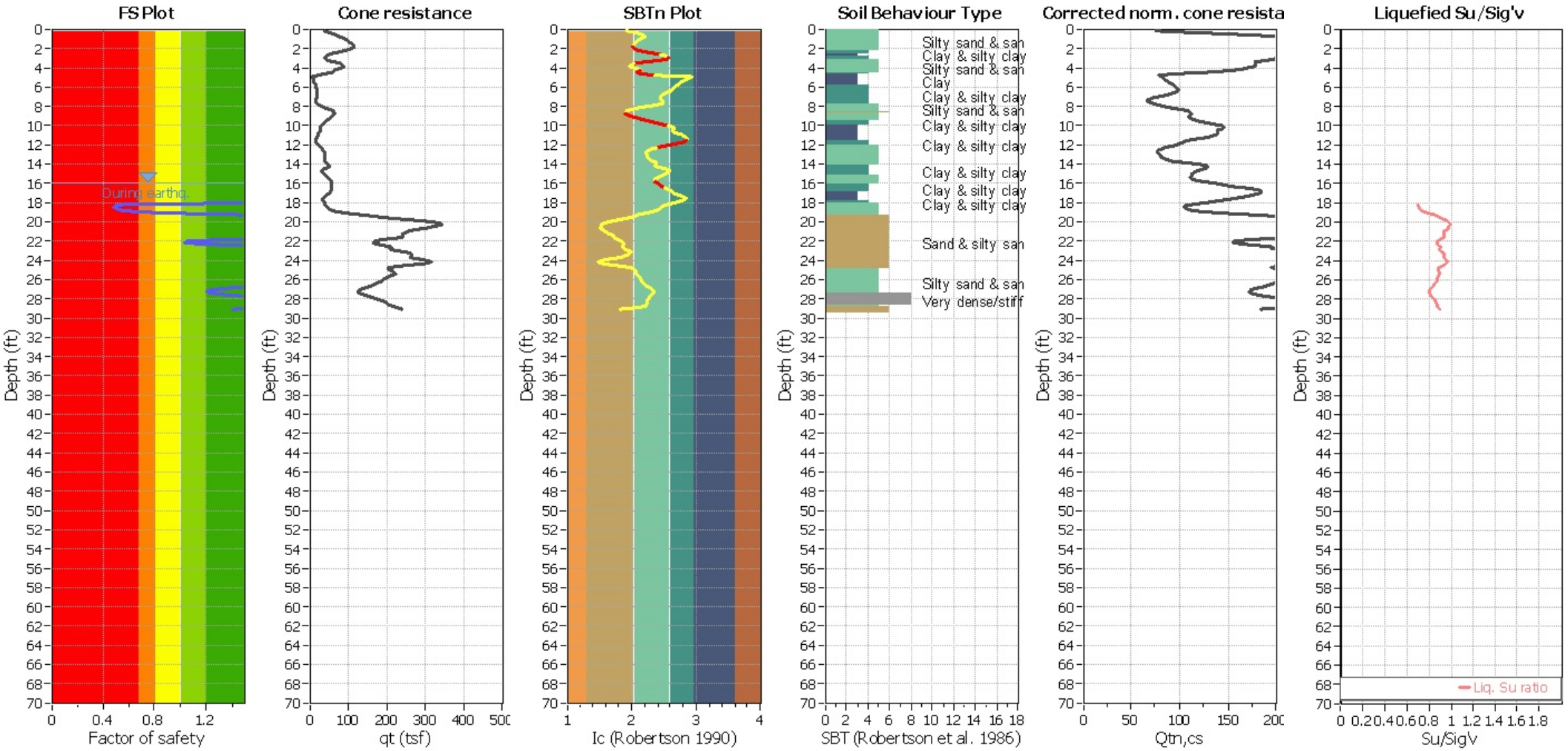
**CPT-2**
Total depth: 29.04 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-2**
Total depth: 29.04 ft

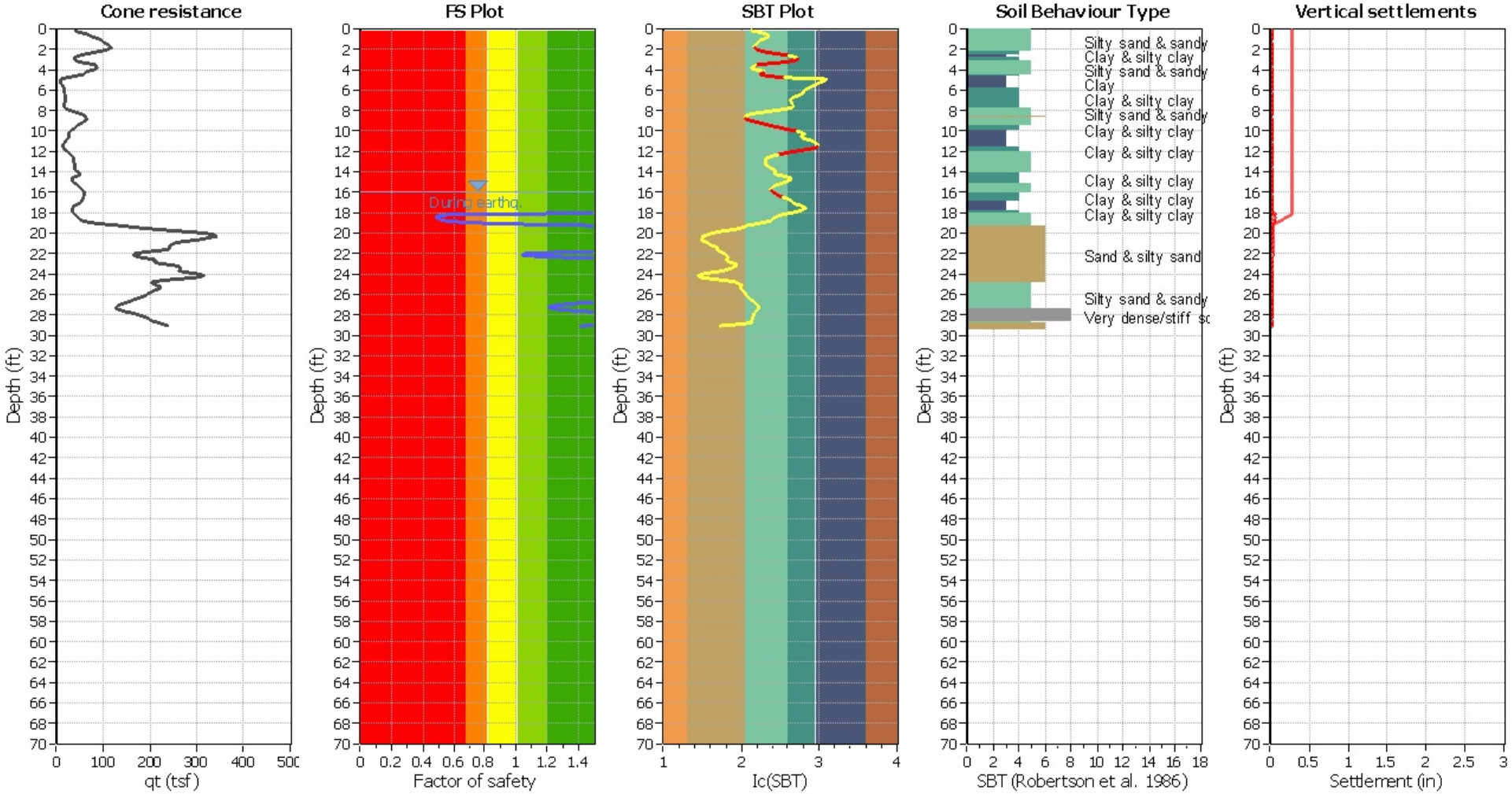



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 36.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 16.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

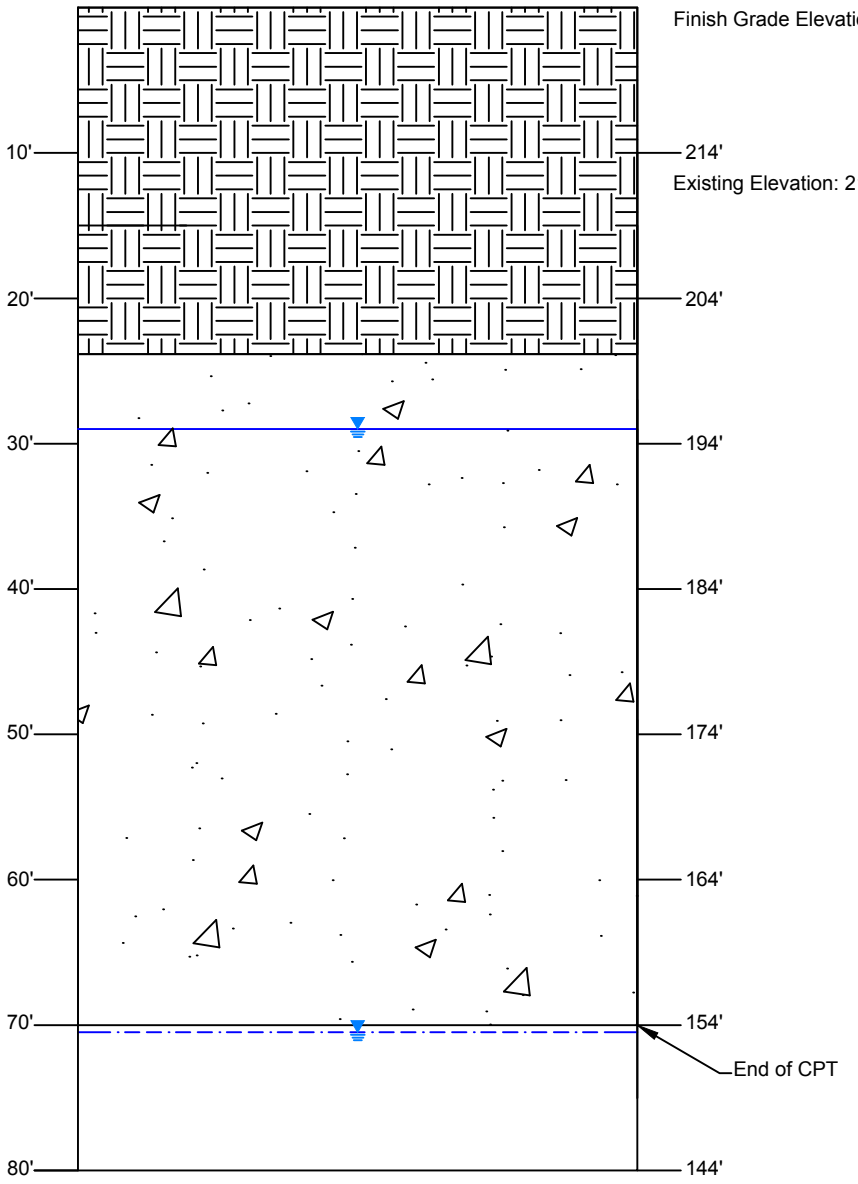
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-2**
Total depth: 29.04 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 36.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 16.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




## LEGEND

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

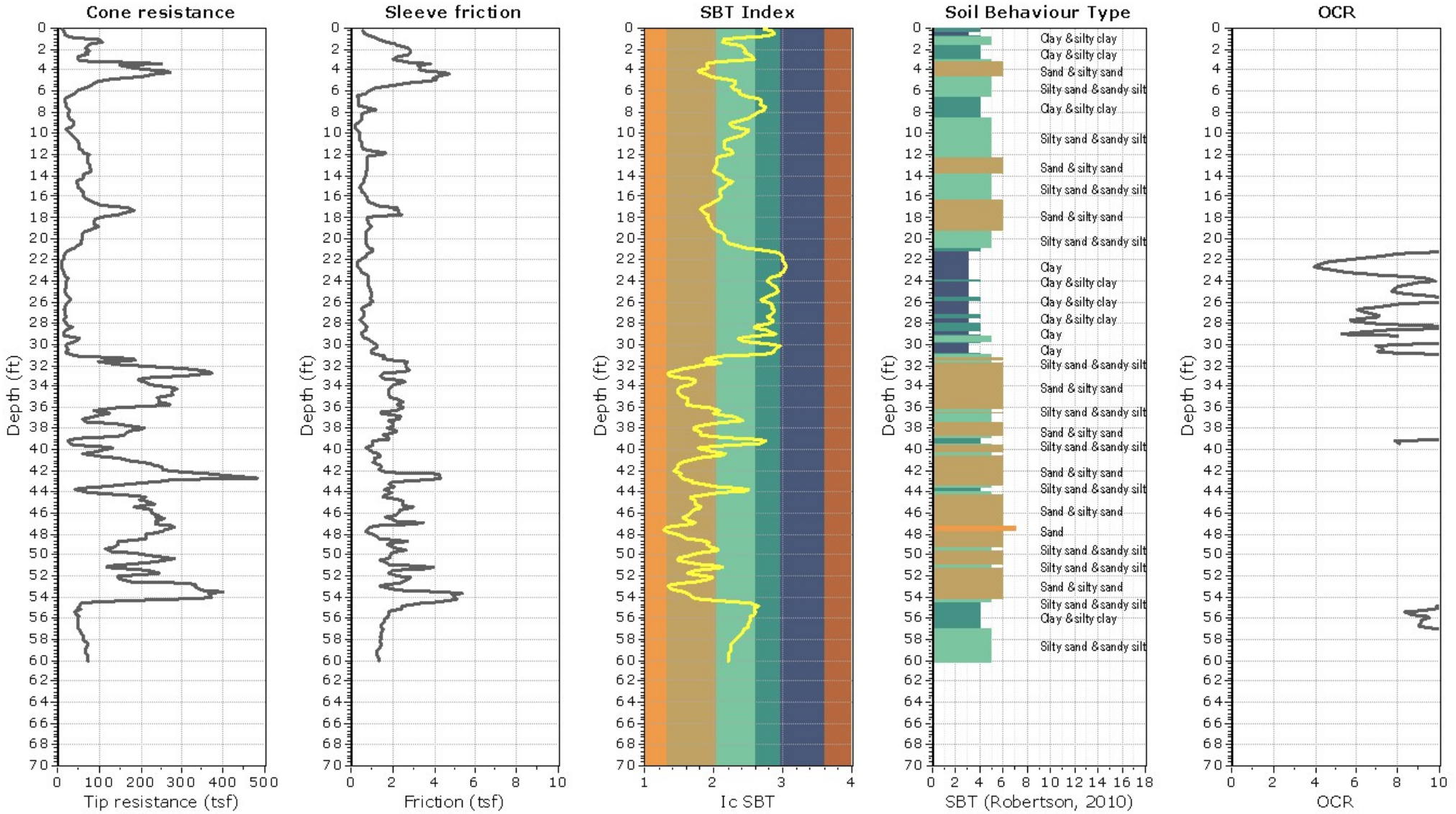
**CPT-3**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

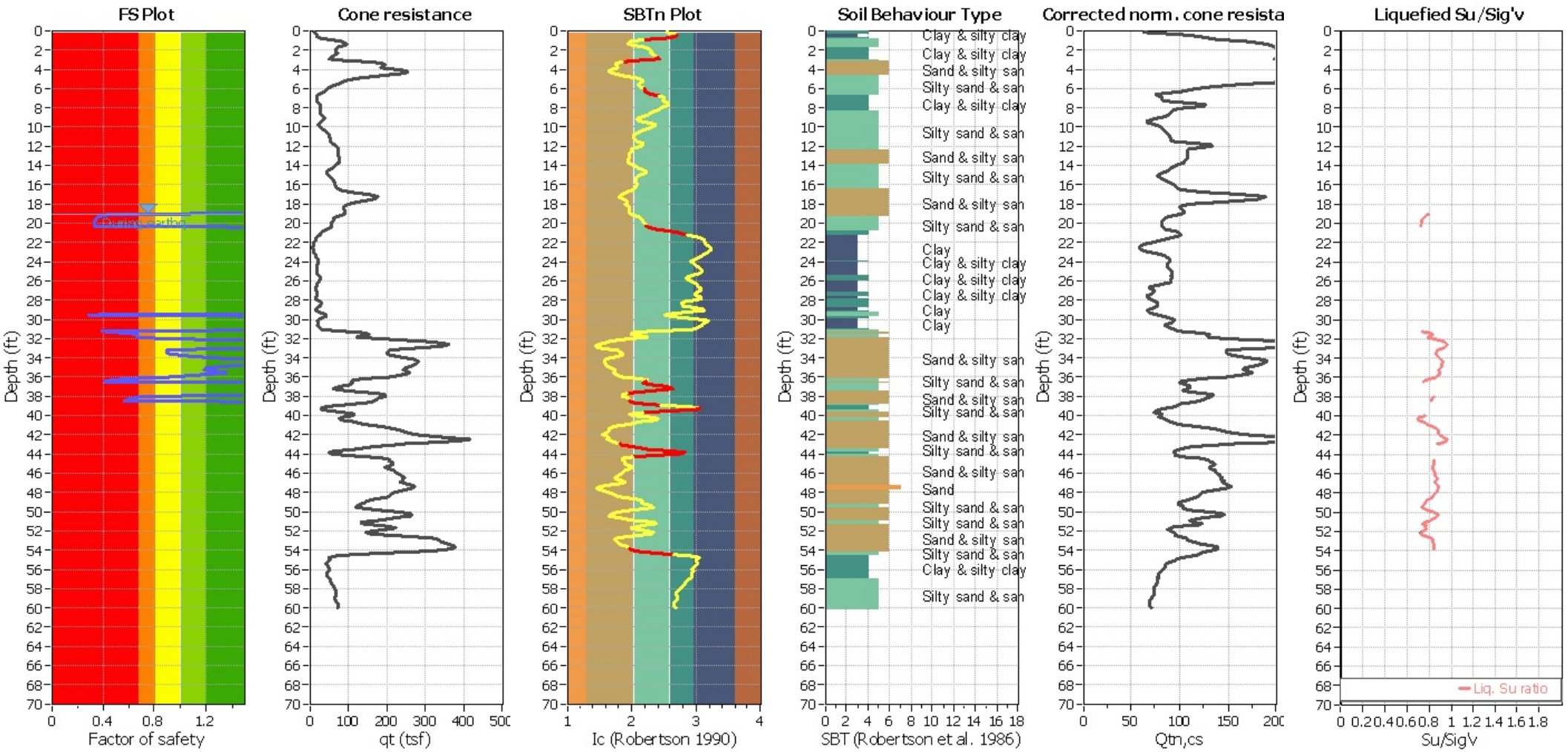
**CPT-3**
Total depth: 60.04 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-3**
Total depth: 60.04 ft

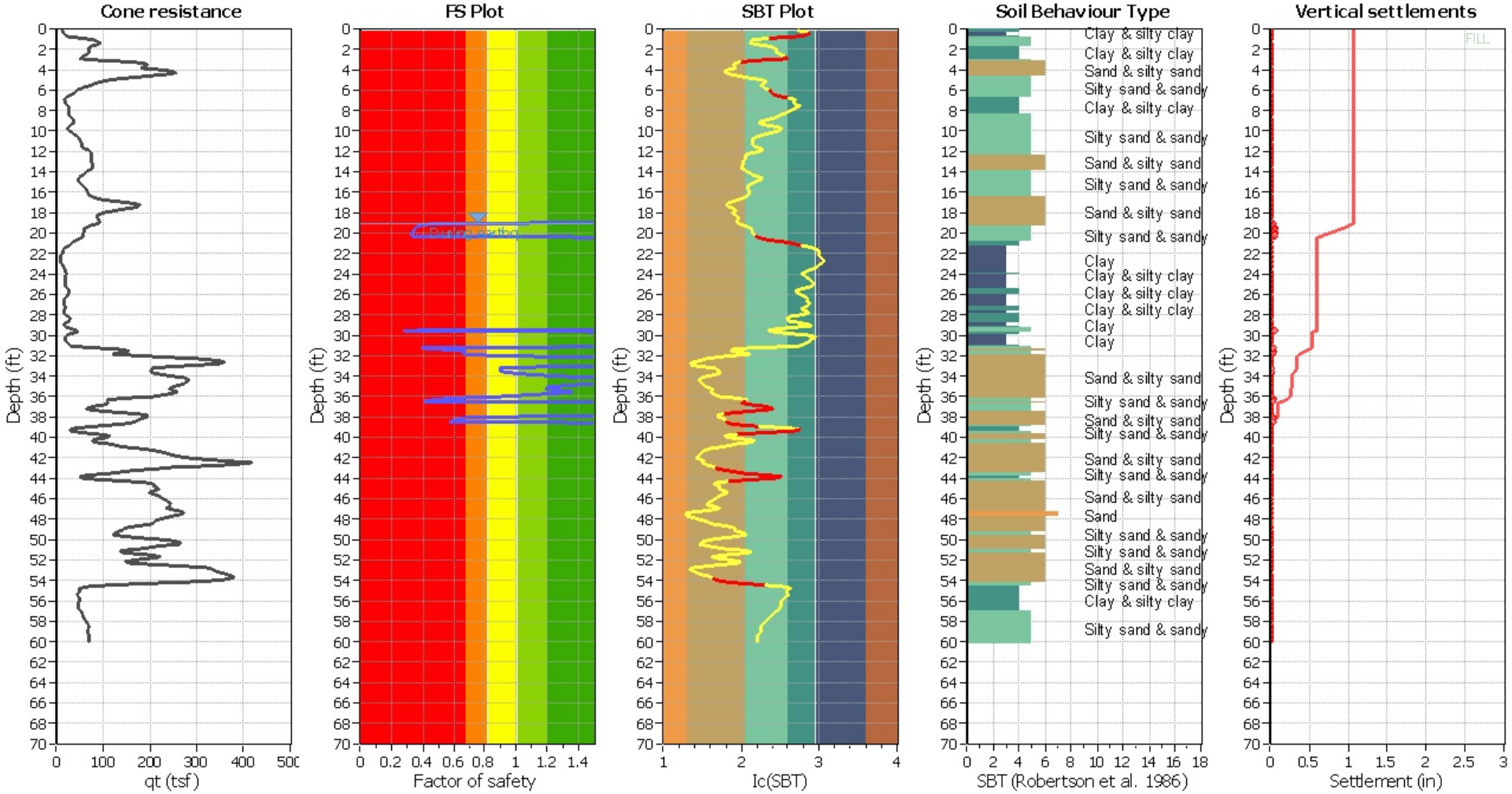



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 60.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 29.00 ft | Fill height: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

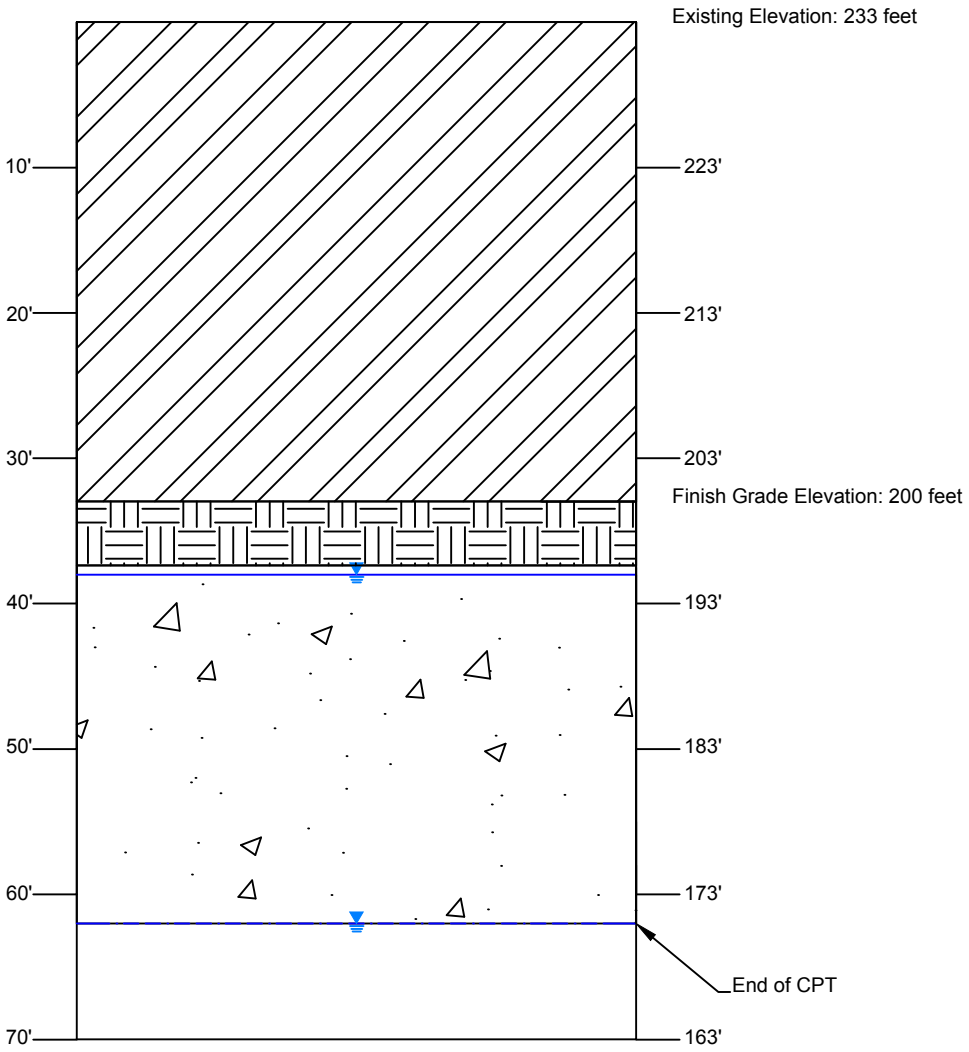
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-3**
Total depth: 60.04 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 60.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 29.00 ft | Fill height: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




## LEGEND

Soil to be Cut

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

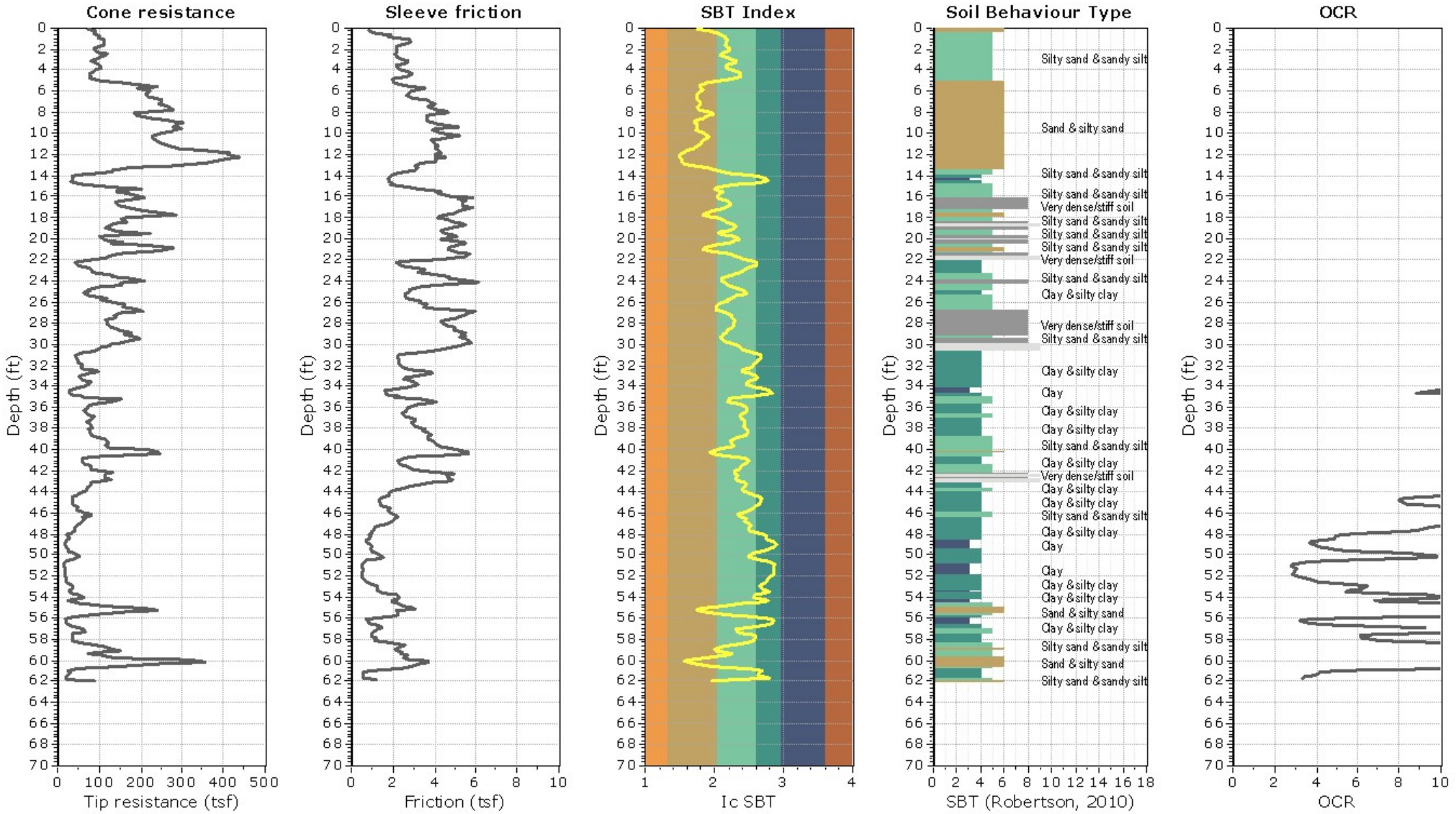
**CPT-4**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

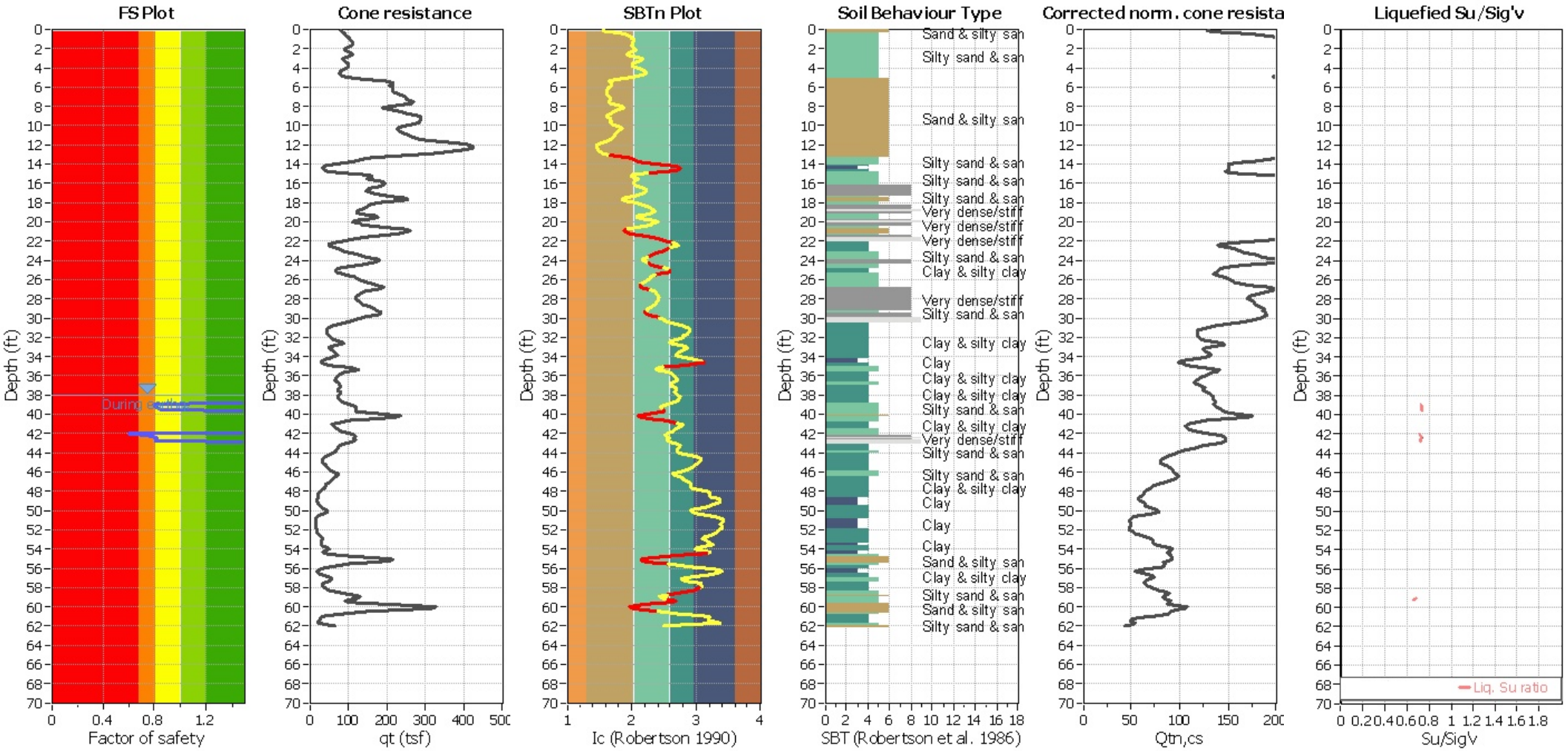
**CPT-4**
Total depth: 62.01 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-4**
Total depth: 62.01 ft

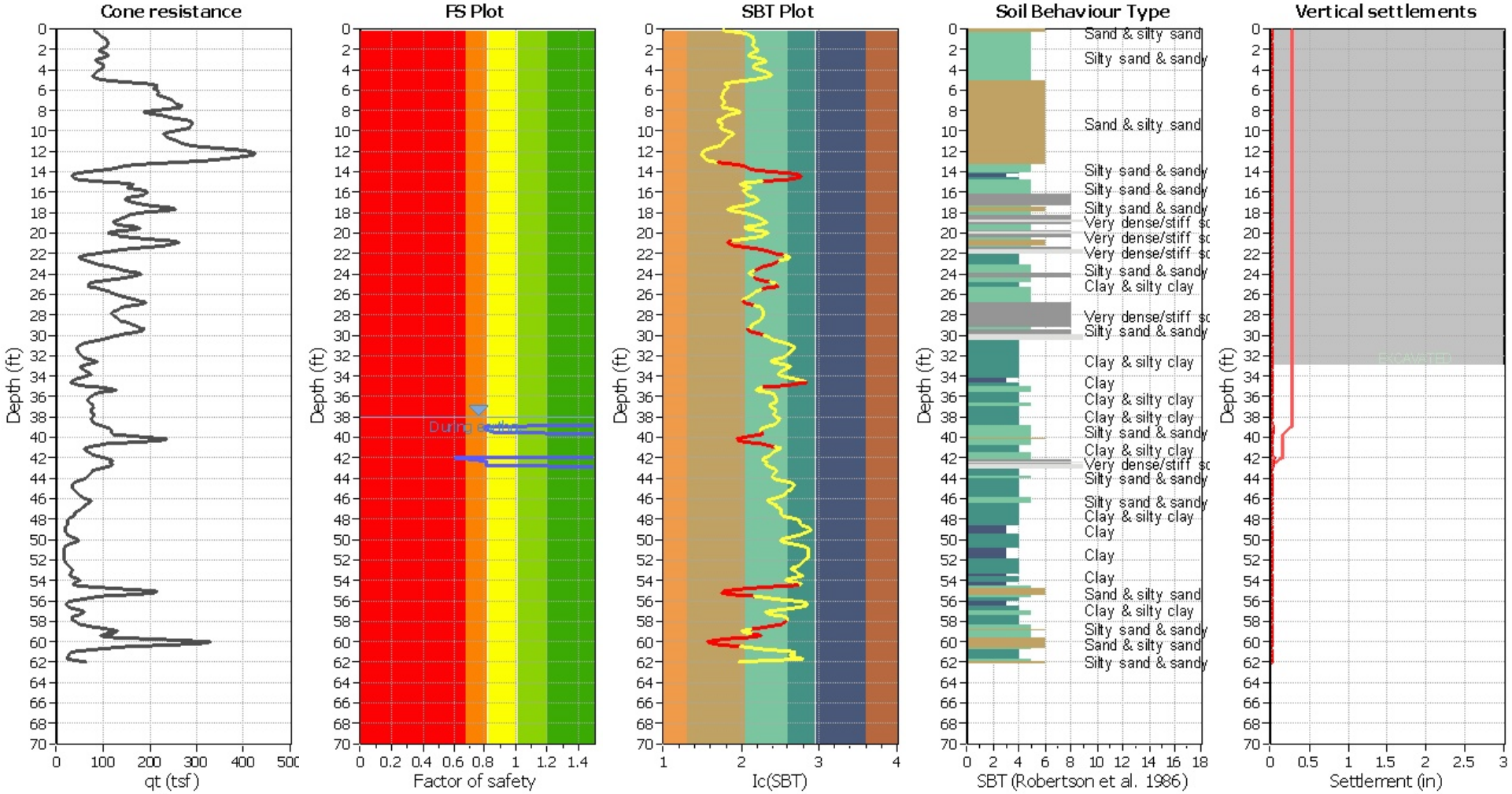



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 62.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 38.00 ft | Excavation depth: | 33.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

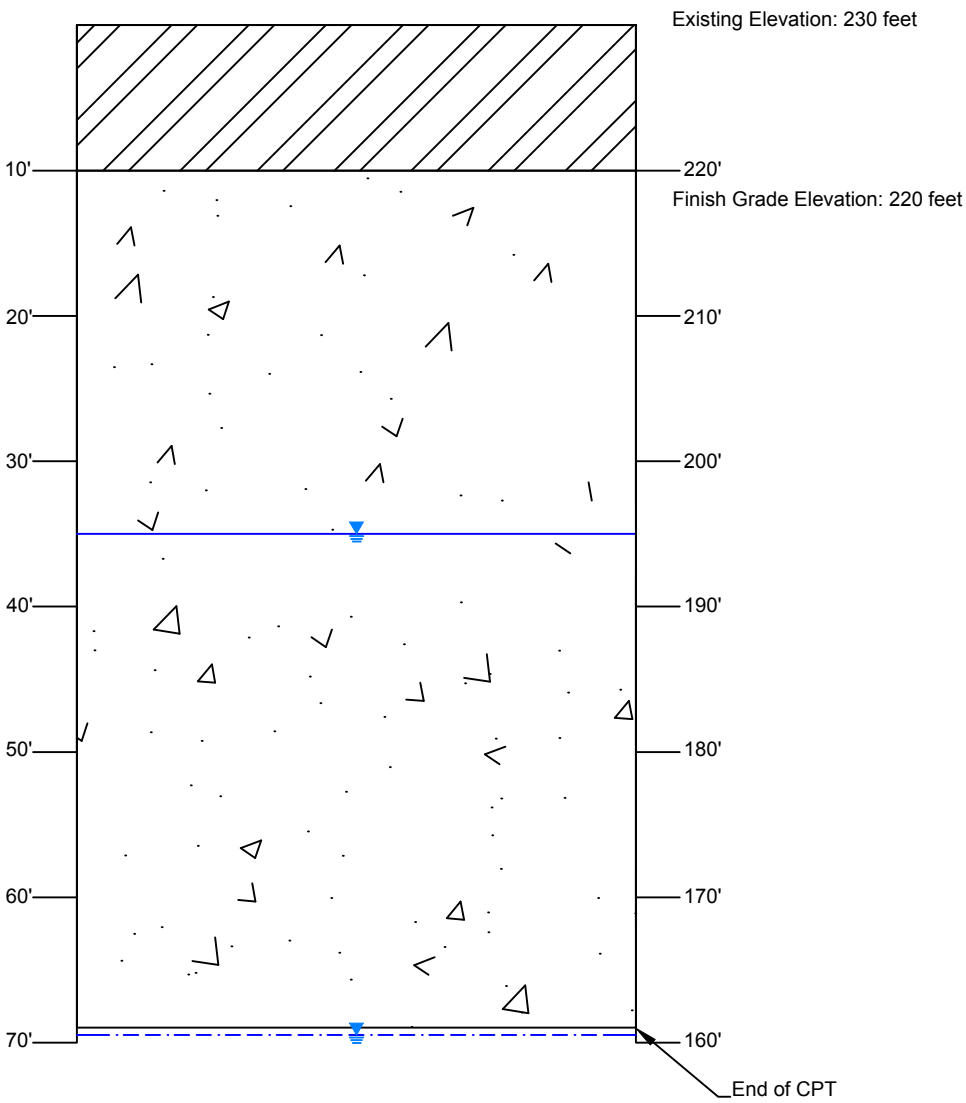
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-4**
Total depth: 62.01 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 62.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 38.00 ft | Excavation depth: | 33.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Soil to be Cut

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

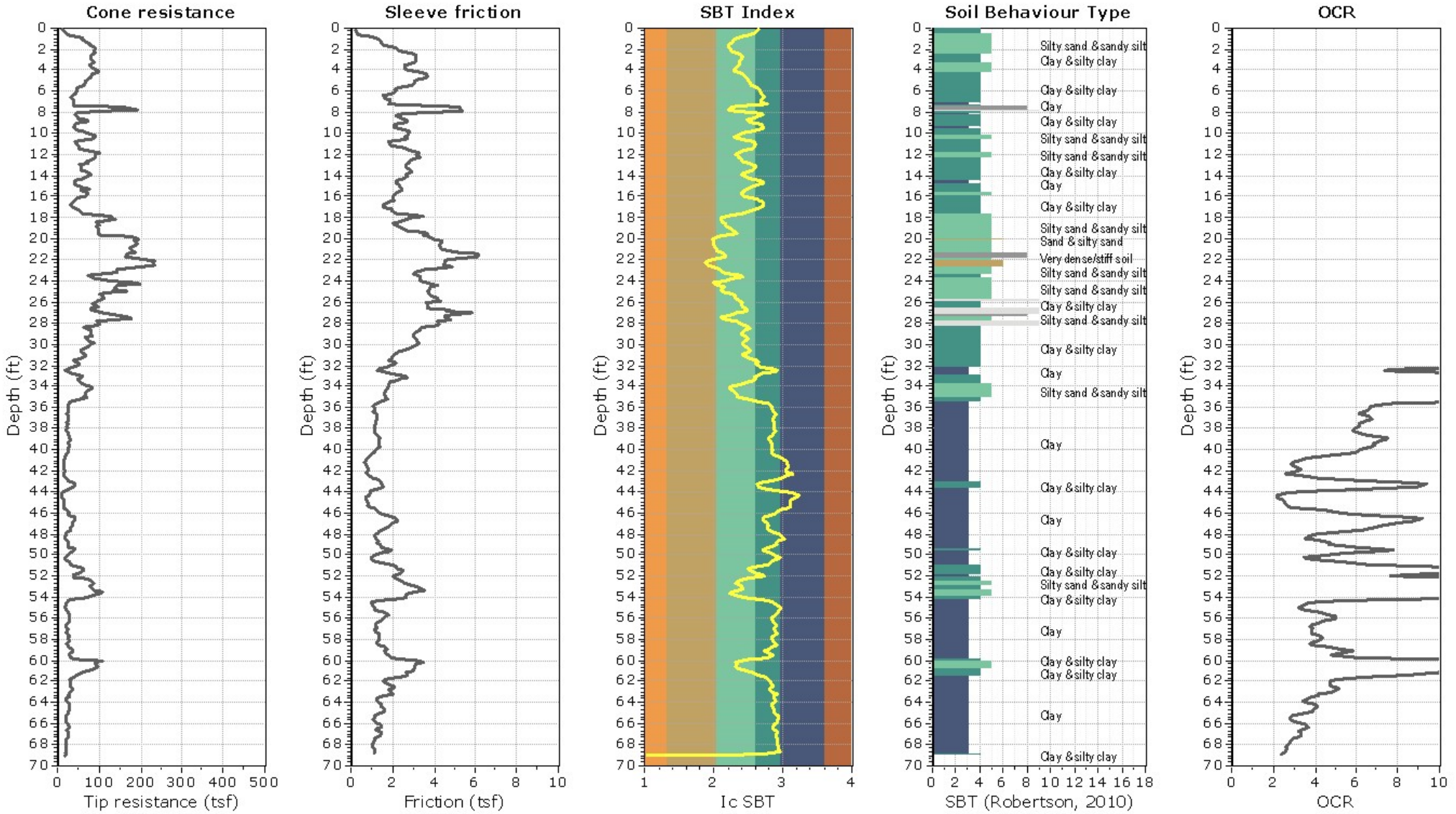
***CPT-5***

| | |
|---|---|
| *PROJECT NAME* | *Rancho La Habra - VTTm 17845* |
| *PROJECT NO.* | *14057-01* |
| *ENG. / GEOL.* | *DJB / KTM* |
| *SCALE* | *Not to Scale* |
| *DATE* | *April 2017* |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

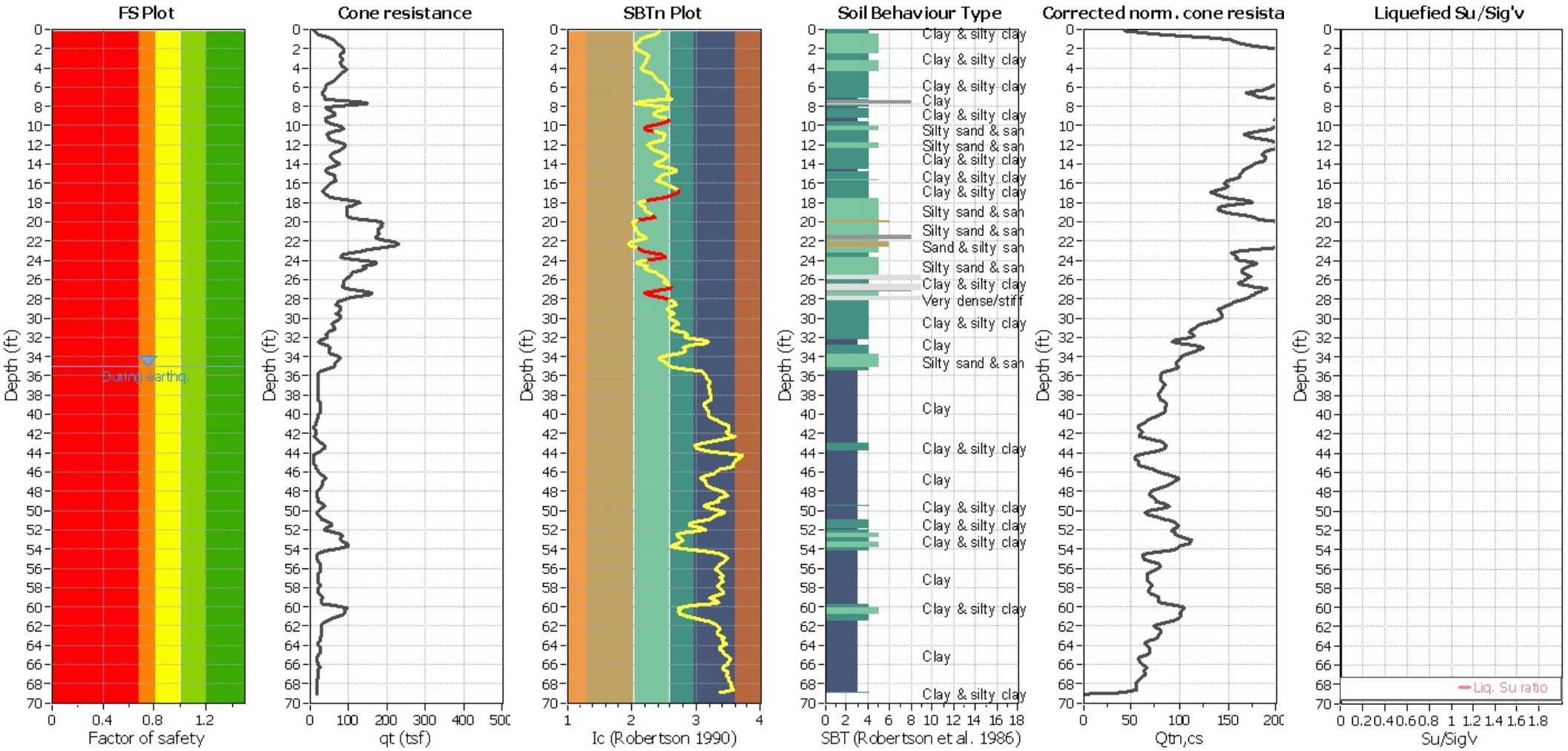
**CPT-5**
Total depth: 69.06 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Stan Pac - Westridge
**Location:**

**CPT: CPT-5**
Total depth: 69.06 ft

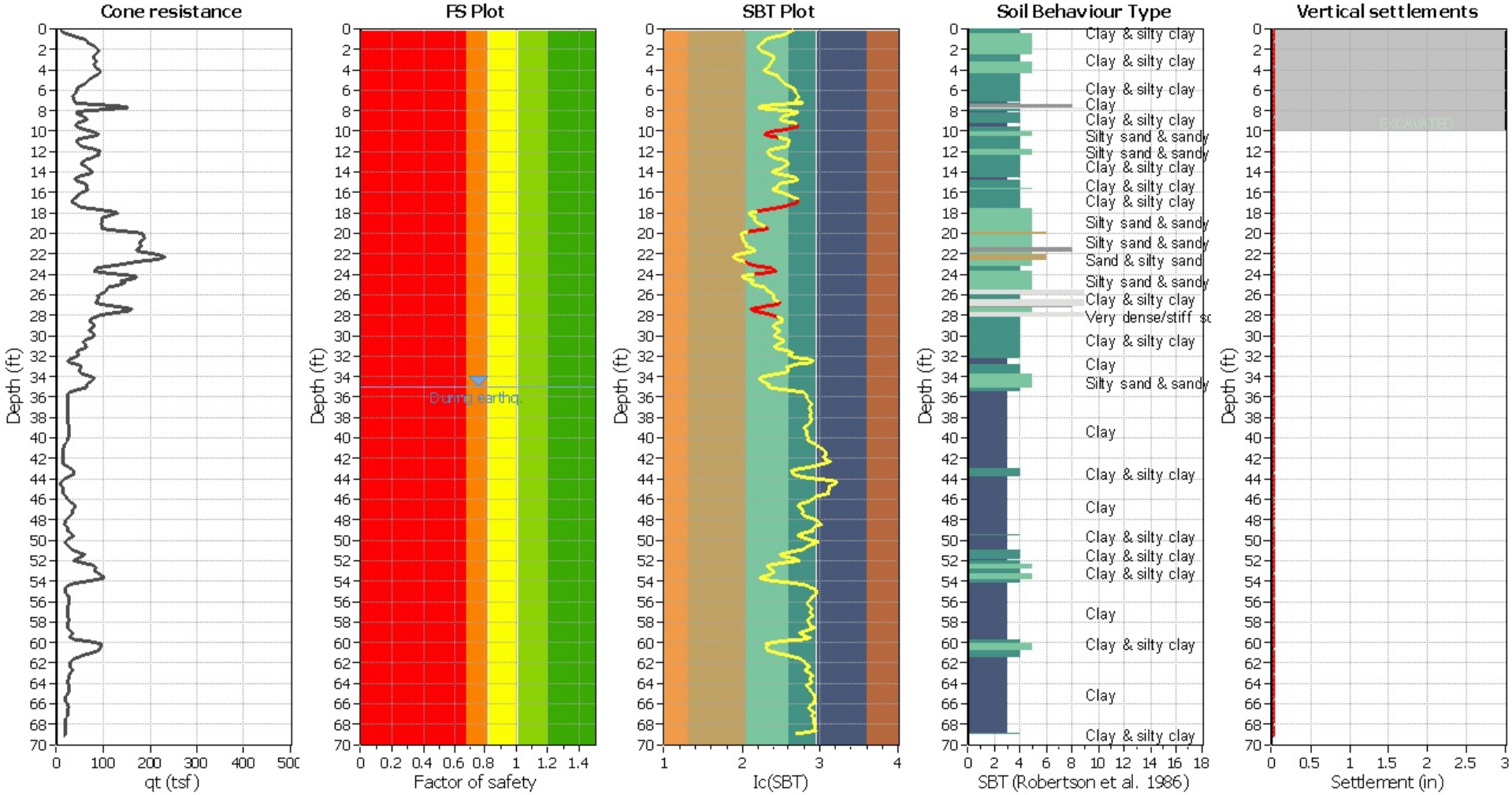



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 69.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 35.00 ft | Excavation depth: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

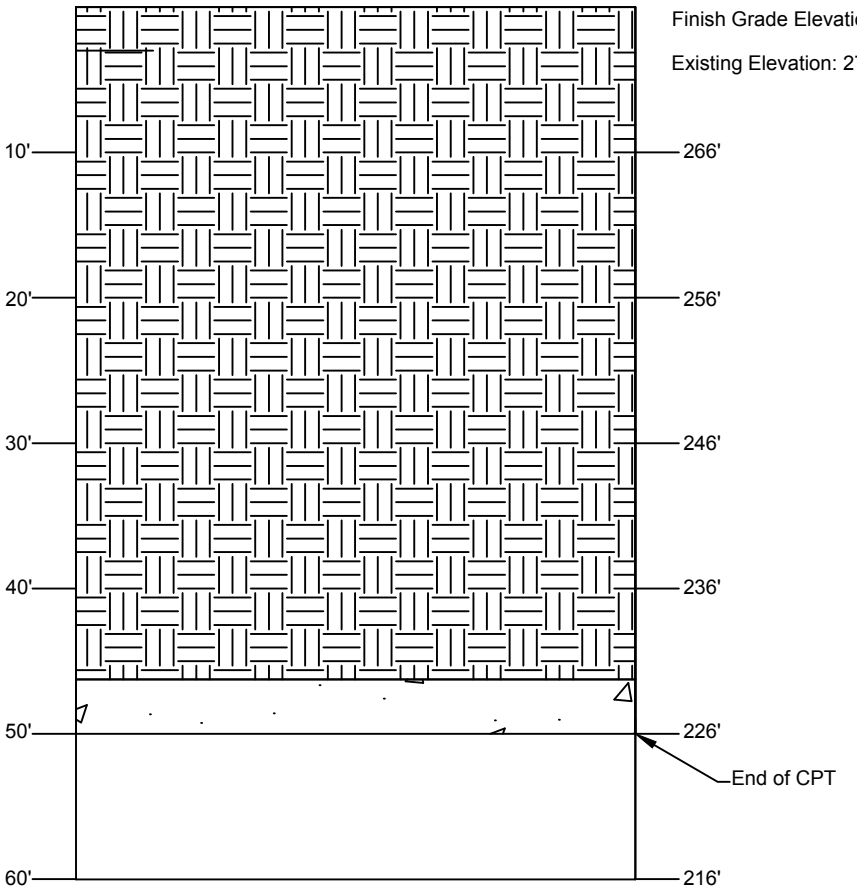
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** **Stan Pac - Westridge**
**Location:**

**CPT: CPT-5**
Total depth: 69.06 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 69.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 35.00 ft | Excavation depth: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Fill

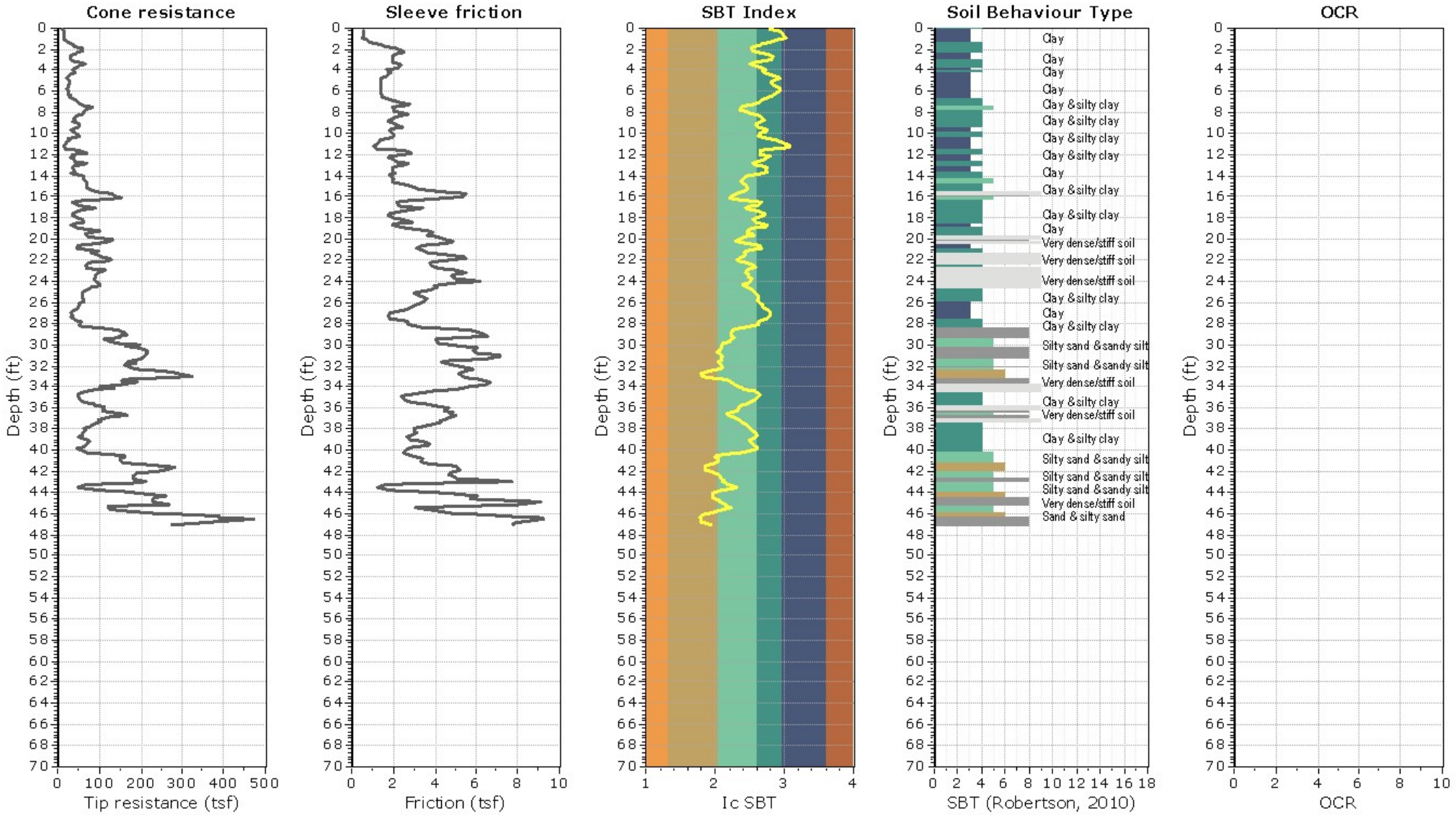
Alluvium

| | |
|---|---|
| **CPT-6** | |
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

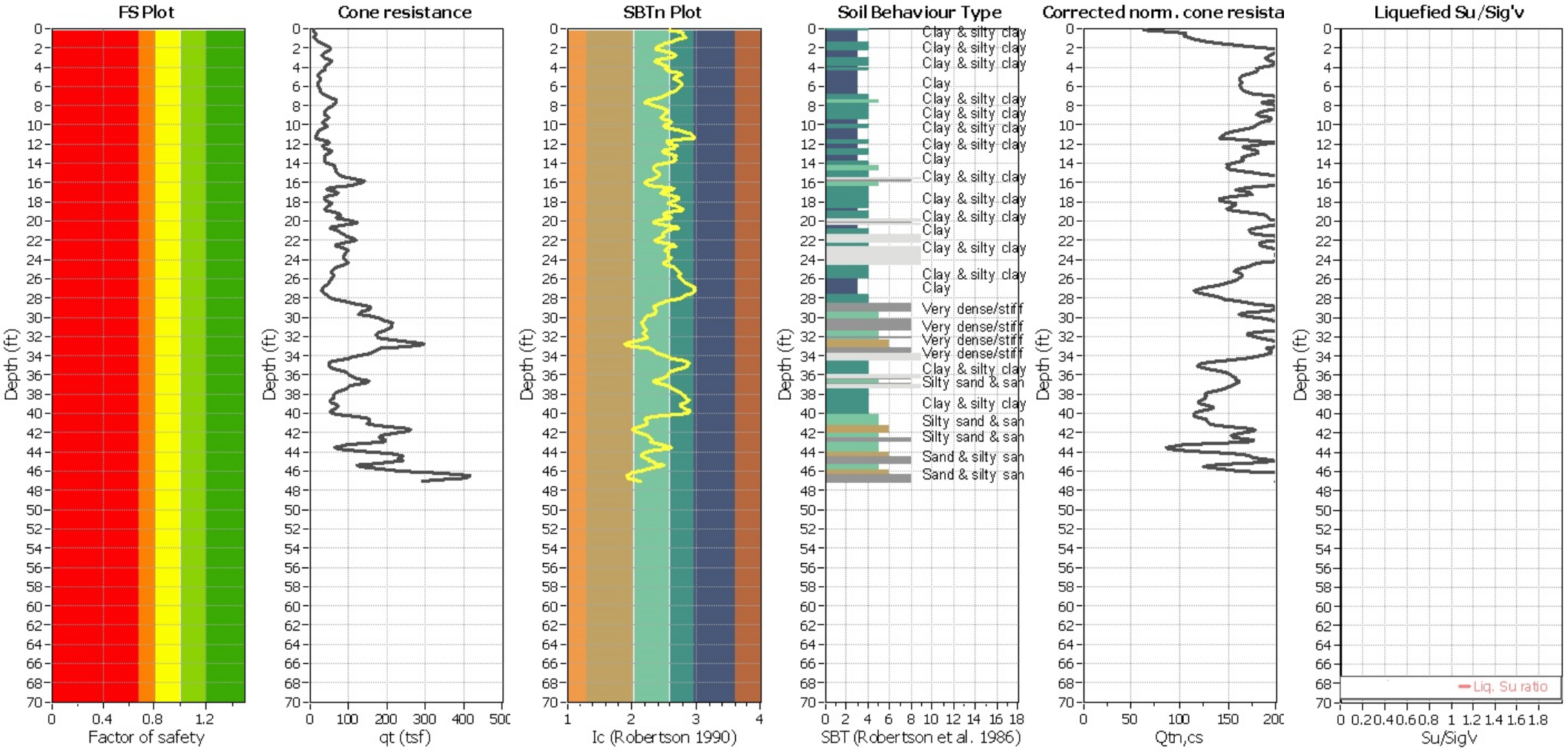
**CPT-6**
Total depth: 47.08 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-6**
Total depth: 47.08 ft

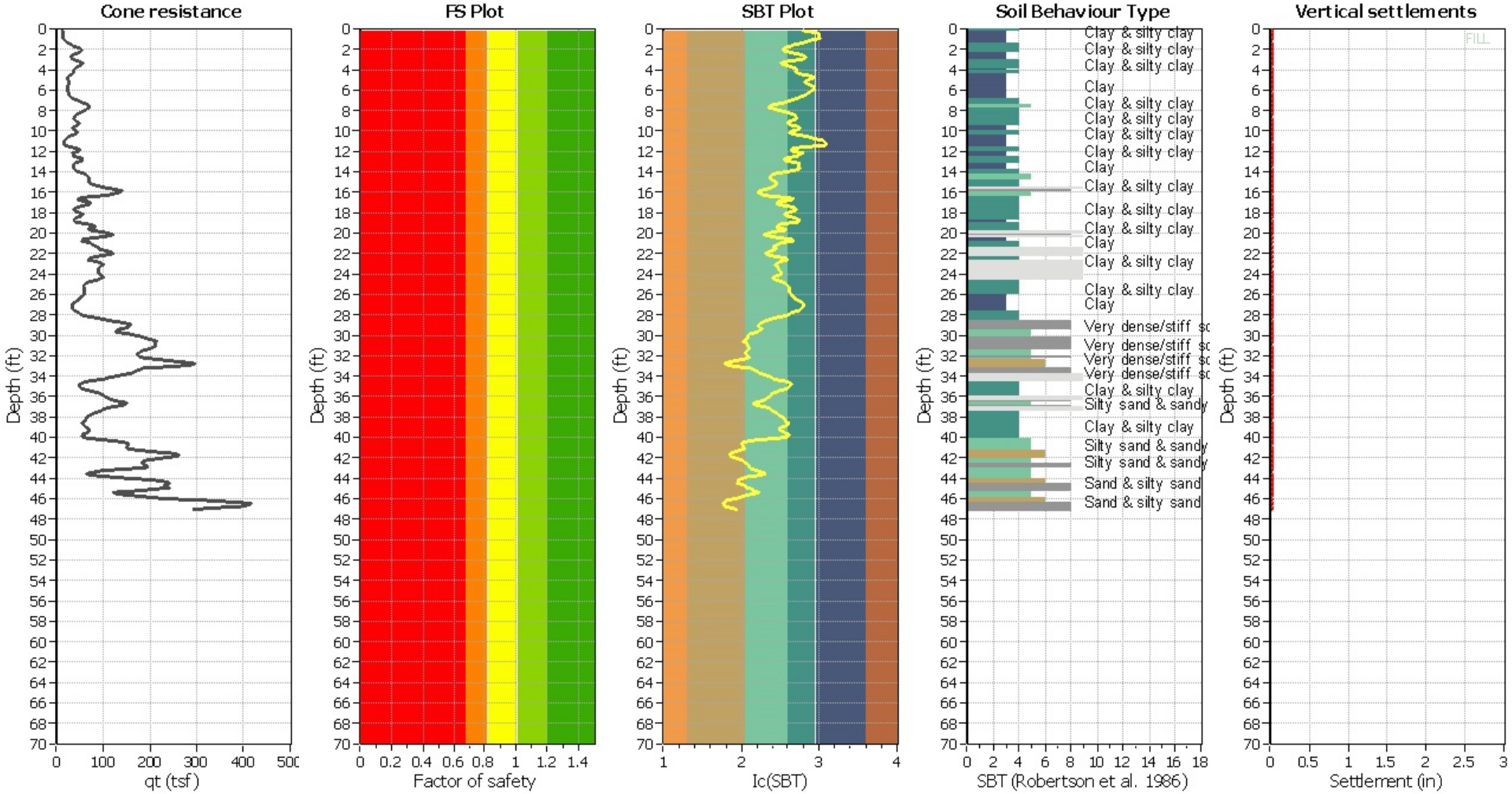



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 101.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 81.00 ft | Fill height: | 3.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | No | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

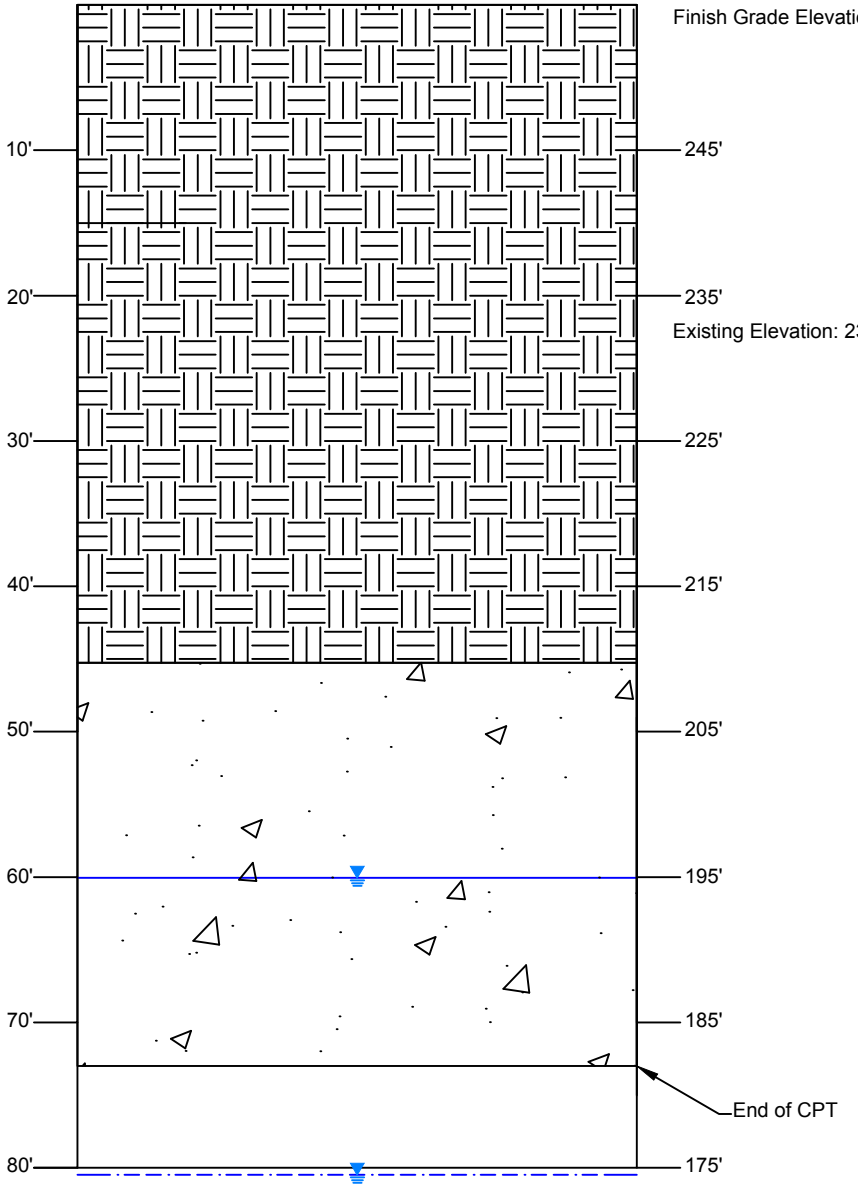
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-6**
Total depth: 47.08 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 101.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 81.00 ft | Fill height: | 3.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | No | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




## LEGEND

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

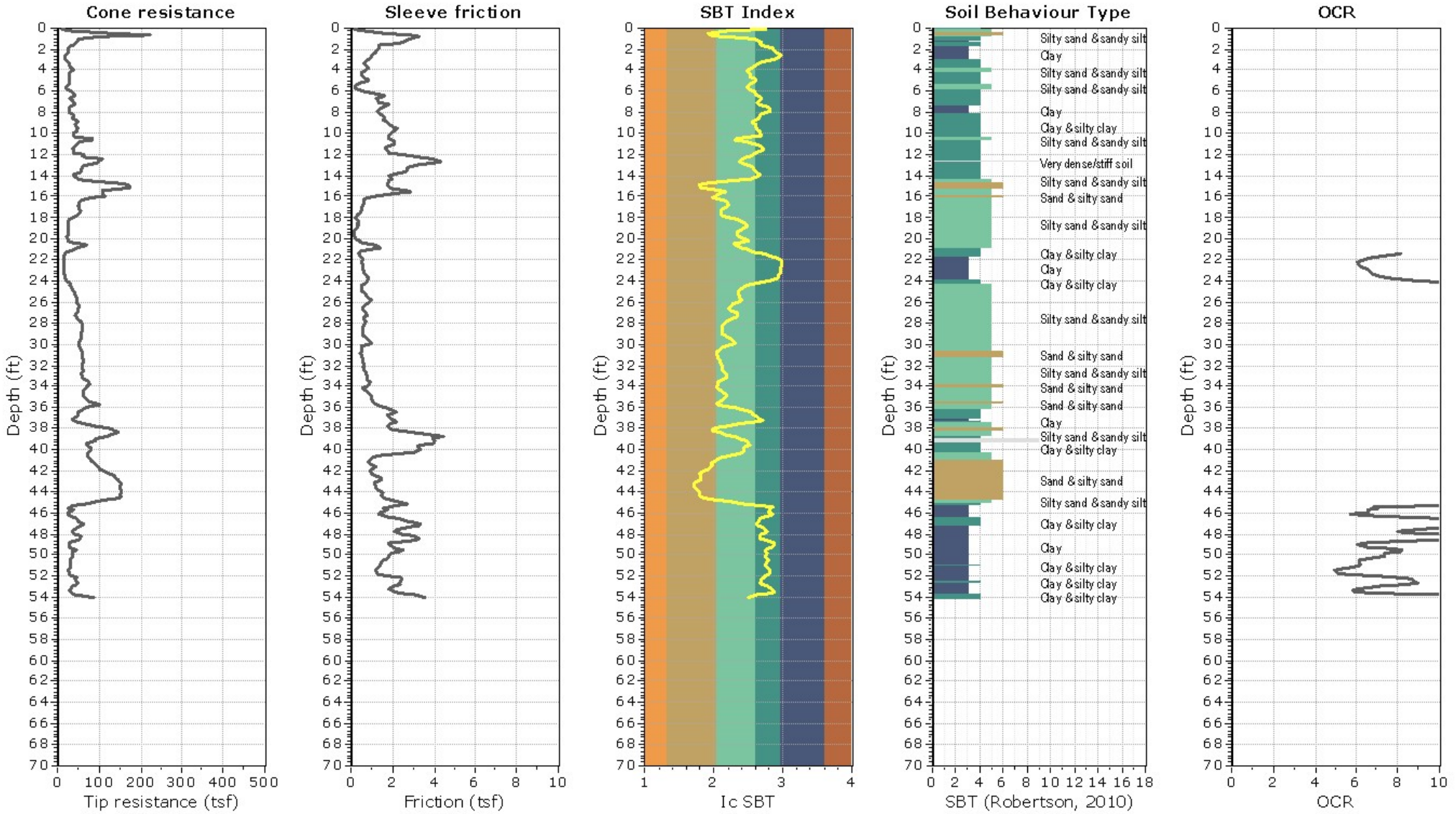
**CPT-10**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

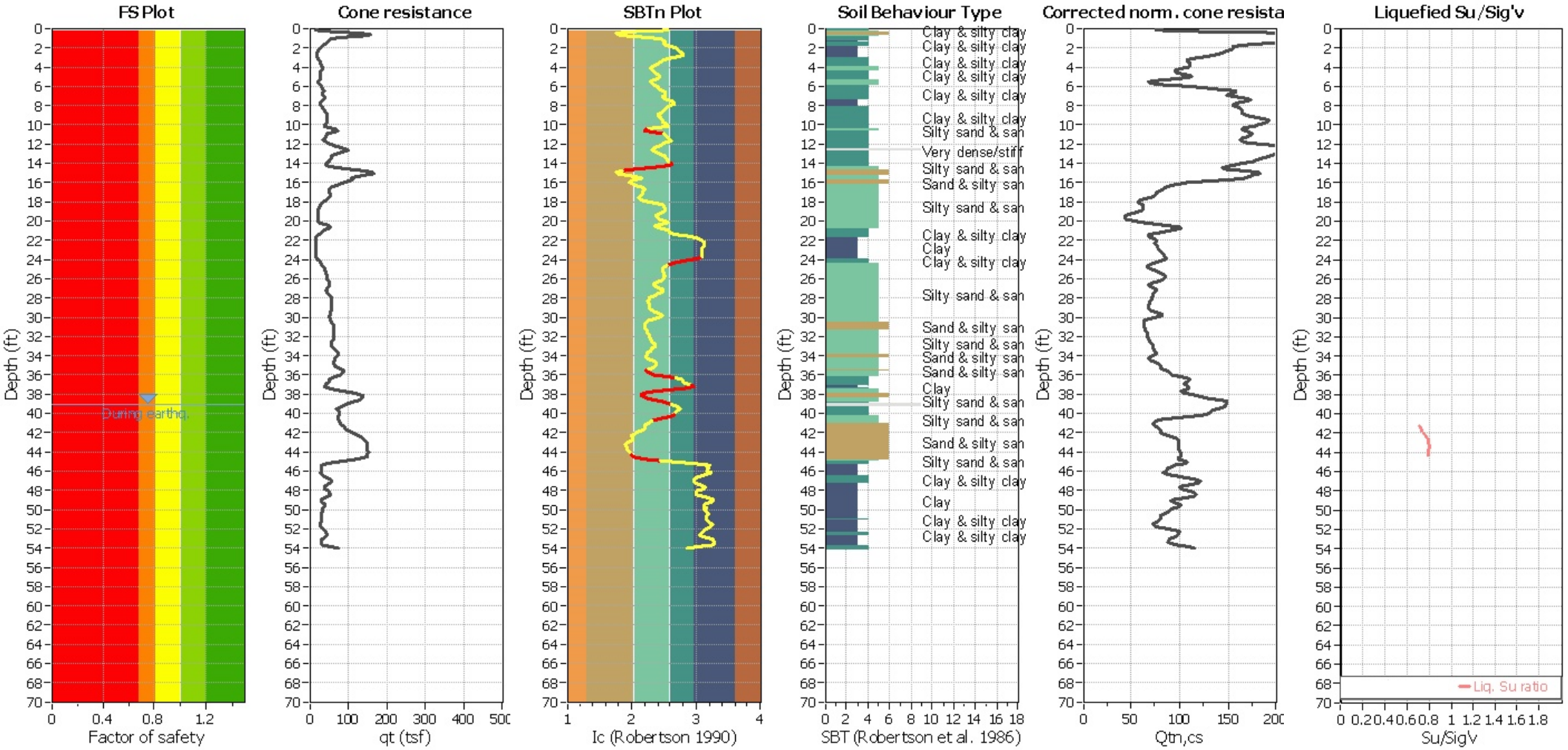
**CPT-10**
Total depth: 53.97 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-10**
Total depth: 53.97 ft

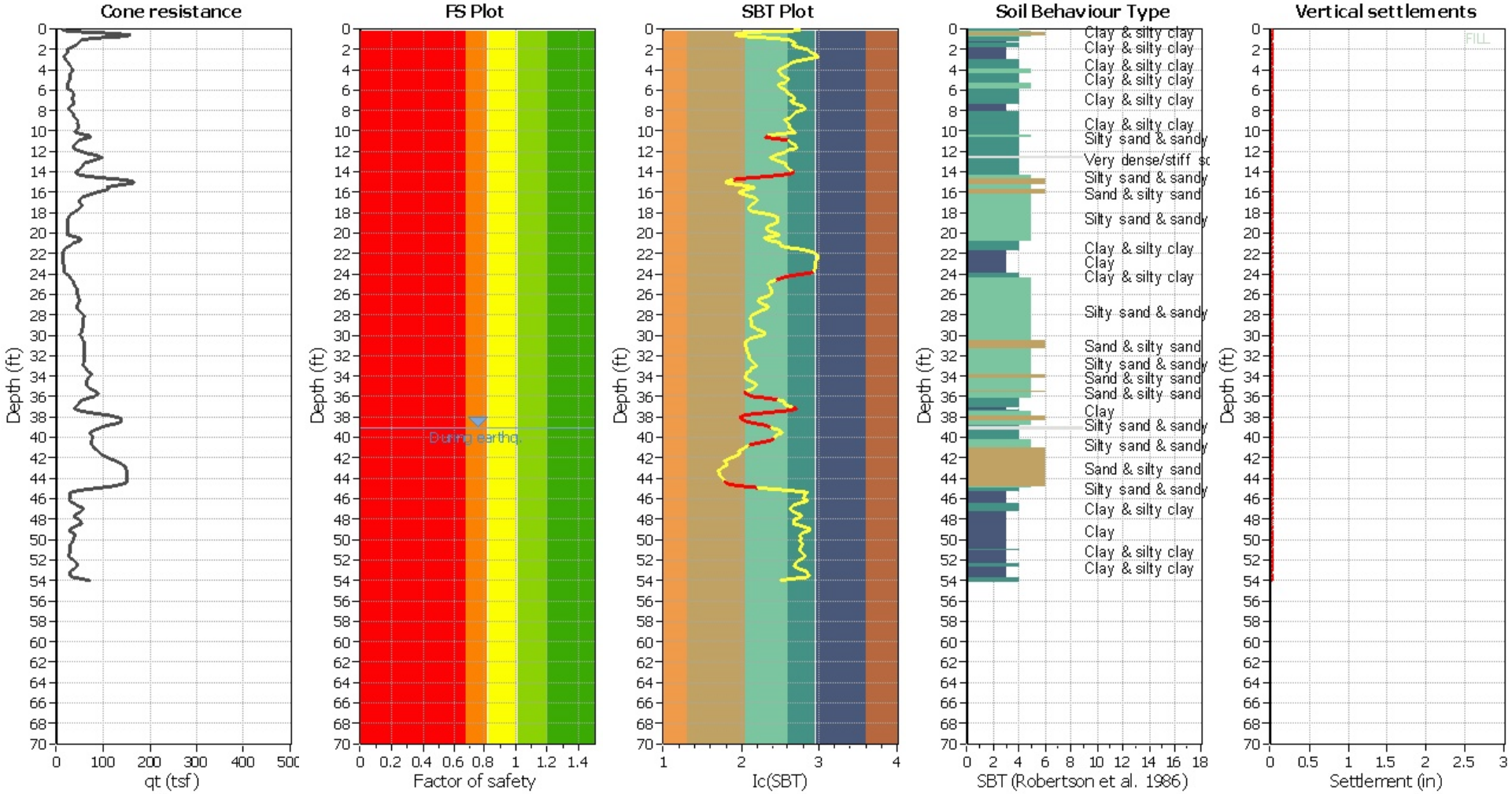



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 80.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 60.00 ft | Fill height: | 21.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

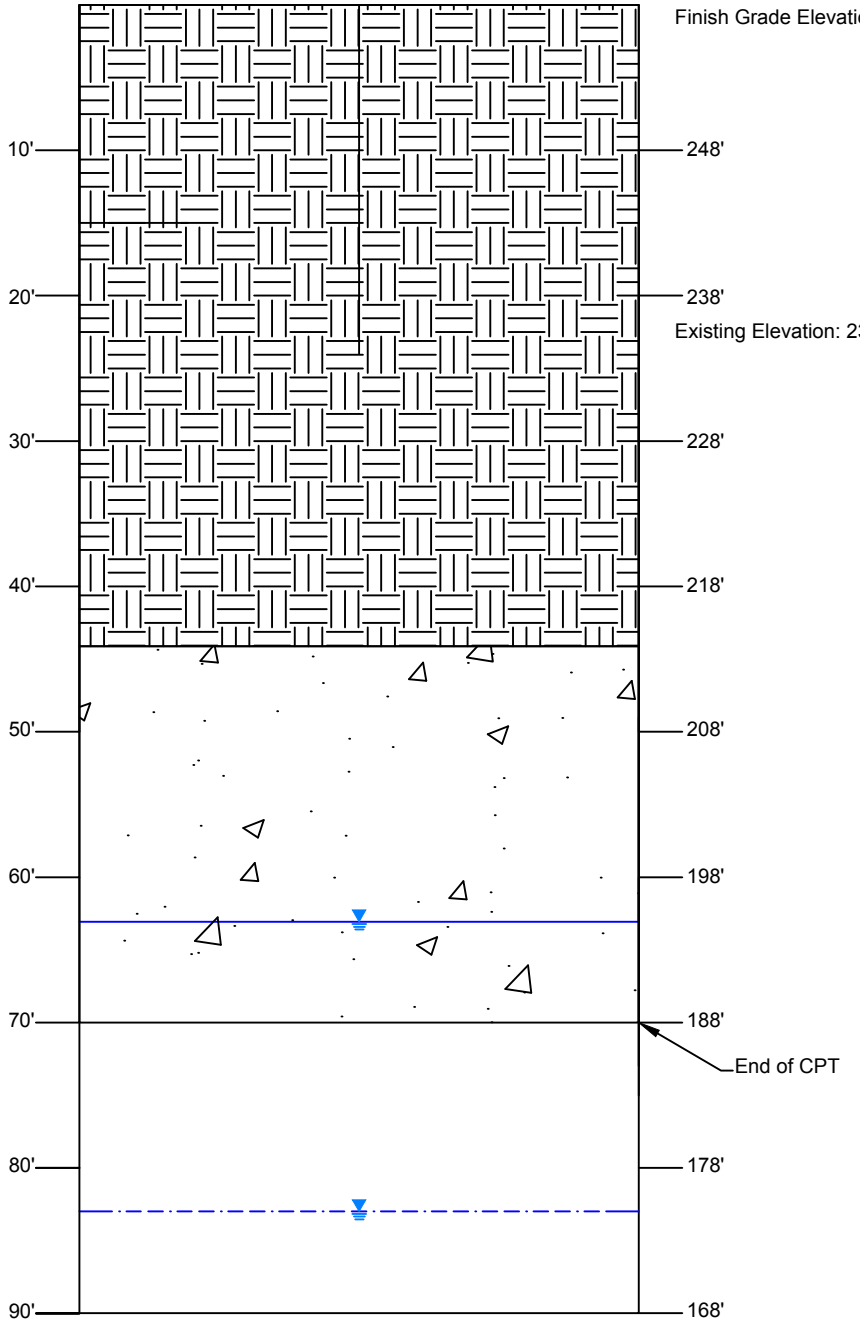
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-10**
Total depth: 53.97 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 80.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 60.00 ft | Fill height: | 21.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




## LEGEND

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

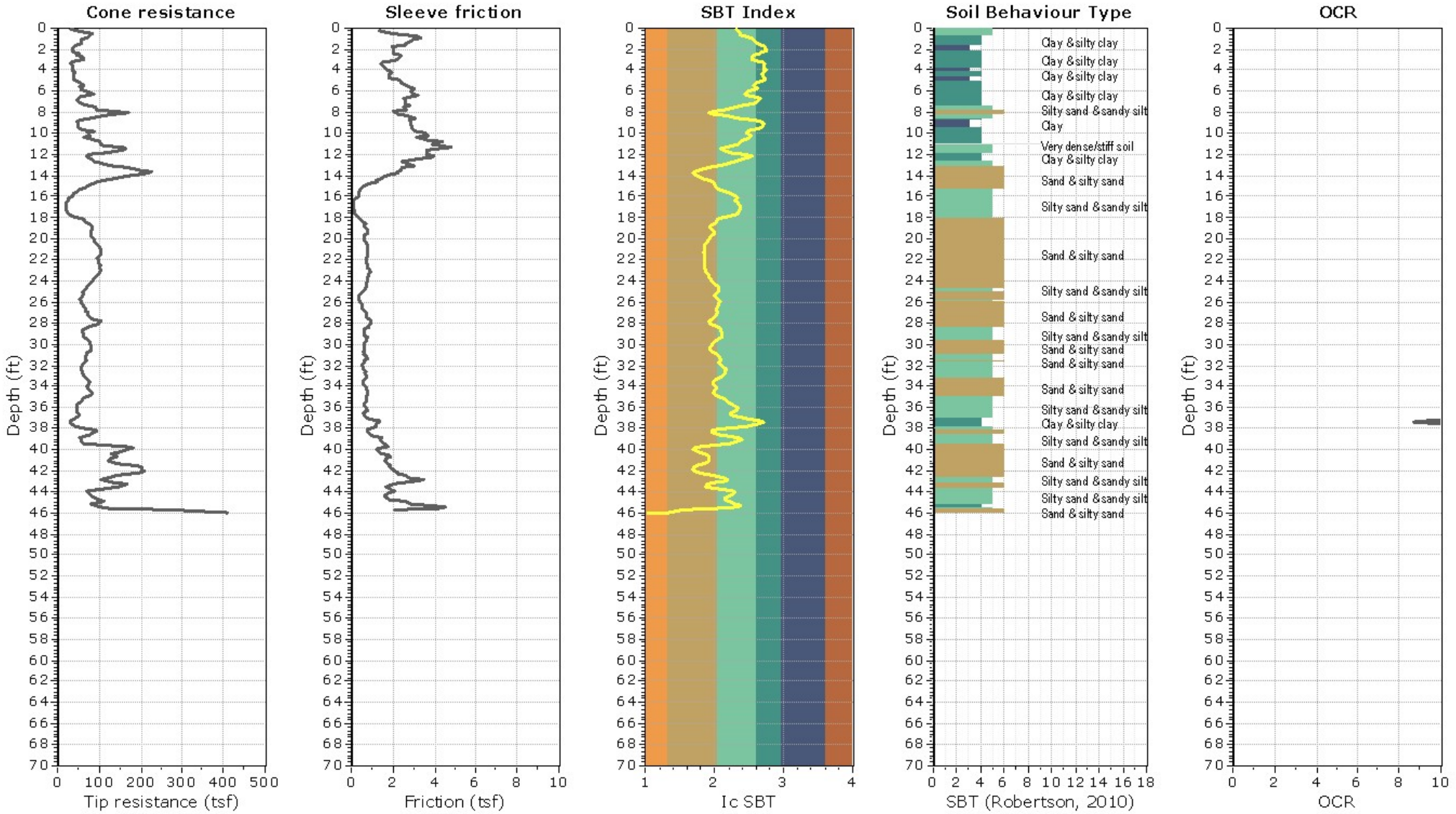
**CPT-11B**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | April 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

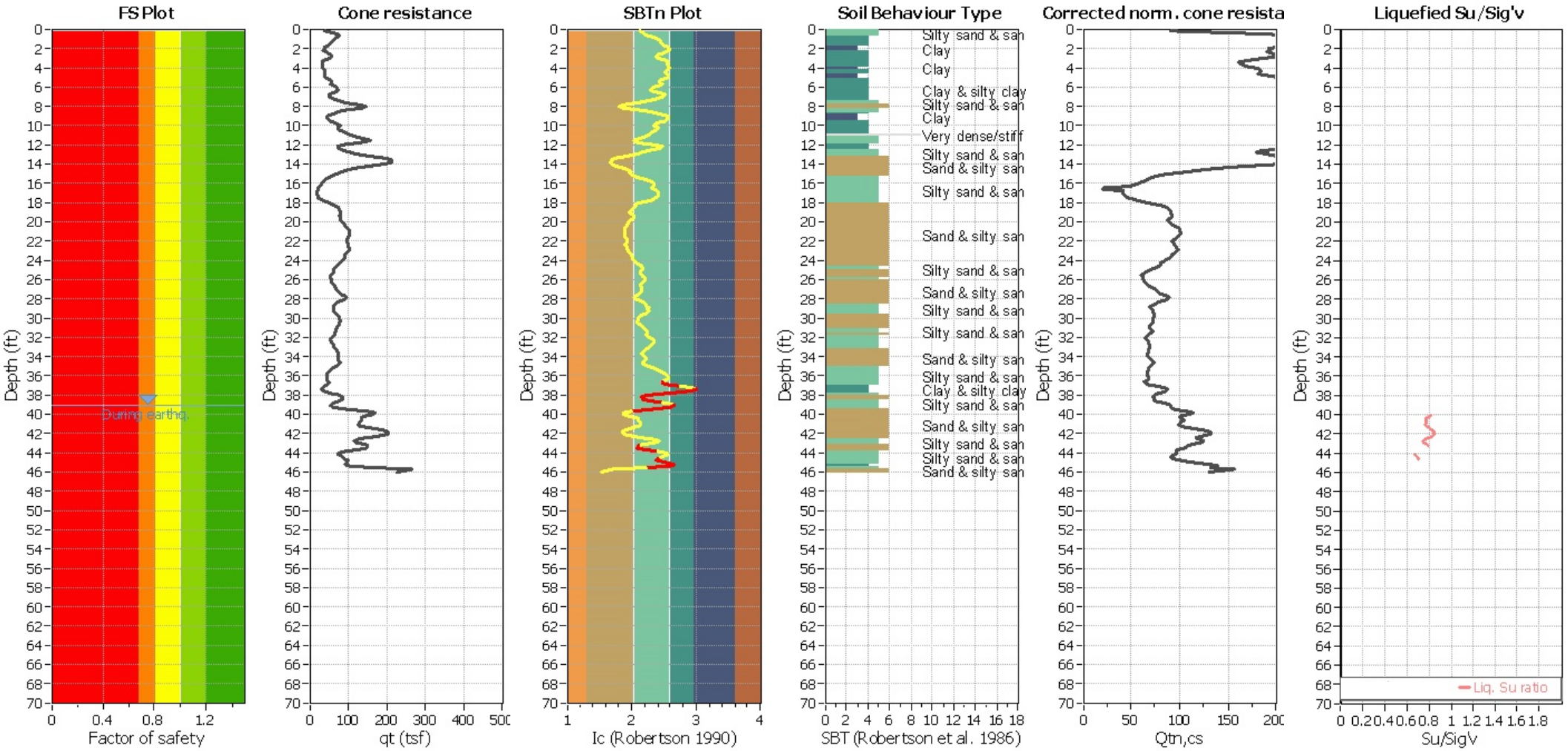
**CPT-11B**
Total depth: 46.10 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-11B**
Total depth: 46.10 ft

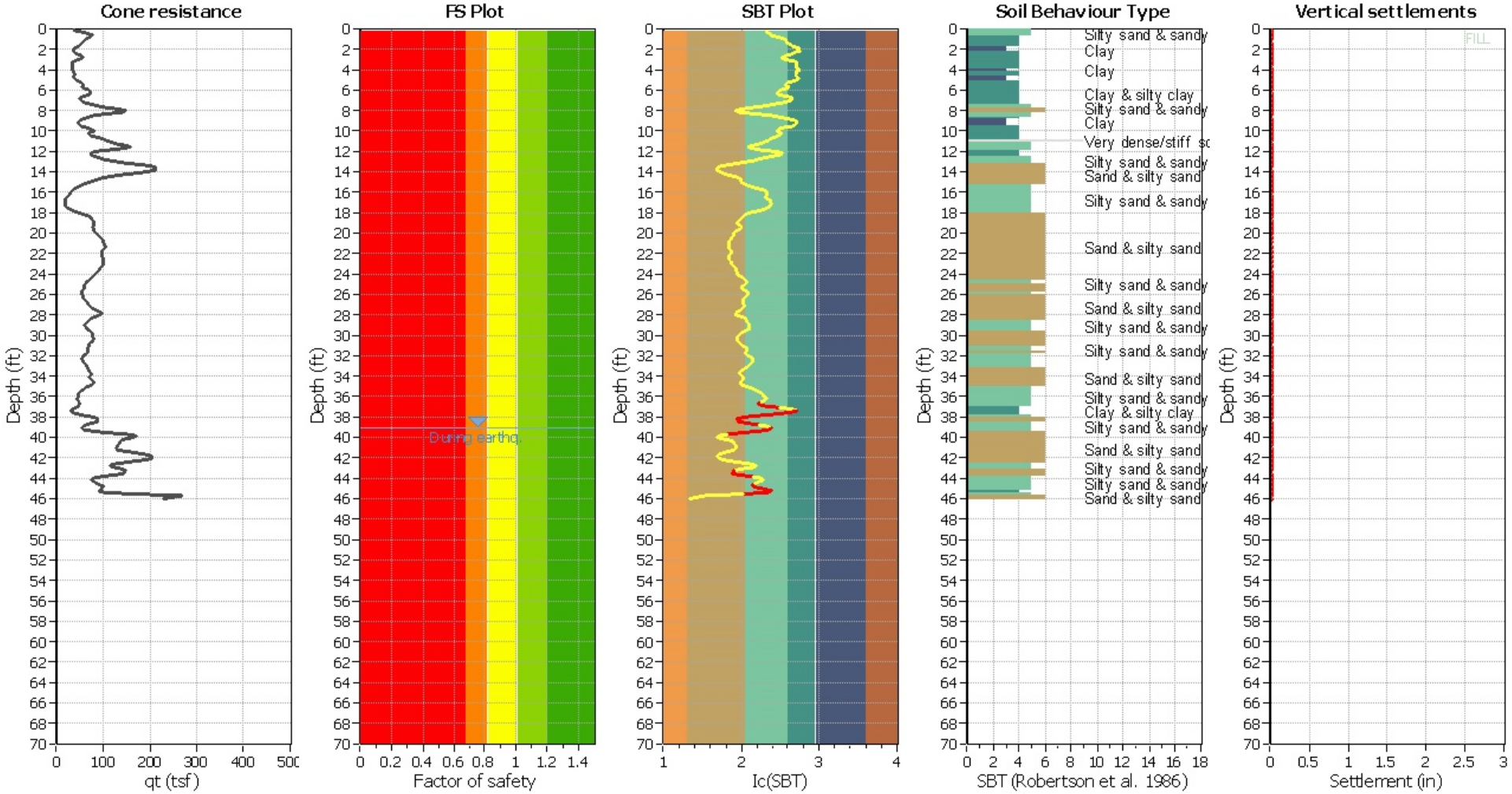



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 83.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 63.00 ft | Fill height: | 24.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-11B**
Total depth: 46.10 ft

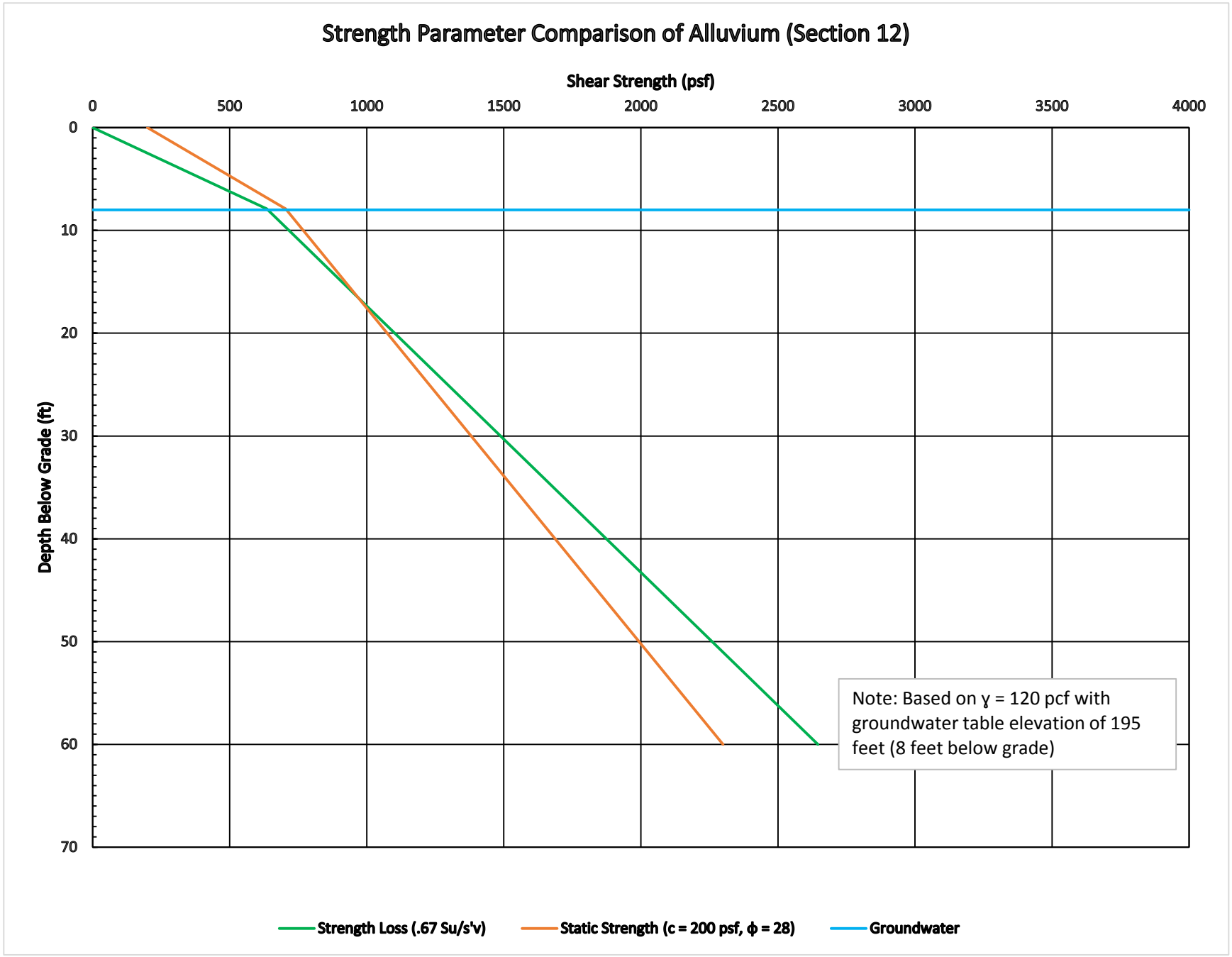


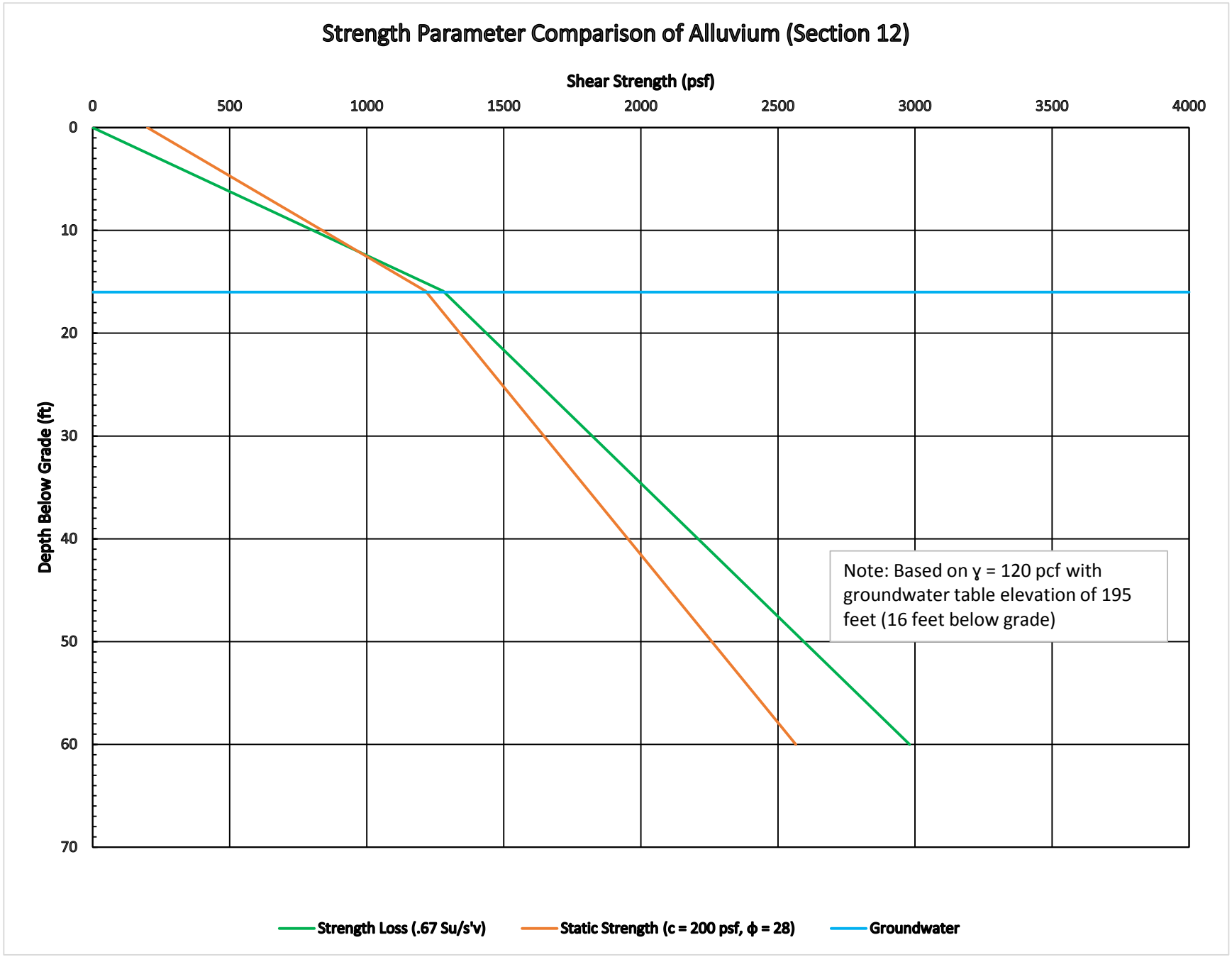

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 83.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 63.00 ft | Fill height: | 24.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

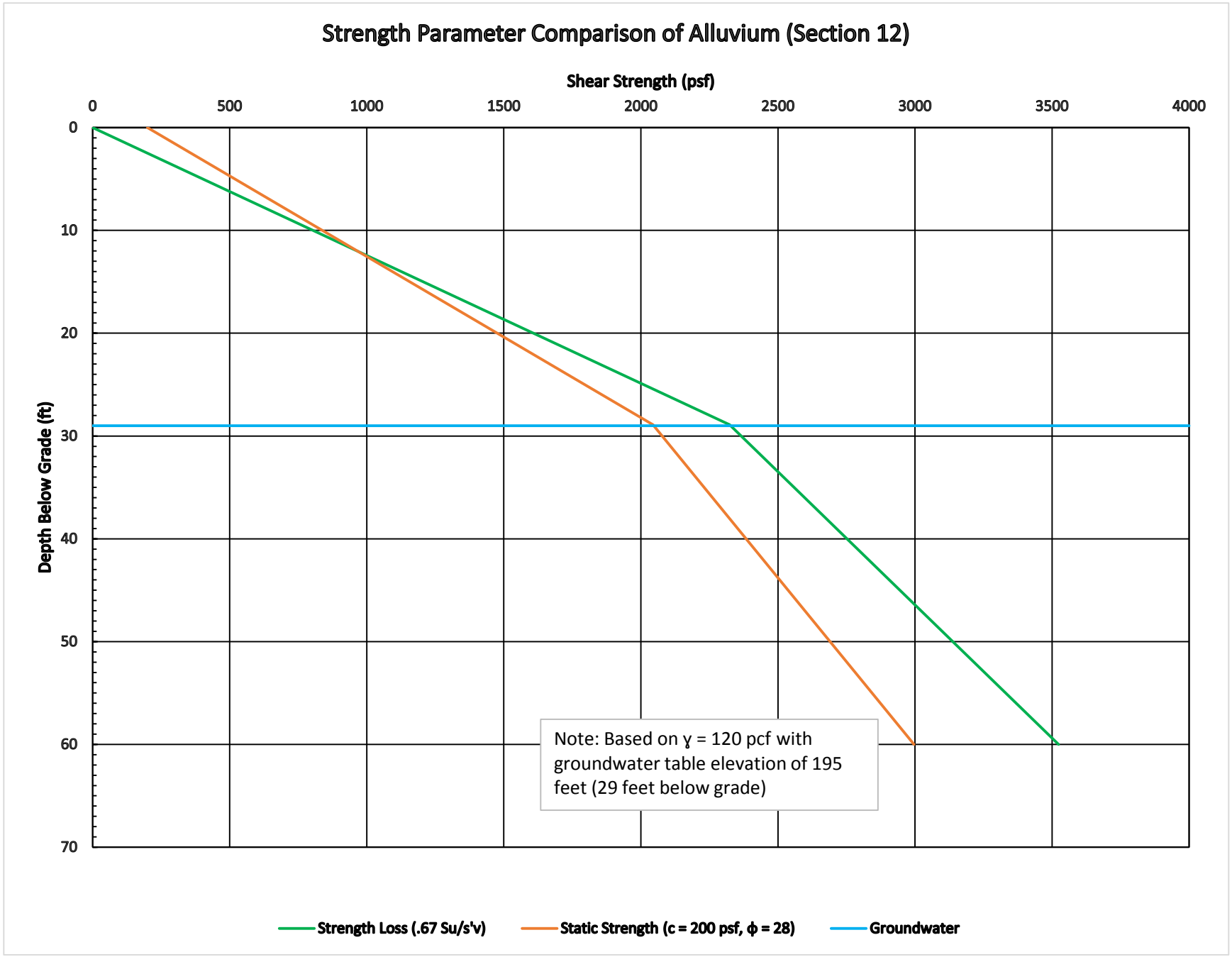
***Summary of Lateral Spreading Analysis***

| Cross-Section | File Name | Factor of Safety | Description |
|---|---|---|---|
| 11-11’ | x11ls | 1.31 | Lower Slope - Lateral Spreading |
| 12-12’ | x12l1ls | 1.96 | Lower Slope 1 - Lateral Spreading |
| | x12l2ls | 1.78 | Lower Slope 2 - Lateral Spreading |
| 15-15’ | x15ls | 1.20 | Lower Slope - Lateral Spreading |

*Please Note:* Soil shear strengths not increased for seismic loading conditions

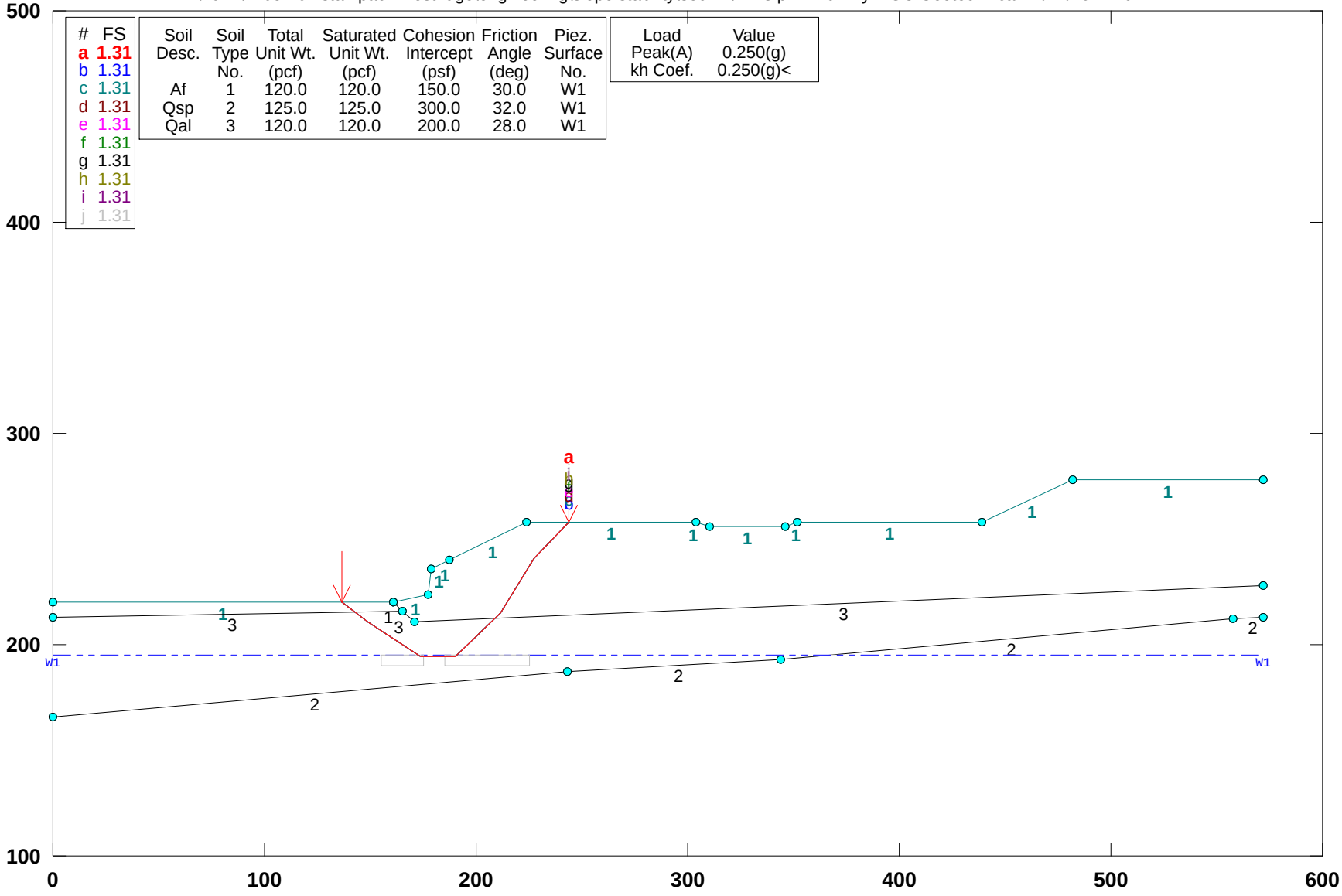

Strength Parameter Comparison of Alluvium (Section 12)
Shear Strength (psf)
0
500
1000
1500
2000
2500
3000
3500
4000
Depth Below Grade (ft)
0
10
20
30
40
50
60
70
Note: Based on γ = 120 pcf with groundwater table elevation of 195 feet (8 feet below grade)
Strength Loss (.67 Su/s'v)
Static Strength (c = 200 psf, ϕ = 28)
Groundwater


Strength Parameter Comparison of Alluvium (Section 12)
Shear Strength (psf)
0
500
1000
1500
2000
2500
3000
3500
4000
Depth Below Grade (ft)
0
10
20
30
40
50
60
70
Note: Based on ɣ = 120 pcf with groundwater table elevation of 195 feet (16 feet below grade)
Strength Loss (.67 Su/s'v)
Static Strength (c = 200 psf, ϕ = 28)
Groundwater


Strength Parameter Comparison of Alluvium (Section 12)
Shear Strength (psf)
0
500
1000
1500
2000
2500
3000
3500
4000
Depth Below Grade (ft)
0
10
20
30
40
50
60
70
Note: Based on ɣ = 120 pcf with groundwater table elevation of 195 feet (29 feet below grade)
Strength Loss (.67 Su/s'v)
Static Strength (c = 200 psf, ϕ = 28)
Groundwater

# Westridge/14057-01/Sec 11-11'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 11\x11ls.pl2 Run By: LGC Geotechnical 2/17/2017 01:12PM




| # | FS |
|---|---|
| a | 1.31 |
| b | 1.31 |
| c | 1.31 |
| d | 1.31 |
| e | 1.31 |
| f | 1.31 |
| g | 1.31 |
| h | 1.31 |
| i | 1.31 |
| j | 1.31 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | 300.0 | 32.0 | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

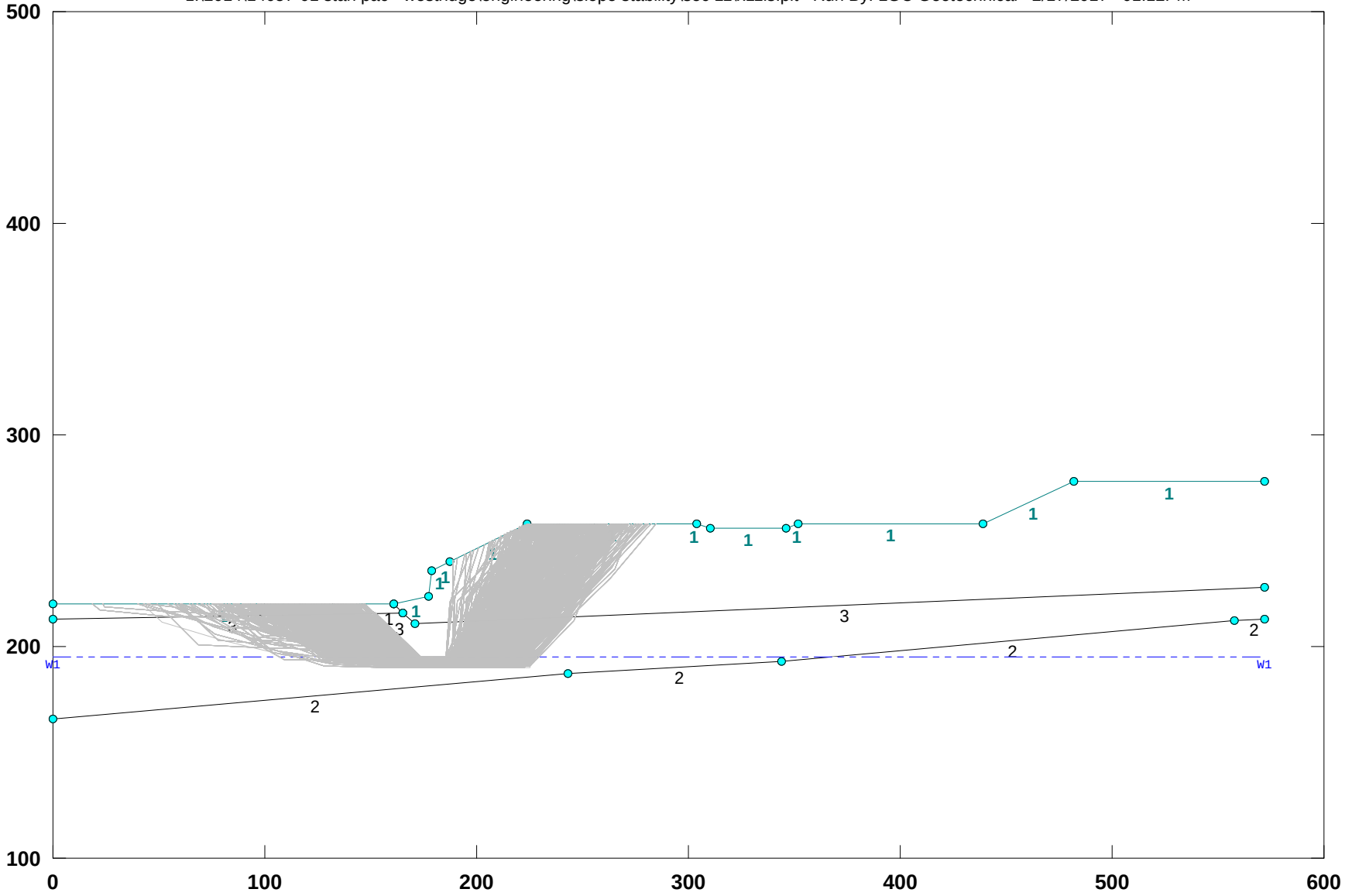
| Load | Value |
|---|---|
| Peak(A) | 0.250(g) |
| kh Coef. | 0.250(g)< |

**GSTABL7 v.2 FSmin=1.31**

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

# Westridge/14057-01/Sec 11-11'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 11\x11ls.plt  Run By: LGC Geotechnical  2/17/2017  01:12PM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 2/17/2017
Time of Run: 01:12PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11ls.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11ls.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11ls.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 11-11'/Lower Slope/Lateral Spreading

BOUNDARY COORDINATES
12 Top Boundaries
20 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 220.00 | 161.00 | 220.00 | 1 |
| 2 | 161.00 | 220.00 | 177.00 | 224.00 | 1 |
| 3 | 177.00 | 224.00 | 179.00 | 236.00 | 1 |
| 4 | 179.00 | 236.00 | 187.00 | 240.00 | 1 |
| 5 | 187.00 | 240.00 | 224.00 | 258.00 | 1 |
| 6 | 224.00 | 258.00 | 304.00 | 258.00 | 1 |
| 7 | 304.00 | 258.00 | 310.00 | 256.00 | 1 |
| 8 | 310.00 | 256.00 | 346.00 | 256.00 | 1 |
| 9 | 346.00 | 256.00 | 352.00 | 258.00 | 1 |
| 10 | 352.00 | 258.00 | 439.00 | 258.00 | 1 |
| 11 | 439.00 | 258.00 | 482.00 | 278.00 | 1 |
| 12 | 482.00 | 278.00 | 572.00 | 278.00 | 1 |
| 13 | 161.00 | 220.00 | 165.00 | 216.00 | 1 |
| 14 | 0.00 | 213.00 | 165.00 | 216.00 | 3 |
| 15 | 165.00 | 216.00 | 171.00 | 211.00 | 3 |
| 16 | 171.00 | 211.00 | 572.00 | 228.00 | 3 |
| 17 | 0.00 | 166.00 | 243.00 | 187.00 | 2 |
| 18 | 243.00 | 187.00 | 344.00 | 193.00 | 2 |
| 19 | 344.00 | 193.00 | 558.00 | 212.00 | 2 |
| 20 | 558.00 | 212.00 | 572.00 | 213.00 | 2 |

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
User Specified Y-Plus Value = 100.00(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 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 572.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.250(g)



Specified Horizontal Earthquake Coefficient (kh) = 0.250(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is 30.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 155.00 | 192.50 | 175.00 | 192.50 | 5.00 |
| 2 | 185.00 | 192.50 | 225.00 | 192.50 | 5.00 |

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 5.317 FS Min = 1.311 FS Ave = 1.689
Standard Deviation = 0.439 Coefficient of Variation = 26.02 %
Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

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 | 5.5 | 1454.5 | 0.0 | 0.0 | 0. | 0. | 363.6 | 0.0 | 0.0 |
| 2 | 6.3 | 5233.2 | 0.0 | 0.0 | 0. | 0. | 1308.3 | 0.0 | 0.0 |
| 3 | 12.5 | 20045.5 | 0.0 | 0.0 | 0. | 0. | 5011.4 | 0.0 | 0.0 |
| 4 | 4.0 | 9101.8 | 0.0 | 0.0 | 0. | 0. | 2275.4 | 0.0 | 0.0 |
| 5 | 6.0 | 16783.4 | 0.0 | 0.0 | 0. | 0. | 4195.8 | 0.0 | 0.0 |
| 6 | 2.6 | 8274.7 | 0.0 | 0.0 | 0. | 0. | 2068.7 | 0.0 | 0.0 |
| 7 | 0.4 | 1468.2 | 0.0 | 4.2 | 0. | 0. | 367.0 | 0.0 | 0.0 |
| 8 | 3.0 | 10479.1 | 0.0 | 60.9 | 0. | 0. | 2619.8 | 0.0 | 0.0 |
| 9 | 2.0 | 8499.7 | 0.0 | 51.9 | 0. | 0. | 2124.9 | 0.0 | 0.0 |
| 10 | 8.0 | 41855.1 | 0.0 | 299.2 | 0. | 0. | 10463.8 | 0.0 | 0.0 |
| 11 | 3.5 | 19740.1 | 0.0 | 178.5 | 0. | 0. | 4935.0 | 0.0 | 0.0 |
| 12 | 0.9 | 4976.3 | 0.0 | 33.8 | 0. | 0. | 1244.1 | 0.0 | 0.0 |
| 13 | 17.6 | 90066.8 | 0.0 | 0.0 | 0. | 0. | 22516.7 | 0.0 | 0.0 |
| 14 | 2.7 | 12235.1 | 0.0 | 0.0 | 0. | 0. | 3058.8 | 0.0 | 0.0 |
| 15 | 12.3 | 43472.4 | 0.0 | 0.0 | 0. | 0. | 10868.1 | 0.0 | 0.0 |
| 16 | 3.3 | 7715.3 | 0.0 | 0.0 | 0. | 0. | 1928.8 | 0.0 | 0.0 |
| 17 | 16.6 | 16943.8 | 0.0 | 0.0 | 0. | 0. | 4236.0 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |



Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

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

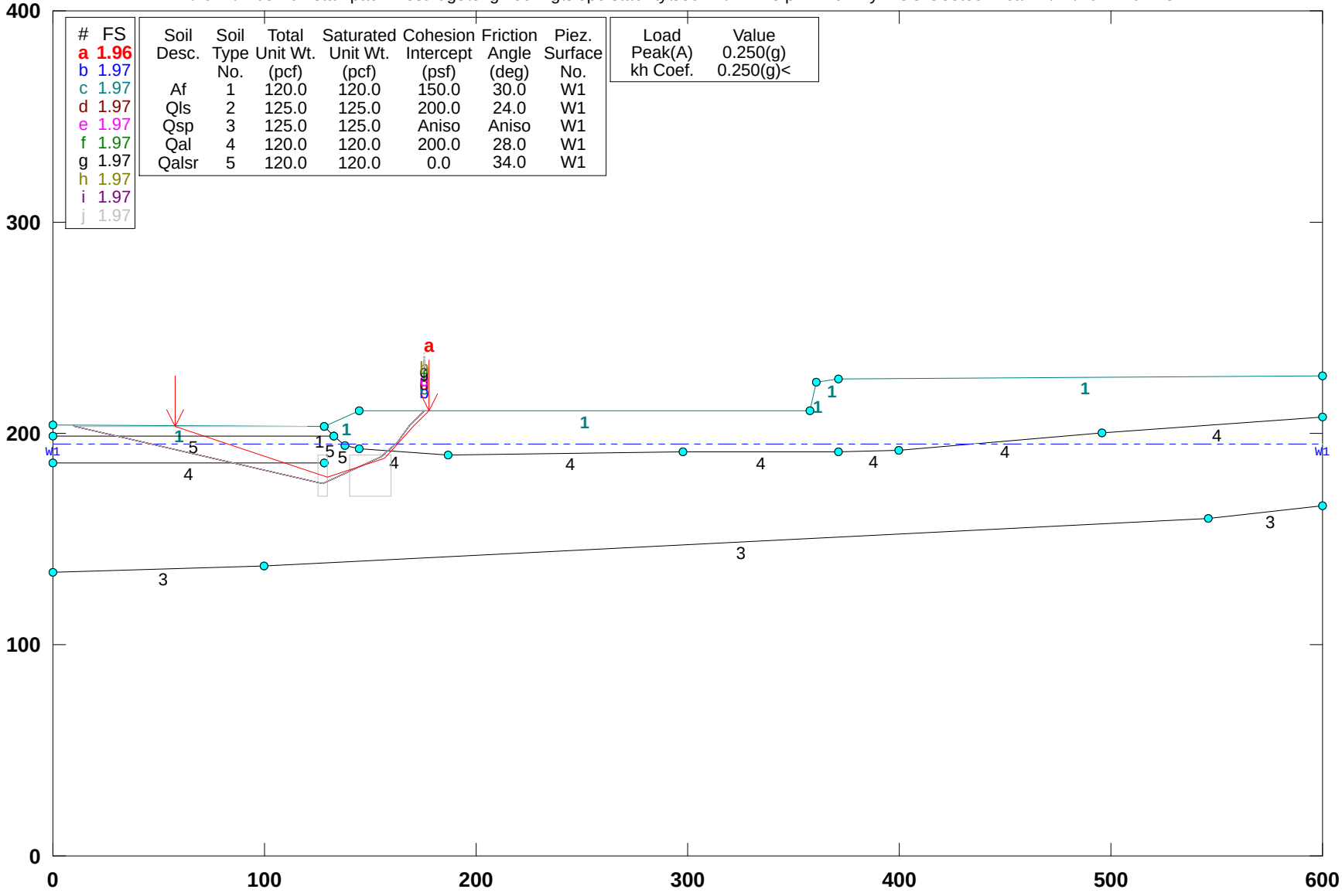
# Westridge/14057-01/Sec 12-12'/Lower Slope 1/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l1ls.pl2  Run By: LGC Geotechnical  2/22/2017  04:23PM

| # | FS |
|---|---|
| a | 1.96 |
| b | 1.97 |
| c | 1.97 |
| d | 1.97 |
| e | 1.97 |
| f | 1.97 |
| g | 1.97 |
| h | 1.97 |
| i | 1.97 |
| j | 1.97 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |
| Qalsr | 5 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |

| Load | Value |
|---|---|
| Peak(A) | 0.250(g) |
| kh Coef. | 0.250(g)< |

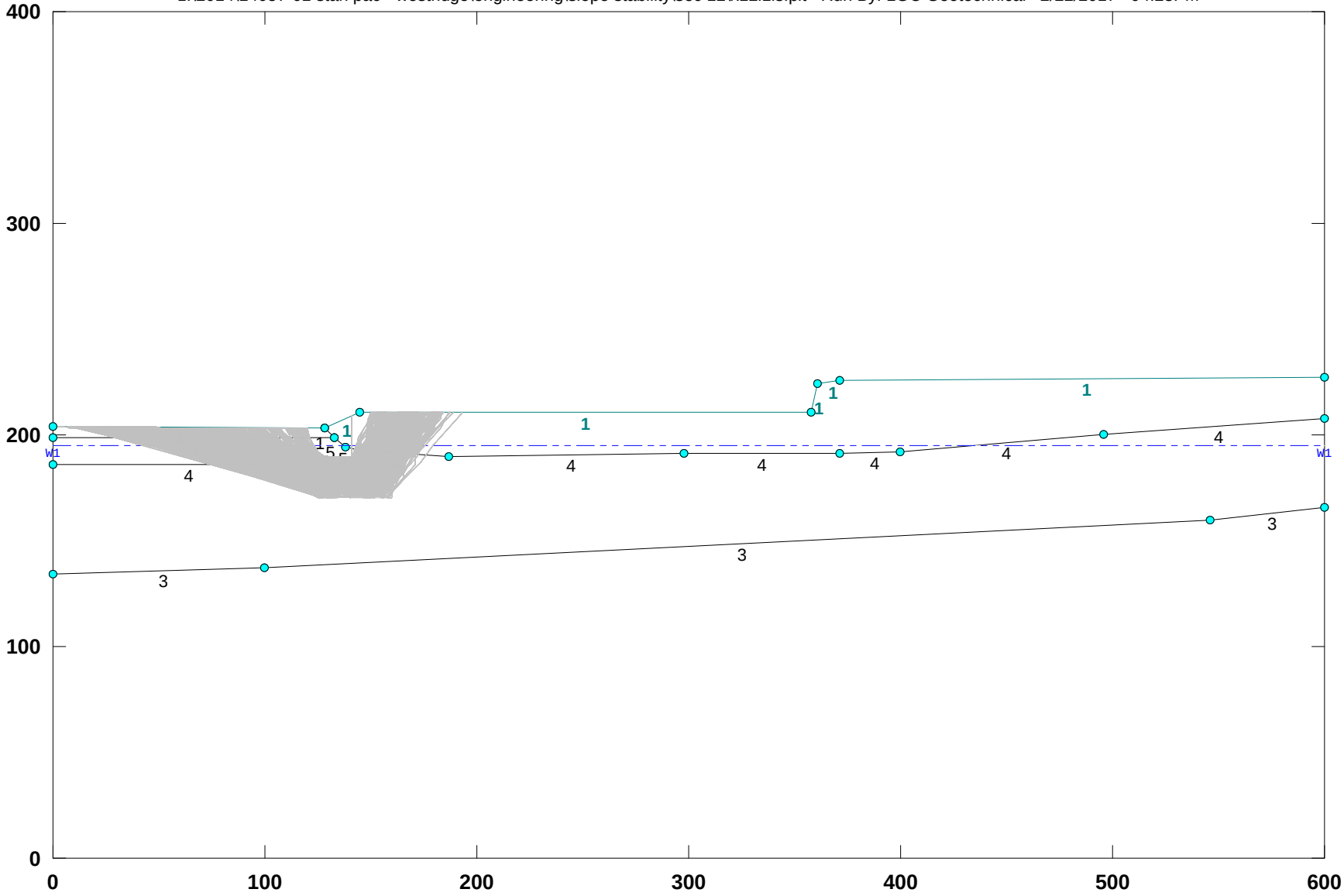



**GSTABL7 v.2  FSmin=1.96**

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

# Westridge/14057-01/Sec 12-12'/Lower Slope 1/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l1ls.plt Run By: LGC Geotechnical 2/22/2017 04:23PM



***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 2/22/2017
Time of Run: 04:23PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12l1ls.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12l1ls.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12l1ls.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12-12'/Lower
Slope 1/Lateral Spreading

BOUNDARY COORDINATES
6 Top Boundaries
20 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 204.00 | 128.00 | 203.00 | 1 |
| 2 | 128.00 | 203.00 | 145.00 | 211.00 | 1 |
| 3 | 145.00 | 211.00 | 358.00 | 211.00 | 1 |
| 4 | 358.00 | 211.00 | 361.00 | 224.00 | 1 |
| 5 | 361.00 | 224.00 | 371.00 | 226.00 | 1 |
| 6 | 371.00 | 226.00 | 600.00 | 227.00 | 1 |
| 7 | 128.00 | 203.00 | 133.00 | 199.00 | 1 |
| 8 | 133.00 | 199.00 | 138.00 | 194.00 | 5 |
| 9 | 138.00 | 194.00 | 145.00 | 193.00 | 5 |
| 10 | 145.00 | 193.00 | 187.00 | 190.00 | 4 |
| 11 | 187.00 | 190.00 | 298.00 | 191.00 | 4 |
| 12 | 298.00 | 191.00 | 371.00 | 191.00 | 4 |
| 13 | 371.00 | 191.00 | 400.00 | 192.00 | 4 |
| 14 | 400.00 | 192.00 | 496.00 | 200.00 | 4 |
| 15 | 496.00 | 200.00 | 600.00 | 208.00 | 4 |
| 16 | 0.00 | 199.00 | 133.00 | 199.00 | 5 |
| 17 | 0.00 | 186.00 | 128.00 | 186.00 | 4 |
| 18 | 0.00 | 134.00 | 100.00 | 137.00 | 3 |
| 19 | 100.00 | 137.00 | 546.00 | 160.00 | 3 |
| 20 | 546.00 | 160.00 | 600.00 | 166.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |
| 5 | 120.0 | 120.0 | 0.0 | 34.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|



| | | | |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |
| 2 | 10.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 600.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.250(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.250(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
3 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 10.00 | 202.90 | 120.00 | 202.90 | 0.00 |
| 2 | 125.00 | 180.00 | 130.00 | 180.00 | 20.00 |
| 3 | 140.00 | 180.00 | 160.00 | 180.00 | 20.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 5.700 FS Min = 1.964 FS Ave = 2.576
Standard Deviation = 0.593 Coefficient of Variation = 23.04 %
Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 57.460 | 203.551 |
| 2 | 58.118 | 202.900 |
| 3 | 129.538 | 179.076 |
| 4 | 156.854 | 188.129 |
| 5 | 163.582 | 195.527 |
| 6 | 170.347 | 202.892 |
| 7 | 177.213 | 210.162 |
| 8 | 177.649 | 211.000 |

Factor of Safety
*** 1.964 ***
Individual data on the 17 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.7 | 25.5 | 0.0 | 0.0 | 0. | 0. | 6.4 | 0.0 | 0.0 |
| 2 | 11.7 | 3578.0 | 0.0 | 0.0 | 0. | 0. | 894.5 | 0.0 | 0.0 |
| 3 | 12.0 | 9220.5 | 0.0 | 0.0 | 0. | 0. | 2305.1 | 0.0 | 0.0 |
| 4 | 27.0 | 41297.7 | 0.0 | 7986.5 | 0. | 0. | 10324.4 | 0.0 | 0.0 |
| 5 | 19.2 | 46772.1 | 0.0 | 15430.3 | 0. | 0. | 11693.0 | 0.0 | 0.0 |
| 6 | 1.5 | 4435.7 | 0.0 | 1585.4 | 0. | 0. | 1108.9 | 0.0 | 0.0 |
| 7 | 3.5 | 10339.0 | 0.0 | 3493.2 | 0. | 0. | 2584.8 | 0.0 | 0.0 |
| 8 | 4.0 | 12195.9 | 0.0 | 3711.3 | 0. | 0. | 3049.0 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 1.0 | 3090.7 | 0.0 | 873.4 | 0. | 0. | 772.7 | 0.0 | 0.0 |
| 10 | 7.0 | 22102.7 | 0.0 | 5503.5 | 0. | 0. | 5525.7 | 0.0 | 0.0 |
| 11 | 11.9 | 35328.9 | 0.0 | 6885.3 | 0. | 0. | 8832.2 | 0.0 | 0.0 |
| 12 | 3.4 | 8652.5 | 0.0 | 1587.9 | 0. | 0. | 2163.1 | 0.0 | 0.0 |
| 13 | 2.8 | 5920.5 | 0.0 | 403.2 | 0. | 0. | 1480.1 | 0.0 | 0.0 |
| 14 | 0.5 | 905.2 | 0.0 | 0.0 | 0. | 0. | 226.3 | 0.0 | 0.0 |
| 15 | 6.8 | 9571.6 | 0.0 | 0.0 | 0. | 0. | 2392.9 | 0.0 | 0.0 |
| 16 | 6.9 | 3686.0 | 0.0 | 0.0 | 0. | 0. | 921.5 | 0.0 | 0.0 |
| 17 | 0.4 | 21.9 | 0.0 | 0.0 | 0. | 0. | 5.5 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

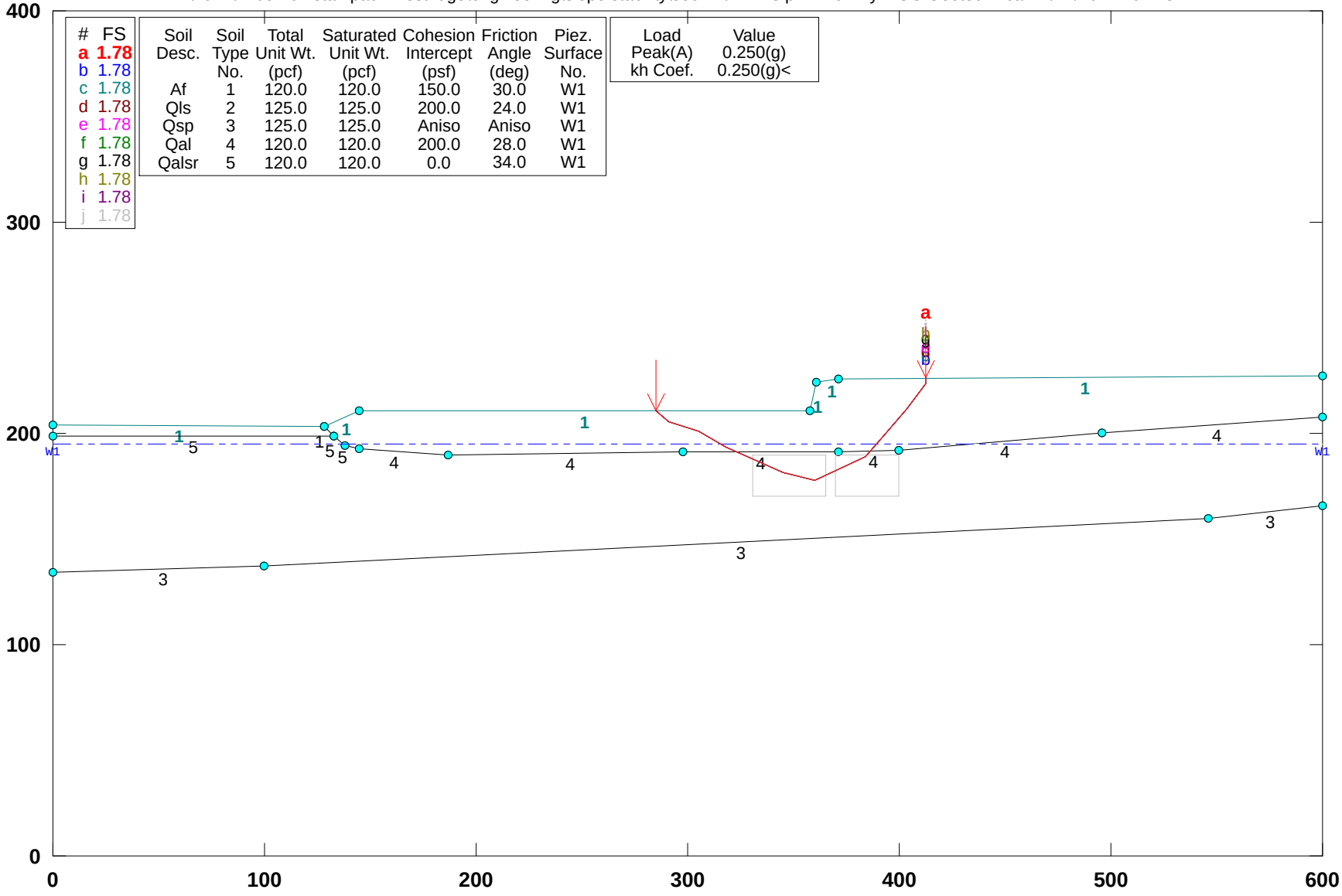
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

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

# Westridge/14057-01/Sec 12-12'/Lower Slope 2/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l2ls.pl2  Run By: LGC Geotechnical  2/17/2017  01:23PM




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

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |
| Qalsr | 5 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |

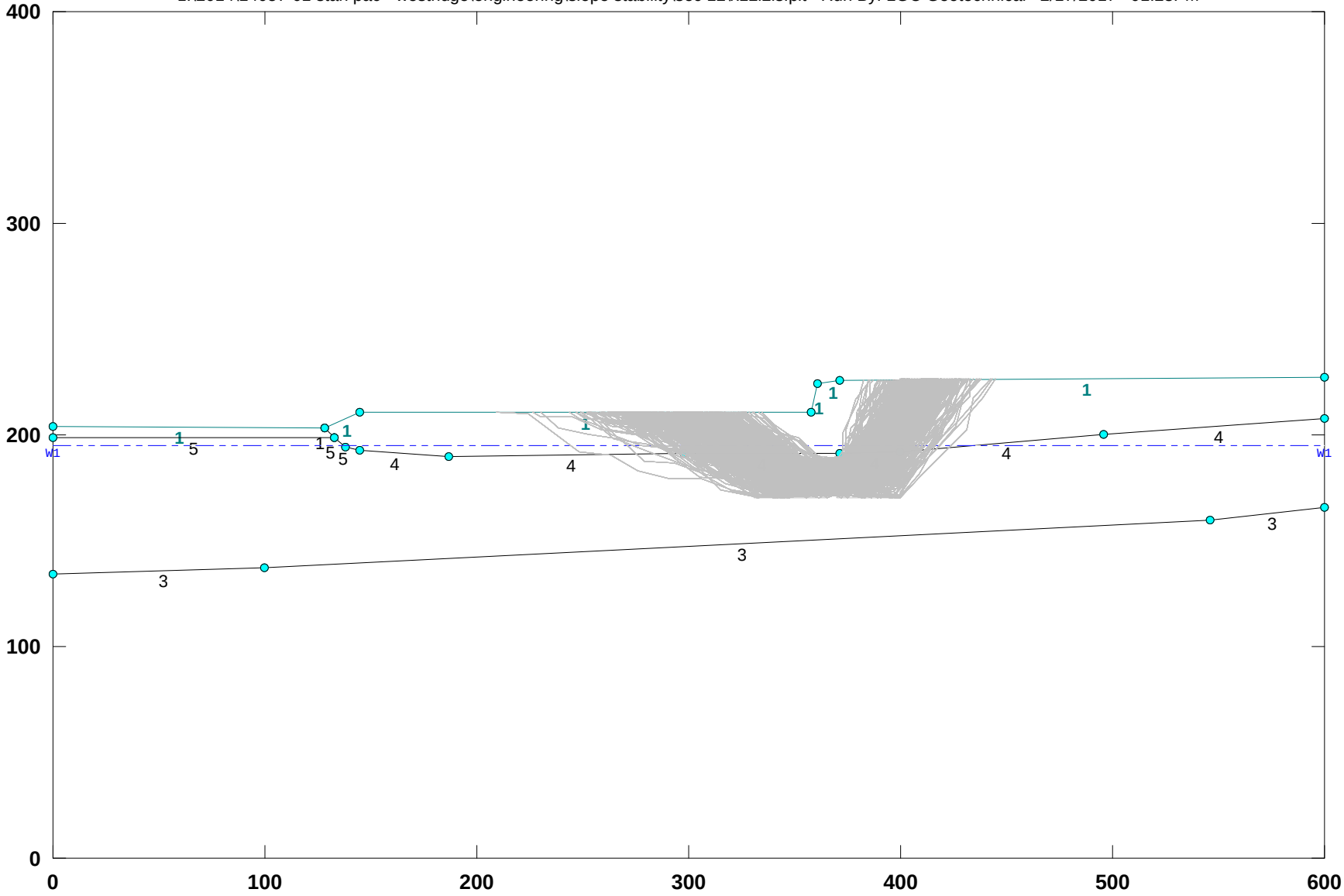
| Load | Value |
|---|---|
| Peak(A) | 0.250(g) |
| kh Coef. | 0.250(g)< |

**GSTABL7 v.2  FSmin=1.78**

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

# Westridge/14057-01/Sec 12-12'/Lower Slope 2/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l2ls.plt  Run By: LGC Geotechnical  2/17/2017  01:23PM



***** GSTABL7 *****

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** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 2/17/2017
Time of Run: 01:23PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12l2ls.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12l2ls.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12l2ls.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12-12'/Lower Slope 2/Lateral Spreading

BOUNDARY COORDINATES
6 Top Boundaries
19 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 204.00 | 128.00 | 203.00 | 1 |
| 2 | 128.00 | 203.00 | 145.00 | 211.00 | 1 |
| 3 | 145.00 | 211.00 | 358.00 | 211.00 | 1 |
| 4 | 358.00 | 211.00 | 361.00 | 224.00 | 1 |
| 5 | 361.00 | 224.00 | 371.00 | 226.00 | 1 |
| 6 | 371.00 | 226.00 | 600.00 | 227.00 | 1 |
| 7 | 128.00 | 203.00 | 133.00 | 199.00 | 1 |
| 8 | 133.00 | 199.00 | 138.00 | 194.00 | 5 |
| 9 | 138.00 | 194.00 | 145.00 | 193.00 | 5 |
| 10 | 145.00 | 193.00 | 187.00 | 190.00 | 4 |
| 11 | 187.00 | 190.00 | 298.00 | 191.00 | 4 |
| 12 | 298.00 | 191.00 | 371.00 | 191.00 | 4 |
| 13 | 371.00 | 191.00 | 400.00 | 192.00 | 4 |
| 14 | 400.00 | 192.00 | 496.00 | 200.00 | 4 |
| 15 | 496.00 | 200.00 | 600.00 | 208.00 | 4 |
| 16 | 0.00 | 199.00 | 133.00 | 199.00 | 5 |
| 17 | 0.00 | 134.00 | 100.00 | 137.00 | 3 |
| 18 | 100.00 | 137.00 | 546.00 | 160.00 | 3 |
| 19 | 546.00 | 160.00 | 600.00 | 166.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |
| 5 | 120.0 | 120.0 | 0.0 | 34.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |



| | | | |
|---|---|---|---|
| 2 | 10.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 600.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.250(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.250(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 331.00 | 180.00 | 365.00 | 180.00 | 20.00 |
| 2 | 370.00 | 180.00 | 400.00 | 180.00 | 20.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 5.161 FS Min = 1.776 FS Ave = 2.312
Standard Deviation = 0.476 Coefficient of Variation = 20.57 %
Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety
*** 1.776 ***

Individual data on the 18 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.8 | 1786.6 | 0.0 | 0.0 | 0. | 0. | 446.7 | 0.0 | 0.0 |
| 2 | 14.2 | 12846.4 | 0.0 | 0.0 | 0. | 0. | 3211.6 | 0.0 | 0.0 |
| 3 | 9.9 | 15426.7 | 0.0 | 0.0 | 0. | 0. | 3856.7 | 0.0 | 0.0 |
| 4 | 2.9 | 5784.8 | 0.0 | 183.5 | 0. | 0. | 1446.2 | 0.0 | 0.0 |
| 5 | 5.6 | 12605.5 | 0.0 | 1077.3 | 0. | 0. | 3151.4 | 0.0 | 0.0 |
| 6 | 8.3 | 21715.0 | 0.0 | 3191.8 | 0. | 0. | 5428.8 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7 | 13.7 | 43378.5 | 0.0 | 9800.6 | 0. | 0. | 10844.6 | 0.0 | 0.0 |
| 8 | 12.7 | 47539.7 | 0.0 | 12506.7 | 0. | 0. | 11884.9 | 0.0 | 0.0 |
| 9 | 1.8 | 8110.4 | 0.0 | 2024.8 | 0. | 0. | 2027.6 | 0.0 | 0.0 |
| 10 | 1.2 | 6189.0 | 0.0 | 1398.4 | 0. | 0. | 1547.2 | 0.0 | 0.0 |
| 11 | 10.0 | 53531.7 | 0.0 | 10049.3 | 0. | 0. | 13382.9 | 0.0 | 0.0 |
| 12 | 13.2 | 63866.8 | 0.0 | 8389.4 | 0. | 0. | 15966.7 | 0.0 | 0.0 |
| 13 | 2.3 | 9907.8 | 0.0 | 1063.8 | 0. | 0. | 2477.0 | 0.0 | 0.0 |
| 14 | 3.0 | 11654.0 | 0.0 | 492.6 | 0. | 0. | 2913.5 | 0.0 | 0.0 |
| 15 | 4.5 | 15311.2 | 0.0 | 0.0 | 0. | 0. | 3827.8 | 0.0 | 0.0 |
| 16 | 9.7 | 23469.7 | 0.0 | 0.0 | 0. | 0. | 5867.4 | 0.0 | 0.0 |
| 17 | 8.8 | 8815.7 | 0.0 | 0.0 | 0. | 0. | 2203.9 | 0.0 | 0.0 |
| 18 | 0.3 | 40.9 | 0.0 | 0.0 | 0. | 0. | 10.2 | 0.0 | 0.0 |

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
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Factor of Safety
*** 1.776 ***

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| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
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| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
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| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
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Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
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| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
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| 12 | 412.721 | 226.182 |

Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |

| | | |
|---|---|---|
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety

*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety

*** 1.776 ***

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

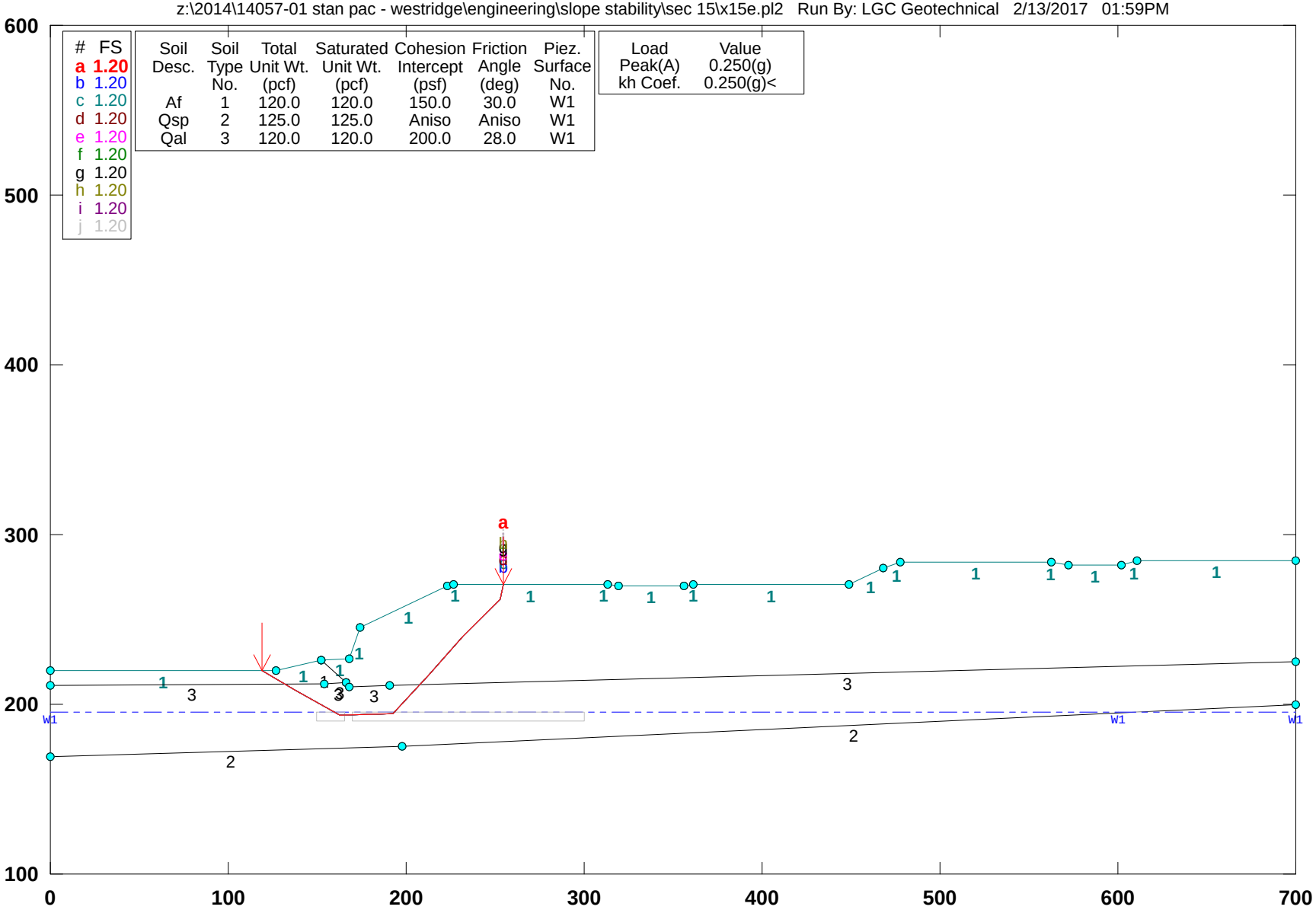
# Westridge/14057-01/Sec 15-15'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 15\x15e.pl2  Run By: LGC Geotechnical  2/13/2017  01:59PM

| # | FS |
|---|---|
| a | 1.20 |
| b | 1.20 |
| c | 1.20 |
| d | 1.20 |
| e | 1.20 |
| f | 1.20 |
| g | 1.20 |
| h | 1.20 |
| i | 1.20 |
| j | 1.20 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

| Load | Value |
|---|---|
| Peak(A) | 0.250(g) |
| kh Coef. | 0.250(g)< |

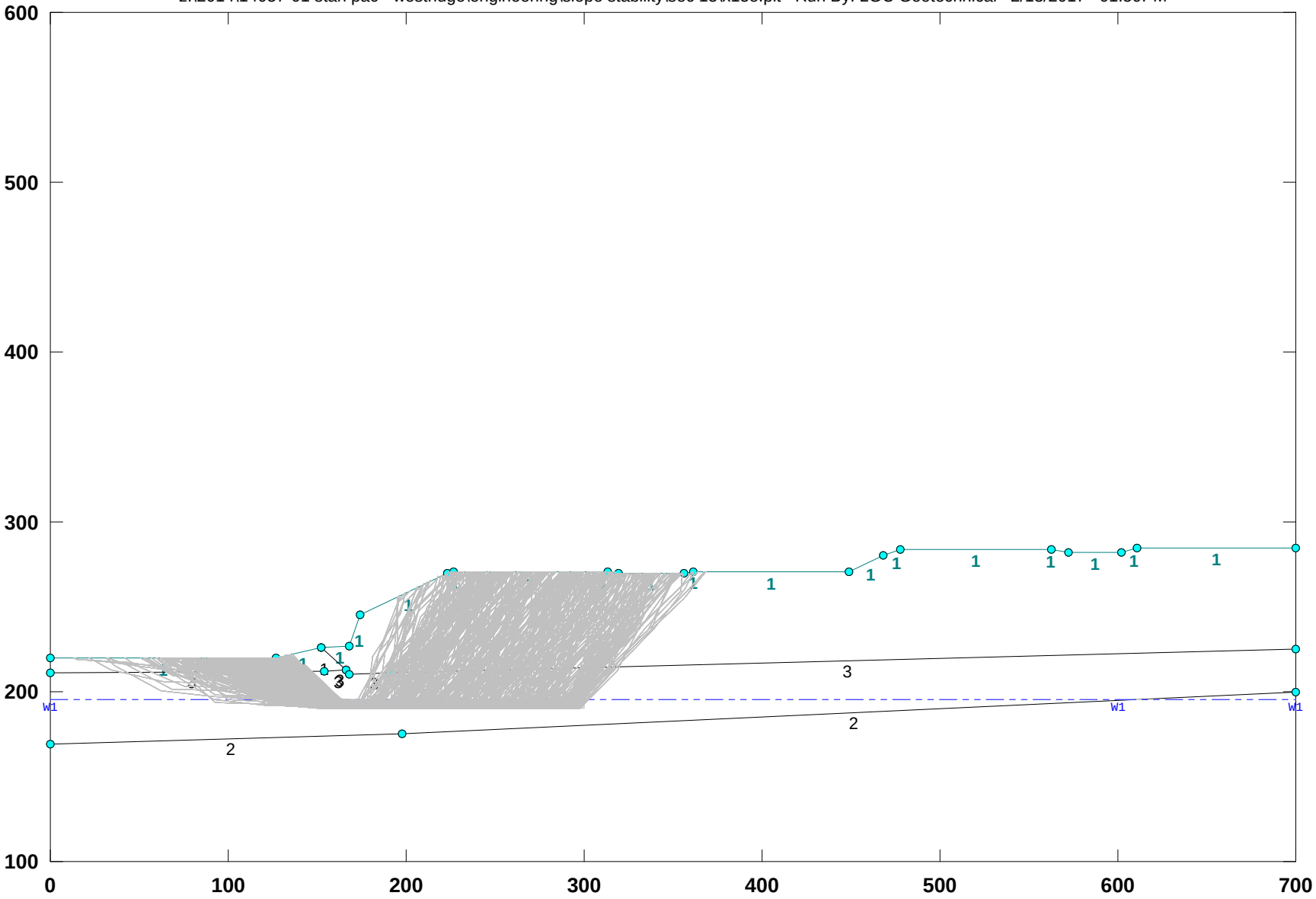



**GSTABL7 v.2  FSmin=1.20**

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

# Westridge/14057-01/Sec 15-15'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 15\x15e.plt Run By: LGC Geotechnical 2/13/2017 01:59PM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 2/13/2017
Time of Run: 01:59PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 15\x15e.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 15\x15e.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 15\x15e.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 15-15'/Lower Slope/Lateral Spreading

BOUNDARY COORDINATES
18 Top Boundaries
26 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 220.00 | 127.00 | 220.00 | 1 |
| 2 | 127.00 | 220.00 | 152.00 | 226.00 | 1 |
| 3 | 152.00 | 226.00 | 168.00 | 227.00 | 1 |
| 4 | 168.00 | 227.00 | 174.00 | 245.00 | 1 |
| 5 | 174.00 | 245.00 | 223.00 | 270.00 | 1 |
| 6 | 223.00 | 270.00 | 227.00 | 271.00 | 1 |
| 7 | 227.00 | 271.00 | 313.00 | 271.00 | 1 |
| 8 | 313.00 | 271.00 | 319.00 | 270.00 | 1 |
| 9 | 319.00 | 270.00 | 356.00 | 270.00 | 1 |
| 10 | 356.00 | 270.00 | 361.00 | 271.00 | 1 |
| 11 | 361.00 | 271.00 | 449.00 | 271.00 | 1 |
| 12 | 449.00 | 271.00 | 468.00 | 280.00 | 1 |
| 13 | 468.00 | 280.00 | 478.00 | 284.00 | 1 |
| 14 | 478.00 | 284.00 | 563.00 | 284.00 | 1 |
| 15 | 563.00 | 284.00 | 572.00 | 282.00 | 1 |
| 16 | 572.00 | 282.00 | 602.00 | 282.00 | 1 |
| 17 | 602.00 | 282.00 | 611.00 | 285.00 | 1 |
| 18 | 611.00 | 285.00 | 700.00 | 285.00 | 1 |
| 19 | 152.00 | 226.00 | 166.00 | 213.00 | 1 |
| 20 | 0.00 | 211.00 | 154.00 | 212.00 | 3 |
| 21 | 154.00 | 212.00 | 166.00 | 213.00 | 3 |
| 22 | 166.00 | 213.00 | 168.00 | 210.00 | 3 |
| 23 | 168.00 | 210.00 | 191.00 | 211.00 | 3 |
| 24 | 191.00 | 211.00 | 700.00 | 225.00 | 3 |
| 25 | 0.00 | 169.00 | 198.00 | 175.00 | 2 |
| 26 | 198.00 | 175.00 | 700.00 | 200.00 | 2 |

User Specified Y-Origin = 100.00(ft)
Default X-Plus Value = 0.00(ft)
User Specified Y-Plus Value = 100.00(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 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic



Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |
| 2 | 10.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 3 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 600.00 | 195.00 |
| 3 | 700.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.250(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.250(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 150.00 | 192.50 | 165.00 | 192.50 | 5.00 |
| 2 | 170.00 | 192.50 | 300.00 | 192.50 | 5.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 3.207 FS Min = 1.202 FS Ave = 1.583
Standard Deviation = 0.245 Coefficient of Variation = 15.46 %
Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***
Individual data on the 20 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.2 | 2555.9 | 0.0 | 0.0 | 0. | 0. | 639.0 | 0.0 | 0.0 |
| 2 | 4.6 | 4014.9 | 0.0 | 0.0 | 0. | 0. | 1003.7 | 0.0 | 0.0 |
| 3 | 5.3 | 7416.1 | 0.0 | 0.0 | 0. | 0. | 1854.0 | 0.0 | 0.0 |
| 4 | 15.0 | 36361.8 | 0.0 | 0.0 | 0. | 0. | 9090.5 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 2.0 | 6484.5 | 0.0 | 0.0 | 0. | 0. | 1621.1 | 0.0 | 0.0 |
| 6 | 5.9 | 20887.0 | 0.0 | 0.0 | 0. | 0. | 5221.8 | 0.0 | 0.0 |
| 7 | 2.9 | 11460.8 | 0.0 | 184.1 | 0. | 0. | 2865.2 | 0.0 | 0.0 |
| 8 | 3.2 | 12728.5 | 0.0 | 328.6 | 0. | 0. | 3182.1 | 0.0 | 0.0 |
| 9 | 2.0 | 8035.2 | 0.0 | 192.7 | 0. | 0. | 2008.8 | 0.0 | 0.0 |
| 10 | 6.0 | 30502.1 | 0.0 | 511.2 | 0. | 0. | 7625.5 | 0.0 | 0.0 |
| 11 | 17.0 | 112582.5 | 0.0 | 903.4 | 0. | 0. | 28145.6 | 0.0 | 0.0 |
| 12 | 1.7 | 12494.6 | 0.0 | 47.2 | 0. | 0. | 3123.6 | 0.0 | 0.0 |
| 13 | 0.4 | 2548.4 | 0.0 | 6.5 | 0. | 0. | 637.1 | 0.0 | 0.0 |
| 14 | 14.9 | 98564.3 | 0.0 | 0.0 | 0. | 0. | 24641.1 | 0.0 | 0.0 |
| 15 | 4.9 | 28962.6 | 0.0 | 0.0 | 0. | 0. | 7240.6 | 0.0 | 0.0 |
| 16 | 10.2 | 54321.7 | 0.0 | 0.0 | 0. | 0. | 13580.4 | 0.0 | 0.0 |
| 17 | 4.0 | 18885.2 | 0.0 | 0.0 | 0. | 0. | 4721.3 | 0.0 | 0.0 |
| 18 | 5.3 | 21854.4 | 0.0 | 0.0 | 0. | 0. | 5463.6 | 0.0 | 0.0 |
| 19 | 20.5 | 50018.2 | 0.0 | 0.0 | 0. | 0. | 12504.5 | 0.0 | 0.0 |
| 20 | 1.6 | 894.9 | 0.0 | 0.0 | 0. | 0. | 223.7 | 0.0 | 0.0 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

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



| No. | (ft) | (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

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

# *Appendix E*
# *Slope Stability Analyses*

***Summary of Slope Stability Analysis***

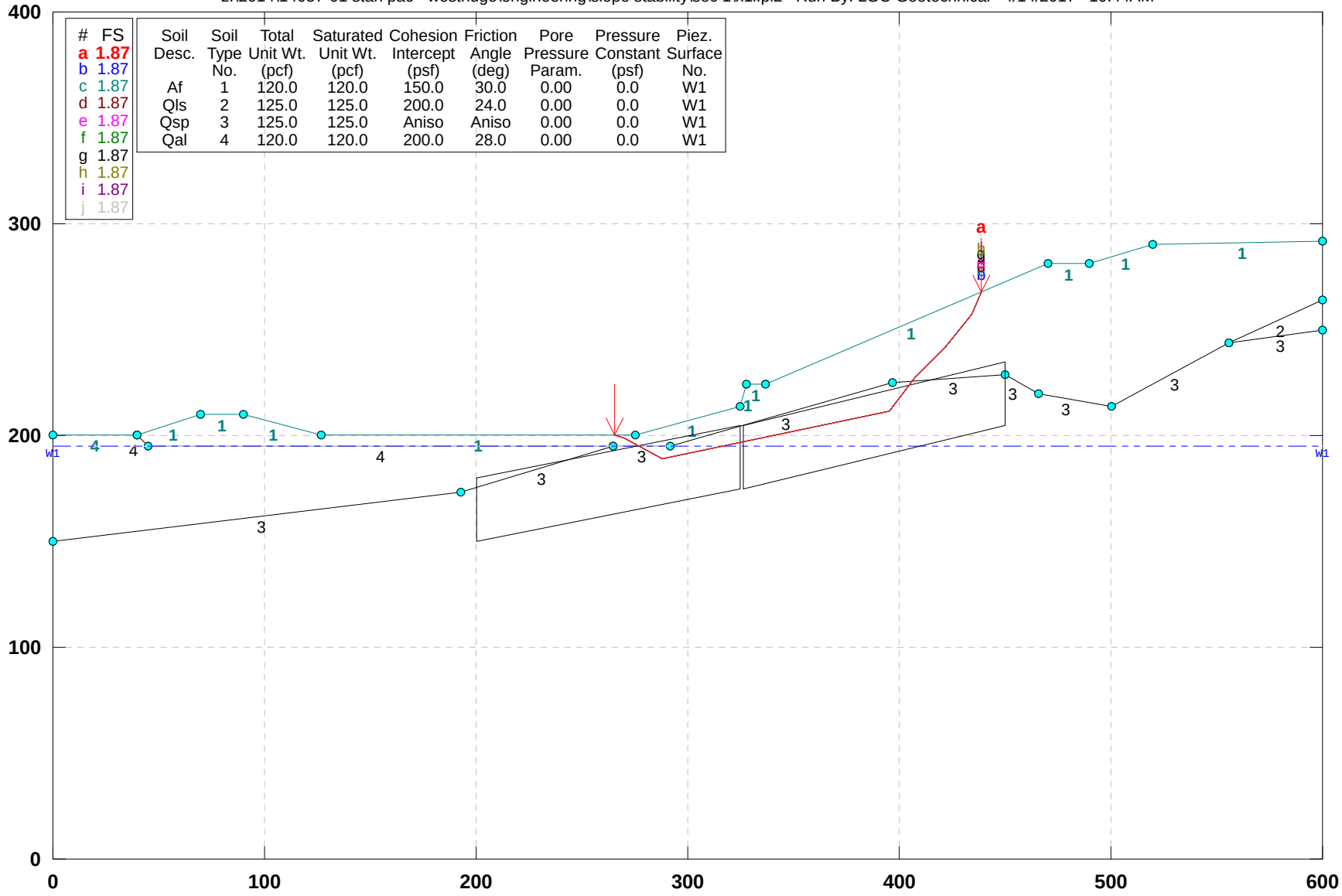
| Cross-Section | File Name | Factor of Safety | Description |
|---|---|---|---|
| 1-1” | x1l | 1.87 | Lower Basin Slope - Static |
| | x1le | 1.41 | Seismic |
| | x1tl | 1.89 | Entire Length – Static |
| | x1t1e | 1.38 | Seismic |
| | x1rd | 1.56 | Rapid Drawdown |
| | x1qls | 1.74 | Landslide |
| | x1u2 | 2.10 | Upper Slope – Static |
| | x1u2e | 1.55 | Seismic |
| 2-2” | x2l | 1.78 | Lower Basin Slope - Static |
| | x2le | 1.29 | Seismic |
| | x2tlx | 2.21 | Entire Length – Static |
| | x2tlxe | 1.43 | Seismic |
| | x2rd | 1.51 | Rapid Drawdown |
| | x2qlsx | 1.68 | Landslide |
| 3-3’ | x3ub | 1.88 | Upper Slope - Static |
| | x3ube | 1.42 | Seismic |
| | x3u | 2.11 | Upper Slope - Static |
| | x3ue | 1.64 | Seismic |
| 4-4’ | x4u | 1.70 | Upper Slope – Static |
| | x4ue | 1.42 | Seismic |
| 5-5’ | x5du | 1.64 | Upper Slope – Block – Static |
| | x5due | 1.33 | Seismic |
| | x5dur | 1.59 | Upper Slope – Rotational – Static |
| | x5dure | 1.33 | Seismic |
| | x5tc | 1.28 | Upper Slope – Temp Backcut |
| 6-6’ | x6dur | 1.85 | Upper Slope – Rotational – Static |
| | x6dure | 1.56 | Seismic |
| | x6du | 2.30 | Upper Slope – Block – Static |
| | x6due | 1.78 | Seismic |
| 7-7’ | x7du | 1.96 | Upper Slope – Static |
| | x7due | 1.47 | Seismic |
| 8-8’ | x8du | 2.61 | Upper Slope – Static |
| | x8due | 2.00 | Seismic |
| | x8dl | 1.82 | Lower Slope – Static |
| | x8dle | 1.53 | Seismic |
| | x8dlb | 2.25 | Lower Slope – Qsp Search – Static |
| | x8dlbe | 1.59 | Seismic |
| | x8utc | 1.37 | Upper Slope – Temp. Backcut |
| 9-9’ | x9dexrf | 1.61 | Upper Slope – Rotational – Static |
| | x9dexrfe | 1.36 | Seismic |
| | x9dex | 2.17 | Upper Slope – Block – Static |
| | x9dexe | 1.82 | Seismic |

***Summary of Slope Stability Analysis (Cont.)***

| Cross-Section | File Name | Factor of Safety | Description |
|---|---|---|---|
| 10-10’ | x10 | 2.28 | Static |
| | x10e | 1.90 | Seismic |
| | x10b | 2.33 | Static – Lower Slope |
| | x10be | 2.08 | Seismic |
| 11-11’ | x11 | 1.93 | Upper Slope - Static |
| | x11e | 1.49 | Seismic |
| 12’-12’” | x12 | 1.90 | Upper Slope - Static |
| | x12e | 1.54 | Seismic |
| | x12tlx | 4.86 | Entire Length – Static |
| | x12tlxe | 2.29 | Seismic |
| | x12tcx | 1.31 | Upper Slope – Temp. Backcut |
| 13-13’ | x13d | 1.55 | MSE Wall – Rotational - Static |
| | x13de | 1.35 | Seismic |
| | x13db | 1.72 | Block - Static |
| | x13dbe | 1.33 | Seismic |
| | x13tcx | 1.75 | Upper Slope – Rotational - Temp. Backcut |
| | x13tcbx | 1.80 | Upper Slope – Block - Temp. Backcut |
| | x13tl | 1.72 | Upper Slope – Block - Temp. Backcut |
| 14-14’ | x14ux | 2.42 | Upper Slope - Static |
| | x14ue | 1.86 | Seismic |
| Generic | - | 1.99 | Surficial Slope Stability Analysis |

# Westridge/14057-01/Sec 1-1'/ Lower Basin / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1l.pl2 Run By: LGC Geotechnical 4/14/2017 10:44AM

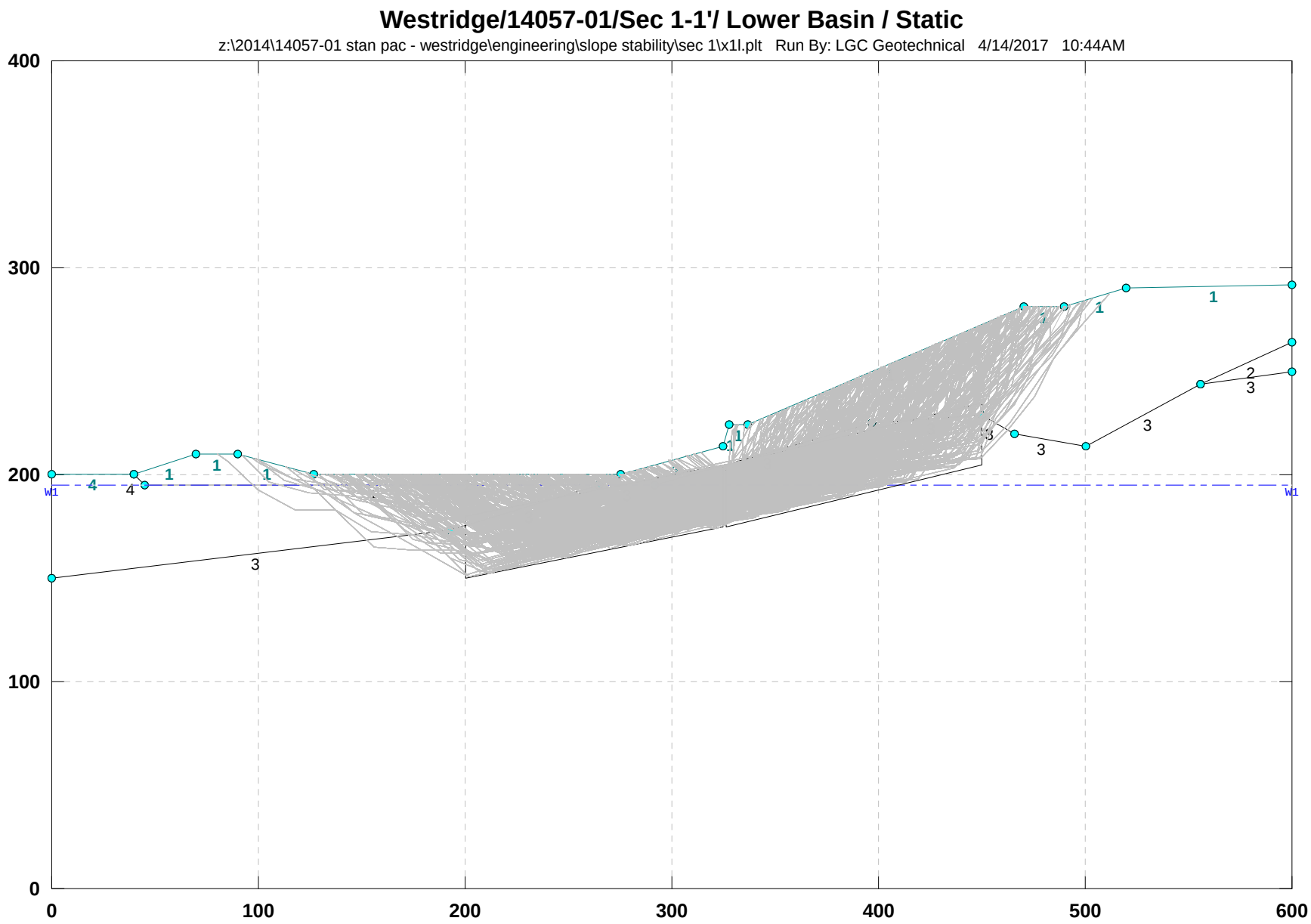



| # | FS |
|---|---|
| a | 1.87 |
| b | 1.87 |
| c | 1.87 |
| d | 1.87 |
| e | 1.87 |
| f | 1.87 |
| g | 1.87 |
| h | 1.87 |
| i | 1.87 |
| j | 1.87 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

**GSTABL7 v.2 FSmin=1.87**

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


Westridge/14057-01/Sec 1-1'/ Lower Basin / Static
z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1l.plt Run By: LGC Geotechnical 4/14/2017 10:44AM
400
300
200
100
0
0
100
200
300
400
500
600
W1
W1
1
2
3
4

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 10:44AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1l.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1l.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1l.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Lower Basin / Static

BOUNDARY COORDINATES

12 Top Boundaries

24 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 1 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 1 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 14 | 45.00 | 195.00 | 265.00 | 195.00 | 4 |
| 15 | 265.00 | 195.00 | 292.00 | 195.00 | 3 |
| 16 | 292.00 | 195.00 | 397.00 | 225.00 | 3 |
| 17 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 18 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 19 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 20 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 21 | 556.00 | 244.00 | 600.00 | 264.00 | 2 |
| 22 | 556.00 | 244.00 | 600.00 | 250.00 | 3 |
| 23 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 24 | 193.00 | 173.00 | 265.00 | 195.00 | 3 |

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|

```
            1   120.0    120.0     150.0     30.0    0.00       0.0
1
            2   125.0    125.0     200.0     24.0    0.00       0.0
1
            3   125.0    125.0     300.0     32.0    0.00       0.0
1
            4   120.0    120.0     200.0     28.0    0.00       0.0
1


          ANISOTROPIC STRENGTH PARAMETERS
               1 soil type(s)


           Soil Type  3 Is Anisotropic

           Number Of Direction Ranges Specified =  3


           Direction    Counterclockwise     Cohesion     Friction
             Range       Direction Limit    Intercept       Angle
              No.            (deg)            (psf)         (deg)

               1              7.0             300.00         32.00
               2             12.0             200.00         27.00
               3             90.0             300.00         32.00

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

1


           1 PIEZOMETRIC SURFACE(S) SPECIFIED


           Unit Weight of Water =  62.40 (pcf)


           Piezometric Surface No.  1 Specified by  2 Coordinate Points
           Pore Pressure Inclination Factor =  0.50


             Point      X-Water     Y-Water
              No.         (ft)        (ft)
                1          0.00      195.00
                2        600.00      195.00

          Janbus Empirical Coef is being used for the case of  c & phi
both > 0
1


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


          5000 Trial Surfaces Have Been Generated.


          2 Boxes Specified For Generation Of Central Block Base


          Length Of Line Segments For Active And Passive Portions Of
          Sliding Block Is  20.0


          Box        X-Left     Y-Left    X-Right    Y-Right      Height
          No.         (ft)       (ft)       (ft)       (ft)        (ft)

           1         200.00     165.00     325.00     190.00      30.00
           2         326.00     190.00     450.00     220.00      30.00


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


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


          Total Number of Trial Surfaces Attempted =  5000

          Number of Trial Surfaces With Valid FS = 5000


          Statistical Data On All Valid FS Values:
             FS Max =  16.628   FS Min =   1.873   FS Ave =   3.073
             Standard Deviation =    1.216   Coefficient of Variation =
39.59 %


          Failure Surface Specified By  8 Coordinate Points
```

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

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 | 5.1 | 316.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 4.7 | 1318.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 2.5 | 1395.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 10.3 | 12518.5 | 0.0 | 2087.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 4.2 | 7338.5 | 0.0 | 1396.2 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 23.2 | 43494.7 | 0.0 | 3550.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 9.8 | 19936.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 2.5 | 6603.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.5 | 29394.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 58.4 | 219678.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 1.6 | 7224.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 9.0 | 34719.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 1.5 | 4748.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 14.1 | 38210.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 12.7 | 20449.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 4.9 | 2469.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Factor of Safety
*** 1.873 ***

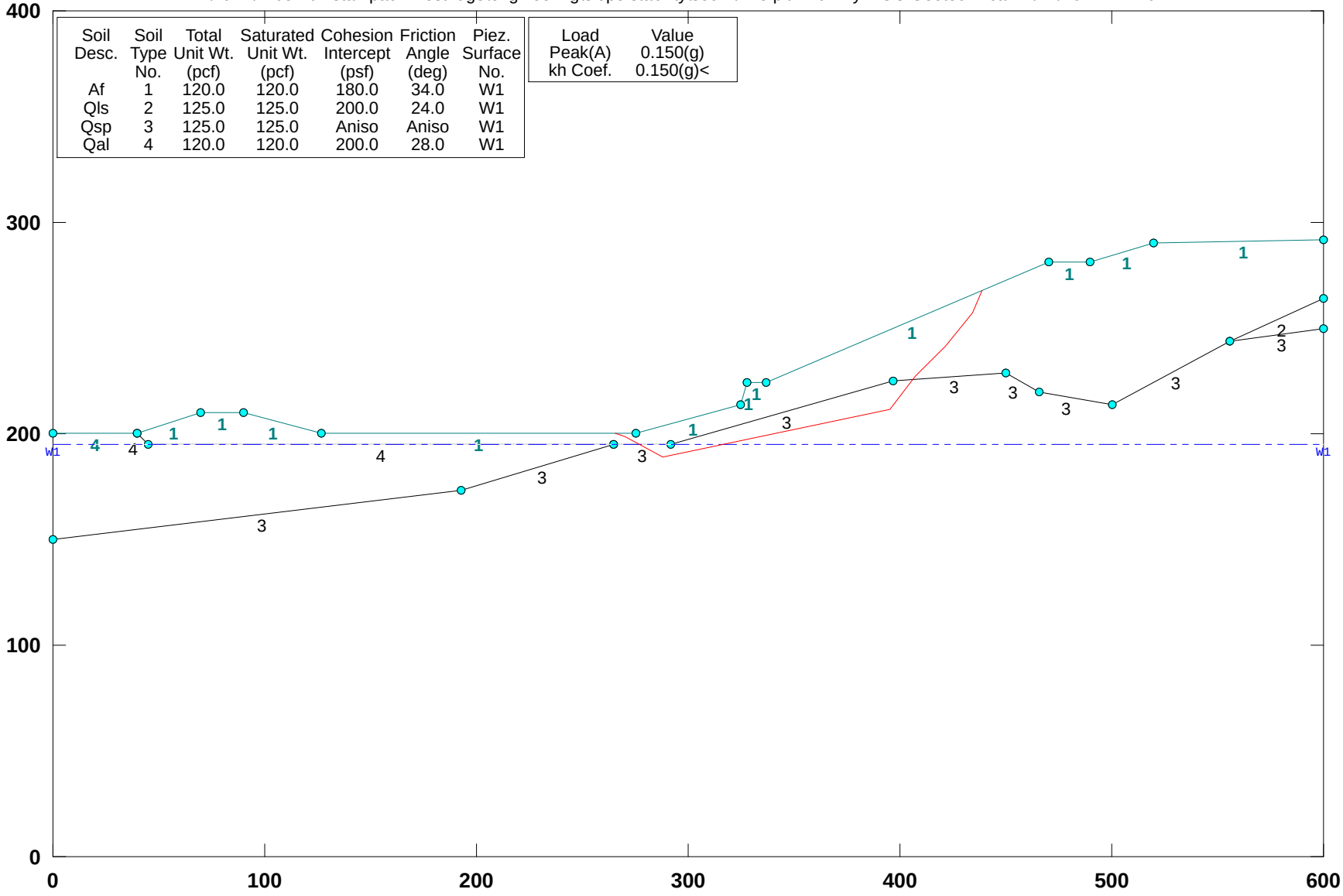
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 1-1'/ Lower Basin / Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1le.plt Run By: LGC Geotechnical 4/17/2017 11:10AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.41**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 11:10AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1le.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1le.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1le.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Lower Basin / Seismic

BOUNDARY COORDINATES
12 Top Boundaries
24 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 1 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 1 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 14 | 45.00 | 195.00 | 265.00 | 195.00 | 4 |
| 15 | 265.00 | 195.00 | 292.00 | 195.00 | 3 |
| 16 | 292.00 | 195.00 | 397.00 | 225.00 | 3 |
| 17 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 18 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 19 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 20 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 21 | 556.00 | 244.00 | 600.00 | 264.00 | 2 |
| 22 | 556.00 | 244.00 | 600.00 | 250.00 | 3 |
| 23 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 24 | 193.00 | 173.00 | 265.00 | 195.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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



| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 600.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 265.233 | 200.000 |
| 2 | 270.296 | 198.957 |
| 3 | 287.822 | 189.323 |
| 4 | 395.379 | 211.654 |
| 5 | 407.455 | 227.597 |
| 6 | 421.579 | 241.757 |
| 7 | 434.238 | 257.241 |
| 8 | 439.119 | 267.765 |

Janbu's Empirical Coefficient (fo) = 1.071
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 1.408

***Table 1 - 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 | 5.1 | 316.8 | 0.0 | 0.0 | 0.0 | 0.0 | 47.5 | 0.0 | 0.0 |
| 2 | 4.7 | 1318.5 | 0.0 | 0.0 | 0.0 | 0.0 | 197.8 | 0.0 | 0.0 |
| 3 | 2.5 | 1396.0 | 0.0 | 0.0 | 0.0 | 0.0 | 209.4 | 0.0 | 0.0 |
| 4 | 10.3 | 12518.2 | 0.0 | 2087.4 | 0.0 | 0.0 | 1877.7 | 0.0 | 0.0 |
| 5 | 4.2 | 7338.3 | 0.0 | 1396.1 | 0.0 | 0.0 | 1100.7 | 0.0 | 0.0 |
| 6 | 23.2 | 43493.0 | 0.0 | 3550.2 | 0.0 | 0.0 | 6523.9 | 0.0 | 0.0 |
| 7 | 9.8 | 19938.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2990.7 | 0.0 | 0.0 |
| 8 | 2.5 | 6603.1 | 0.0 | 0.0 | 0.0 | 0.0 | 990.5 | 0.0 | 0.0 |
| 9 | 9.5 | 29394.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4409.1 | 0.0 | 0.0 |
| 10 | 58.4 | 219677.2 | 0.0 | 0.0 | 0.0 | 0.0 | 32951.6 | 0.0 | 0.0 |
| 11 | 1.6 | 7225.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1083.8 | 0.0 | 0.0 |
| 12 | 9.0 | 34721.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5208.2 | 0.0 | 0.0 |
| 13 | 1.5 | 4748.7 | 0.0 | 0.0 | 0.0 | 0.0 | 712.3 | 0.0 | 0.0 |
| 14 | 14.1 | 38210.4 | 0.0 | 0.0 | 0.0 | 0.0 | 5731.6 | 0.0 | 0.0 |
| 15 | 12.7 | 20449.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3067.4 | 0.0 | 0.0 |
| 16 | 4.9 | 2469.5 | 0.0 | 0.0 | 0.0 | 0.0 | 370.4 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 16 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -11.64 | 267.76 | 5.17 | 251.71 | -3.43 |
| 2 | -28.80 | 272.65 | 5.37 | 571.65 | -98.18 |
| 3 | -28.80 | 276.25 | 2.85 | 863.47 | -196.02 |
| 4 | -28.80 | 282.66 | 11.78 | 1855.76 | -424.57 |
| 5 | 11.73 | 289.91 | 4.27 | 881.79 | 615.01 |

| | | | | | |
|---|---|---|---|---|---|
| 6 | 11.73 | 303.58 | 23.66 | 1026.14 | 657.42 |
| 7 | 11.73 | 320.08 | 10.04 | 1171.26 | 709.86 |
| 8 | 11.73 | 326.25 | 2.55 | 1468.45 | 924.84 |
| 9 | 11.73 | 332.25 | 9.70 | 1687.65 | 1083.41 |
| 10 | 11.73 | 366.19 | 59.62 | 2011.39 | 1317.61 |
| 11 | 52.86 | 396.19 | 2.68 | 3557.90 | 3956.85 |
| 12 | 52.86 | 401.50 | 14.91 | 3146.88 | 3423.73 |
| 13 | 52.86 | 406.73 | 2.41 | 2420.22 | 2902.34 |
| 14 | 45.07 | 414.52 | 20.00 | 1917.92 | 2201.98 |
| 15 | 50.73 | 427.91 | 20.00 | 1264.90 | 1404.02 |
| 16 | 65.12 | 436.68 | 11.60 | 609.51 | 490.91 |

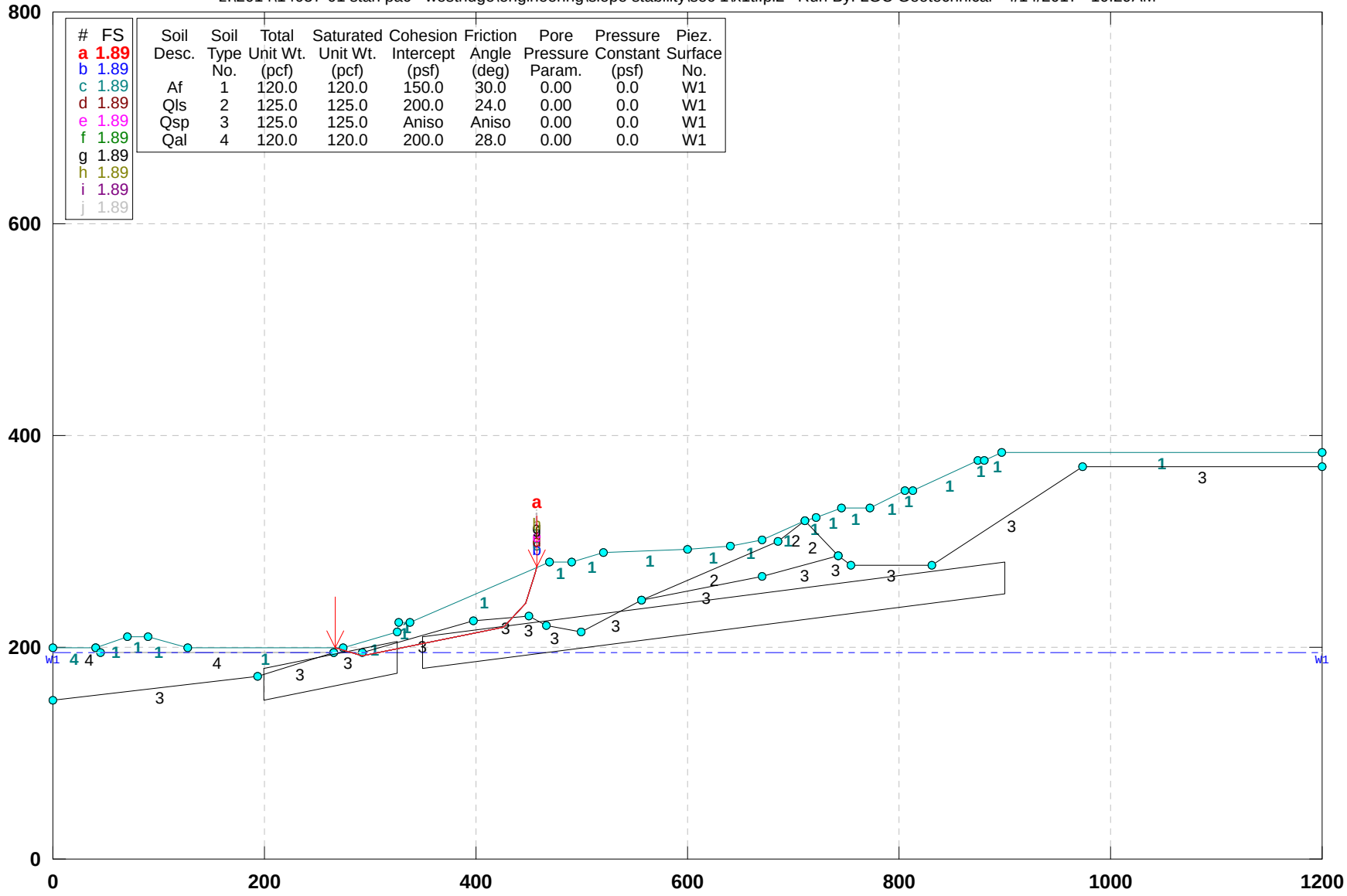
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) =  338130.34 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   1636.48(psf)
Sum of the Driving Forces =   257103.67 (lbs)
Average Mobilized Shear Stress =    1244.33(psf)
Total length of the failure surface =     206.62(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.3416(g)
Calculated Newmark Seismic Displacement =   0.003(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 1-1'/ Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1tl.pl2  Run By: LGC Geotechnical  4/14/2017  10:29AM

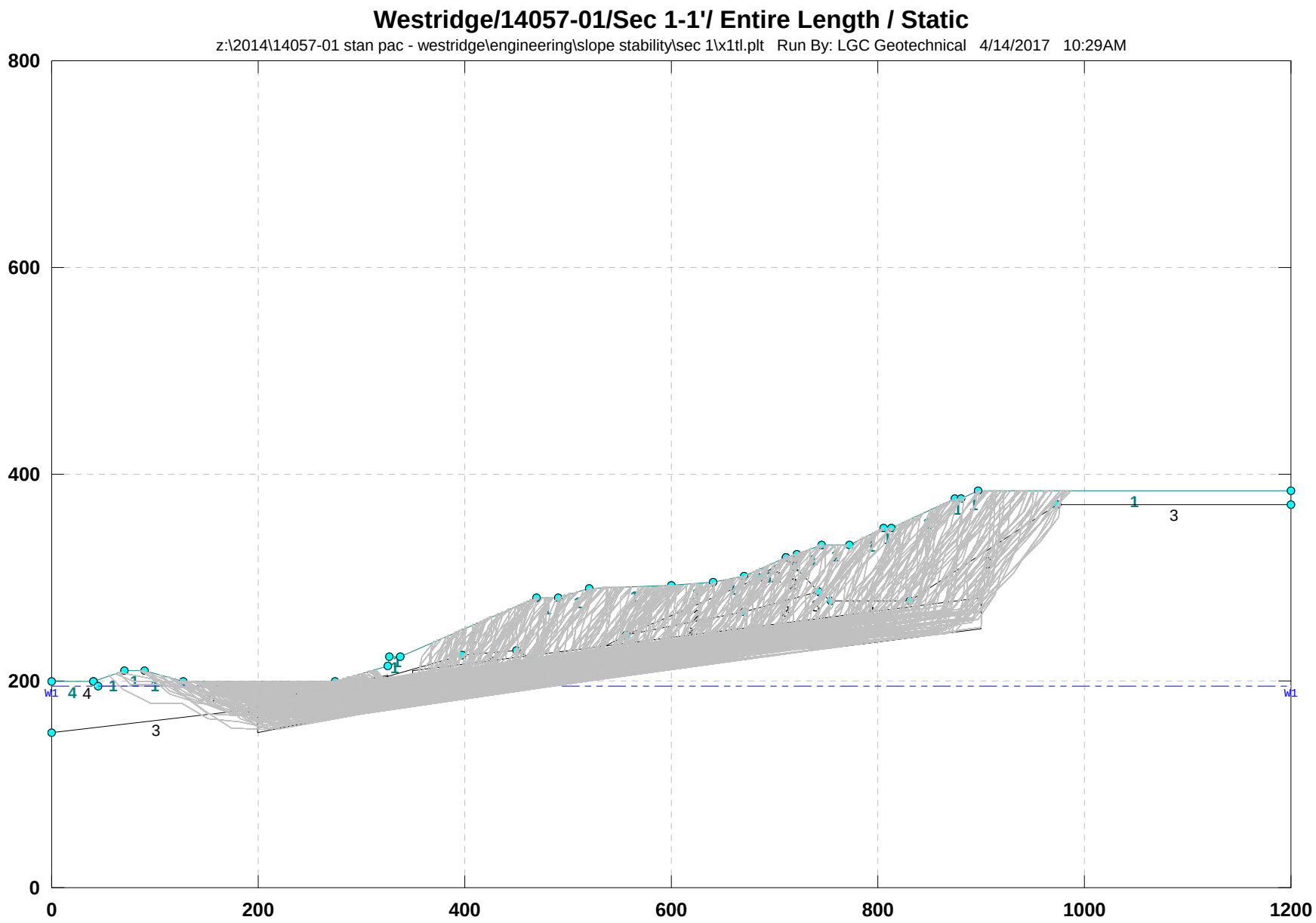
| # | FS |
|---|---|
| a | 1.89 |
| b | 1.89 |
| c | 1.89 |
| d | 1.89 |
| e | 1.89 |
| f | 1.89 |
| g | 1.89 |
| h | 1.89 |
| i | 1.89 |
| j | 1.89 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |




**GSTABL7 v.2  FSmin=1.89**

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


Westridge/14057-01/Sec 1-1'/ Entire Length / Static
z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1tl.plt Run By: LGC Geotechnical 4/14/2017 10:29AM
800
600
400
200
0
0
200
400
600
800
1000
1200
w1
4
4
1
1
1
3
1
1
1
3
w1

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 10:29AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1tl.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1tl.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1tl.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Entire Length / Static

BOUNDARY COORDINATES

24 Top Boundaries

43 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 1 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 1 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 26 | 45.00 | 195.00 | 265.00 | 195.00 | 4 |
| 27 | 265.00 | 195.00 | 292.00 | 195.00 | 3 |
| 28 | 292.00 | 195.00 | 397.00 | 225.00 | 3 |
| 29 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 30 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 31 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 32 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 33 | 556.00 | 244.00 | 686.00 | 300.00 | 2 |
| 34 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |
| 35 | 711.00 | 320.00 | 743.00 | 287.00 | 2 |
| 36 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 37 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 38 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |
| 39 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 40 | 556.00 | 244.00 | 670.00 | 267.00 | 3 |
| 41 | 670.00 | 267.00 | 743.00 | 287.00 | 3 |
| 42 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 43 | 193.00 | 173.00 | 265.00 | 195.00 | 3 |

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)
1

ISOTROPIC SOIL PARAMETERS

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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

5000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 200.00 | 165.00 | 325.00 | 190.00 | 30.00 |
| 2 | 350.00 | 195.00 | 900.00 | 265.00 | 30.00 |

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

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

Total Number of Trial Surfaces Attempted = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 8.932 FS Min = 1.885 FS Ave = 2.923
Standard Deviation = 0.664 Coefficient of Variation = 22.71 %

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

Individual data on the 14 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.8 | 1163.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 8.0 | 4638.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.0 | 10827.2 | 0.0 | 846.2 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 0.8 | 1289.7 | 0.0 | 162.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 15.4 | 25726.9 | 0.0 | 1535.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 16.7 | 30492.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 2.5 | 6186.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 9.5 | 27847.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 60.0 | 218714.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 29.2 | 142093.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 8.2 | 40094.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 12.0 | 49000.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 9.7 | 20648.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 1.8 | 625.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |

| | | |
|---|---|---|
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Factor of Safety
*** 1.885 ***

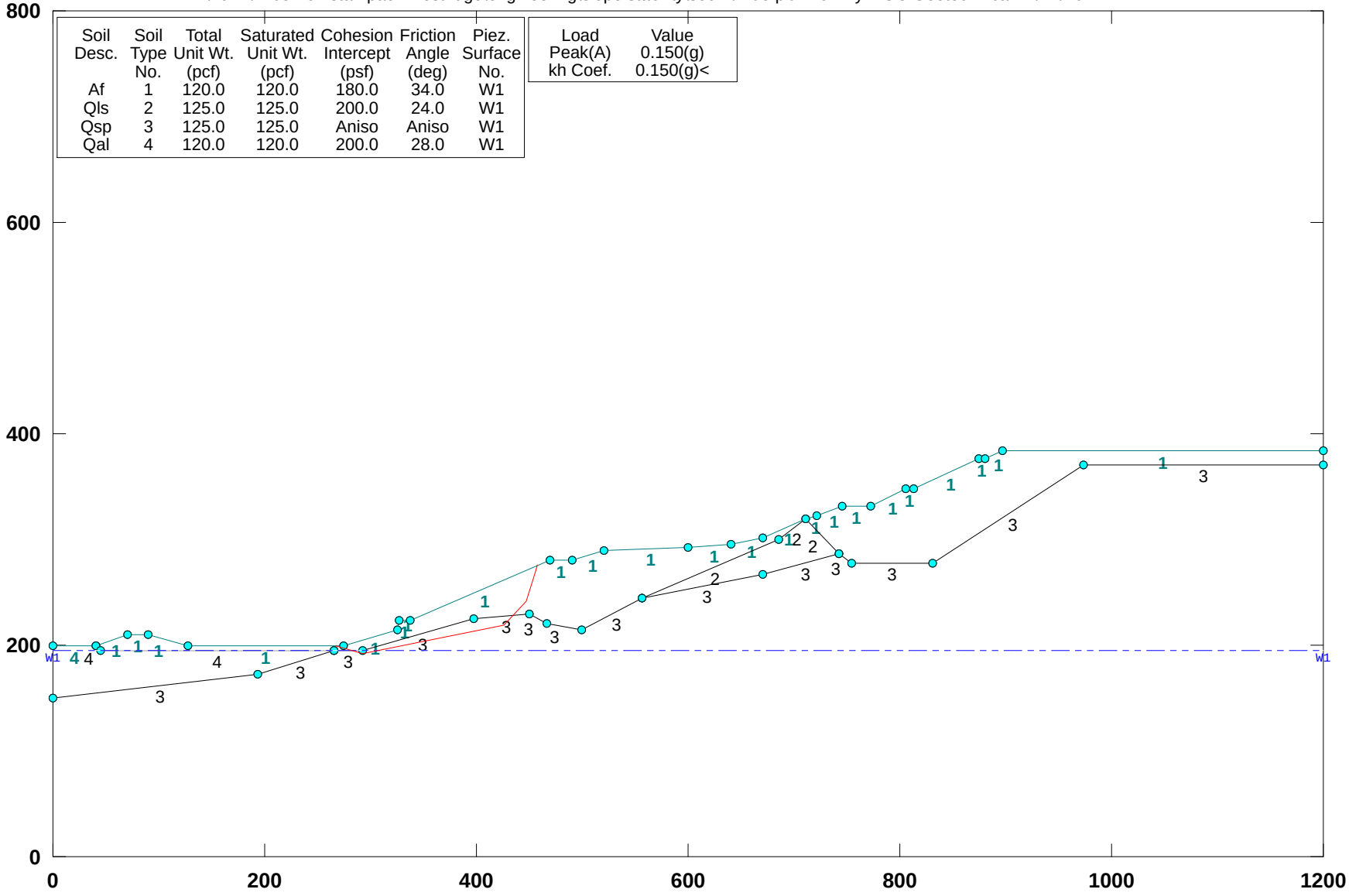
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 1-1'/ Entire Length / Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1tle.plt Run By: LGC Geotechnical 4/17/2017 11:12AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.38**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 11:12AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1tle.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1tle.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1tle.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Entire
Length / Seismic

BOUNDARY COORDINATES
24 Top Boundaries
43 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 1 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 1 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 26 | 45.00 | 195.00 | 265.00 | 195.00 | 4 |
| 27 | 265.00 | 195.00 | 292.00 | 195.00 | 3 |
| 28 | 292.00 | 195.00 | 397.00 | 225.00 | 3 |
| 29 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 30 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 31 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 32 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 33 | 556.00 | 244.00 | 686.00 | 300.00 | 2 |
| 34 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |
| 35 | 711.00 | 320.00 | 743.00 | 287.00 | 2 |
| 36 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 37 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 38 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |
| 39 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 40 | 556.00 | 244.00 | 670.00 | 267.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 670.00 | 267.00 | 743.00 | 287.00 | 3 |
| 42 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 43 | 193.00 | 173.00 | 265.00 | 195.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 267.176 | 200.000 |
| 2 | 292.827 | 191.877 |
| 3 | 426.236 | 218.859 |
| 4 | 446.461 | 241.016 |
| 5 | 456.142 | 269.411 |
| 6 | 457.988 | 275.852 |

Janbu's Empirical Coefficient (fo) = 1.072
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 1.376

***Table 1 - Individual Data on the 14 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.8 | 1163.1 | 0.0 | 0.0 | 0.0 | 0.0 | 174.5 | 0.0 | 0.0 |
| 2 | 8.0 | 4639.5 | 0.0 | 0.0 | 0.0 | 0.0 | 695.9 | 0.0 | 0.0 |
| 3 | 9.0 | 10825.9 | 0.0 | 846.0 | 0.0 | 0.0 | 1623.9 | 0.0 | 0.0 |
| 4 | 0.8 | 1289.8 | 0.0 | 162.0 | 0.0 | 0.0 | 193.5 | 0.0 | 0.0 |
| 5 | 15.4 | 25721.9 | 0.0 | 1535.0 | 0.0 | 0.0 | 3858.3 | 0.0 | 0.0 |
| 6 | 16.7 | 30495.4 | 0.0 | 0.0 | 0.0 | 0.0 | 4574.3 | 0.0 | 0.0 |
| 7 | 2.5 | 6185.8 | 0.0 | 0.0 | 0.0 | 0.0 | 927.9 | 0.0 | 0.0 |
| 8 | 9.5 | 27846.5 | 0.0 | 0.0 | 0.0 | 0.0 | 4177.0 | 0.0 | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 60.0 | 218711.1 | 0.0 | 0.0 | 0.0 | 0.0 | 32806.7 | 0.0 | 0.0 |
| 10 | 29.2 | 142092.9 | 0.0 | 0.0 | 0.0 | 0.0 | 21313.9 | 0.0 | 0.0 |
| 11 | 8.2 | 40095.2 | 0.0 | 0.0 | 0.0 | 0.0 | 6014.3 | 0.0 | 0.0 |
| 12 | 12.0 | 49001.8 | 0.0 | 0.0 | 0.0 | 0.0 | 7350.3 | 0.0 | 0.0 |
| 13 | 9.7 | 20647.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3097.1 | 0.0 | 0.0 |
| 14 | 1.8 | 625.8 | 0.0 | 0.0 | 0.0 | 0.0 | 93.9 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 14 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -17.57 | 271.09 | 8.21 | 347.99 | -23.62 |
| 2 | -17.57 | 278.98 | 8.35 | 711.30 | -92.55 |
| 3 | -17.57 | 287.48 | 9.48 | 1549.56 | -190.40 |
| 4 | -17.57 | 292.41 | 0.87 | 1770.67 | -247.83 |
| 5 | 11.43 | 300.55 | 15.75 | 948.35 | 575.13 |
| 6 | 11.43 | 316.63 | 17.07 | 1071.30 | 629.27 |
| 7 | 11.43 | 326.25 | 2.55 | 1386.50 | 854.28 |
| 8 | 11.43 | 332.25 | 9.69 | 1607.46 | 1012.03 |
| 9 | 11.43 | 367.00 | 61.21 | 1952.77 | 1258.53 |
| 10 | 11.43 | 411.62 | 29.83 | 2540.39 | 1678.03 |
| 11 | 47.61 | 430.33 | 12.14 | 3672.22 | 4114.19 |
| 12 | 47.61 | 440.44 | 17.86 | 2822.90 | 3417.06 |
| 13 | 71.17 | 451.30 | 30.00 | 2057.84 | 2121.88 |
| 14 | 74.01 | 457.07 | 6.70 | 547.36 | 339.88 |

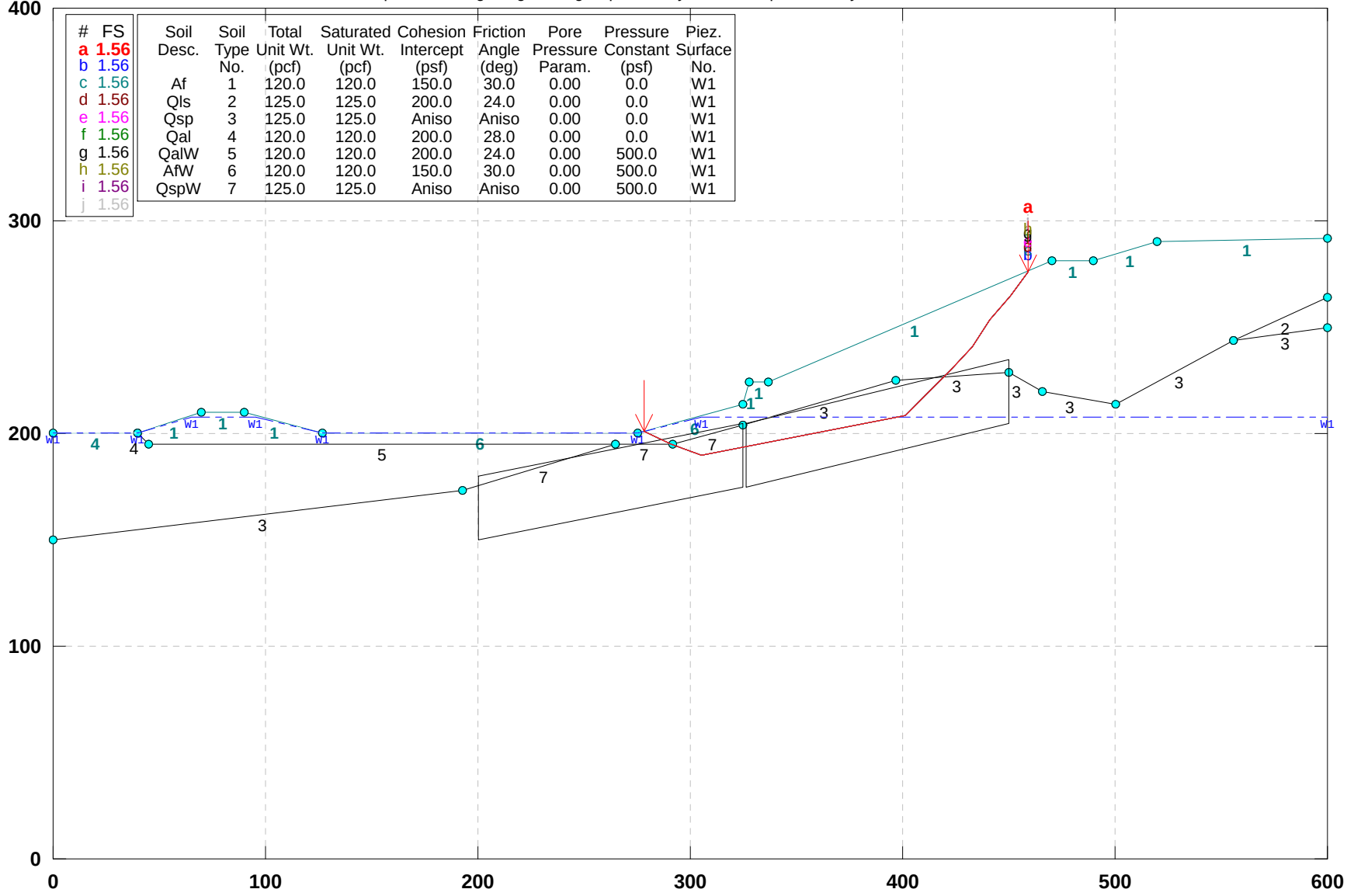
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) =  427238.62 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   1859.85(psf)
Sum of the Driving Forces =   332803.47 (lbs)
Average Mobilized Shear Stress =    1448.76(psf)
Total length of the failure surface =     229.72(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.3160(g)
Calculated Newmark Seismic Displacement =   0.003(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 1-1'/ Lower Basin / Rapid Drawdown

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1rd.pl2  Run By: LGC Geotechnical  4/14/2017  11:15AM

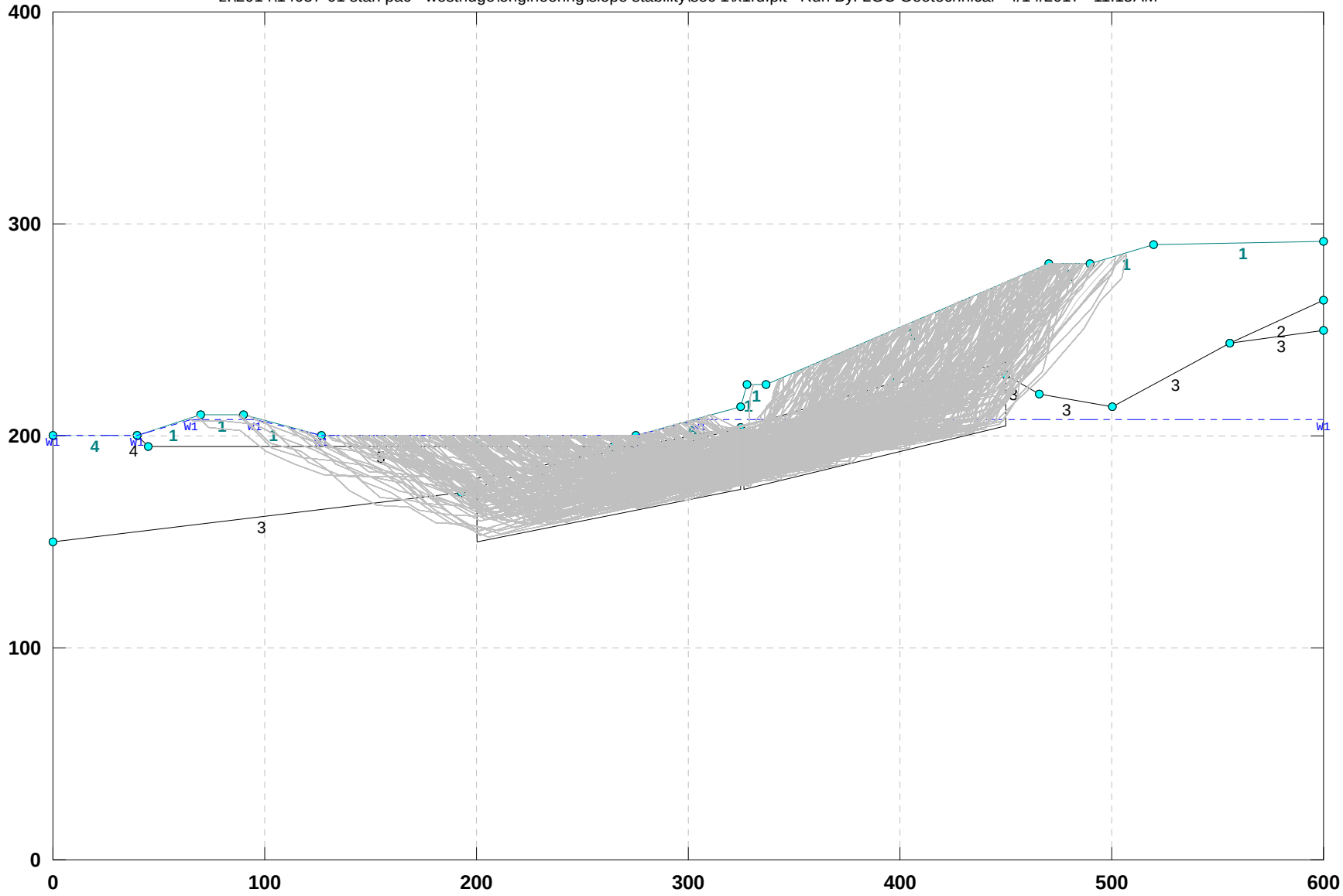
| # | FS |
|---|---|
| a | 1.56 |
| b | 1.56 |
| c | 1.56 |
| d | 1.56 |
| e | 1.56 |
| f | 1.56 |
| g | 1.56 |
| h | 1.56 |
| i | 1.56 |
| j | 1.56 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |
| QalW | 5 | 120.0 | 120.0 | 200.0 | 24.0 | 0.00 | 500.0 | W1 |
| AfW | 6 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 500.0 | W1 |
| QspW | 7 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 500.0 | W1 |




**GSTABL7 v.2  FSmin=1.56**

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


Westridge/14057-01/Sec 1-1'/ Lower Basin / Rapid Drawdown
z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1rd.plt Run By: LGC Geotechnical 4/14/2017 11:15AM
400
300
200
100
0
0
100
200
300
400
500
600
W1
1
2
3
4

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 11:15AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1rd.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1rd.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1rd.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Lower Basin / Rapid Drawdown

BOUNDARY COORDINATES

12 Top Boundaries

25 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 6 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 6 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 14 | 45.00 | 195.00 | 265.00 | 195.00 | 5 |
| 15 | 265.00 | 195.00 | 292.00 | 195.00 | 7 |
| 16 | 292.00 | 195.00 | 325.00 | 204.20 | 7 |
| 17 | 325.00 | 204.20 | 397.00 | 225.00 | 3 |
| 18 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 19 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 20 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 21 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 22 | 556.00 | 244.00 | 600.00 | 264.00 | 2 |
| 23 | 556.00 | 244.00 | 600.00 | 250.00 | 3 |
| 24 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 25 | 193.00 | 173.00 | 265.00 | 195.00 | 7 |

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 |
| 1 | | | | | | | |
| | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |
| 1 | | | | | | | |
| | 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 |
| 1 | | | | | | | |
| | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |
| 1 | | | | | | | |
| | 5 | 120.0 | 120.0 | 200.0 | 24.0 | 0.00 | 500.0 |
| 1 | | | | | | | |
| | 6 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 500.0 |
| 1 | | | | | | | |
| | 7 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 500.0 |
| 1 | | | | | | | |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

Soil Type 7 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 8 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 200.00 |
| 2 | 40.00 | 200.00 |
| 3 | 65.00 | 208.00 |
| 4 | 95.00 | 208.00 |
| 5 | 127.00 | 200.00 |
| 6 | 275.00 | 200.00 |
| 7 | 305.00 | 208.00 |
| 8 | 600.00 | 208.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

5000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | 200.00 | 165.00 | 325.00 | 190.00 | 30.00 |
| 2 | 326.00 | 190.00 | 450.00 | 220.00 | 30.00 |

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

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

Total Number of Trial Surfaces Attempted = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 4.869 FS Min = 1.555 FS Ave = 2.257
Standard Deviation = 0.508 Coefficient of Variation = 22.49 %

Failure Surface Specified By 10 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 277.900 | 200.812 |
| 2 | 291.304 | 195.024 |
| 3 | 305.217 | 189.418 |
| 4 | 401.494 | 208.461 |
| 5 | 412.101 | 219.068 |
| 6 | 422.537 | 229.842 |
| 7 | 433.098 | 240.494 |
| 8 | 440.667 | 253.444 |
| 9 | 450.681 | 264.612 |
| 10 | 459.188 | 276.366 |

Factor of Safety
*** 1.555 ***

Individual data on the 20 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1 | 0.1 | 0.0 | 30.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 13.3 | 7673.2 | 0.0 | 11359.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 0.1 | 68.4 | 0.0 | 68.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 0.6 | 748.8 | 0.0 | 739.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 13.0 | 22855.3 | 0.0 | 18965.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 0.2 | 503.9 | 0.0 | 387.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 19.8 | 48133.1 | 0.0 | 31004.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 2.5 | 7763.8 | 0.0 | 2293.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.5 | 33875.7 | 0.0 | 7997.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 1.2 | 4005.7 | 0.0 | 894.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 58.8 | 253980.2 | 0.0 | 23386.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 2.2 | 11201.6 | 0.0 | 29.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 2.3 | 12192.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 10.6 | 51734.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 7.4 | 31073.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 3.0 | 11599.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 10.6 | 35172.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 7.6 | 18017.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 10.0 | 13876.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 8.5 | 4138.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 10 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 277.900 | 200.812 |
| 2 | 291.304 | 195.024 |
| 3 | 305.217 | 189.418 |
| 4 | 401.494 | 208.461 |
| 5 | 412.101 | 219.068 |
| 6 | 422.537 | 229.842 |
| 7 | 433.098 | 240.494 |
| 8 | 440.667 | 253.444 |
| 9 | 450.681 | 264.612 |
| 10 | 459.188 | 276.366 |

Factor of Safety
*** 1.555 ***

1

Failure Surface Specified By 10 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 277.900 | 200.812 |
| 2 | 291.304 | 195.024 |
| 3 | 305.217 | 189.418 |
| 4 | 401.494 | 208.461 |
| 5 | 412.101 | 219.068 |
| 6 | 422.537 | 229.842 |
| 7 | 433.098 | 240.494 |
| 8 | 440.667 | 253.444 |
| 9 | 450.681 | 264.612 |
| 10 | 459.188 | 276.366 |

Factor of Safety
*** 1.555 ***

Failure Surface Specified By 10 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 277.900 | 200.812 |
| 2 | 291.304 | 195.024 |
| 3 | 305.217 | 189.418 |
| 4 | 401.494 | 208.461 |
| 5 | 412.101 | 219.068 |


| | | |
|---|---|---|
| 6 | 422.537 | 229.842 |
| 7 | 433.098 | 240.494 |
| 8 | 440.667 | 253.444 |
| 9 | 450.681 | 264.612 |
| 10 | 459.188 | 276.366 |

Factor of Safety
*** 1.555 ***

1

Failure Surface Specified By 10 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 277.900 | 200.812 |
| 2 | 291.304 | 195.024 |
| 3 | 305.217 | 189.418 |
| 4 | 401.494 | 208.461 |
| 5 | 412.101 | 219.068 |
| 6 | 422.537 | 229.842 |
| 7 | 433.098 | 240.494 |
| 8 | 440.667 | 253.444 |
| 9 | 450.681 | 264.612 |
| 10 | 459.188 | 276.366 |

Factor of Safety
*** 1.555 ***

Failure Surface Specified By 10 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 277.900 | 200.812 |
| 2 | 291.304 | 195.024 |
| 3 | 305.217 | 189.418 |
| 4 | 401.494 | 208.461 |
| 5 | 412.101 | 219.068 |
| 6 | 422.537 | 229.842 |
| 7 | 433.098 | 240.494 |
| 8 | 440.667 | 253.444 |
| 9 | 450.681 | 264.612 |
| 10 | 459.188 | 276.366 |

Factor of Safety
*** 1.555 ***

1

Failure Surface Specified By 10 Coordinate Points

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Factor of Safety
*** 1.555 ***

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Factor of Safety
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1

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Factor of Safety
*** 1.555 ***

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| 7 | 433.098 | 240.494 |
| 8 | 440.667 | 253.444 |
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| 10 | 459.188 | 276.366 |

Factor of Safety
*** 1.555 ***

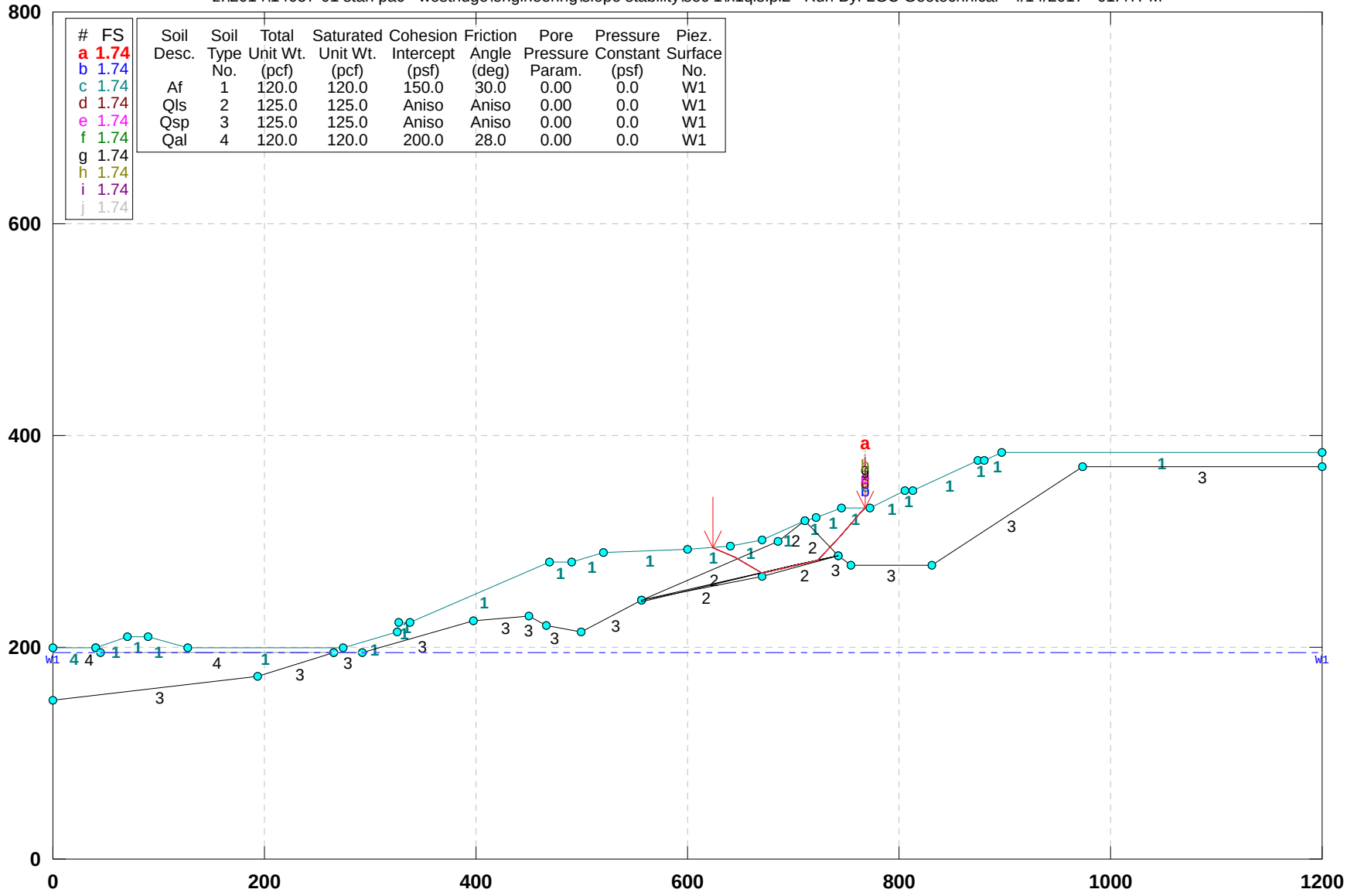
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 1-1'/ Qls / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1qls.pl2  Run By: LGC Geotechnical  4/14/2017  01:47PM

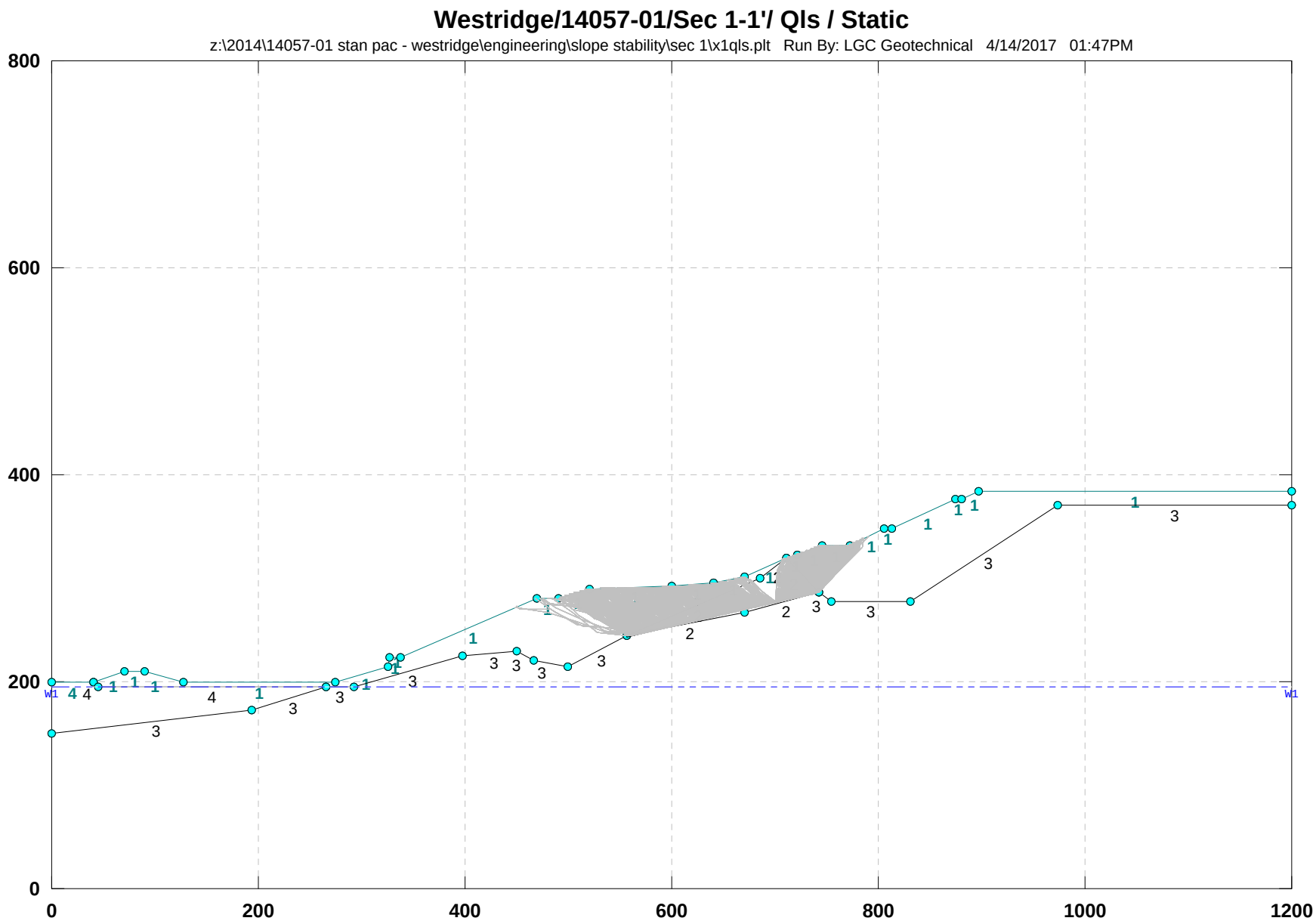
| # | FS |
|---|---|
| a | 1.74 |
| b | 1.74 |
| c | 1.74 |
| d | 1.74 |
| e | 1.74 |
| f | 1.74 |
| g | 1.74 |
| h | 1.74 |
| i | 1.74 |
| j | 1.74 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |




**GSTABL7 v.2  FSmin=1.74**

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


Westridge/14057-01/Sec 1-1'/ Qls / Static
z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1qls.plt Run By: LGC Geotechnical 4/14/2017 01:47PM
800
600
400
200
0
0
200
400
600
800
1000
1200
w1
w1

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:47PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1qls.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1qls.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1qls.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Qls / Static

BOUNDARY COORDINATES

24 Top Boundaries

43 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 1 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 1 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 26 | 45.00 | 195.00 | 265.00 | 195.00 | 4 |
| 27 | 265.00 | 195.00 | 292.00 | 195.00 | 3 |
| 28 | 292.00 | 195.00 | 397.00 | 225.00 | 3 |
| 29 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 30 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 31 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 32 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 33 | 556.00 | 244.00 | 686.00 | 300.00 | 2 |
| 34 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |
| 35 | 711.00 | 320.00 | 743.00 | 287.00 | 2 |
| 36 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 37 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 38 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |
| 39 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 40 | 556.00 | 244.00 | 670.00 | 267.00 | 2 |
| 41 | 670.00 | 267.00 | 743.00 | 287.00 | 2 |
| 42 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 43 | 193.00 | 173.00 | 265.00 | 195.00 | 3 |

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 24.00 | 24.00 |
| 2 | 15.0 | 0.00 | 13.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

5000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of

Sliding Block Is 30.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 556.00 | 244.00 | 700.00 | 277.20 | 0.50 |
| 2 | 700.10 | 277.20 | 743.10 | 287.00 | 0.50 |

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

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

Total Number of Trial Surfaces Attempted = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 9.972 FS Min = 1.737 FS Ave = 2.670
Standard Deviation = 0.948 Coefficient of Variation = 35.49 %

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
| 7 | 768.160 | 332.000 |

Factor of Safety
*** 1.737 ***

Individual data on the 14 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 16.5 | 8028.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 3.8 | 4243.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 3.0 | 4281.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 22.9 | 62836.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 0.3 | 1153.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 15.0 | 61875.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 25.0 | 117138.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 10.0 | 50523.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 1.6 | 7973.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 12.4 | 55753.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 8.4 | 29974.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 2.7 | 8351.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 17.2 | 31523.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 4.9 | 1637.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
| 7 | 768.160 | 332.000 |

Factor of Safety

*** 1.737 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
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Factor of Safety
*** 1.737 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
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Factor of Safety
*** 1.737 ***

1

Failure Surface Specified By 7 Coordinate Points

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


| 1 | 624.498 | 293.793 |
|---|---|---|
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
| 7 | 768.160 | 332.000 |

Factor of Safety
*** 1.737 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
| 7 | 768.160 | 332.000 |

Factor of Safety
*** 1.737 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
| 7 | 768.160 | 332.000 |

Factor of Safety

*** 1.737 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
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Factor of Safety
*** 1.737 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
| 7 | 768.160 | 332.000 |

Factor of Safety
*** 1.737 ***

Failure Surface Specified By 7 Coordinate Points

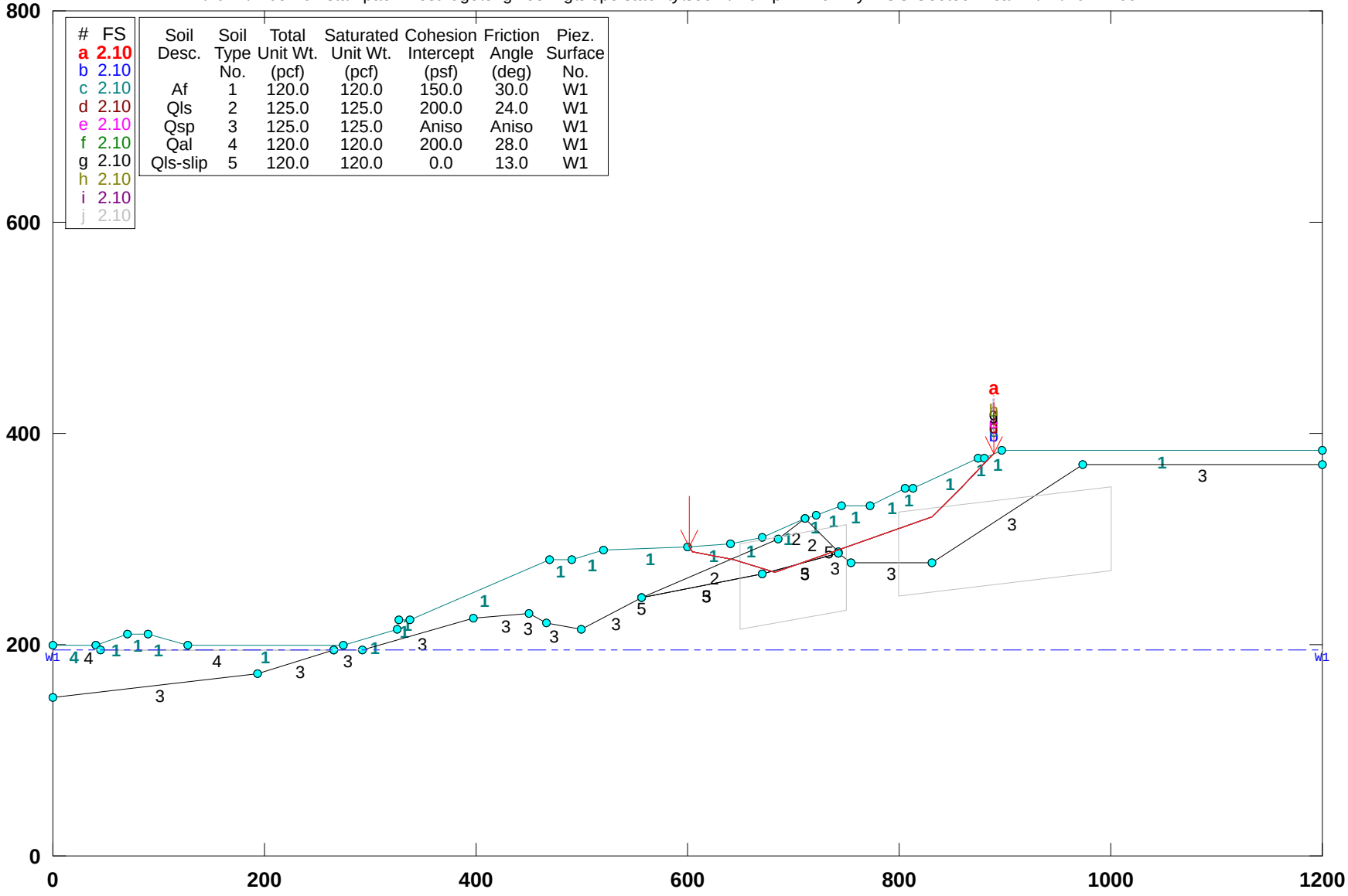
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.498 | 293.793 |
| 2 | 644.785 | 285.308 |
| 3 | 670.706 | 270.205 |
| 4 | 722.574 | 282.355 |
| 5 | 743.322 | 304.023 |
| 6 | 763.230 | 326.465 |
| 7 | 768.160 | 332.000 |

Factor of Safety
*** 1.737 ***

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

# Westridge/14057-01/Sec 1-1'/ Upper Slope / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1u2.pl2 Run By: LGC Geotechnical 4/17/2017 09:22AM

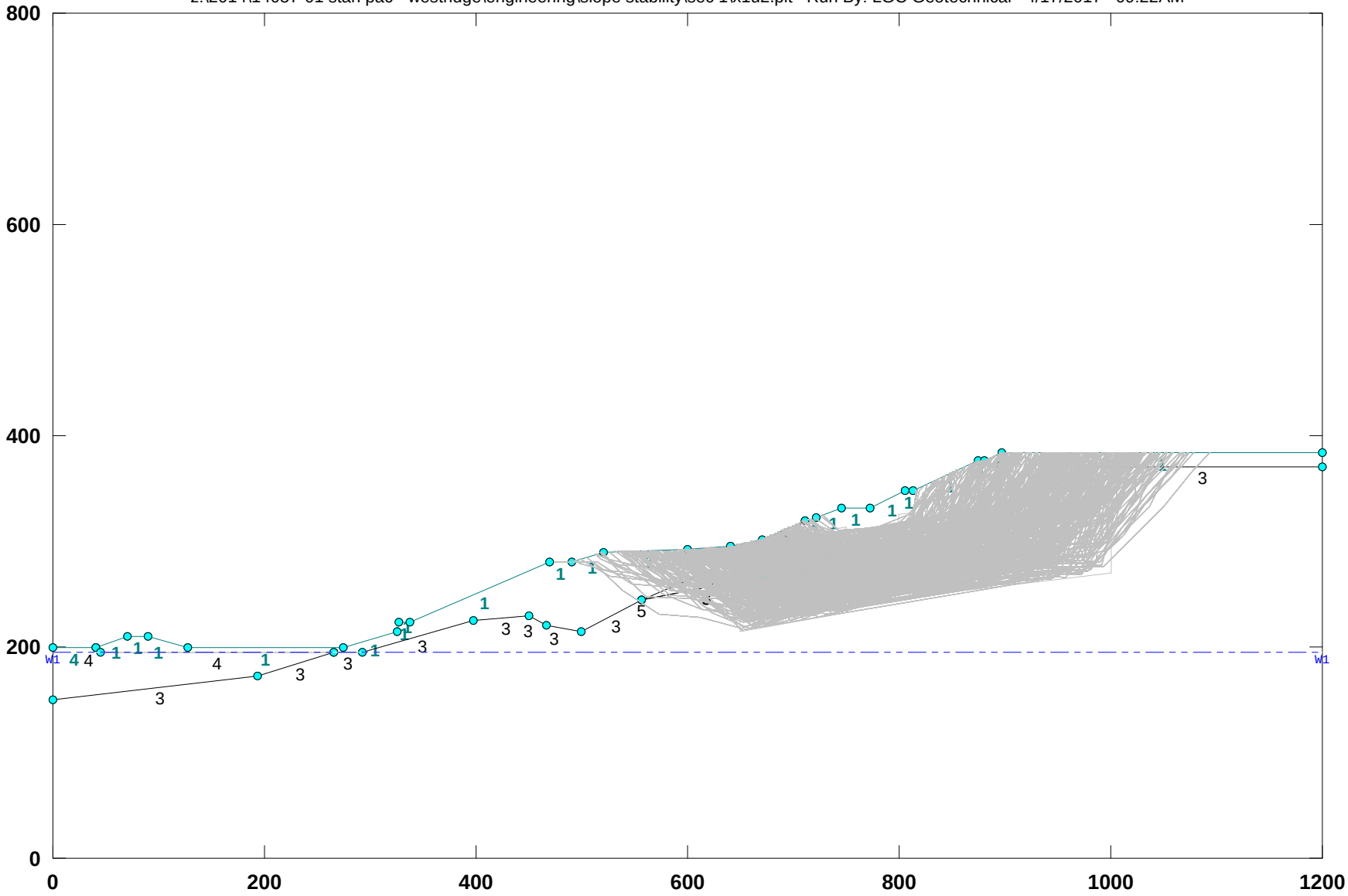



**GSTABL7 v.2 FSmin=2.10**

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

# Westridge/14057-01/Sec 1-1'/ Upper Slope / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1u2.plt Run By: LGC Geotechnical 4/17/2017 09:22AM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 09:22AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1u2.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1u2.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1u2.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Upper Slope / Static

BOUNDARY COORDINATES
24 Top Boundaries
47 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 1 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 1 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 26 | 45.00 | 195.00 | 265.00 | 195.00 | 4 |
| 27 | 265.00 | 195.00 | 292.00 | 195.00 | 3 |
| 28 | 292.00 | 195.00 | 397.00 | 225.00 | 3 |
| 29 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 30 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 31 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 32 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 33 | 556.00 | 244.00 | 556.10 | 244.50 | 5 |
| 34 | 556.10 | 244.50 | 686.00 | 300.00 | 2 |
| 35 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |
| 36 | 711.00 | 320.00 | 743.00 | 287.50 | 2 |
| 37 | 743.00 | 287.50 | 743.10 | 287.00 | 5 |
| 38 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 39 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 40 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 42 | 556.00 | 244.00 | 670.00 | 267.00 | 5 |
| 43 | 670.00 | 267.00 | 743.00 | 287.00 | 5 |
| 44 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 45 | 193.00 | 173.00 | 265.00 | 195.00 | 3 |
| 46 | 556.00 | 244.00 | 670.00 | 266.50 | 3 |
| 47 | 670.00 | 266.50 | 743.00 | 287.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |
| 5 | 120.0 | 120.0 | 0.0 | 13.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 650.00 | 255.00 | 750.00 | 273.00 | 80.00 |
| 2 | 800.00 | 286.00 | 1000.00 | 310.00 | 80.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 13.141 FS Min = 2.104 FS Ave = 3.460
Standard Deviation = 1.001 Coefficient of Variation = 28.92 %
Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |

| | | |
|---|---|---|
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Individual data on the 24 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.8 | 894.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 36.1 | 37398.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 1.4 | 2317.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 1.8 | 3123.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 26.8 | 72491.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 8.8 | 35985.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 0.7 | 3267.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 1.8 | 8242.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 3.7 | 17379.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 11.1 | 53870.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 4.0 | 19754.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 9.9 | 50090.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 10.0 | 50572.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 19.9 | 98383.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 5.1 | 24616.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 26.0 | 112470.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 33.0 | 133210.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 8.0 | 33029.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 18.0 | 73304.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 27.9 | 90389.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 15.1 | 27115.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 22 | 6.0 | 5667.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 23 | 7.2 | 2548.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 24 | 2.0 | 127.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |



| | | |
|---|---|---|
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Factor of Safety
*** 2.104 ***

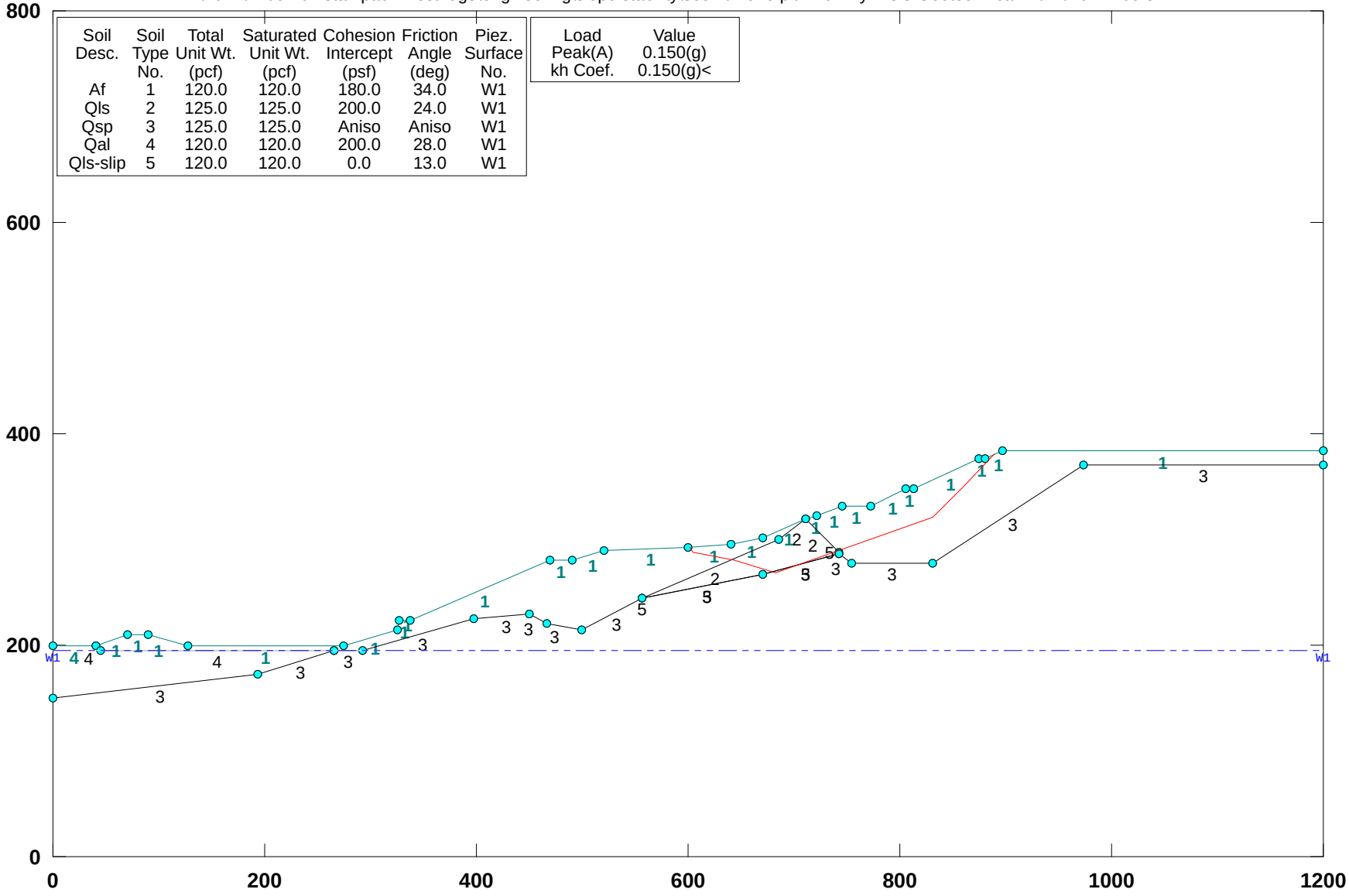
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 1-1'/ Upper Slope / Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 1\x1u2e.plt Run By: LGC Geotechnical 4/17/2017 09:31AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |
| Qls-slip | 5 | 120.0 | 120.0 | 0.0 | 13.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.55**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 09:31AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1u2e.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1u2e.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 1\x1u2e.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ Upper Slope / Seismic
BOUNDARY COORDINATES
24 Top Boundaries
47 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 40.00 | 200.00 | 4 |
| 2 | 40.00 | 200.00 | 70.00 | 210.00 | 1 |
| 3 | 70.00 | 210.00 | 90.00 | 210.00 | 1 |
| 4 | 90.00 | 210.00 | 127.00 | 200.00 | 1 |
| 5 | 127.00 | 200.00 | 275.00 | 200.00 | 1 |
| 6 | 275.00 | 200.00 | 325.00 | 214.00 | 1 |
| 7 | 325.00 | 214.00 | 327.50 | 224.00 | 1 |
| 8 | 327.50 | 224.00 | 337.00 | 224.00 | 1 |
| 9 | 337.00 | 224.00 | 470.00 | 281.00 | 1 |
| 10 | 470.00 | 281.00 | 490.00 | 281.00 | 1 |
| 11 | 490.00 | 281.00 | 520.00 | 290.00 | 1 |
| 12 | 520.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 40.00 | 200.00 | 45.00 | 195.00 | 4 |
| 26 | 45.00 | 195.00 | 265.00 | 195.00 | 4 |
| 27 | 265.00 | 195.00 | 292.00 | 195.00 | 3 |
| 28 | 292.00 | 195.00 | 397.00 | 225.00 | 3 |
| 29 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 30 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 31 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 32 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 33 | 556.00 | 244.00 | 556.10 | 244.50 | 5 |
| 34 | 556.10 | 244.50 | 686.00 | 300.00 | 2 |
| 35 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |
| 36 | 711.00 | 320.00 | 743.00 | 287.50 | 2 |
| 37 | 743.00 | 287.50 | 743.10 | 287.00 | 5 |
| 38 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 39 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 40 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 42 | 556.00 | 244.00 | 670.00 | 267.00 | 5 |
| 43 | 670.00 | 267.00 | 743.00 | 287.00 | 5 |
| 44 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 45 | 193.00 | 173.00 | 265.00 | 195.00 | 3 |
| 46 | 556.00 | 244.00 | 670.00 | 266.50 | 3 |
| 47 | 670.00 | 266.50 | 743.00 | 287.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |
| 5 | 120.0 | 120.0 | 0.0 | 13.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 601.117 | 292.082 |
| 2 | 604.919 | 288.440 |
| 3 | 644.227 | 281.036 |
| 4 | 682.343 | 268.903 |
| 5 | 830.994 | 321.355 |
| 6 | 858.907 | 350.006 |
| 7 | 887.168 | 378.313 |
| 8 | 889.169 | 380.315 |

Janbu's Empirical Coefficient (fo) = 1.060
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 1.548

***Table 1 - Individual Data on the 24 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.8 | 894.2 | 0.0 | 0.0 | 0.0 | 0.0 | 134.1 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 36.1 | 37400.2 | 0.0 | 0.0 | 0.0 | 0.0 | 5610.0 | 0.0 | 0.0 |
| 3 | 1.4 | 2316.0 | 0.0 | 0.0 | 0.0 | 0.0 | 347.4 | 0.0 | 0.0 |
| 4 | 1.8 | 3124.6 | 0.0 | 0.0 | 0.0 | 0.0 | 468.7 | 0.0 | 0.0 |
| 5 | 26.8 | 72492.7 | 0.0 | 0.0 | 0.0 | 0.0 | 10873.9 | 0.0 | 0.0 |
| 6 | 8.8 | 35988.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5398.2 | 0.0 | 0.0 |
| 7 | 0.7 | 3267.4 | 0.0 | 0.0 | 0.0 | 0.0 | 490.1 | 0.0 | 0.0 |
| 8 | 1.8 | 8242.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1236.3 | 0.0 | 0.0 |
| 9 | 3.7 | 17377.6 | 0.0 | 0.0 | 0.0 | 0.0 | 2606.6 | 0.0 | 0.0 |
| 10 | 11.1 | 53863.2 | 0.0 | 0.0 | 0.0 | 0.0 | 8079.5 | 0.0 | 0.0 |
| 11 | 4.0 | 19755.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2963.3 | 0.0 | 0.0 |
| 12 | 9.9 | 50096.4 | 0.0 | 0.0 | 0.0 | 0.0 | 7514.5 | 0.0 | 0.0 |
| 13 | 10.0 | 50572.4 | 0.0 | 0.0 | 0.0 | 0.0 | 7585.9 | 0.0 | 0.0 |
| 14 | 19.9 | 98383.4 | 0.0 | 0.0 | 0.0 | 0.0 | 14757.5 | 0.0 | 0.0 |
| 15 | 5.1 | 24616.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3692.5 | 0.0 | 0.0 |
| 16 | 26.0 | 112470.8 | 0.0 | 0.0 | 0.0 | 0.0 | 16870.6 | 0.0 | 0.0 |
| 17 | 33.0 | 133211.2 | 0.0 | 0.0 | 0.0 | 0.0 | 19981.7 | 0.0 | 0.0 |
| 18 | 8.0 | 33029.5 | 0.0 | 0.0 | 0.0 | 0.0 | 4954.4 | 0.0 | 0.0 |
| 19 | 18.0 | 73306.7 | 0.0 | 0.0 | 0.0 | 0.0 | 10996.0 | 0.0 | 0.0 |
| 20 | 27.9 | 90388.9 | 0.0 | 0.0 | 0.0 | 0.0 | 13558.3 | 0.0 | 0.0 |
| 21 | 15.1 | 27115.3 | 0.0 | 0.0 | 0.0 | 0.0 | 4067.3 | 0.0 | 0.0 |
| 22 | 6.0 | 5667.5 | 0.0 | 0.0 | 0.0 | 0.0 | 850.1 | 0.0 | 0.0 |
| 23 | 7.2 | 2549.0 | 0.0 | 0.0 | 0.0 | 0.0 | 382.3 | 0.0 | 0.0 |
| 24 | 2.0 | 127.3 | 0.0 | 0.0 | 0.0 | 0.0 | 19.1 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 24 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -43.77 | 603.02 | 5.26 | 804.98 | -137.21 |
| 2 | -10.67 | 622.96 | 36.72 | 974.64 | -39.07 |
| 3 | -10.67 | 641.71 | 1.44 | 1424.75 | -61.76 |
| 4 | -10.67 | 643.32 | 1.85 | 1040.50 | -64.95 |
| 5 | -17.66 | 657.61 | 28.10 | 1623.73 | -434.28 |
| 6 | -17.66 | 675.42 | 9.28 | 2323.42 | -652.47 |
| 7 | -17.66 | 680.21 | 0.76 | 1151.22 | -725.91 |
| 8 | -17.66 | 681.46 | 1.86 | 4426.58 | -744.95 |
| 9 | 19.44 | 684.17 | 3.88 | 3405.33 | 2253.31 |
| 10 | 19.44 | 691.55 | 11.77 | 3466.93 | 2300.43 |
| 11 | 19.44 | 699.10 | 4.23 | 1152.88 | 2350.60 |
| 12 | 19.44 | 706.04 | 10.51 | 2358.93 | 2396.75 |
| 13 | 19.44 | 716.00 | 10.60 | 2360.18 | 2398.14 |
| 14 | 19.44 | 730.97 | 21.16 | 2306.34 | 2338.57 |
| 15 | 19.44 | 743.47 | 5.36 | 3187.02 | 2311.29 |
| 16 | 19.44 | 759.00 | 27.57 | 2847.12 | 2051.29 |
| 17 | 19.44 | 788.50 | 34.99 | 2667.90 | 1914.20 |
| 18 | 19.44 | 809.00 | 8.48 | 2724.92 | 1957.82 |
| 19 | 19.44 | 822.00 | 19.08 | 2690.98 | 1931.85 |
| 20 | 45.75 | 844.95 | 40.00 | 2340.80 | 2658.42 |
| 21 | 45.05 | 866.45 | 21.36 | 1371.26 | 1461.79 |
| 22 | 45.05 | 877.00 | 8.49 | 805.08 | 768.57 |
| 23 | 45.05 | 883.58 | 10.15 | 413.67 | 289.35 |
| 24 | 45.01 | 888.17 | 2.83 | 219.57 | 51.73 |

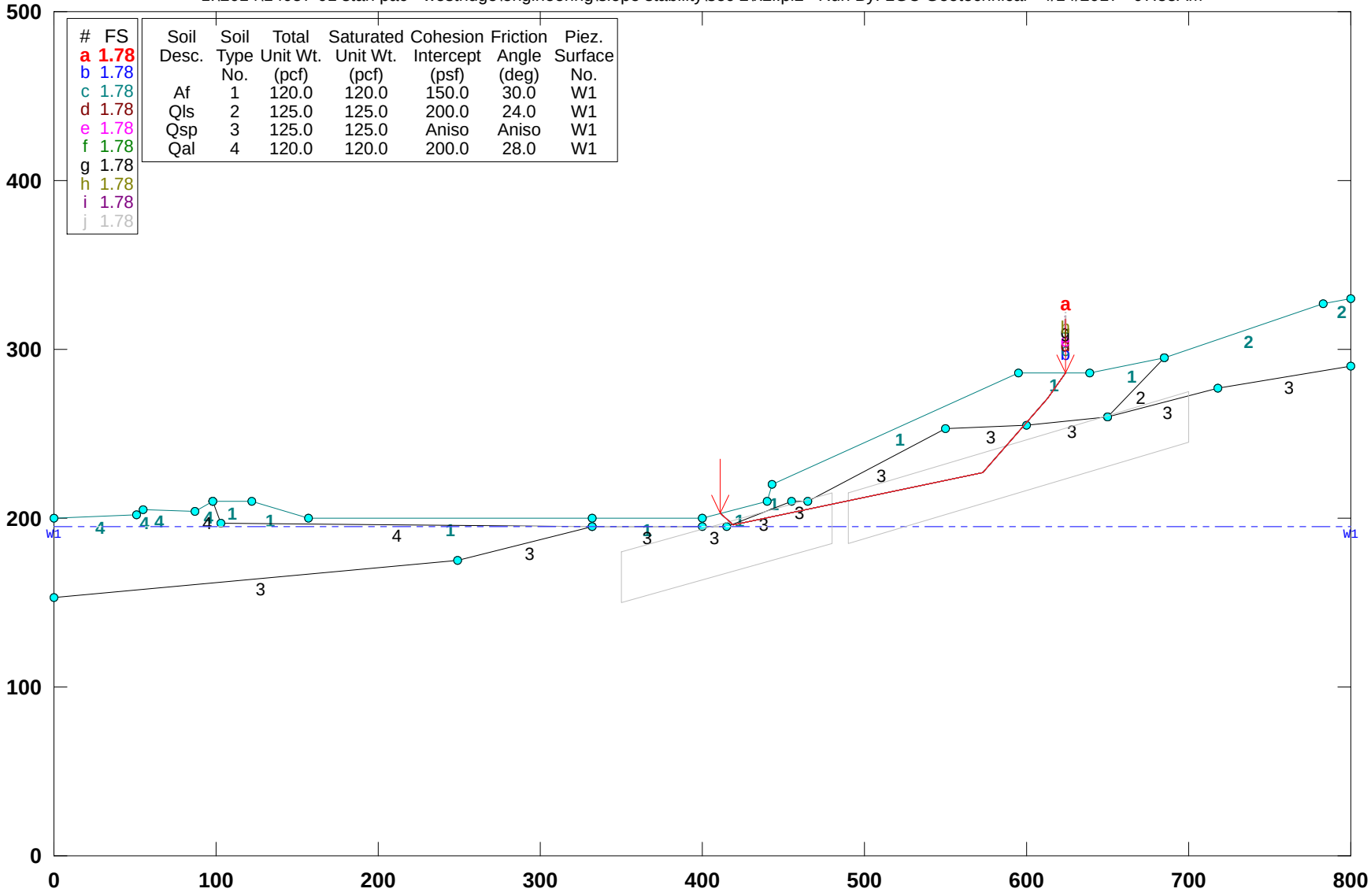
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) =  671393.12 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   2061.21(psf)
Sum of the Driving Forces =   459853.97 (lbs)
Average Mobilized Shear Stress =    1411.77(psf)
Total length of the failure surface =     325.73(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.3725(g)
Calculated Newmark Seismic Displacement =   0.002(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 2-2" / Lower Basin / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2l.pl2 Run By: LGC Geotechnical 4/14/2017 07:55AM




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

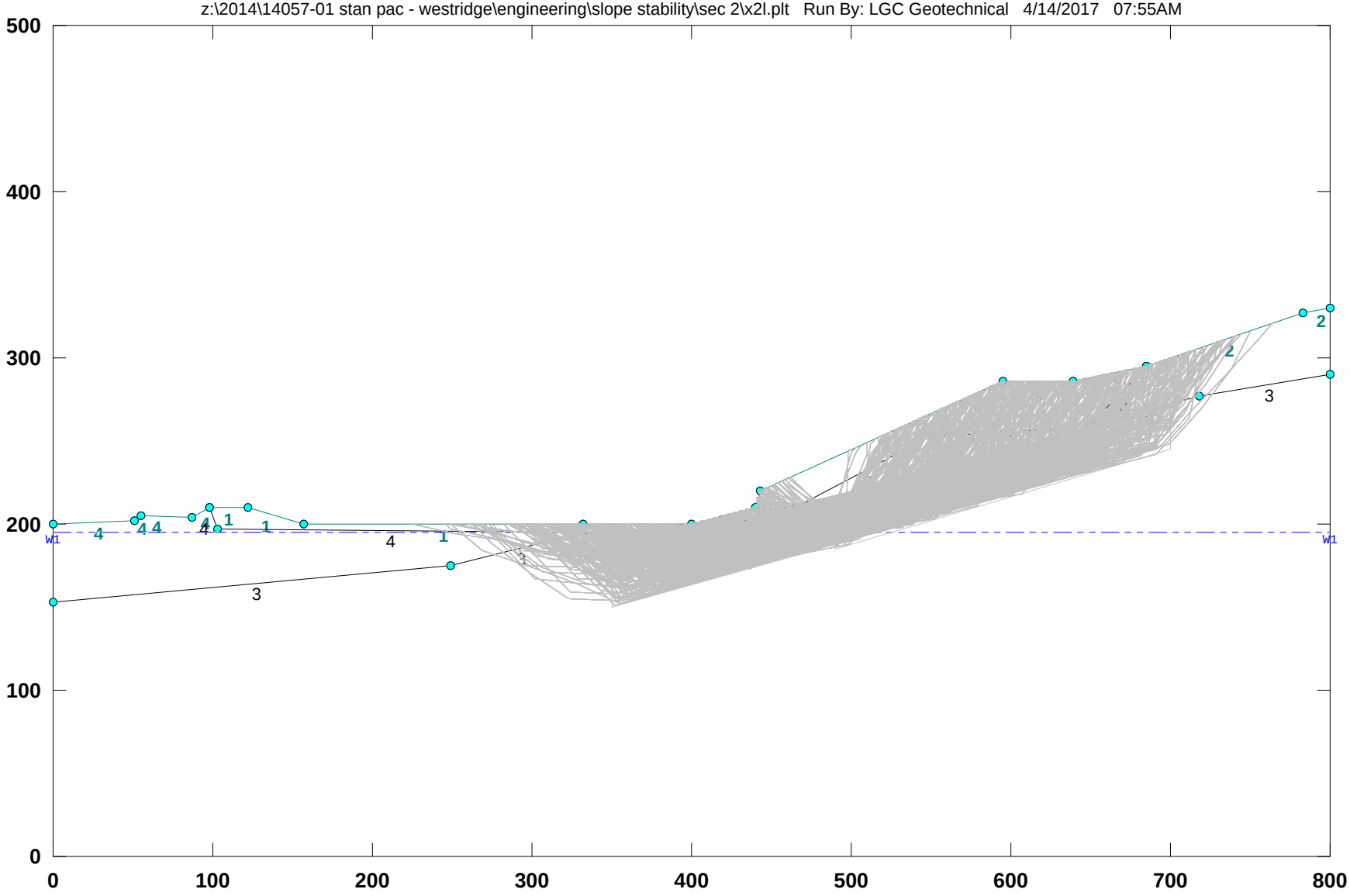
| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

**GSTABL7 v.2 FSmin=1.78**

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

# Westridge/14057-01/Sec 2-2" / Lower Basin / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2l.plt Run By: LGC Geotechnical 4/14/2017 07:55AM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/14/2017
Time of Run: 07:55AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2l.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2l.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2l.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 2-2" / Lower Basin / Static

BOUNDARY COORDINATES
15 Top Boundaries
29 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 51.00 | 202.00 | 4 |
| 2 | 51.00 | 202.00 | 55.00 | 205.00 | 4 |
| 3 | 55.00 | 205.00 | 87.00 | 204.00 | 4 |
| 4 | 87.00 | 204.00 | 98.00 | 210.00 | 4 |
| 5 | 98.00 | 210.00 | 122.00 | 210.00 | 1 |
| 6 | 122.00 | 210.00 | 157.00 | 200.00 | 1 |
| 7 | 157.00 | 200.00 | 332.00 | 200.00 | 1 |
| 8 | 332.00 | 200.00 | 400.00 | 200.00 | 1 |
| 9 | 400.00 | 200.00 | 440.00 | 210.00 | 1 |
| 10 | 440.00 | 210.00 | 442.50 | 220.00 | 1 |
| 11 | 442.50 | 220.00 | 595.00 | 286.00 | 1 |
| 12 | 595.00 | 286.00 | 639.00 | 286.00 | 1 |
| 13 | 639.00 | 286.00 | 685.00 | 295.00 | 1 |
| 14 | 685.00 | 295.00 | 783.00 | 327.00 | 2 |
| 15 | 783.00 | 327.00 | 800.00 | 330.00 | 2 |
| 16 | 98.00 | 210.00 | 103.00 | 197.00 | 4 |
| 17 | 103.00 | 197.00 | 332.00 | 195.00 | 4 |
| 18 | 332.00 | 195.00 | 400.00 | 195.00 | 3 |
| 19 | 400.00 | 195.00 | 415.00 | 195.00 | 3 |
| 20 | 415.00 | 195.00 | 455.00 | 210.00 | 3 |
| 21 | 455.00 | 210.00 | 465.00 | 210.00 | 3 |
| 22 | 465.00 | 210.00 | 550.00 | 253.00 | 3 |
| 23 | 550.00 | 253.00 | 600.00 | 255.00 | 3 |
| 24 | 600.00 | 255.00 | 650.00 | 260.00 | 3 |
| 25 | 650.00 | 260.00 | 685.00 | 295.00 | 2 |
| 26 | 0.00 | 153.00 | 249.00 | 175.00 | 3 |
| 27 | 249.00 | 175.00 | 332.00 | 195.00 | 3 |
| 28 | 650.00 | 260.00 | 718.00 | 277.00 | 3 |
| 29 | 718.00 | 277.00 | 800.00 | 290.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 800.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 350.00 | 165.00 | 480.00 | 200.00 | 30.00 |
| 2 | 490.00 | 200.00 | 700.00 | 260.00 | 30.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 9.441 FS Min = 1.775 FS Ave = 2.552
Standard Deviation = 0.575 Coefficient of Variation = 22.55 %
Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***
Individual data on the 13 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.4 | 3690.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 0.3 | 324.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 21.0 | 23348.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 2.5 | 4375.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 12.5 | 31239.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 10.0 | 28109.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 85.0 | 355745.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 22.6 | 129388.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 20.1 | 103993.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 2.3 | 9641.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 2.8 | 11151.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 15.3 | 41924.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 11.1 | 9785.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |



Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Factor of Safety
*** 1.775 ***

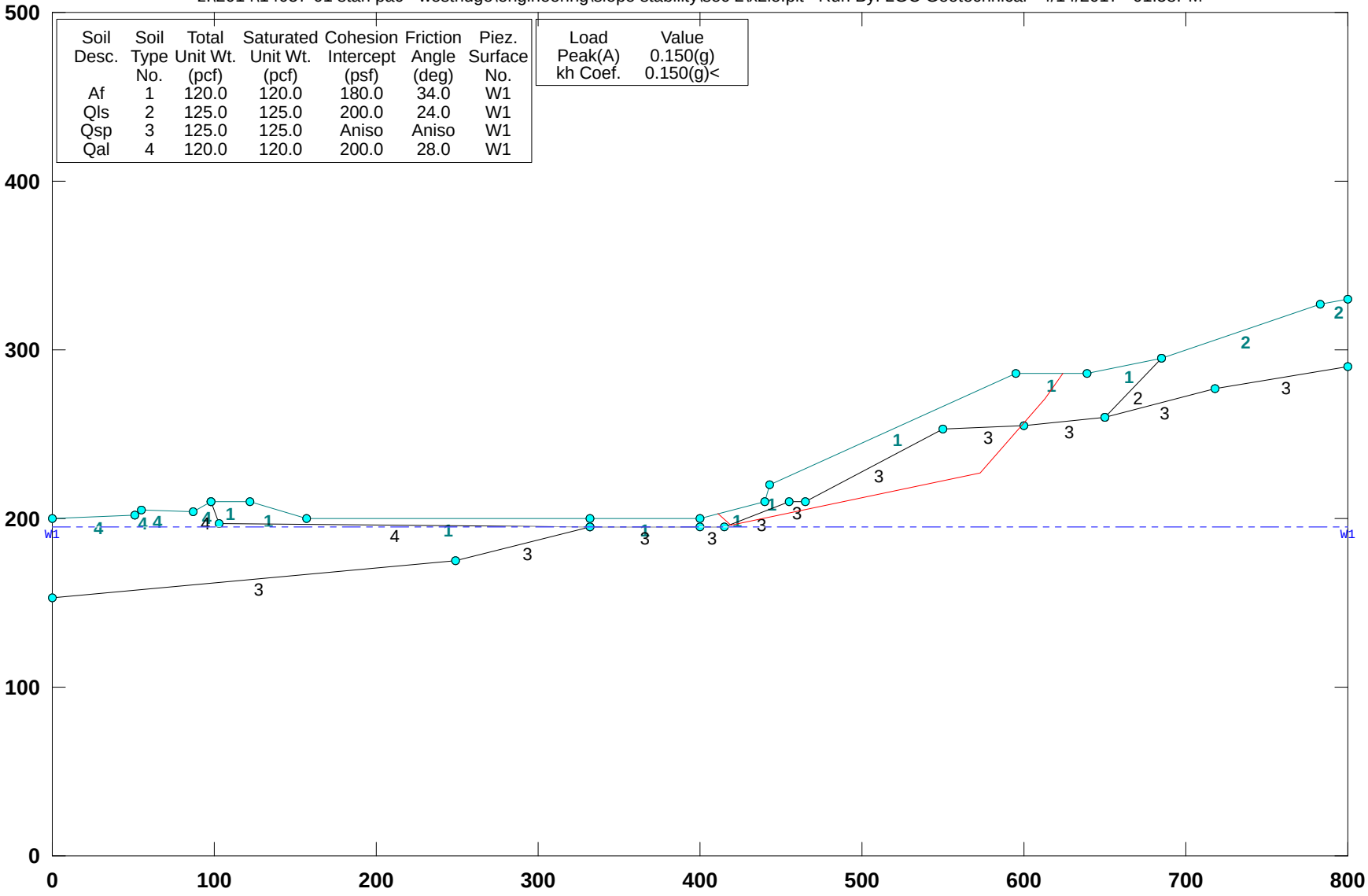
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 2-2" / Lower Basin / Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2le.plt Run By: LGC Geotechnical 4/14/2017 01:58PM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.29**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:  4/14/2017
Time of Run:  01:58PM
Run By:  LGC Geotechnical
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2le.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2le.OUT
Unit System:  English
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2le.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 2-2" / Lower Basin  / Seismic

BOUNDARY COORDINATES
15 Top Boundaries
29 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 51.00 | 202.00 | 4 |
| 2 | 51.00 | 202.00 | 55.00 | 205.00 | 4 |
| 3 | 55.00 | 205.00 | 87.00 | 204.00 | 4 |
| 4 | 87.00 | 204.00 | 98.00 | 210.00 | 4 |
| 5 | 98.00 | 210.00 | 122.00 | 210.00 | 1 |
| 6 | 122.00 | 210.00 | 157.00 | 200.00 | 1 |
| 7 | 157.00 | 200.00 | 332.00 | 200.00 | 1 |
| 8 | 332.00 | 200.00 | 400.00 | 200.00 | 1 |
| 9 | 400.00 | 200.00 | 440.00 | 210.00 | 1 |
| 10 | 440.00 | 210.00 | 442.50 | 220.00 | 1 |
| 11 | 442.50 | 220.00 | 595.00 | 286.00 | 1 |
| 12 | 595.00 | 286.00 | 639.00 | 286.00 | 1 |
| 13 | 639.00 | 286.00 | 685.00 | 295.00 | 1 |
| 14 | 685.00 | 295.00 | 783.00 | 327.00 | 2 |
| 15 | 783.00 | 327.00 | 800.00 | 330.00 | 2 |
| 16 | 98.00 | 210.00 | 103.00 | 197.00 | 4 |
| 17 | 103.00 | 197.00 | 332.00 | 195.00 | 4 |
| 18 | 332.00 | 195.00 | 400.00 | 195.00 | 3 |
| 19 | 400.00 | 195.00 | 415.00 | 195.00 | 3 |
| 20 | 415.00 | 195.00 | 455.00 | 210.00 | 3 |
| 21 | 455.00 | 210.00 | 465.00 | 210.00 | 3 |
| 22 | 465.00 | 210.00 | 550.00 | 253.00 | 3 |
| 23 | 550.00 | 253.00 | 600.00 | 255.00 | 3 |
| 24 | 600.00 | 255.00 | 650.00 | 260.00 | 3 |
| 25 | 650.00 | 260.00 | 685.00 | 295.00 | 2 |
| 26 | 0.00 | 153.00 | 249.00 | 175.00 | 3 |
| 27 | 249.00 | 175.00 | 332.00 | 195.00 | 3 |
| 28 | 650.00 | 260.00 | 718.00 | 277.00 | 3 |
| 29 | 718.00 | 277.00 | 800.00 | 290.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 800.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) =  0.150(g)
Specified Horizontal Earthquake Coefficient (kh) =  0.150(g)
Specified Vertical Earthquake Coefficient (kv) =  0.000(g)
Specified Seismic Pore-Pressure Factor =  0.000
Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
Trial Failure Surface Specified By  6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 411.225 | 202.806 |
| 2 | 418.959 | 196.089 |
| 3 | 572.582 | 227.138 |
| 4 | 592.708 | 249.386 |
| 5 | 613.126 | 271.365 |
| 6 | 624.270 | 286.000 |

Janbu's Empirical Coefficient (fo) =  1.061
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface =  1.293

***Table 1 - Individual Data on the  13 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.4 | 3690.8 | 0.0 | 0.0 | 0.0 | 0.0 | 553.6 | 0.0 | 0.0 |
| 2 | 0.3 | 323.8 | 0.0 | 0.0 | 0.0 | 0.0 | 48.6 | 0.0 | 0.0 |
| 3 | 21.0 | 23347.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3502.1 | 0.0 | 0.0 |
| 4 | 2.5 | 4374.8 | 0.0 | 0.0 | 0.0 | 0.0 | 656.2 | 0.0 | 0.0 |
| 5 | 12.5 | 31238.9 | 0.0 | 0.0 | 0.0 | 0.0 | 4685.8 | 0.0 | 0.0 |
| 6 | 10.0 | 28108.7 | 0.0 | 0.0 | 0.0 | 0.0 | 4216.3 | 0.0 | 0.0 |
| 7 | 85.0 | 355743.5 | 0.0 | 0.0 | 0.0 | 0.0 | 53361.5 | 0.0 | 0.0 |
| 8 | 22.6 | 129386.2 | 0.0 | 0.0 | 0.0 | 0.0 | 19407.9 | 0.0 | 0.0 |
| 9 | 20.1 | 103993.5 | 0.0 | 0.0 | 0.0 | 0.0 | 15599.0 | 0.0 | 0.0 |
| 10 | 2.3 | 9642.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1446.3 | 0.0 | 0.0 |
| 11 | 2.8 | 11148.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1672.3 | 0.0 | 0.0 |
| 12 | 15.3 | 41925.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6288.8 | 0.0 | 0.0 |
| 13 | 11.1 | 9785.6 | 0.0 | 0.0 | 0.0 | 0.0 | 1467.8 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the  13 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -40.98 | 414.93 | 9.82 | 1248.98 | -269.99 |
| 2 | -40.98 | 418.80 | 0.42 | 2873.51 | -552.10 |
| 3 | 11.43 | 429.48 | 21.47 | 723.25 | 382.97 |
| 4 | 11.43 | 441.25 | 2.55 | 1031.55 | 603.96 |
| 5 | 11.43 | 448.75 | 12.75 | 1392.26 | 862.52 |

| | | | | | |
|---|---|---|---|---|---|
| 6 | 11.43 | 460.00 | 10.20 | 1542.36 | 970.12 |
| 7 | 11.43 | 507.50 | 86.72 | 2204.08 | 1444.46 |
| 8 | 11.43 | 561.29 | 23.04 | 2947.67 | 1977.48 |
| 9 | 47.87 | 582.65 | 30.00 | 3767.74 | 4351.84 |
| 10 | 47.11 | 593.85 | 3.37 | 3140.23 | 3511.57 |
| 11 | 47.11 | 596.42 | 4.18 | 2959.07 | 3273.30 |
| 12 | 47.11 | 605.48 | 22.45 | 1910.34 | 2289.91 |
| 13 | 52.71 | 618.70 | 18.39 | 756.49 | 778.41 |

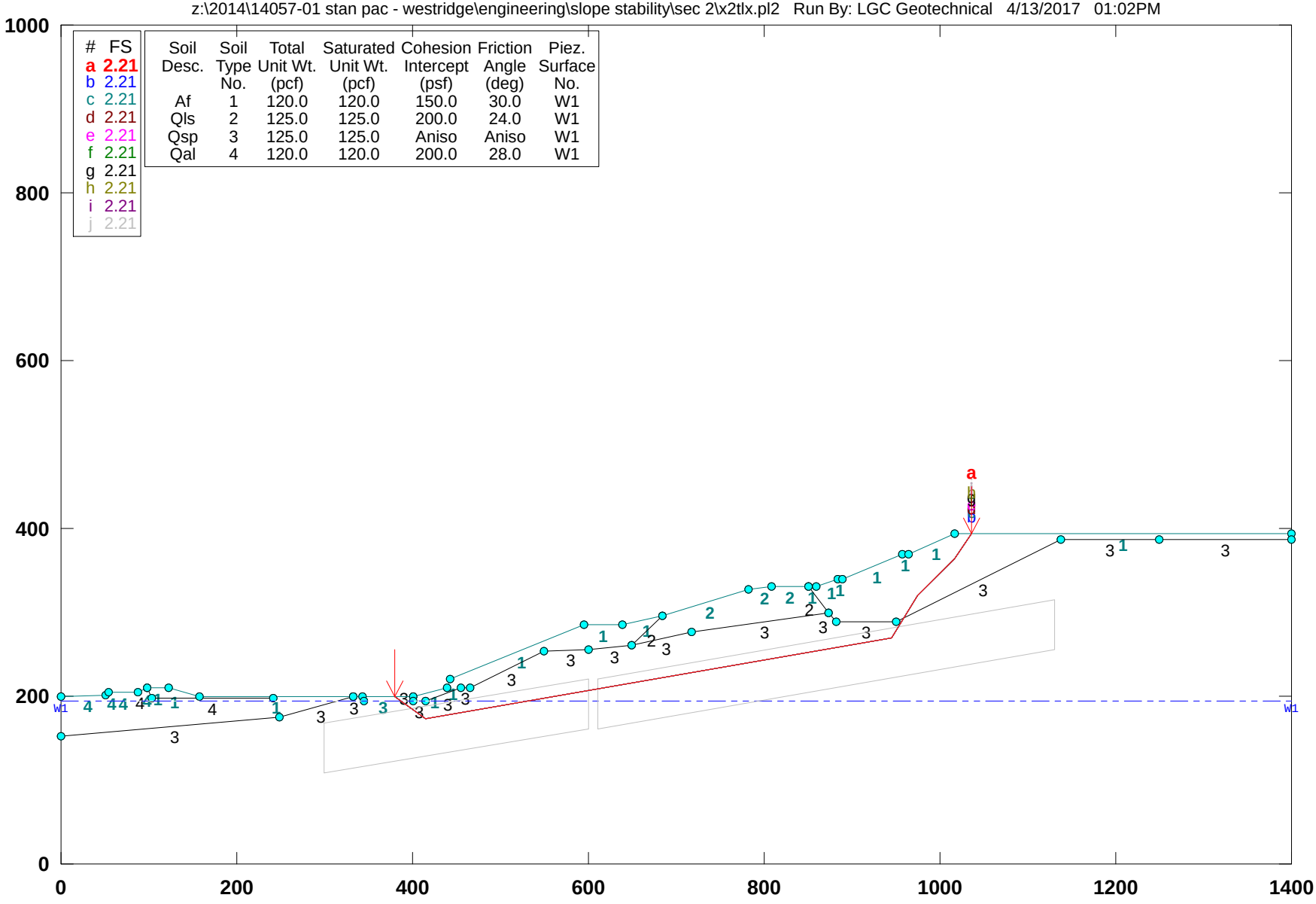
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) =  512090.12 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   2087.03(psf)
Sum of the Driving Forces =   420387.81 (lbs)
Average Mobilized Shear Stress =    1713.29(psf)
Total length of the failure surface =     245.37(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.2851(g)
Calculated Newmark Seismic Displacement =   0.004(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 2-2" / Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2tlx.pl2  Run By: LGC Geotechnical  4/13/2017  01:02PM

| # | FS |
|---|---|
| a | 2.21 |
| b | 2.21 |
| c | 2.21 |
| d | 2.21 |
| e | 2.21 |
| f | 2.21 |
| g | 2.21 |
| h | 2.21 |
| i | 2.21 |
| j | 2.21 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

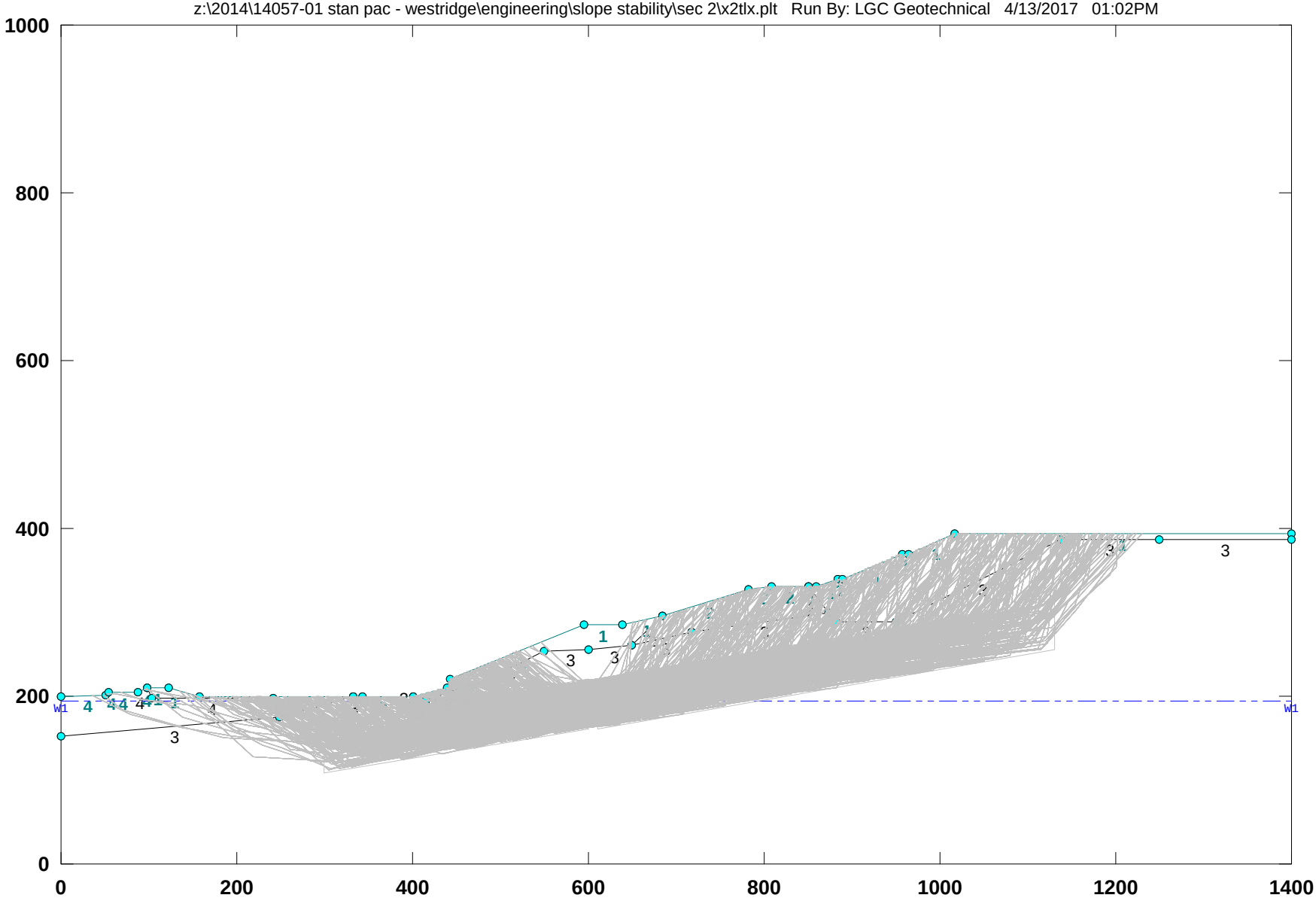



**GSTABL7 v.2  FSmin=2.21**

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

# Westridge/14057-01/Sec 2-2" / Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2tlx.plt  Run By: LGC Geotechnical  4/13/2017  01:02PM


1000
800
600
400
200
0
0
200
400
600
800
1000
1200
1400
W1
W1
1
3
3
3
3
4
4
4
4
4
1
1
1

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/13/2017
Time of Run: 01:02PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2tlx.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2tlx.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2tlx.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 2-2" / Entire
Length / Static
BOUNDARY COORDINATES
23 Top Boundaries
44 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 51.00 | 202.00 | 4 |
| 2 | 51.00 | 202.00 | 55.00 | 205.00 | 4 |
| 3 | 55.00 | 205.00 | 87.00 | 204.00 | 4 |
| 4 | 87.00 | 204.00 | 98.00 | 210.00 | 4 |
| 5 | 98.00 | 210.00 | 122.00 | 210.00 | 1 |
| 6 | 122.00 | 210.00 | 157.00 | 200.00 | 1 |
| 7 | 157.00 | 200.00 | 332.00 | 200.00 | 1 |
| 8 | 332.00 | 200.00 | 400.00 | 200.00 | 3 |
| 9 | 400.00 | 200.00 | 440.00 | 210.00 | 1 |
| 10 | 440.00 | 210.00 | 442.50 | 220.00 | 1 |
| 11 | 442.50 | 220.00 | 595.00 | 286.00 | 1 |
| 12 | 595.00 | 286.00 | 639.00 | 286.00 | 1 |
| 13 | 639.00 | 286.00 | 685.00 | 295.00 | 1 |
| 14 | 685.00 | 295.00 | 783.00 | 327.00 | 2 |
| 15 | 783.00 | 327.00 | 809.00 | 331.00 | 2 |
| 16 | 809.00 | 331.00 | 850.00 | 330.00 | 2 |
| 17 | 850.00 | 330.00 | 860.00 | 330.00 | 1 |
| 18 | 860.00 | 330.00 | 883.00 | 339.00 | 1 |
| 19 | 883.00 | 339.00 | 889.00 | 339.00 | 1 |
| 20 | 889.00 | 339.00 | 957.00 | 370.00 | 1 |
| 21 | 957.00 | 370.00 | 965.00 | 370.00 | 1 |
| 22 | 965.00 | 370.00 | 1017.00 | 394.00 | 1 |
| 23 | 1017.00 | 394.00 | 1400.00 | 394.00 | 1 |
| 24 | 98.00 | 210.00 | 103.00 | 197.00 | 4 |
| 25 | 103.00 | 197.00 | 241.00 | 198.00 | 4 |
| 26 | 343.00 | 200.00 | 345.00 | 194.00 | 3 |
| 27 | 400.00 | 200.00 | 400.10 | 195.00 | 3 |
| 28 | 400.10 | 195.00 | 415.00 | 195.00 | 3 |
| 29 | 415.00 | 195.00 | 455.00 | 210.00 | 3 |
| 30 | 455.00 | 210.00 | 465.00 | 210.00 | 3 |
| 31 | 465.00 | 210.00 | 550.00 | 253.00 | 3 |
| 32 | 550.00 | 253.00 | 600.00 | 255.00 | 3 |
| 33 | 600.00 | 255.00 | 650.00 | 260.00 | 3 |
| 34 | 650.00 | 260.00 | 685.00 | 295.00 | 2 |
| 35 | 0.00 | 153.00 | 249.00 | 175.00 | 3 |
| 36 | 249.00 | 175.00 | 332.00 | 200.00 | 3 |
| 37 | 850.00 | 330.00 | 874.00 | 300.00 | 2 |
| 38 | 874.00 | 300.00 | 882.00 | 289.00 | 3 |
| 39 | 882.00 | 289.00 | 951.00 | 289.00 | 3 |
| 40 | 951.00 | 289.00 | 1138.00 | 386.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 1138.00 | 386.00 | 1250.00 | 386.00 | 3 |
| 42 | 1250.00 | 386.00 | 1400.00 | 386.00 | 3 |
| 43 | 650.00 | 260.00 | 718.00 | 277.00 | 3 |
| 44 | 718.00 | 277.00 | 874.00 | 300.00 | 3 |

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1400.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 60.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 300.00 | 138.00 | 600.00 | 191.00 | 60.00 |
| 2 | 610.00 | 191.00 | 1130.00 | 285.00 | 60.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 8.816 FS Min = 2.208 FS Ave = 3.058
Standard Deviation = 0.804 Coefficient of Variation = 26.30 %
Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |

6 1035.971 394.000

Factor of Safety

*** 2.208 ***

Individual data on the 34 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.7 | 2096.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 13.8 | 17453.6 | 0.0 | 5504.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 0.1 | 190.2 | 0.0 | 80.2 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 14.9 | 41917.7 | 0.0 | 18429.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 0.1 | 442.6 | 0.0 | 198.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 24.9 | 96068.9 | 0.0 | 30428.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 2.5 | 11376.6 | 0.0 | 2665.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 12.5 | 66498.1 | 0.0 | 12250.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 10.0 | 56616.7 | 0.0 | 8511.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 69.3 | 478777.0 | 0.0 | 27492.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 15.7 | 130072.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 45.0 | 413198.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 5.0 | 48954.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 39.0 | 362861.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 11.0 | 97690.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 35.0 | 314705.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 33.0 | 310044.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 65.0 | 668738.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 26.0 | 281758.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 41.0 | 420969.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 10.0 | 95977.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 22 | 14.0 | 134124.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 23 | 8.0 | 78216.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 24 | 1.0 | 9859.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 25 | 6.0 | 58821.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 26 | 55.4 | 588217.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 27 | 6.6 | 72950.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 28 | 6.0 | 60023.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 29 | 1.3 | 12305.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 30 | 6.7 | 57434.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 31 | 9.8 | 70440.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 32 | 42.2 | 213093.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 33 | 0.0 | 35.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 34 | 19.0 | 34705.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Factor of Safety

*** 2.208 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Factor of Safety

*** 2.208 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |



| | | |
|---|---|---|
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Factor of Safety

*** 2.208 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Factor of Safety

*** 2.208 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Factor of Safety

*** 2.208 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Factor of Safety

*** 2.208 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Factor of Safety

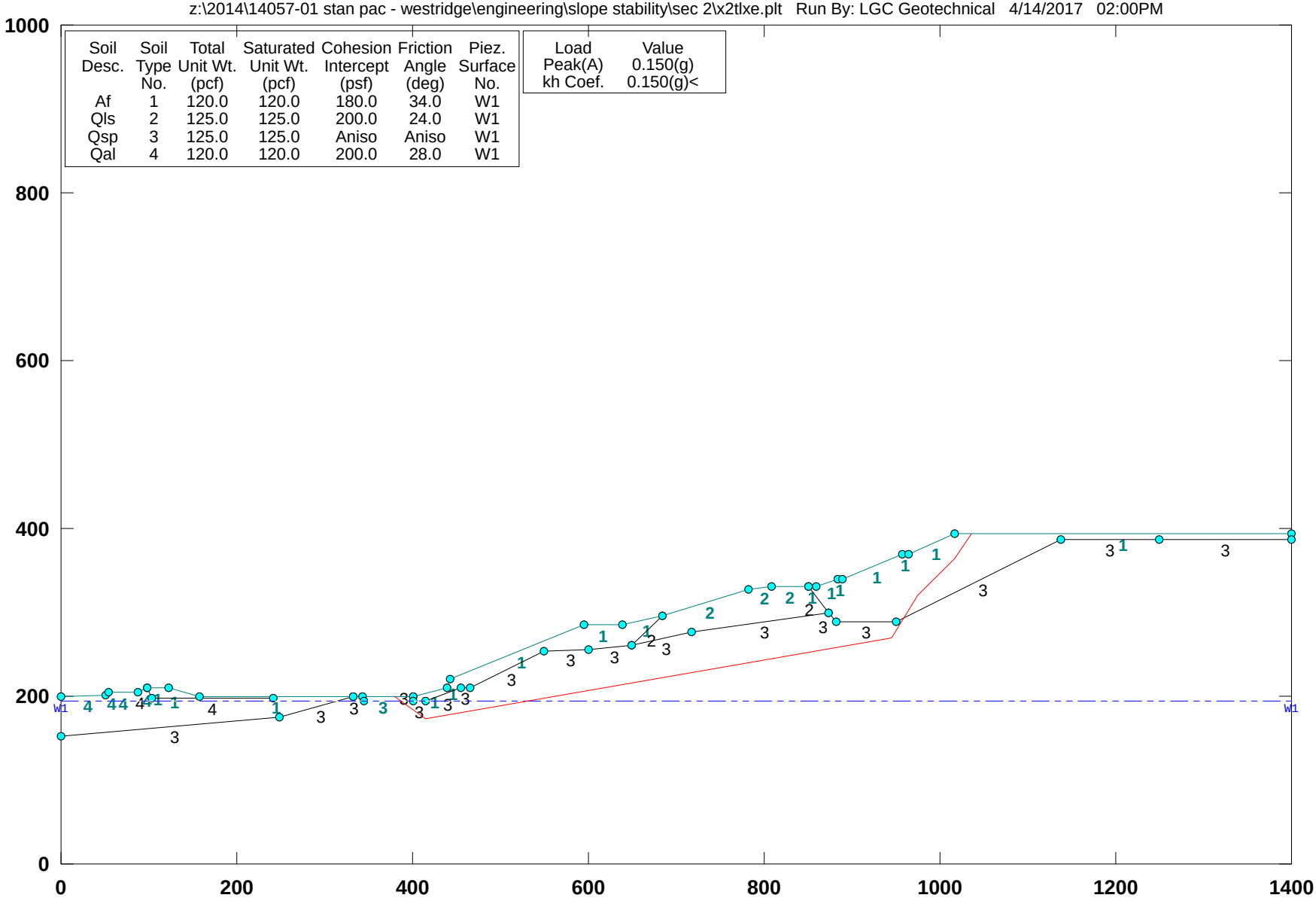
```
            ***    2.208   ***
                **** END OF GSTABL7 OUTPUT ****
```

# Westridge/14057-01/Sec 2-2" / Entire Length / Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2tlxe.plt Run By: LGC Geotechnical 4/14/2017 02:00PM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.43**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/14/2017
Time of Run: 02:00PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2tlxe.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2tlxe.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2tlxe.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 2-2" / Entire Length / Seismic

BOUNDARY COORDINATES
23 Top Boundaries
44 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 51.00 | 202.00 | 4 |
| 2 | 51.00 | 202.00 | 55.00 | 205.00 | 4 |
| 3 | 55.00 | 205.00 | 87.00 | 204.00 | 4 |
| 4 | 87.00 | 204.00 | 98.00 | 210.00 | 4 |
| 5 | 98.00 | 210.00 | 122.00 | 210.00 | 1 |
| 6 | 122.00 | 210.00 | 157.00 | 200.00 | 1 |
| 7 | 157.00 | 200.00 | 332.00 | 200.00 | 1 |
| 8 | 332.00 | 200.00 | 400.00 | 200.00 | 3 |
| 9 | 400.00 | 200.00 | 440.00 | 210.00 | 1 |
| 10 | 440.00 | 210.00 | 442.50 | 220.00 | 1 |
| 11 | 442.50 | 220.00 | 595.00 | 286.00 | 1 |
| 12 | 595.00 | 286.00 | 639.00 | 286.00 | 1 |
| 13 | 639.00 | 286.00 | 685.00 | 295.00 | 1 |
| 14 | 685.00 | 295.00 | 783.00 | 327.00 | 2 |
| 15 | 783.00 | 327.00 | 809.00 | 331.00 | 2 |
| 16 | 809.00 | 331.00 | 850.00 | 330.00 | 2 |
| 17 | 850.00 | 330.00 | 860.00 | 330.00 | 1 |
| 18 | 860.00 | 330.00 | 883.00 | 339.00 | 1 |
| 19 | 883.00 | 339.00 | 889.00 | 339.00 | 1 |
| 20 | 889.00 | 339.00 | 957.00 | 370.00 | 1 |
| 21 | 957.00 | 370.00 | 965.00 | 370.00 | 1 |
| 22 | 965.00 | 370.00 | 1017.00 | 394.00 | 1 |
| 23 | 1017.00 | 394.00 | 1400.00 | 394.00 | 1 |
| 24 | 98.00 | 210.00 | 103.00 | 197.00 | 4 |
| 25 | 103.00 | 197.00 | 241.00 | 198.00 | 4 |
| 26 | 343.00 | 200.00 | 345.00 | 194.00 | 3 |
| 27 | 400.00 | 200.00 | 400.10 | 195.00 | 3 |
| 28 | 400.10 | 195.00 | 415.00 | 195.00 | 3 |
| 29 | 415.00 | 195.00 | 455.00 | 210.00 | 3 |
| 30 | 455.00 | 210.00 | 465.00 | 210.00 | 3 |
| 31 | 465.00 | 210.00 | 550.00 | 253.00 | 3 |
| 32 | 550.00 | 253.00 | 600.00 | 255.00 | 3 |
| 33 | 600.00 | 255.00 | 650.00 | 260.00 | 3 |
| 34 | 650.00 | 260.00 | 685.00 | 295.00 | 2 |
| 35 | 0.00 | 153.00 | 249.00 | 175.00 | 3 |
| 36 | 249.00 | 175.00 | 332.00 | 200.00 | 3 |
| 37 | 850.00 | 330.00 | 874.00 | 300.00 | 2 |
| 38 | 874.00 | 300.00 | 882.00 | 289.00 | 3 |
| 39 | 882.00 | 289.00 | 951.00 | 289.00 | 3 |
| 40 | 951.00 | 289.00 | 1138.00 | 386.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 1138.00 | 386.00 | 1250.00 | 386.00 | 3 |
| 42 | 1250.00 | 386.00 | 1400.00 | 386.00 | 3 |
| 43 | 650.00 | 260.00 | 718.00 | 277.00 | 3 |
| 44 | 718.00 | 277.00 | 874.00 | 300.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1400.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 379.512 | 200.000 |
| 2 | 415.118 | 173.466 |
| 3 | 944.363 | 269.120 |
| 4 | 974.819 | 320.815 |
| 5 | 1016.990 | 363.495 |
| 6 | 1035.971 | 394.000 |

Janbu's Empirical Coefficient (fo) = 1.055
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 1.431

***Table 1 - Individual Data on the 34 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.7 | 2096.7 | 0.0 | 0.0 | 0.0 | 0.0 | 314.5 | 0.0 | 0.0 |
| 2 | 13.8 | 17453.8 | 0.0 | 5504.9 | 0.0 | 0.0 | 2618.1 | 0.0 | 0.0 |
| 3 | 0.1 | 190.2 | 0.0 | 80.2 | 0.0 | 0.0 | 28.5 | 0.0 | 0.0 |
| 4 | 14.9 | 41917.8 | 0.0 | 18429.9 | 0.0 | 0.0 | 6287.7 | 0.0 | 0.0 |
| 5 | 0.1 | 441.1 | 0.0 | 197.4 | 0.0 | 0.0 | 66.2 | 0.0 | 0.0 |
| 6 | 24.9 | 96069.4 | 0.0 | 30428.4 | 0.0 | 0.0 | 14410.4 | 0.0 | 0.0 |
| 7 | 2.5 | 11376.5 | 0.0 | 2665.0 | 0.0 | 0.0 | 1706.5 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 12.5 | 66497.6 | 0.0 | 12250.6 | 0.0 | 0.0 | 9974.6 | 0.0 | 0.0 |
| 9 | 10.0 | 56616.3 | 0.0 | 8511.1 | 0.0 | 0.0 | 8492.4 | 0.0 | 0.0 |
| 10 | 69.3 | 478758.9 | 0.0 | 27491.1 | 0.0 | 0.0 | 71813.8 | 0.0 | 0.0 |
| 11 | 15.7 | 130086.4 | 0.0 | 0.0 | 0.0 | 0.0 | 19513.0 | 0.0 | 0.0 |
| 12 | 45.0 | 413196.3 | 0.0 | 0.0 | 0.0 | 0.0 | 61979.4 | 0.0 | 0.0 |
| 13 | 5.0 | 48954.3 | 0.0 | 0.0 | 0.0 | 0.0 | 7343.1 | 0.0 | 0.0 |
| 14 | 39.0 | 362859.3 | 0.0 | 0.0 | 0.0 | 0.0 | 54428.9 | 0.0 | 0.0 |
| 15 | 11.0 | 97690.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14653.5 | 0.0 | 0.0 |
| 16 | 35.0 | 314704.0 | 0.0 | 0.0 | 0.0 | 0.0 | 47205.6 | 0.0 | 0.0 |
| 17 | 33.0 | 310043.3 | 0.0 | 0.0 | 0.0 | 0.0 | 46506.5 | 0.0 | 0.0 |
| 18 | 65.0 | 668735.6 | 0.0 | 0.0 | 0.0 | 0.0 | ******* | 0.0 | 0.0 |
| 19 | 26.0 | 281757.6 | 0.0 | 0.0 | 0.0 | 0.0 | 42263.6 | 0.0 | 0.0 |
| 20 | 41.0 | 420967.3 | 0.0 | 0.0 | 0.0 | 0.0 | 63145.1 | 0.0 | 0.0 |
| 21 | 10.0 | 95976.5 | 0.0 | 0.0 | 0.0 | 0.0 | 14396.5 | 0.0 | 0.0 |
| 22 | 14.0 | 134123.3 | 0.0 | 0.0 | 0.0 | 0.0 | 20118.5 | 0.0 | 0.0 |
| 23 | 8.0 | 78216.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11732.4 | 0.0 | 0.0 |
| 24 | 1.0 | 9859.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1478.9 | 0.0 | 0.0 |
| 25 | 6.0 | 58821.3 | 0.0 | 0.0 | 0.0 | 0.0 | 8823.2 | 0.0 | 0.0 |
| 26 | 55.4 | 588216.3 | 0.0 | 0.0 | 0.0 | 0.0 | 88232.5 | 0.0 | 0.0 |
| 27 | 6.6 | 72948.4 | 0.0 | 0.0 | 0.0 | 0.0 | 10942.3 | 0.0 | 0.0 |
| 28 | 6.0 | 60023.8 | 0.0 | 0.0 | 0.0 | 0.0 | 9003.6 | 0.0 | 0.0 |
| 29 | 1.3 | 12306.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1845.9 | 0.0 | 0.0 |
| 30 | 6.7 | 57434.3 | 0.0 | 0.0 | 0.0 | 0.0 | 8615.2 | 0.0 | 0.0 |
| 31 | 9.8 | 70442.2 | 0.0 | 0.0 | 0.0 | 0.0 | 10566.3 | 0.0 | 0.0 |
| 32 | 42.2 | 213091.9 | 0.0 | 0.0 | 0.0 | 0.0 | 31963.8 | 0.0 | 0.0 |
| 33 | 0.0 | 36.4 | 0.0 | 0.0 | 0.0 | 0.0 | 5.5 | 0.0 | 0.0 |
| 34 | 19.0 | 34704.3 | 0.0 | 0.0 | 0.0 | 0.0 | 5205.6 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 34 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -36.69 | 382.87 | 8.37 | 1366.21 | -149.14 |
| 2 | -36.69 | 393.11 | 17.18 | 2188.04 | -604.57 |
| 3 | -36.69 | 400.05 | 0.12 | 2593.48 | -907.83 |
| 4 | -36.69 | 407.55 | 18.58 | 3322.59 | -1342.68 |
| 5 | -36.69 | 415.06 | 0.15 | 4068.95 | -1784.08 |
| 6 | 10.24 | 427.56 | 25.29 | 1483.82 | 1256.62 |
| 7 | 10.24 | 441.25 | 2.54 | 1894.41 | 1481.05 |
| 8 | 10.24 | 448.75 | 12.70 | 2309.77 | 1731.40 |
| 9 | 10.24 | 460.00 | 10.16 | 2537.78 | 1842.65 |
| 10 | 10.24 | 499.63 | 70.39 | 3363.56 | 2249.64 |
| 11 | 10.24 | 542.13 | 15.99 | 4212.54 | 2690.50 |
| 12 | 10.24 | 572.50 | 45.73 | 4657.90 | 2988.45 |
| 13 | 10.24 | 597.50 | 5.08 | 4954.03 | 3186.57 |
| 14 | 10.24 | 619.50 | 39.63 | 4717.22 | 3028.14 |
| 15 | 10.24 | 644.50 | 11.18 | 4511.36 | 2890.41 |
| 16 | 10.24 | 667.50 | 35.57 | 4565.18 | 2926.42 |
| 17 | 10.24 | 701.50 | 33.53 | 4761.57 | 3057.81 |
| 18 | 10.24 | 750.50 | 66.05 | 5196.00 | 3348.45 |
| 19 | 10.24 | 796.00 | 26.42 | 5462.88 | 3526.99 |
| 20 | 10.24 | 829.50 | 41.66 | 5185.90 | 3341.70 |
| 21 | 10.24 | 855.00 | 10.16 | 4860.04 | 3123.69 |
| 22 | 10.24 | 867.00 | 14.23 | 4851.57 | 3118.02 |
| 23 | 10.24 | 878.00 | 8.13 | 4947.29 | 3182.06 |
| 24 | 10.24 | 882.50 | 1.02 | 4987.25 | 3208.79 |
| 25 | 10.24 | 886.00 | 6.10 | 4960.20 | 3190.70 |
| 26 | 10.24 | 916.68 | 56.26 | 5359.69 | 3457.96 |
| 27 | 59.50 | 947.68 | 13.08 | 8661.87 | 10306.72 |
| 28 | 59.50 | 954.00 | 11.82 | 7933.06 | 9381.03 |
| 29 | 59.50 | 957.65 | 2.58 | 7488.79 | 8816.74 |
| 30 | 59.50 | 961.65 | 13.18 | 6534.18 | 8049.12 |
| 31 | 59.50 | 969.91 | 19.34 | 5493.55 | 6727.37 |
| 32 | 45.34 | 995.90 | 60.00 | 3456.76 | 4127.13 |
| 33 | 58.11 | 1016.99 | 0.02 | 2852.50 | 3397.00 |
| 34 | 58.11 | 1026.49 | 35.91 | 1522.94 | 1698.18 |

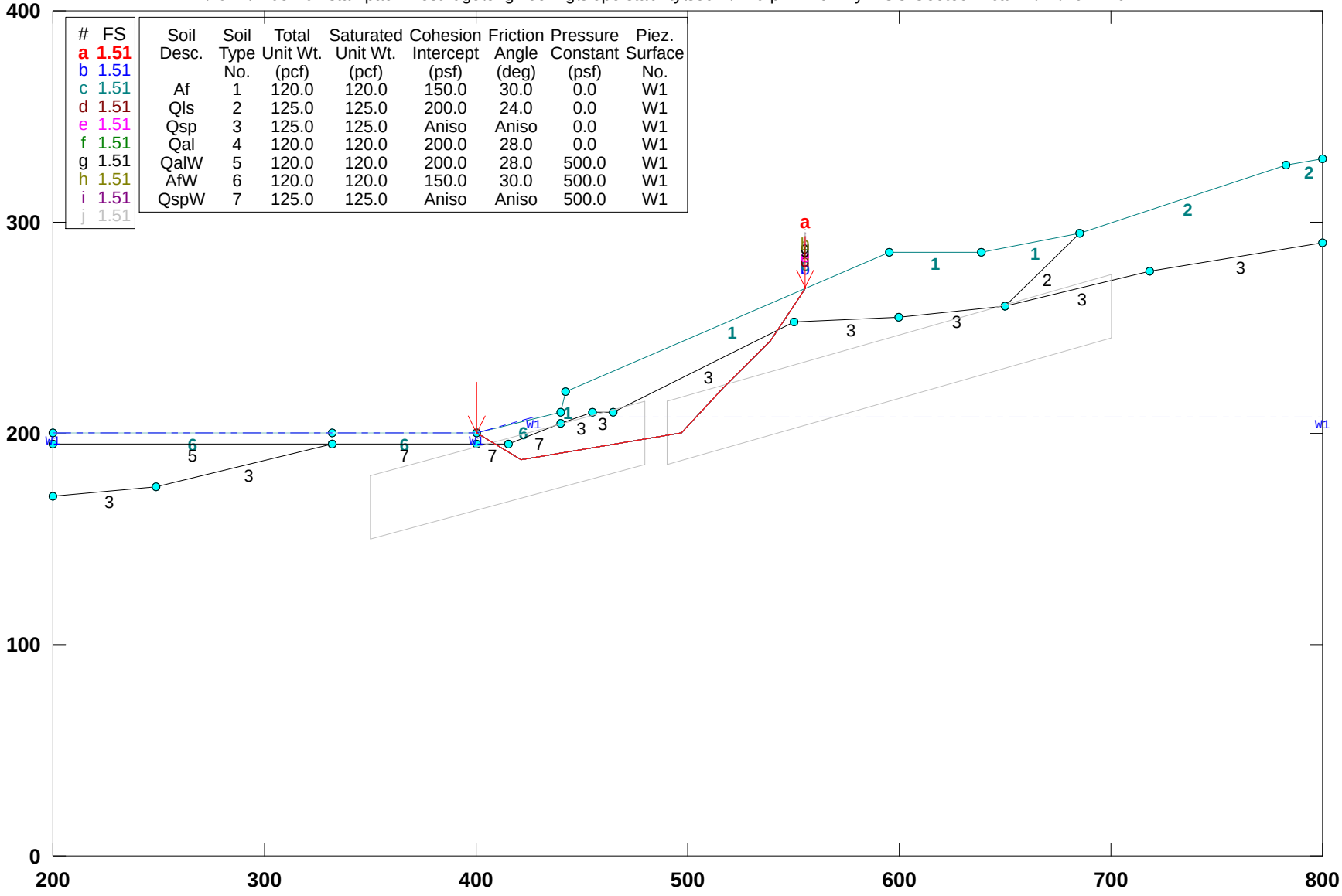
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 3171734.25 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 4296.85(psf)
Sum of the Driving Forces = 2338569.75 (lbs)



Average Mobilized Shear Stress = 3168.14(psf)
Total length of the failure surface = 738.15(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3150(g)
Calculated Newmark Seismic Displacement = 0.003(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 2-2" / Lower Basin / Rapid Drawdown

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2rd.pl2 Run By: LGC Geotechnical 4/14/2017 01:24PM

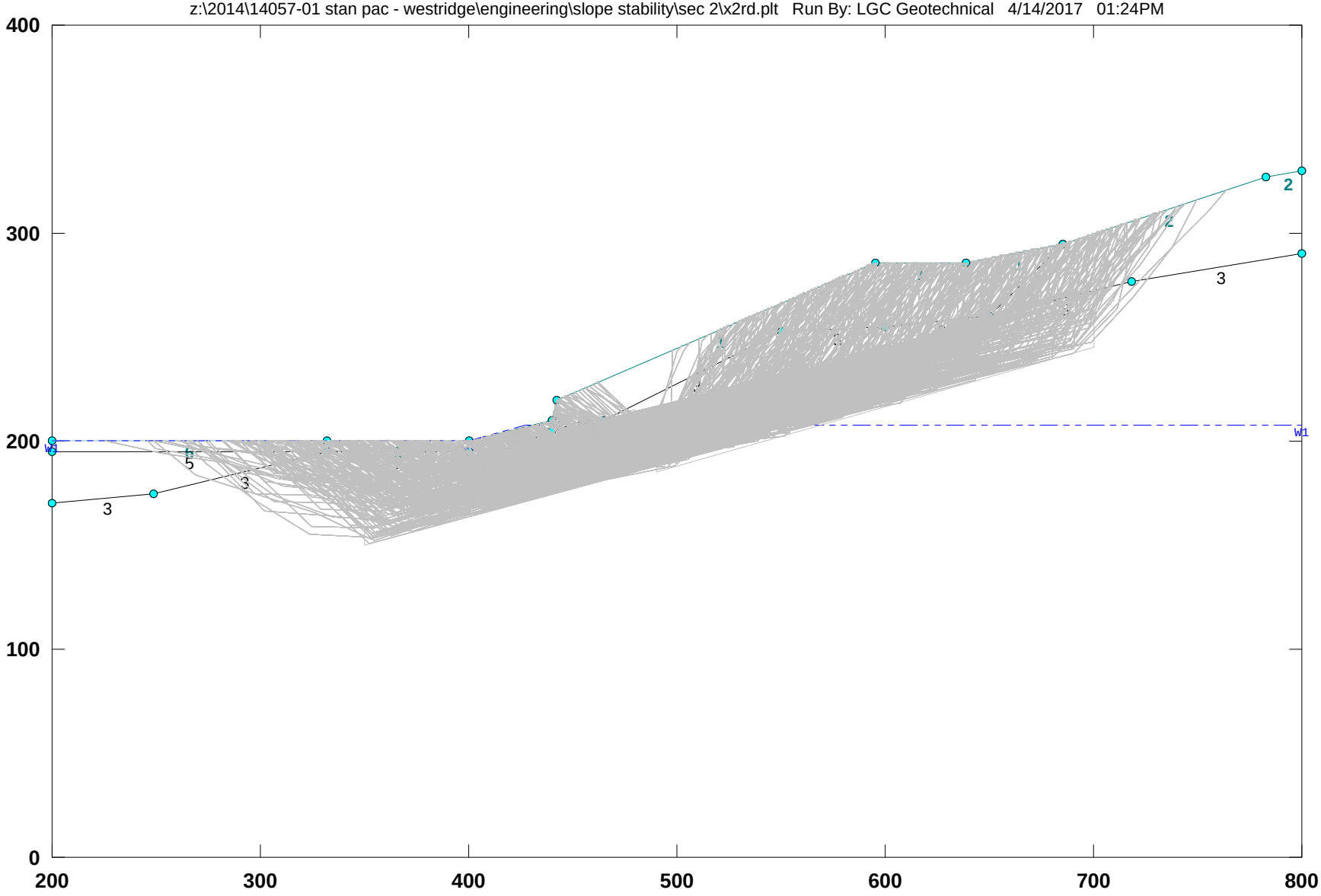



| # | FS |
|---|---|
| a | 1.51 |
| b | 1.51 |
| c | 1.51 |
| d | 1.51 |
| e | 1.51 |
| f | 1.51 |
| g | 1.51 |
| h | 1.51 |
| i | 1.51 |
| j | 1.51 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.0 | W1 |
| QalW | 5 | 120.0 | 120.0 | 200.0 | 28.0 | 500.0 | W1 |
| AfW | 6 | 120.0 | 120.0 | 150.0 | 30.0 | 500.0 | W1 |
| QspW | 7 | 125.0 | 125.0 | Aniso | Aniso | 500.0 | W1 |

**GSTABL7 v.2 FSmin=1.51**

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


Westridge/14057-01/Sec 2-2" / Lower Basin / Rapid Drawdown
z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2rd.plt Run By: LGC Geotechnical 4/14/2017 01:24PM
400
300
200
100
0
200
300
400
500
600
700
800
2
2
3
3
5
5
3
3
W1
W2

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:  4/14/2017
Time of Run:  01:24PM
Run By:  LGC Geotechnical
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2rd.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2rd.OUT
Unit System:  English
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2rd.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 2-2" / Lower Basin  / Rapid Drawdown

BOUNDARY COORDINATES
9 Top  Boundaries
23 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 200.00 | 200.00 | 332.00 | 200.00 | 6 |
| 2 | 332.00 | 200.00 | 400.00 | 200.00 | 6 |
| 3 | 400.00 | 200.00 | 440.00 | 210.00 | 6 |
| 4 | 440.00 | 210.00 | 442.50 | 220.00 | 1 |
| 5 | 442.50 | 220.00 | 595.00 | 286.00 | 1 |
| 6 | 595.00 | 286.00 | 639.00 | 286.00 | 1 |
| 7 | 639.00 | 286.00 | 685.00 | 295.00 | 1 |
| 8 | 685.00 | 295.00 | 783.00 | 327.00 | 2 |
| 9 | 783.00 | 327.00 | 800.00 | 330.00 | 2 |
| 10 | 200.00 | 195.00 | 332.00 | 195.00 | 5 |
| 11 | 332.00 | 195.00 | 400.00 | 195.00 | 7 |
| 12 | 400.00 | 195.00 | 415.00 | 195.00 | 7 |
| 13 | 415.00 | 195.00 | 440.00 | 204.40 | 7 |
| 14 | 440.00 | 204.40 | 455.00 | 210.00 | 3 |
| 15 | 455.00 | 210.00 | 465.00 | 210.00 | 3 |
| 16 | 465.00 | 210.00 | 550.00 | 253.00 | 3 |
| 17 | 550.00 | 253.00 | 600.00 | 255.00 | 3 |
| 18 | 600.00 | 255.00 | 650.00 | 260.00 | 3 |
| 19 | 650.00 | 260.00 | 685.00 | 295.00 | 2 |
| 20 | 200.00 | 170.00 | 249.00 | 175.00 | 3 |
| 21 | 249.00 | 175.00 | 332.00 | 195.00 | 3 |
| 22 | 650.00 | 260.00 | 718.00 | 277.00 | 3 |
| 23 | 718.00 | 277.00 | 800.00 | 290.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
7 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |
| 5 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 500.0 | 1 |
| 6 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 500.0 | 1 |
| 7 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 500.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)



Soil Type  3 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

Soil Type  7 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  4 Coordinate Points
Pore Pressure Inclination Factor =  0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 200.00 | 200.00 |
| 2 | 400.00 | 200.00 |
| 3 | 427.00 | 208.00 |
| 4 | 800.00 | 208.00 |

Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is  30.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 350.00 | 165.00 | 480.00 | 200.00 | 30.00 |
| 2 | 490.00 | 200.00 | 700.00 | 260.00 | 30.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted =  5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max =  8.194  FS Min =  1.506  FS Ave =  2.299
Standard Deviation =  0.529  Coefficient of Variation =  23.00 %
Failure Surface Specified By  7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
***  1.506  ***

Individual data on the  16  slices

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

| No. | (ft) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.5 | 3671.3 | 29.2 | 7204.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 6.3 | 7460.0 | 52.7 | 8182.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 6.0 | 10977.4 | 74.9 | 10081.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 6.0 | 13118.6 | 134.9 | 9933.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 13.0 | 29743.5 | 0.0 | 21545.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 2.5 | 7340.0 | 0.0 | 2671.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 7.1 | 25928.7 | 0.0 | 7270.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 5.4 | 20550.2 | 0.0 | 5099.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 10.0 | 40798.2 | 0.0 | 8709.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 32.1 | 153349.8 | 0.0 | 20838.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 7.1 | 35713.8 | 0.0 | 2455.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 13.4 | 56615.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 21.0 | 61553.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 3.6 | 6988.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 13.2 | 11403.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 0.4 | 7.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |



| | | |
|---|---|---|
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

Failure Surface Specified By 7 Coordinate Points

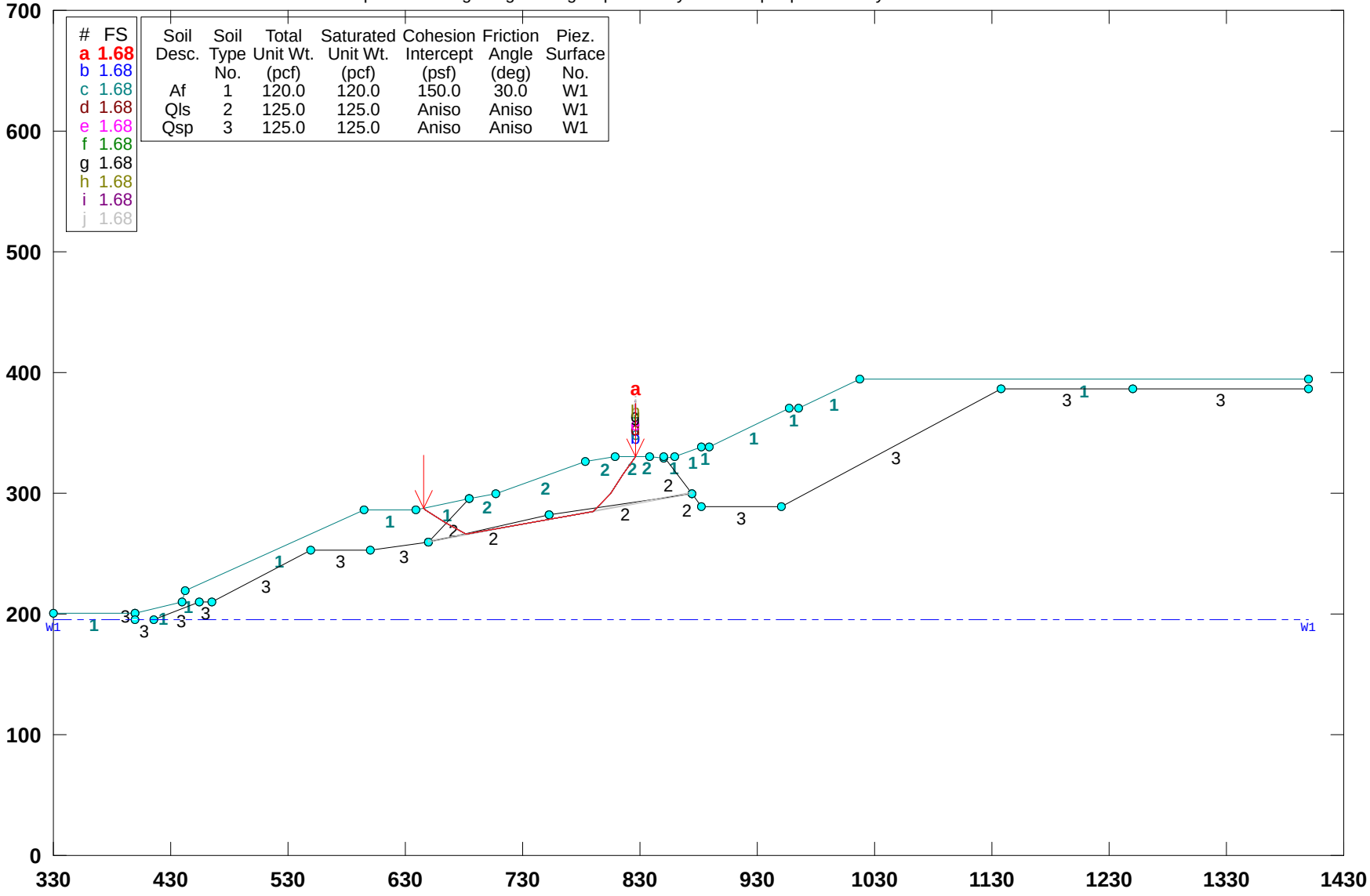
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 400.201 | 200.050 |
| 2 | 420.991 | 187.729 |
| 3 | 497.114 | 200.419 |
| 4 | 517.612 | 222.324 |
| 5 | 538.633 | 243.728 |
| 6 | 555.453 | 268.569 |
| 7 | 555.835 | 269.050 |

Factor of Safety
*** 1.506 ***

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

# Westridge / 14057-01 /Sec 2-2' / Qls / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2qlsx.pl2  Run By: LGC Geotechnical  4/13/2017  01:19PM

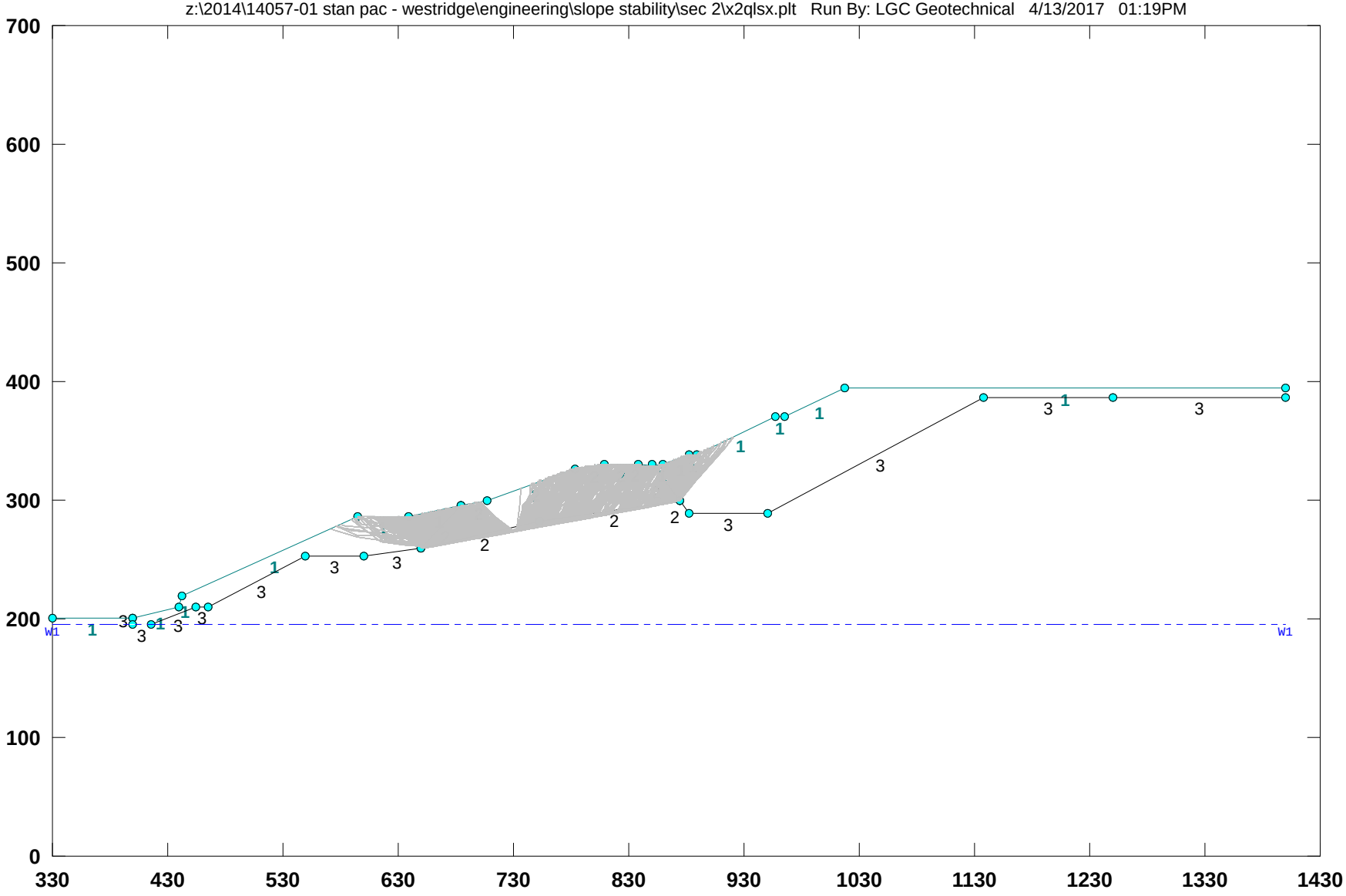



**GSTABL7 v.2  FSmin=1.68**

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

# Westridge / 14057-01 /Sec 2-2' / Qls / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 2\x2qlsx.plt  Run By: LGC Geotechnical  4/13/2017  01:19PM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/13/2017
Time of Run: 01:19PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2qlsx.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2qlsx.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 2\x2qlsx.PLT
PROBLEM DESCRIPTION: Westridge / 14057-01 /Sec 2-2' / Qls / Static
BOUNDARY COORDINATES
Note: User origin value specified.
Add 330.00 to X-values and 0.00 to Y-values listed.

18 Top Boundaries
34 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 330.00 | 200.00 | 400.00 | 200.00 | 1 |
| 2 | 400.00 | 200.00 | 440.00 | 210.00 | 1 |
| 3 | 440.00 | 210.00 | 442.50 | 220.00 | 1 |
| 4 | 442.50 | 220.00 | 595.00 | 286.00 | 1 |
| 5 | 595.00 | 286.00 | 639.00 | 286.00 | 1 |
| 6 | 639.00 | 286.00 | 685.00 | 295.00 | 1 |
| 7 | 685.00 | 295.00 | 707.00 | 300.00 | 2 |
| 8 | 707.00 | 300.00 | 783.00 | 327.00 | 2 |
| 9 | 783.00 | 327.00 | 809.00 | 331.00 | 2 |
| 10 | 809.00 | 331.00 | 838.00 | 330.00 | 2 |
| 11 | 838.00 | 330.00 | 850.00 | 329.00 | 2 |
| 12 | 850.00 | 329.00 | 860.00 | 330.00 | 1 |
| 13 | 860.00 | 330.00 | 883.00 | 339.00 | 1 |
| 14 | 883.00 | 339.00 | 889.00 | 339.00 | 1 |
| 15 | 889.00 | 339.00 | 957.00 | 370.00 | 1 |
| 16 | 957.00 | 370.00 | 965.00 | 370.00 | 1 |
| 17 | 965.00 | 370.00 | 1017.00 | 394.00 | 1 |
| 18 | 1017.00 | 394.00 | 1400.00 | 394.00 | 1 |
| 19 | 400.00 | 200.00 | 400.10 | 195.00 | 3 |
| 20 | 400.10 | 195.00 | 415.00 | 195.00 | 3 |
| 21 | 415.00 | 195.00 | 455.00 | 210.00 | 3 |
| 22 | 455.00 | 210.00 | 465.00 | 210.00 | 3 |
| 23 | 465.00 | 210.00 | 550.00 | 253.00 | 3 |
| 24 | 550.00 | 253.00 | 600.00 | 253.00 | 3 |
| 25 | 600.00 | 253.00 | 650.00 | 260.00 | 3 |
| 26 | 650.00 | 260.00 | 685.00 | 295.00 | 2 |
| 27 | 650.00 | 260.00 | 752.00 | 282.00 | 2 |
| 28 | 850.00 | 330.00 | 874.00 | 300.00 | 2 |
| 29 | 752.00 | 282.00 | 874.00 | 300.00 | 2 |
| 30 | 874.00 | 300.00 | 882.00 | 289.00 | 2 |
| 31 | 882.00 | 289.00 | 951.00 | 289.00 | 3 |
| 32 | 951.00 | 289.00 | 1138.00 | 386.00 | 3 |
| 33 | 1138.00 | 386.00 | 1250.00 | 386.00 | 3 |
| 34 | 1250.00 | 386.00 | 1400.00 | 386.00 | 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 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 8.0 | 200.00 | 24.00 |
| 2 | 11.0 | 0.00 | 13.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 330.00 | 195.00 |
| 2 | 1400.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 650.00 | 260.00 | 730.00 | 274.10 | 1.00 |
| 2 | 730.10 | 274.10 | 875.00 | 300.00 | 1.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Failure Surfaces Attempted = 9999
Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.
Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |

| | | | |
|---|---|---|---|
| 6 | 804.352 | 299.263 | |
| 7 | 815.026 | 316.177 | |
| 8 | 825.613 | 330.427 | |

Factor of Safety
*** 1.678 ***

Individual data on the 15 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4 | 130.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 17.0 | 17286.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 0.9 | 1771.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 15.2 | 40719.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 1.4 | 4754.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 3.5 | 12566.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 22.0 | 80438.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 45.0 | 190985.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 31.0 | 158427.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 7.7 | 42141.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 3.3 | 17516.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 10.3 | 46006.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 4.6 | 16091.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 6.0 | 14684.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 10.6 | 9670.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |



| | | |
|---|---|---|
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***

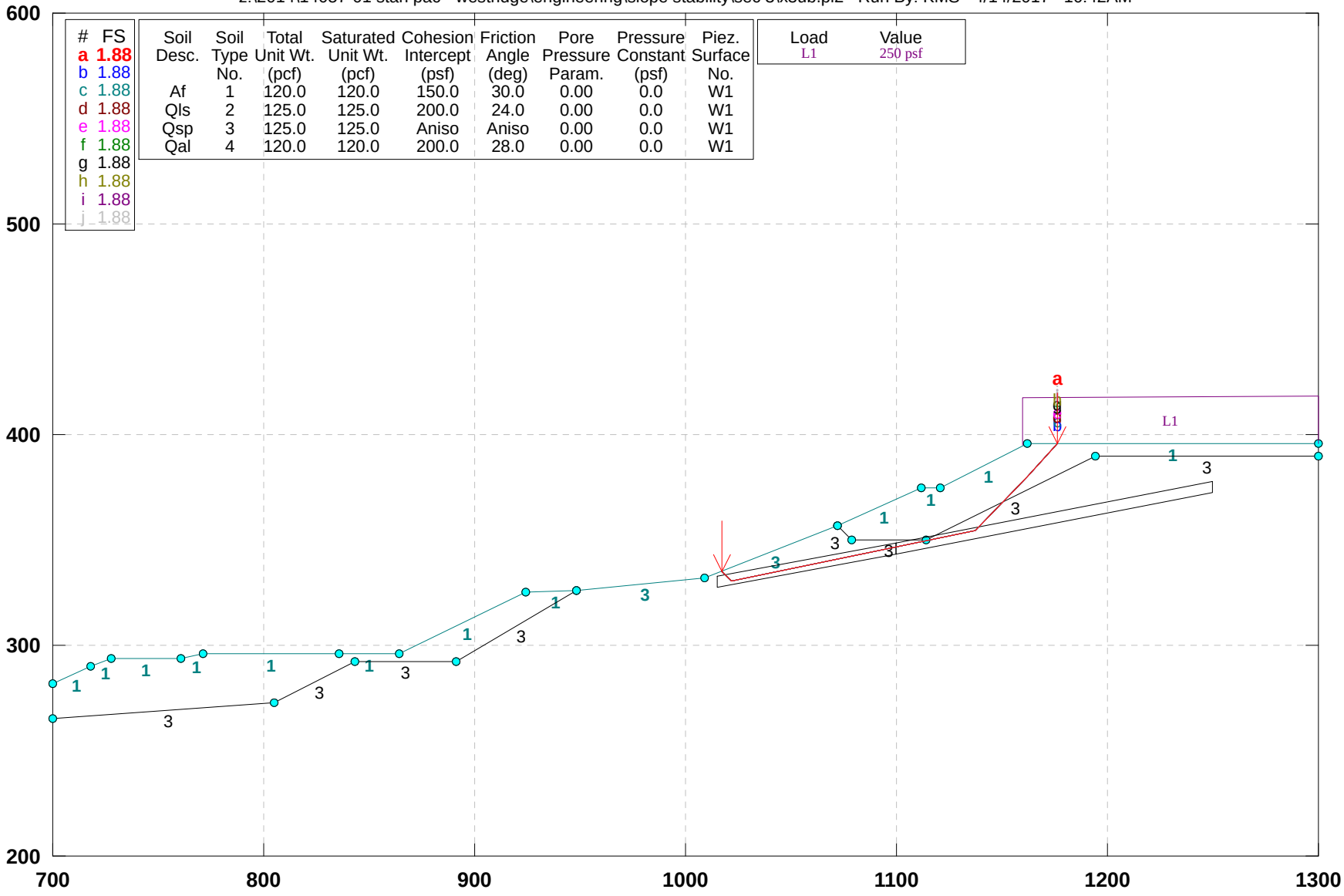
Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 645.613 | 287.294 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.678 ***
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 3-3'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 3\x3ub.pl2 Run By: KMS 4/14/2017 10:42AM




| # | FS |
|---|---|
| a | 1.88 |
| b | 1.88 |
| c | 1.88 |
| d | 1.88 |
| e | 1.88 |
| f | 1.88 |
| g | 1.88 |
| h | 1.88 |
| i | 1.88 |
| j | 1.88 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

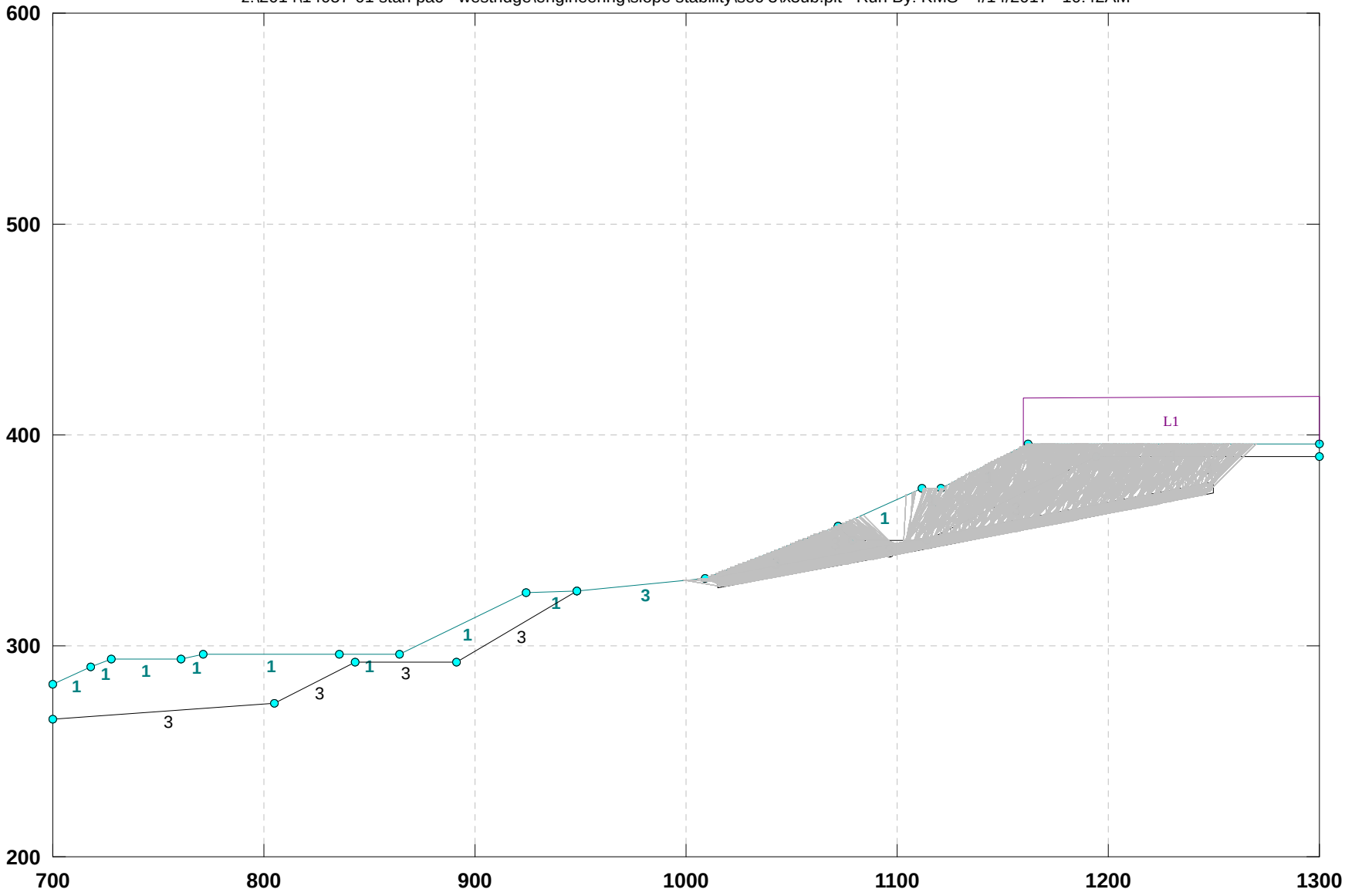
| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=1.88**

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

# Westridge/14057-01/Sec 3-3'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 3\x3ub.plt Run By: KMS 4/14/2017 10:42AM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 10:42AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ub.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ub.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ub.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 3-3'/
Upper Slope - Static

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 700.00 | 282.00 | 718.00 | 290.00 | 1 |
| 2 | 718.00 | 290.00 | 728.00 | 294.00 | 1 |
| 3 | 728.00 | 294.00 | 761.00 | 294.00 | 1 |
| 4 | 761.00 | 294.00 | 771.00 | 296.00 | 1 |
| 5 | 771.00 | 296.00 | 836.00 | 296.00 | 1 |
| 6 | 836.00 | 296.00 | 864.00 | 296.00 | 1 |
| 7 | 864.00 | 296.00 | 924.00 | 325.00 | 1 |
| 8 | 924.00 | 325.00 | 948.00 | 326.00 | 1 |
| 9 | 948.00 | 326.00 | 1009.00 | 332.00 | 3 |
| 10 | 1009.00 | 332.00 | 1072.00 | 357.00 | 3 |
| 11 | 1072.00 | 357.00 | 1112.00 | 375.00 | 1 |
| 12 | 1112.00 | 375.00 | 1121.00 | 375.00 | 1 |
| 13 | 1121.00 | 375.00 | 1162.00 | 396.00 | 1 |
| 14 | 1162.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 15 | 1072.00 | 357.00 | 1079.00 | 350.00 | 3 |
| 16 | 1079.00 | 350.00 | 1114.00 | 350.00 | 3 |
| 17 | 1114.00 | 350.00 | 1194.00 | 390.00 | 3 |
| 18 | 1194.00 | 390.00 | 1300.00 | 390.00 | 3 |
| 19 | 700.00 | 265.00 | 805.00 | 273.00 | 3 |
| 20 | 805.00 | 273.00 | 843.00 | 292.00 | 3 |
| 21 | 843.00 | 292.00 | 891.00 | 292.00 | 3 |
| 22 | 891.00 | 292.00 | 948.00 | 326.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1160.00 | 1300.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 35.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 1015.00 | 330.00 | 1100.00 | 346.00 | 5.00 |
| 2 | 1100.10 | 346.00 | 1250.00 | 375.00 | 5.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |

| | | |
|---|---|---|
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

Individual data on the 12 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.6 | 1796.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 50.2 | 69048.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 7.0 | 14351.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 33.0 | 85594.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 2.0 | 6061.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 7.0 | 20458.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 16.2 | 51131.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 13.2 | 40197.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.5 | 22274.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 1.8 | 3541.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 444.5 |
| 11 | 0.2 | 428.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 55.5 |
| 12 | 14.6 | 14028.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 3649.4 |

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety
*** 1.882 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1017.232 | 335.267 |
| 2 | 1021.822 | 330.827 |
| 3 | 1137.236 | 354.786 |
| 4 | 1161.778 | 379.740 |
| 5 | 1176.598 | 396.000 |

Factor of Safety

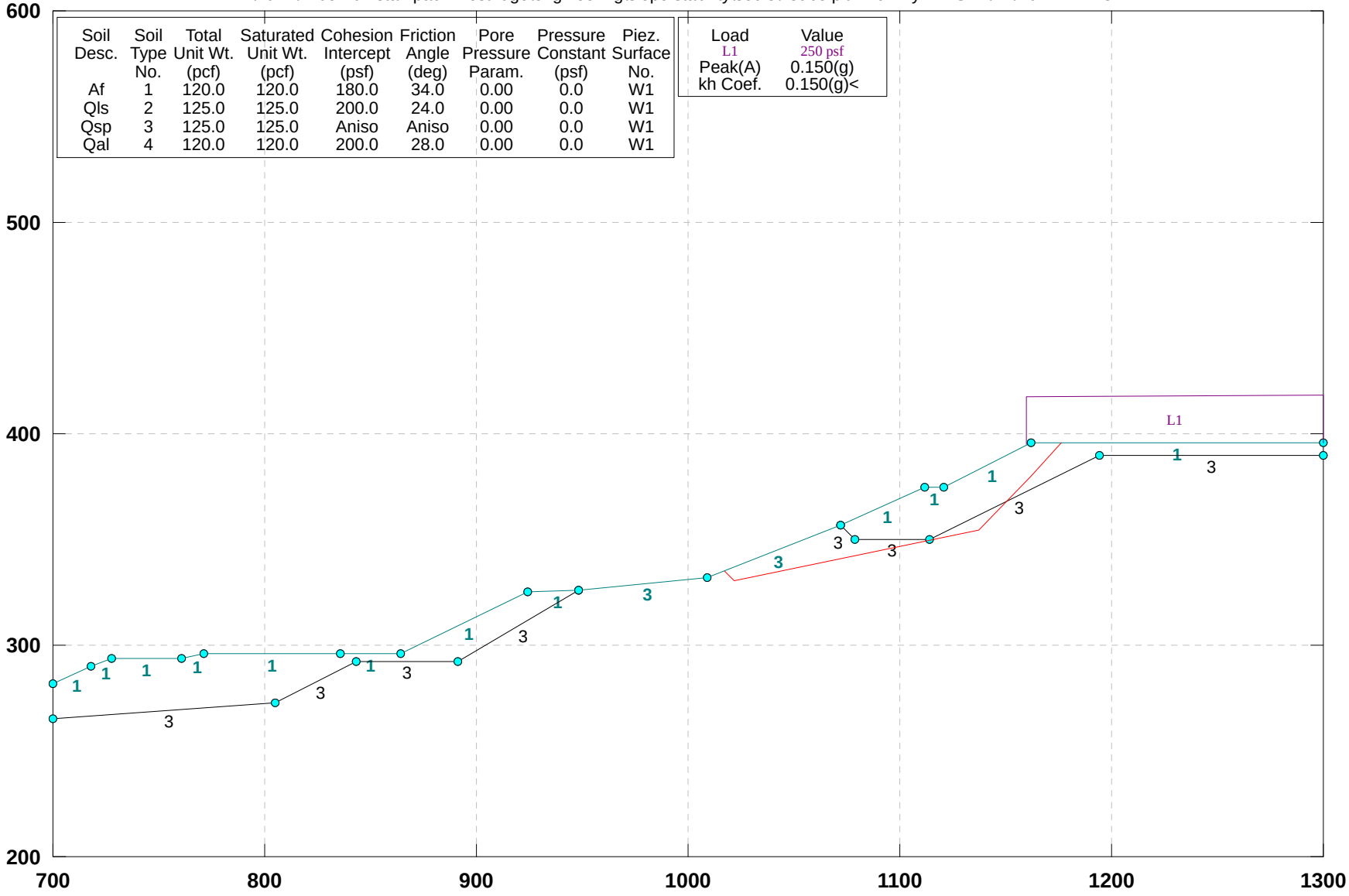
```
***    1.882   ***


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

# Westridge/14057-01/Sec 3-3'/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 3\x3ube.plt Run By: KMS 4/14/2017 11:23AM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.42**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 11:23AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ube.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ube.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ube.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 3-3'/
Upper Slope - Seismic

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 700.00 | 282.00 | 718.00 | 290.00 | 1 |
| 2 | 718.00 | 290.00 | 728.00 | 294.00 | 1 |
| 3 | 728.00 | 294.00 | 761.00 | 294.00 | 1 |
| 4 | 761.00 | 294.00 | 771.00 | 296.00 | 1 |
| 5 | 771.00 | 296.00 | 836.00 | 296.00 | 1 |
| 6 | 836.00 | 296.00 | 864.00 | 296.00 | 1 |
| 7 | 864.00 | 296.00 | 924.00 | 325.00 | 1 |
| 8 | 924.00 | 325.00 | 948.00 | 326.00 | 1 |
| 9 | 948.00 | 326.00 | 1009.00 | 332.00 | 3 |
| 10 | 1009.00 | 332.00 | 1072.00 | 357.00 | 3 |
| 11 | 1072.00 | 357.00 | 1112.00 | 375.00 | 1 |
| 12 | 1112.00 | 375.00 | 1121.00 | 375.00 | 1 |
| 13 | 1121.00 | 375.00 | 1162.00 | 396.00 | 1 |
| 14 | 1162.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 15 | 1072.00 | 357.00 | 1079.00 | 350.00 | 3 |
| 16 | 1079.00 | 350.00 | 1114.00 | 350.00 | 3 |
| 17 | 1114.00 | 350.00 | 1194.00 | 390.00 | 3 |
| 18 | 1194.00 | 390.00 | 1300.00 | 390.00 | 3 |
| 19 | 700.00 | 265.00 | 805.00 | 273.00 | 3 |
| 20 | 805.00 | 273.00 | 843.00 | 292.00 | 3 |
| 21 | 843.00 | 292.00 | 891.00 | 292.00 | 3 |
| 22 | 891.00 | 292.00 | 948.00 | 326.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |

```
            2   125.0    125.0     200.0     24.0    0.00       0.0
1
            3   125.0    125.0     500.0     34.0    0.00       0.0
1
            4   120.0    120.0     200.0     28.0    0.00       0.0
1


          ANISOTROPIC STRENGTH PARAMETERS
               1 soil type(s)


           Soil Type  3 Is Anisotropic

           Number Of Direction Ranges Specified =  3


           Direction    Counterclockwise     Cohesion     Friction
             Range       Direction Limit    Intercept       Angle
              No.            (deg)            (psf)         (deg)

               1              7.0             500.00         34.00
               2             12.0             200.00         27.00
               3             90.0             500.00         34.00

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

1


          BOUNDARY LOAD(S)

               1 Load(s) Specified


           Load        X-Left      X-Right     Intensity     Deflection
            No.          (ft)        (ft)        (psf)         (deg)


             1        1160.00     1300.00        250.0          0.0


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

           Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
```

```
           Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
           Specified Vertical Earthquake Coefficient (kv) =   0.000(g)

           Specified Seismic Pore-Pressure Factor =   0.000


           Janbu's Empirical Coef. is being used for the case of  c & phi
both > 0
1


           Trial Failure Surface Specified By  5 Coordinate Points


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

               1       1017.232      335.267
               2       1021.822      330.827
               3       1137.236      354.786
               4       1161.778      379.740
               5       1176.598      396.000


           Janbu's Empirical Coefficient (fo) =  1.057

           * * Factor Of Safety Is Calculated By The Simplified Janbu
Method * *



           Factor Of Safety For The Preceding Specified Surface =  1.420


                ***Table 1 - Individual Data on the   12 Slices***

                                  Water  Water     Tie     Tie     Earthquake
                                  Force  Force    Force   Force       Force
Surcharge
 Slice  Width   Weight    Top     Bot     Norm     Tan     Hor      Ver
Load
  No.    (ft)    (lbs)   (lbs)   (lbs)    (lbs)   (lbs)   (lbs)   (lbs)
(lbs)

   1      4.6    1796.2     0.0     0.0      0.0     0.0   269.4     0.0
0.0
   2     50.2   69049.8     0.0     0.0      0.0     0.0 10357.5     0.0
0.0
   3      7.0   14351.7     0.0     0.0      0.0     0.0  2152.8     0.0
0.0
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 33.0 | 85594.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12839.1 | 0.0 | 0.0 |
| 5 | 2.0 | 6061.3 | 0.0 | 0.0 | 0.0 | 0.0 | 909.2 | 0.0 | 0.0 |
| 6 | 7.0 | 20458.4 | 0.0 | 0.0 | 0.0 | 0.0 | 3068.8 | 0.0 | 0.0 |
| 7 | 16.2 | 51129.5 | 0.0 | 0.0 | 0.0 | 0.0 | 7669.4 | 0.0 | 0.0 |
| 8 | 13.2 | 40194.8 | 0.0 | 0.0 | 0.0 | 0.0 | 6029.2 | 0.0 | 0.0 |
| 9 | 9.5 | 22277.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3341.6 | 0.0 | 0.0 |
| 10 | 1.8 | 3540.6 | 0.0 | 0.0 | 0.0 | 0.0 | 531.1 | 0.0 | 444.5 |
| 11 | 0.2 | 428.5 | 0.0 | 0.0 | 0.0 | 0.0 | 64.3 | 0.0 | 55.5 |
| 12 | 14.6 | 14028.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2104.2 | 0.0 | 3649.5 |

***Table 2 - Base Stress Data on the 12 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Shear Mobilized Stress (psf) |
|---|---|---|---|---|---|
| 1 | -44.05 | 1019.53 | 6.39 | 1965.71 | -229.87 |
| 2 | 11.73 | 1046.91 | 51.25 | 856.59 | 481.81 |
| 3 | 11.73 | 1075.50 | 7.15 | 1183.09 | 717.85 |
| 4 | 11.73 | 1095.50 | 33.70 | 1446.33 | 908.15 |
| 5 | 11.73 | 1113.00 | 2.04 | 1657.92 | 1061.11 |
| 6 | 11.73 | 1117.50 | 7.15 | 1605.61 | 1023.29 |
| 7 | 11.73 | 1129.12 | 16.58 | 1715.32 | 1102.61 |
| 8 | 45.48 | 1143.85 | 18.85 | 2453.29 | 2487.52 |
| 9 | 45.48 | 1155.23 | 13.61 | 1687.34 | 1909.68 |
| 10 | 45.48 | 1160.89 | 2.54 | 1627.16 | 1807.49 |
| 11 | 47.65 | 1161.89 | 0.33 | 1610.69 | 1806.00 |
| 12 | 47.65 | 1169.30 | 21.67 | 972.91 | 992.10 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 250276.58 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1380.75(psf)

Sum of the Driving Forces = 186299.77 (lbs)

Average Mobilized Shear Stress = 1027.80(psf)

Total length of the failure surface = 181.26(ft)

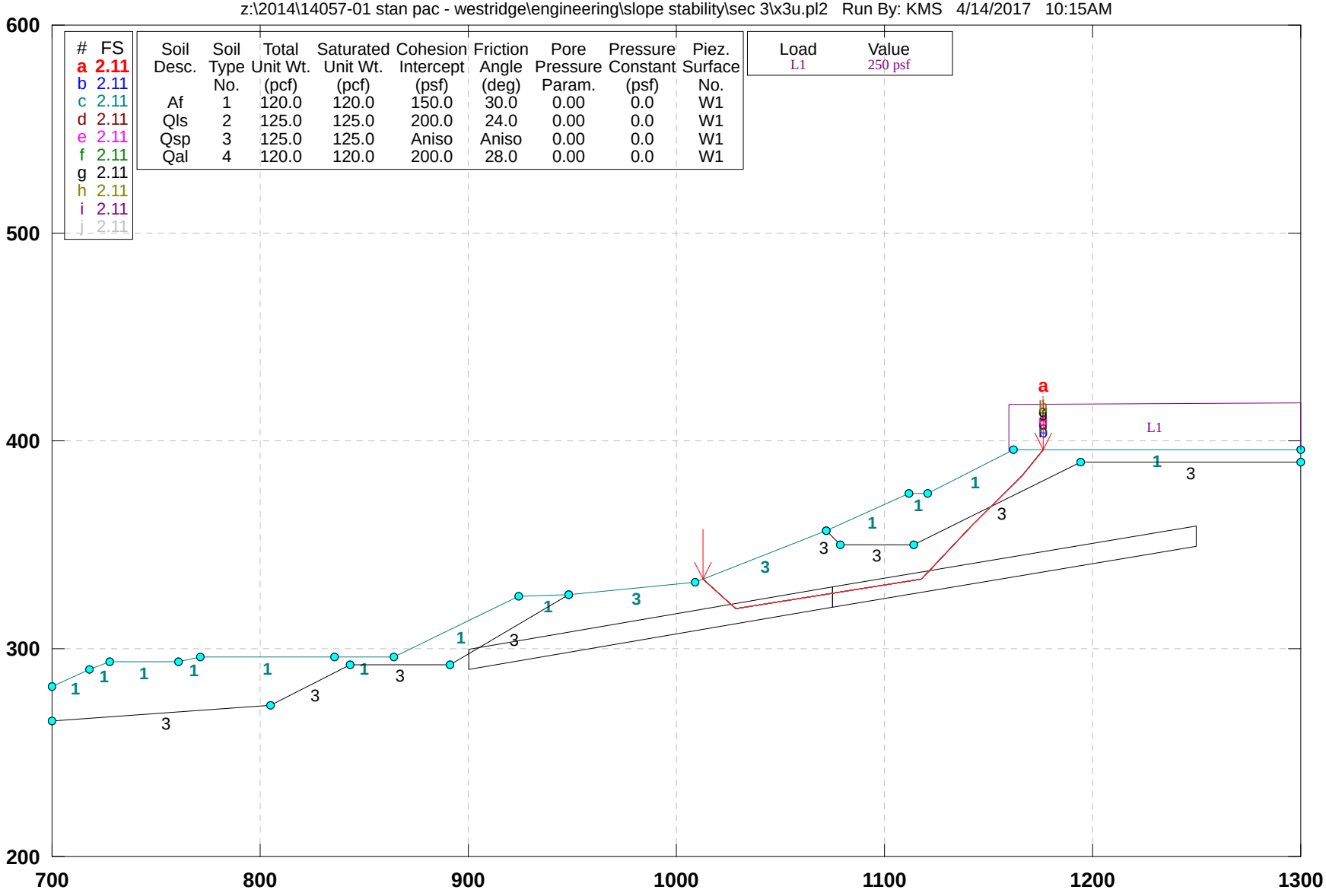
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3650(g)
Calculated Newmark Seismic Displacement = 0.002(ft)

Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

# Westridge/14057-01/Sec 3-3'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 3\x3u.pl2 Run By: KMS 4/14/2017 10:15AM




| # | FS |
|---|---|
| a | 2.11 |
| b | 2.11 |
| c | 2.11 |
| d | 2.11 |
| e | 2.11 |
| f | 2.11 |
| g | 2.11 |
| h | 2.11 |
| i | 2.11 |
| j | 2.11 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

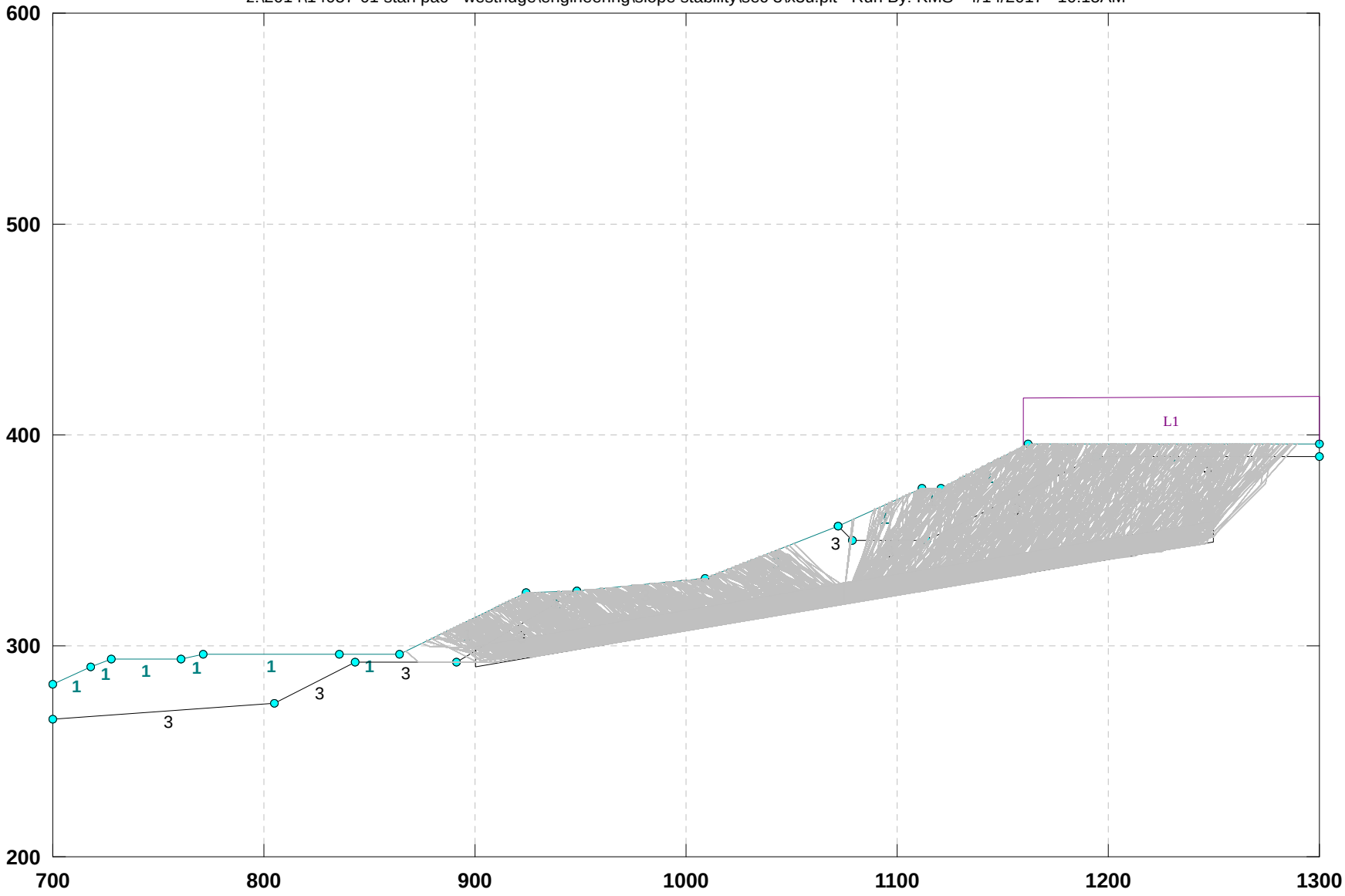
| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=2.11**

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

# Westridge/14057-01/Sec 3-3'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 3\x3u.plt  Run By: KMS  4/14/2017  10:15AM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 10:15AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3u.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3u.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3u.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 3-3'/
Upper Slope - Static

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 700.00 | 282.00 | 718.00 | 290.00 | 1 |
| 2 | 718.00 | 290.00 | 728.00 | 294.00 | 1 |
| 3 | 728.00 | 294.00 | 761.00 | 294.00 | 1 |
| 4 | 761.00 | 294.00 | 771.00 | 296.00 | 1 |
| 5 | 771.00 | 296.00 | 836.00 | 296.00 | 1 |
| 6 | 836.00 | 296.00 | 864.00 | 296.00 | 1 |
| 7 | 864.00 | 296.00 | 924.00 | 325.00 | 1 |
| 8 | 924.00 | 325.00 | 948.00 | 326.00 | 1 |
| 9 | 948.00 | 326.00 | 1009.00 | 332.00 | 3 |
| 10 | 1009.00 | 332.00 | 1072.00 | 357.00 | 3 |
| 11 | 1072.00 | 357.00 | 1112.00 | 375.00 | 1 |
| 12 | 1112.00 | 375.00 | 1121.00 | 375.00 | 1 |
| 13 | 1121.00 | 375.00 | 1162.00 | 396.00 | 1 |
| 14 | 1162.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 15 | 1072.00 | 357.00 | 1079.00 | 350.00 | 3 |
| 16 | 1079.00 | 350.00 | 1114.00 | 350.00 | 3 |
| 17 | 1114.00 | 350.00 | 1194.00 | 390.00 | 3 |
| 18 | 1194.00 | 390.00 | 1300.00 | 390.00 | 3 |
| 19 | 700.00 | 265.00 | 805.00 | 273.00 | 3 |
| 20 | 805.00 | 273.00 | 843.00 | 292.00 | 3 |
| 21 | 843.00 | 292.00 | 891.00 | 292.00 | 3 |
| 22 | 891.00 | 292.00 | 948.00 | 326.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1160.00 | 1300.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 35.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 900.00 | 295.00 | 1075.00 | 325.00 | 10.00 |
| 2 | 1075.10 | 325.00 | 1250.00 | 354.00 | 10.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |

| | | |
|---|---|---|
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

Individual data on the 13 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 15.2 | 19040.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 43.8 | 138461.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 7.0 | 27486.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 33.0 | 151836.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 2.0 | 10305.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 3.7 | 19114.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.3 | 15822.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 21.1 | 83668.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.8 | 28794.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 8.2 | 19296.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 2.0 | 4066.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 500.0 |
| 12 | 4.2 | 7176.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1053.6 |
| 13 | 9.7 | 6995.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 2433.2 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |

| | | |
|---|---|---|
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety
*** 2.110 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1012.975 | 333.577 |
| 2 | 1028.206 | 319.619 |
| 3 | 1117.747 | 333.516 |
| 4 | 1142.078 | 358.675 |
| 5 | 1166.214 | 384.022 |
| 6 | 1175.947 | 396.000 |

Factor of Safety

*** 2.110 ***

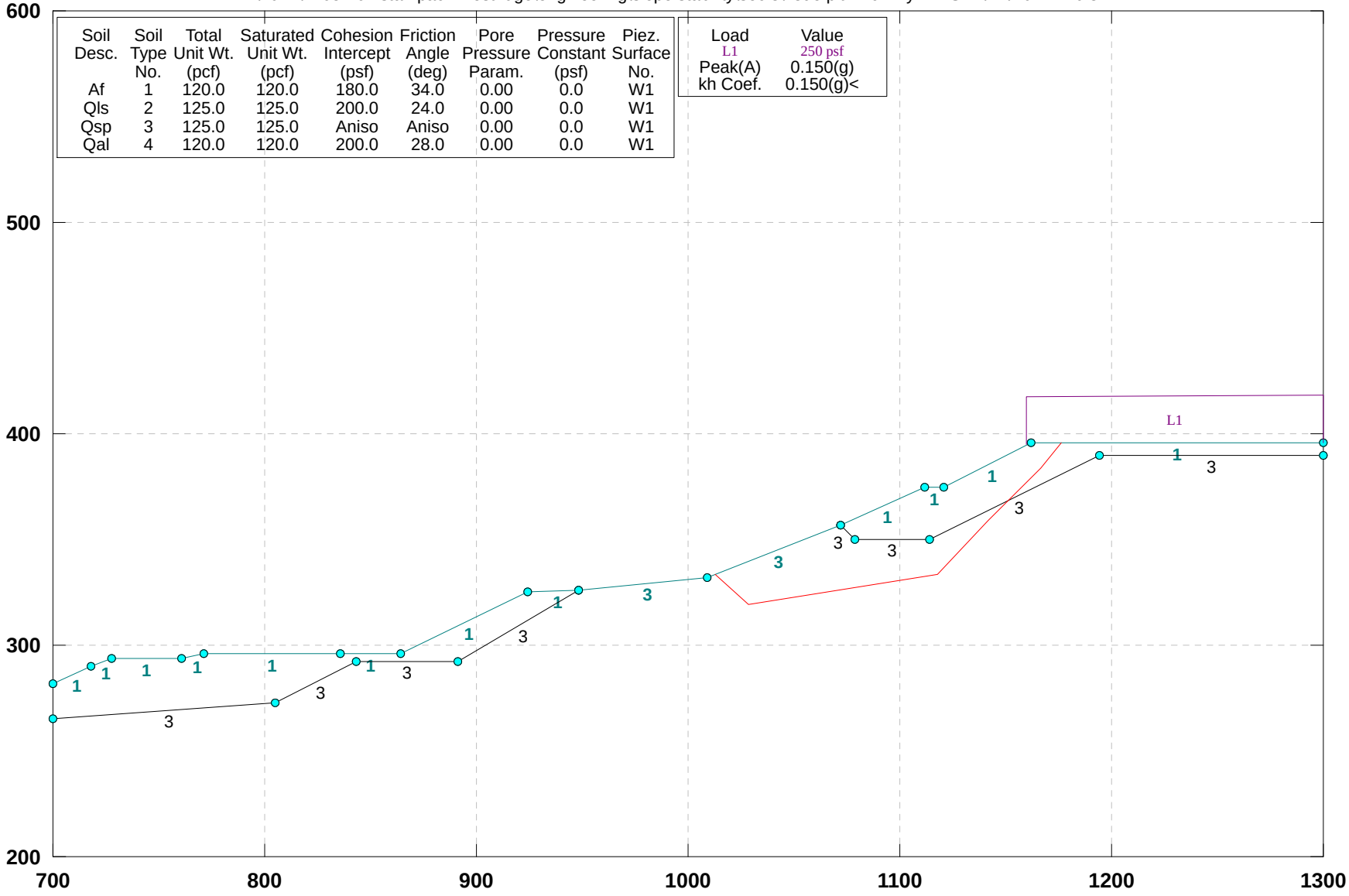
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 3-3'/ 4-4-16 Design - Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 3\x3ue.plt Run By: KMS 4/14/2017 10:37AM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.64**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 10:37AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ue.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ue.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 3\x3ue.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 3-3'/ 4-4-16 Design - Upper Slope - Seismic

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 700.00 | 282.00 | 718.00 | 290.00 | 1 |
| 2 | 718.00 | 290.00 | 728.00 | 294.00 | 1 |
| 3 | 728.00 | 294.00 | 761.00 | 294.00 | 1 |
| 4 | 761.00 | 294.00 | 771.00 | 296.00 | 1 |
| 5 | 771.00 | 296.00 | 836.00 | 296.00 | 1 |
| 6 | 836.00 | 296.00 | 864.00 | 296.00 | 1 |
| 7 | 864.00 | 296.00 | 924.00 | 325.00 | 1 |
| 8 | 924.00 | 325.00 | 948.00 | 326.00 | 1 |
| 9 | 948.00 | 326.00 | 1009.00 | 332.00 | 3 |
| 10 | 1009.00 | 332.00 | 1072.00 | 357.00 | 3 |
| 11 | 1072.00 | 357.00 | 1112.00 | 375.00 | 1 |
| 12 | 1112.00 | 375.00 | 1121.00 | 375.00 | 1 |
| 13 | 1121.00 | 375.00 | 1162.00 | 396.00 | 1 |
| 14 | 1162.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 15 | 1072.00 | 357.00 | 1079.00 | 350.00 | 3 |
| 16 | 1079.00 | 350.00 | 1114.00 | 350.00 | 3 |
| 17 | 1114.00 | 350.00 | 1194.00 | 390.00 | 3 |
| 18 | 1194.00 | 390.00 | 1300.00 | 390.00 | 3 |
| 19 | 700.00 | 265.00 | 805.00 | 273.00 | 3 |
| 20 | 805.00 | 273.00 | 843.00 | 292.00 | 3 |
| 21 | 843.00 | 292.00 | 891.00 | 292.00 | 3 |
| 22 | 891.00 | 292.00 | 948.00 | 326.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |

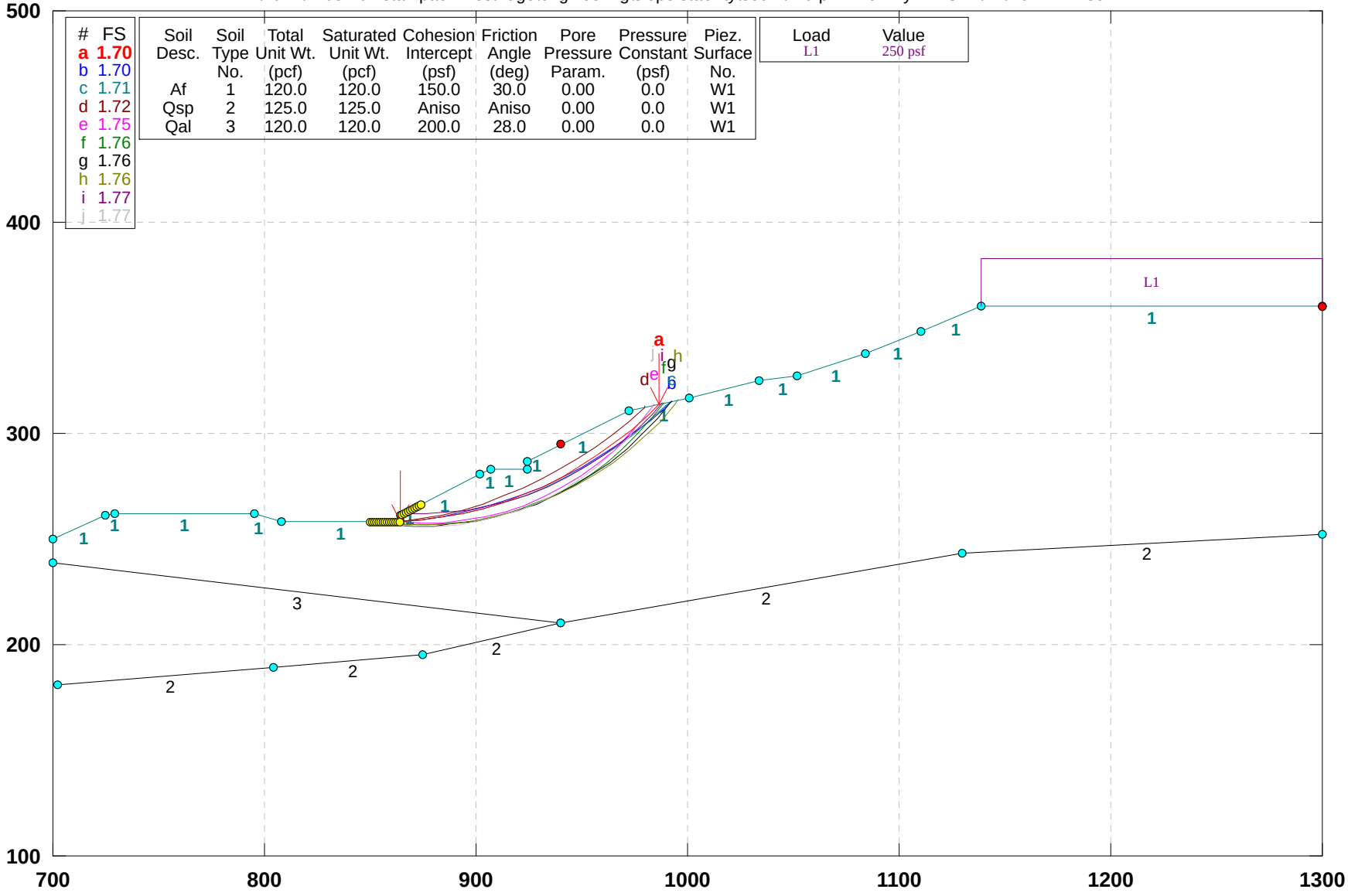
```
            2   125.0    125.0     200.0     24.0    0.00       0.0
1
            3   125.0    125.0     500.0     34.0    0.00       0.0
1
            4   120.0    120.0     200.0     28.0    0.00       0.0
1


          ANISOTROPIC STRENGTH PARAMETERS
               1 soil type(s)


           Soil Type  3 Is Anisotropic

           Number Of Direction Ranges Specified =  3


           Direction    Counterclockwise     Cohesion     Friction
             Range       Direction Limit    Intercept       Angle
              No.            (deg)            (psf)         (deg)

               1              7.0             500.00         34.00
               2             12.0             200.00         27.00
               3             90.0             500.00         34.00

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

1


          BOUNDARY LOAD(S)

               1 Load(s) Specified


           Load        X-Left      X-Right     Intensity     Deflection
            No.          (ft)        (ft)        (psf)         (deg)


             1        1160.00     1300.00        250.0          0.0


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

           Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
```

```
           Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
           Specified Vertical Earthquake Coefficient (kv) =   0.000(g)

           Specified Seismic Pore-Pressure Factor =   0.000


           Janbu's Empirical Coef. is being used for the case of  c & phi
both > 0
1


           Trial Failure Surface Specified By  6 Coordinate Points


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

               1       1012.975      333.577
               2       1028.206      319.619
               3       1117.747      333.516
               4       1142.078      358.675
               5       1166.214      384.022
               6       1175.947      396.000


           Janbu's Empirical Coefficient (fo) =  1.075

           * * Factor Of Safety Is Calculated By The Simplified Janbu
Method * *




           Factor Of Safety For The Preceding Specified Surface =  1.636


               ***Table 1 - Individual Data on the   13 Slices***

                                Water  Water     Tie     Tie      Earthquake
                                Force  Force    Force   Force       Force
Surcharge
 Slice  Width   Weight    Top    Bot     Norm     Tan     Hor      Ver
Load
  No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)    (lbs)
(lbs)

   1     15.2   19040.8     0.0     0.0      0.0     0.0  2856.1     0.0
0.0
   2     43.8  138461.6     0.0     0.0      0.0     0.0 20769.2     0.0
0.0
```

```
   3      7.0   27486.2     0.0     0.0      0.0     0.0  4122.9     0.0
0.0
   4     33.0  151836.2     0.0     0.0      0.0     0.0 22775.4     0.0
0.0
   5      2.0   10305.2     0.0     0.0      0.0     0.0  1545.8     0.0
0.0
   6      3.7   19115.2     0.0     0.0      0.0     0.0  2867.3     0.0
0.0
   7      3.3   15821.8     0.0     0.0      0.0     0.0  2373.3     0.0
0.0
   8     21.1   83667.7     0.0     0.0      0.0     0.0 12550.2     0.0
0.0
   9      9.7   28792.8     0.0     0.0      0.0     0.0  4318.9     0.0
0.0
  10      8.2   19297.6     0.0     0.0      0.0     0.0  2894.6     0.0
0.0
  11      2.0    4065.9     0.0     0.0      0.0     0.0   609.9     0.0
500.0
  12      4.2    7176.0     0.0     0.0      0.0     0.0  1076.4     0.0
1053.5
  13      9.7    6994.8     0.0     0.0      0.0     0.0  1049.2     0.0
2433.3
              ***Table 2 - Base Stress Data on the   13 Slices***


 Slice   Alpha     X-Coord.      Base          Available
Mobilized
  No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear
Stress
   *                 (ft)        (ft)           (psf)
(psf)

   1     -42.50     1020.59       20.66           2928.67              -
706.40
   2       8.82     1050.10       44.32           1748.12
953.53
   3       8.82     1075.50        7.08           2124.36
1184.23
   4       8.82     1095.50       33.40           2456.11
1387.65
   5       8.82     1113.00        2.02           2727.36
1553.98
   6       8.82     1115.87        3.79           2702.24
1538.58
   7      45.96     1119.37        4.68           3812.72
4003.36
   8      45.96     1131.54       30.32           3204.41
3267.29
   9      46.40     1146.95       14.14           2521.73
2444.19
  10      46.40     1155.91       11.85           1793.90
1954.31
  11      46.40     1161.00        2.90           1740.42
1863.60
  12      46.40     1164.11        6.11           1515.12
1590.42
  13      50.90     1171.08       15.43            876.66
819.75

     Sum of the Resisting Forces (including Pier/Pile, Tieback,
Reinforcing
     Soil Nail, and Applied Forces if applicable) =  448335.72 (lbs)


     Average Available Shear Strength (including Tieback, Pier/Pile,
Reinforcing,
     Soil Nail, and Applied Forces if applicable) =   2279.21(psf)


     Sum of the Driving Forces =   294664.75 (lbs)


     Average Mobilized Shear Stress =    1497.99(psf)


     Total length of the failure surface =     196.71(ft)


           *** SEISMIC SLOPE DISPLACEMENT DATA ***
      (Note: kv is set = zero for displacement calculations)
      Seismic Yield Coefficient (ky) =  0.5230(g)
      Calculated Newmark Seismic Displacement =   0.001(ft)

      Non-Symmetrical Sliding Resistance Has Been Specified
      for Downhill Sliding.


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

# Westridge/14057-01/Sec 4-4'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 4\x4u.pl2 Run By: KMS 4/14/2017 12:55PM




**GSTABL7 v.2 FSmin=1.70**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 12:55PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 4\x4u.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 4\x4u.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 4\x4u.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 4-4'/
Upper Slope - Static

BOUNDARY COORDINATES

18 Top Boundaries

24 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 700.00 | 250.00 | 725.00 | 261.00 | 1 |
| 2 | 725.00 | 261.00 | 729.00 | 262.00 | 1 |
| 3 | 729.00 | 262.00 | 795.00 | 262.00 | 1 |
| 4 | 795.00 | 262.00 | 808.00 | 258.00 | 1 |
| 5 | 808.00 | 258.00 | 864.00 | 258.00 | 1 |
| 6 | 864.00 | 258.00 | 864.10 | 261.00 | 1 |
| 7 | 864.10 | 261.00 | 902.00 | 281.00 | 1 |
| 8 | 902.00 | 281.00 | 907.00 | 283.00 | 1 |
| 9 | 907.00 | 283.00 | 924.00 | 283.00 | 1 |
| 10 | 924.00 | 283.00 | 924.10 | 287.00 | 1 |
| 11 | 924.10 | 287.00 | 972.00 | 311.00 | 1 |
| 12 | 972.00 | 311.00 | 1001.00 | 317.00 | 1 |
| 13 | 1001.00 | 317.00 | 1034.00 | 325.00 | 1 |
| 14 | 1034.00 | 325.00 | 1052.00 | 327.00 | 1 |
| 15 | 1052.00 | 327.00 | 1084.00 | 338.00 | 1 |
| 16 | 1084.00 | 338.00 | 1110.00 | 348.00 | 1 |
| 17 | 1110.00 | 348.00 | 1139.00 | 360.00 | 1 |
| 18 | 1139.00 | 360.00 | 1300.00 | 360.00 | 1 |
| 19 | 700.00 | 239.00 | 940.00 | 210.00 | 3 |
| 20 | 940.00 | 210.00 | 1130.00 | 243.00 | 2 |
| 21 | 1130.00 | 243.00 | 1300.00 | 252.00 | 2 |
| 22 | 702.00 | 181.00 | 804.00 | 189.00 | 2 |
| 23 | 804.00 | 189.00 | 875.00 | 195.00 | 2 |
| 24 | 875.00 | 195.00 | 940.00 | 210.00 | 2 |

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 14.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1139.00 | 1300.00 | 250.0 | 0.0 |

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

1

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

5000 Trial Surfaces Have Been Generated.

200 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced
Along The Ground Surface Between X = 850.00(ft)
and X = 874.00(ft)

Each Surface Terminates Between X = 940.00(ft)
and X =1300.00(ft)

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

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

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 = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 4.466 FS Min = 1.703 FS Ave = 2.815
Standard Deviation = 0.650 Coefficient of Variation = 23.08 %

Failure Surface Specified By 15 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.963 | 258.860 |
| 3 | 883.866 | 260.252 |
| 4 | 893.680 | 262.172 |
| 5 | 903.377 | 264.615 |
| 6 | 912.929 | 267.573 |
| 7 | 922.310 | 271.037 |
| 8 | 931.492 | 274.999 |
| 9 | 940.448 | 279.447 |
| 10 | 949.154 | 284.367 |
| 11 | 957.584 | 289.746 |
| 12 | 965.714 | 295.568 |
| 13 | 973.521 | 301.817 |
| 14 | 980.983 | 308.475 |
| 15 | 986.555 | 314.011 |

Circle Center At X = 852.917 ; Y = 444.485 ; and Radius = 186.814

Factor of Safety
*** 1.703 ***

Individual data on the 20 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1 | 17.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 9.9 | 6116.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.9 | 11005.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 9.8 | 15083.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 8.3 | 15560.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 1.4 | 2781.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.6 | 7434.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 5.9 | 11629.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.4 | 15416.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 1.7 | 2352.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 0.1 | 158.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 7.4 | 13701.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 9.0 | 16900.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 8.7 | 16156.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 8.4 | 14778.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 8.1 | 12835.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 6.3 | 8554.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 1.5 | 1816.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 7.5 | 6214.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 5.6 | 1465.5 | 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 | 864.000 | 258.000 |
| 2 | 873.943 | 259.063 |
| 3 | 883.826 | 260.589 |
| 4 | 893.627 | 262.573 |
| 5 | 903.325 | 265.013 |
| 6 | 912.899 | 267.902 |
| 7 | 922.327 | 271.234 |
| 8 | 931.590 | 275.002 |
| 9 | 940.668 | 279.197 |
| 10 | 949.540 | 283.811 |
| 11 | 958.187 | 288.834 |
| 12 | 966.590 | 294.255 |
| 13 | 974.732 | 300.061 |
| 14 | 982.594 | 306.240 |
| 15 | 990.160 | 312.780 |
| 16 | 992.823 | 315.308 |

Circle Center At X = 846.294 ; Y = 471.247 ; and Radius = 213.981

Factor of Safety
*** 1.704 ***

1

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.964 | 258.843 |
| 3 | 883.874 | 260.184 |
| 4 | 893.704 | 262.020 |
| 5 | 903.430 | 264.346 |
| 6 | 913.027 | 267.157 |
| 7 | 922.470 | 270.445 |
| 8 | 931.738 | 274.203 |
| 9 | 940.805 | 278.420 |
| 10 | 949.649 | 283.086 |
| 11 | 958.249 | 288.190 |
| 12 | 966.582 | 293.718 |
| 13 | 974.627 | 299.657 |
| 14 | 982.365 | 305.992 |
| 15 | 989.776 | 312.706 |
| 16 | 992.256 | 315.191 |

Circle Center At X = 852.280 ; Y = 456.692 ; and Radius = 199.037

Factor of Safety
*** 1.705 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.890 | 259.479 |
| 3 | 883.697 | 261.435 |
| 4 | 893.397 | 263.863 |
| 5 | 902.969 | 266.760 |
| 6 | 912.389 | 270.116 |
| 7 | 921.635 | 273.925 |
| 8 | 930.686 | 278.178 |
| 9 | 939.520 | 282.864 |
| 10 | 948.116 | 287.972 |
| 11 | 956.455 | 293.491 |
| 12 | 964.517 | 299.408 |
| 13 | 972.283 | 305.709 |
| 14 | 979.734 | 312.378 |
| 15 | 980.019 | 312.659 |

Circle Center At X = 838.450 ; Y = 462.727 ; and Radius = 206.315

Factor of Safety
*** 1.721 ***

1

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.986 | 257.473 |
| 3 | 883.983 | 257.701 |
| 4 | 893.935 | 258.683 |
| 5 | 903.784 | 260.413 |
| 6 | 913.475 | 262.882 |
| 7 | 922.951 | 266.076 |
| 8 | 932.159 | 269.976 |
| 9 | 941.047 | 274.560 |
| 10 | 949.563 | 279.801 |
| 11 | 957.659 | 285.671 |
| 12 | 965.289 | 292.135 |
| 13 | 972.409 | 299.157 |
| 14 | 978.979 | 306.696 |
| 15 | 984.053 | 313.494 |

Circle Center At X = 875.969 ; Y = 389.828 ; and Radius = 132.370

Factor of Safety
*** 1.750 ***

Failure Surface Specified By 16 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 858.000 | 258.000 |
| 2 | 867.951 | 257.013 |
| 3 | 877.948 | 256.749 |
| 4 | 887.937 | 257.212 |
| 5 | 897.866 | 258.397 |
| 6 | 907.684 | 260.299 |
| 7 | 917.338 | 262.908 |
| 8 | 926.777 | 266.210 |
| 9 | 935.952 | 270.187 |
| 10 | 944.814 | 274.820 |
| 11 | 953.317 | 280.082 |
| 12 | 961.416 | 285.948 |
| 13 | 969.069 | 292.385 |
| 14 | 976.235 | 299.360 |
| 15 | 982.876 | 306.836 |
| 16 | 988.716 | 314.458 |

Circle Center At X = 876.581 ; Y = 394.531 ; and Radius = 137.789

Factor of Safety
*** 1.758 ***

1

Failure Surface Specified By 18 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 850.000 | 258.000 |
| 2 | 859.926 | 256.786 |
| 3 | 869.911 | 256.236 |
| 4 | 879.910 | 256.352 |
| 5 | 889.880 | 257.134 |
| 6 | 899.775 | 258.578 |
| 7 | 909.552 | 260.679 |
| 8 | 919.167 | 263.425 |
| 9 | 928.578 | 266.806 |
| 10 | 937.743 | 270.806 |
| 11 | 946.622 | 275.408 |
| 12 | 955.174 | 280.591 |
| 13 | 963.361 | 286.332 |
| 14 | 971.149 | 292.606 |
| 15 | 978.501 | 299.384 |
| 16 | 985.385 | 306.637 |
| 17 | 991.771 | 314.333 |
| 18 | 992.415 | 315.224 |

Circle Center At X = 873.181 ; Y = 406.138 ; and Radius = 149.941

Factor of Safety
*** 1.761 ***

Failure Surface Specified By 18 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 851.000 | 258.000 |
| 2 | 860.937 | 256.876 |
| 3 | 870.925 | 256.393 |
| 4 | 880.924 | 256.554 |
| 5 | 890.891 | 257.358 |
| 6 | 900.787 | 258.802 |
| 7 | 910.568 | 260.879 |
| 8 | 920.196 | 263.582 |
| 9 | 929.630 | 266.898 |
| 10 | 938.831 | 270.815 |
| 11 | 947.761 | 275.315 |
| 12 | 956.383 | 280.381 |
| 13 | 964.661 | 285.991 |
| 14 | 972.561 | 292.122 |
| 15 | 980.050 | 298.749 |
| 16 | 987.098 | 305.844 |
| 17 | 993.674 | 313.378 |
| 18 | 995.589 | 315.880 |

Circle Center At X = 873.455 ; Y = 411.443 ; and Radius = 155.077

Factor of Safety
*** 1.762 ***

1

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 866.000 | 262.003 |
| 2 | 876.000 | 261.957 |

| | | |
|---|---|---|
| 3 | 885.982 | 262.554 |
| 4 | 895.905 | 263.791 |
| 5 | 905.729 | 265.663 |
| 6 | 915.411 | 268.162 |
| 7 | 924.913 | 271.278 |
| 8 | 934.196 | 274.998 |
| 9 | 943.220 | 279.306 |
| 10 | 951.949 | 284.186 |
| 11 | 960.346 | 289.616 |
| 12 | 968.377 | 295.574 |
| 13 | 976.009 | 302.036 |
| 14 | 983.209 | 308.975 |
| 15 | 988.095 | 314.330 |

Circle Center At X = 871.709 ; Y = 417.477 ; and Radius = 155.580

Factor of Safety
*** 1.768 ***

Failure Surface Specified By 17 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 853.000 | 258.000 |
| 2 | 862.903 | 256.609 |
| 3 | 872.883 | 255.986 |
| 4 | 882.882 | 256.132 |
| 5 | 892.840 | 257.048 |
| 6 | 902.698 | 258.729 |
| 7 | 912.397 | 261.163 |
| 8 | 921.880 | 264.338 |
| 9 | 931.090 | 268.233 |
| 10 | 939.973 | 272.826 |
| 11 | 948.476 | 278.089 |
| 12 | 956.548 | 283.992 |
| 13 | 964.142 | 290.498 |
| 14 | 971.212 | 297.570 |
| 15 | 977.716 | 305.166 |
| 16 | 983.616 | 313.240 |
| 17 | 983.732 | 313.427 |

Circle Center At X = 875.982 ; Y = 385.701 ; and Radius = 129.753

Factor of Safety
*** 1.770 ***

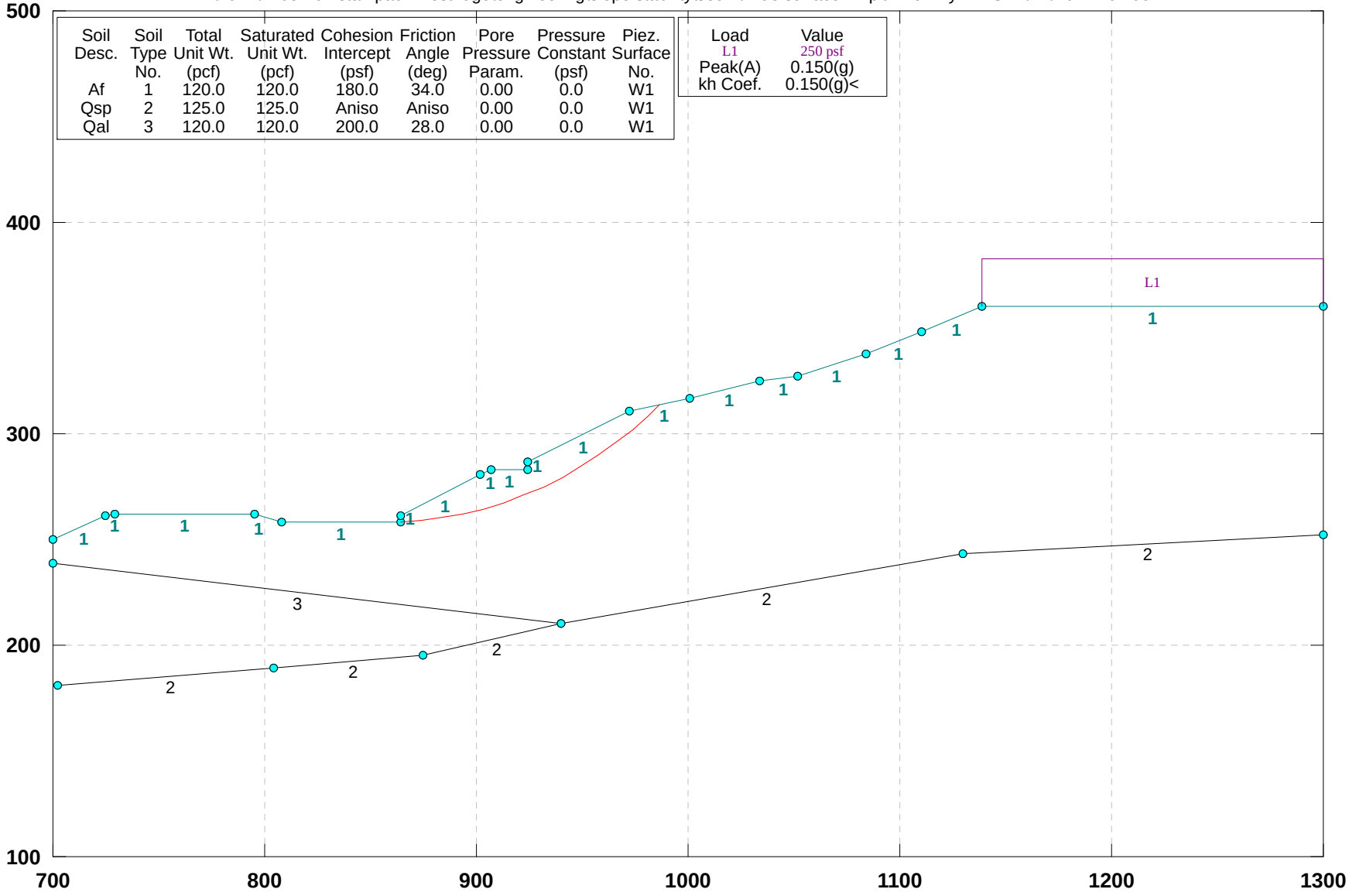
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 4-4'/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 4\x4ue surface #1.plt Run By: KMS 4/14/2017 01:06PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.42**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:06PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 4\x4ue.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 4\x4ue.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 4\x4ue.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 4-4'/
Upper Slope - Seismic

BOUNDARY COORDINATES

18 Top Boundaries

24 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 700.00 | 250.00 | 725.00 | 261.00 | 1 |
| 2 | 725.00 | 261.00 | 729.00 | 262.00 | 1 |
| 3 | 729.00 | 262.00 | 795.00 | 262.00 | 1 |
| 4 | 795.00 | 262.00 | 808.00 | 258.00 | 1 |
| 5 | 808.00 | 258.00 | 864.00 | 258.00 | 1 |
| 6 | 864.00 | 258.00 | 864.10 | 261.00 | 1 |
| 7 | 864.10 | 261.00 | 902.00 | 281.00 | 1 |
| 8 | 902.00 | 281.00 | 907.00 | 283.00 | 1 |
| 9 | 907.00 | 283.00 | 924.00 | 283.00 | 1 |
| 10 | 924.00 | 283.00 | 924.10 | 287.00 | 1 |
| 11 | 924.10 | 287.00 | 972.00 | 311.00 | 1 |
| 12 | 972.00 | 311.00 | 1001.00 | 317.00 | 1 |
| 13 | 1001.00 | 317.00 | 1034.00 | 325.00 | 1 |
| 14 | 1034.00 | 325.00 | 1052.00 | 327.00 | 1 |
| 15 | 1052.00 | 327.00 | 1084.00 | 338.00 | 1 |
| 16 | 1084.00 | 338.00 | 1110.00 | 348.00 | 1 |
| 17 | 1110.00 | 348.00 | 1139.00 | 360.00 | 1 |
| 18 | 1139.00 | 360.00 | 1300.00 | 360.00 | 1 |
| 19 | 700.00 | 239.00 | 940.00 | 210.00 | 3 |
| 20 | 940.00 | 210.00 | 1130.00 | 243.00 | 2 |
| 21 | 1130.00 | 243.00 | 1300.00 | 252.00 | 2 |
| 22 | 702.00 | 181.00 | 804.00 | 189.00 | 2 |
| 23 | 804.00 | 189.00 | 875.00 | 195.00 | 2 |
| 24 | 875.00 | 195.00 | 940.00 | 210.00 | 2 |

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

1

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 14.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1139.00 | 1300.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

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

5000 Trial Surfaces Have Been Generated.

200 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced

Along The Ground Surface Between X = 850.00(ft)
and X = 874.00(ft)

Each Surface Terminates Between X = 940.00(ft)
and X =1300.00(ft)

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

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

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 = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 2.962 FS Min = 1.417 FS Ave = 2.162
Standard Deviation = 0.392 Coefficient of Variation = 18.11 %

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.943 | 259.063 |
| 3 | 883.826 | 260.589 |
| 4 | 893.627 | 262.573 |
| 5 | 903.325 | 265.013 |
| 6 | 912.899 | 267.902 |
| 7 | 922.327 | 271.234 |
| 8 | 931.590 | 275.002 |
| 9 | 940.668 | 279.197 |
| 10 | 949.540 | 283.811 |
| 11 | 958.187 | 288.834 |
| 12 | 966.590 | 294.255 |
| 13 | 974.732 | 300.061 |
| 14 | 982.594 | 306.240 |
| 15 | 990.160 | 312.780 |
| 16 | 992.823 | 315.308 |

Circle Center At X = 846.294 ; Y = 471.247 ; and Radius = 213.981

Factor of Safety
*** 1.417 ***

Individual data on the 21 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1 | 17.9 | 0.0 | 0.0 | 0. | 0. | 2.7 | 0.0 | 0.0 |
| 2 | 9.8 | 5977.1 | 0.0 | 0.0 | 0. | 0. | 896.6 | 0.0 | 0.0 |
| 3 | 9.9 | 10645.0 | 0.0 | 0.0 | 0. | 0. | 1596.8 | 0.0 | 0.0 |
| 4 | 9.8 | 14601.1 | 0.0 | 0.0 | 0. | 0. | 2190.2 | 0.0 | 0.0 |
| 5 | 8.4 | 15235.9 | 0.0 | 0.0 | 0. | 0. | 2285.4 | 0.0 | 0.0 |
| 6 | 1.3 | 2611.0 | 0.0 | 0.0 | 0. | 0. | 391.6 | 0.0 | 0.0 |
| 7 | 3.7 | 7363.3 | 0.0 | 0.0 | 0. | 0. | 1104.5 | 0.0 | 0.0 |
| 8 | 5.9 | 11317.5 | 0.0 | 0.0 | 0. | 0. | 1697.6 | 0.0 | 0.0 |
| 9 | 9.4 | 15197.7 | 0.0 | 0.0 | 0. | 0. | 2279.7 | 0.0 | 0.0 |
| 10 | 1.7 | 2293.3 | 0.0 | 0.0 | 0. | 0. | 344.0 | 0.0 | 0.0 |
| 11 | 0.1 | 156.7 | 0.0 | 0.0 | 0. | 0. | 23.5 | 0.0 | 0.0 |
| 12 | 7.5 | 13841.0 | 0.0 | 0.0 | 0. | 0. | 2076.1 | 0.0 | 0.0 |
| 13 | 9.1 | 17349.6 | 0.0 | 0.0 | 0. | 0. | 2602.4 | 0.0 | 0.0 |
| 14 | 8.9 | 17054.6 | 0.0 | 0.0 | 0. | 0. | 2558.2 | 0.0 | 0.0 |
| 15 | 8.6 | 16176.9 | 0.0 | 0.0 | 0. | 0. | 2426.5 | 0.0 | 0.0 |
| 16 | 8.4 | 14763.1 | 0.0 | 0.0 | 0. | 0. | 2214.5 | 0.0 | 0.0 |
| 17 | 5.4 | 8738.8 | 0.0 | 0.0 | 0. | 0. | 1310.8 | 0.0 | 0.0 |
| 18 | 2.7 | 3998.1 | 0.0 | 0.0 | 0. | 0. | 599.7 | 0.0 | 0.0 |
| 19 | 7.9 | 8706.3 | 0.0 | 0.0 | 0. | 0. | 1305.9 | 0.0 | 0.0 |
| 20 | 7.6 | 4053.3 | 0.0 | 0.0 | 0. | 0. | 608.0 | 0.0 | 0.0 |
| 21 | 2.7 | 316.1 | 0.0 | 0.0 | 0. | 0. | 47.4 | 0.0 | 0.0 |

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.964 | 258.843 |
| 3 | 883.874 | 260.184 |
| 4 | 893.704 | 262.020 |
| 5 | 903.430 | 264.346 |
| 6 | 913.027 | 267.157 |
| 7 | 922.470 | 270.445 |
| 8 | 931.738 | 274.203 |
| 9 | 940.805 | 278.420 |
| 10 | 949.649 | 283.086 |
| 11 | 958.249 | 288.190 |
| 12 | 966.582 | 293.718 |
| 13 | 974.627 | 299.657 |
| 14 | 982.365 | 305.992 |
| 15 | 989.776 | 312.706 |

| | | |
|---|---|---|
| 16 | 992.256 | 315.191 |

Circle Center At X = 852.280 ; Y = 456.692 ; and Radius = 199.037

Factor of Safety
*** 1.418 ***

1

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.963 | 258.860 |
| 3 | 883.866 | 260.252 |
| 4 | 893.680 | 262.172 |
| 5 | 903.377 | 264.615 |
| 6 | 912.929 | 267.573 |
| 7 | 922.310 | 271.037 |
| 8 | 931.492 | 274.999 |
| 9 | 940.448 | 279.447 |
| 10 | 949.154 | 284.367 |
| 11 | 957.584 | 289.746 |
| 12 | 965.714 | 295.568 |
| 13 | 973.521 | 301.817 |
| 14 | 980.983 | 308.475 |
| 15 | 986.555 | 314.011 |

Circle Center At X = 852.917 ; Y = 444.485 ; and Radius = 186.814

Factor of Safety
*** 1.421 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.890 | 259.479 |
| 3 | 883.697 | 261.435 |
| 4 | 893.397 | 263.863 |
| 5 | 902.969 | 266.760 |
| 6 | 912.389 | 270.116 |
| 7 | 921.635 | 273.925 |
| 8 | 930.686 | 278.178 |
| 9 | 939.520 | 282.864 |
| 10 | 948.116 | 287.972 |
| 11 | 956.455 | 293.491 |
| 12 | 964.517 | 299.408 |
| 13 | 972.283 | 305.709 |
| 14 | 979.734 | 312.378 |
| 15 | 980.019 | 312.659 |

Circle Center At X = 838.450 ; Y = 462.727 ; and Radius = 206.315

Factor of Safety
*** 1.441 ***

1

Failure Surface Specified By 19 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 874.000 | 258.093 |
| 3 | 883.984 | 258.641 |
| 4 | 893.934 | 259.645 |
| 5 | 903.827 | 261.101 |
| 6 | 913.644 | 263.007 |
| 7 | 923.364 | 265.359 |
| 8 | 932.966 | 268.151 |
| 9 | 942.430 | 271.379 |
| 10 | 951.738 | 275.035 |
| 11 | 960.869 | 279.112 |
| 12 | 969.805 | 283.602 |
| 13 | 978.526 | 288.494 |
| 14 | 987.016 | 293.779 |
| 15 | 995.255 | 299.446 |
| 16 | 1003.228 | 305.482 |
| 17 | 1010.916 | 311.876 |
| 18 | 1018.305 | 318.614 |
| 19 | 1021.716 | 322.022 |

Circle Center At X = 866.973 ; Y = 477.147 ; and Radius = 219.167

Factor of Safety
*** 1.461 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.986 | 257.473 |
| 3 | 883.983 | 257.701 |
| 4 | 893.935 | 258.683 |
| 5 | 903.784 | 260.413 |
| 6 | 913.475 | 262.882 |
| 7 | 922.951 | 266.076 |
| 8 | 932.159 | 269.976 |
| 9 | 941.047 | 274.560 |
| 10 | 949.563 | 279.801 |
| 11 | 957.659 | 285.671 |
| 12 | 965.289 | 292.135 |
| 13 | 972.409 | 299.157 |
| 14 | 978.979 | 306.696 |
| 15 | 984.053 | 313.494 |

Circle Center At X = 875.969 ; Y = 389.828 ; and Radius = 132.370

Factor of Safety
*** 1.464 ***

1

Failure Surface Specified By 18 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 851.000 | 258.000 |
| 2 | 860.937 | 256.876 |
| 3 | 870.925 | 256.393 |
| 4 | 880.924 | 256.554 |
| 5 | 890.891 | 257.358 |
| 6 | 900.787 | 258.802 |
| 7 | 910.568 | 260.879 |
| 8 | 920.196 | 263.582 |
| 9 | 929.630 | 266.898 |
| 10 | 938.831 | 270.815 |
| 11 | 947.761 | 275.315 |
| 12 | 956.383 | 280.381 |
| 13 | 964.661 | 285.991 |
| 14 | 972.561 | 292.122 |
| 15 | 980.050 | 298.749 |
| 16 | 987.098 | 305.844 |
| 17 | 993.674 | 313.378 |
| 18 | 995.589 | 315.880 |

Circle Center At X = 873.455 ; Y = 411.443 ; and Radius = 155.077

Factor of Safety
*** 1.467 ***

Failure Surface Specified By 17 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 865.000 | 261.475 |
| 2 | 874.996 | 261.747 |
| 3 | 884.967 | 262.506 |
| 4 | 894.890 | 263.750 |
| 5 | 904.740 | 265.476 |
| 6 | 914.494 | 267.680 |
| 7 | 924.129 | 270.356 |
| 8 | 933.622 | 273.499 |
| 9 | 942.951 | 277.101 |
| 10 | 952.093 | 281.154 |
| 11 | 961.027 | 285.647 |
| 12 | 969.731 | 290.570 |
| 13 | 978.185 | 295.911 |
| 14 | 986.369 | 301.658 |
| 15 | 994.263 | 307.797 |
| 16 | 1001.848 | 314.313 |
| 17 | 1005.949 | 318.200 |

Circle Center At X = 864.419 ; Y = 466.612 ; and Radius = 205.138

Factor of Safety
*** 1.468 ***

1

Failure Surface Specified By 17 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 866.000 | 262.003 |
| 2 | 875.989 | 262.472 |
| 3 | 885.944 | 263.423 |
| 4 | 895.841 | 264.854 |
| 5 | 905.657 | 266.762 |
| 6 | 915.370 | 269.141 |
| 7 | 924.957 | 271.986 |
| 8 | 934.395 | 275.291 |
| 9 | 943.662 | 279.049 |
| 10 | 952.737 | 283.249 |
| 11 | 961.599 | 287.883 |
| 12 | 970.226 | 292.939 |
| 13 | 978.599 | 298.406 |
| 14 | 986.699 | 304.271 |
| 15 | 994.506 | 310.520 |
| 16 | 1002.001 | 317.139 |
| 17 | 1002.143 | 317.277 |

Circle Center At X = 861.280 ; Y = 468.944 ; and Radius = 206.995

Factor of Safety
*** 1.469 ***

Failure Surface Specified By 18 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 850.000 | 258.000 |
| 2 | 859.926 | 256.786 |
| 3 | 869.911 | 256.236 |
| 4 | 879.910 | 256.352 |
| 5 | 889.880 | 257.134 |
| 6 | 899.775 | 258.578 |
| 7 | 909.552 | 260.679 |
| 8 | 919.167 | 263.425 |
| 9 | 928.578 | 266.806 |
| 10 | 937.743 | 270.806 |
| 11 | 946.622 | 275.408 |
| 12 | 955.174 | 280.591 |
| 13 | 963.361 | 286.332 |
| 14 | 971.149 | 292.606 |
| 15 | 978.501 | 299.384 |
| 16 | 985.385 | 306.637 |
| 17 | 991.771 | 314.333 |
| 18 | 992.415 | 315.224 |

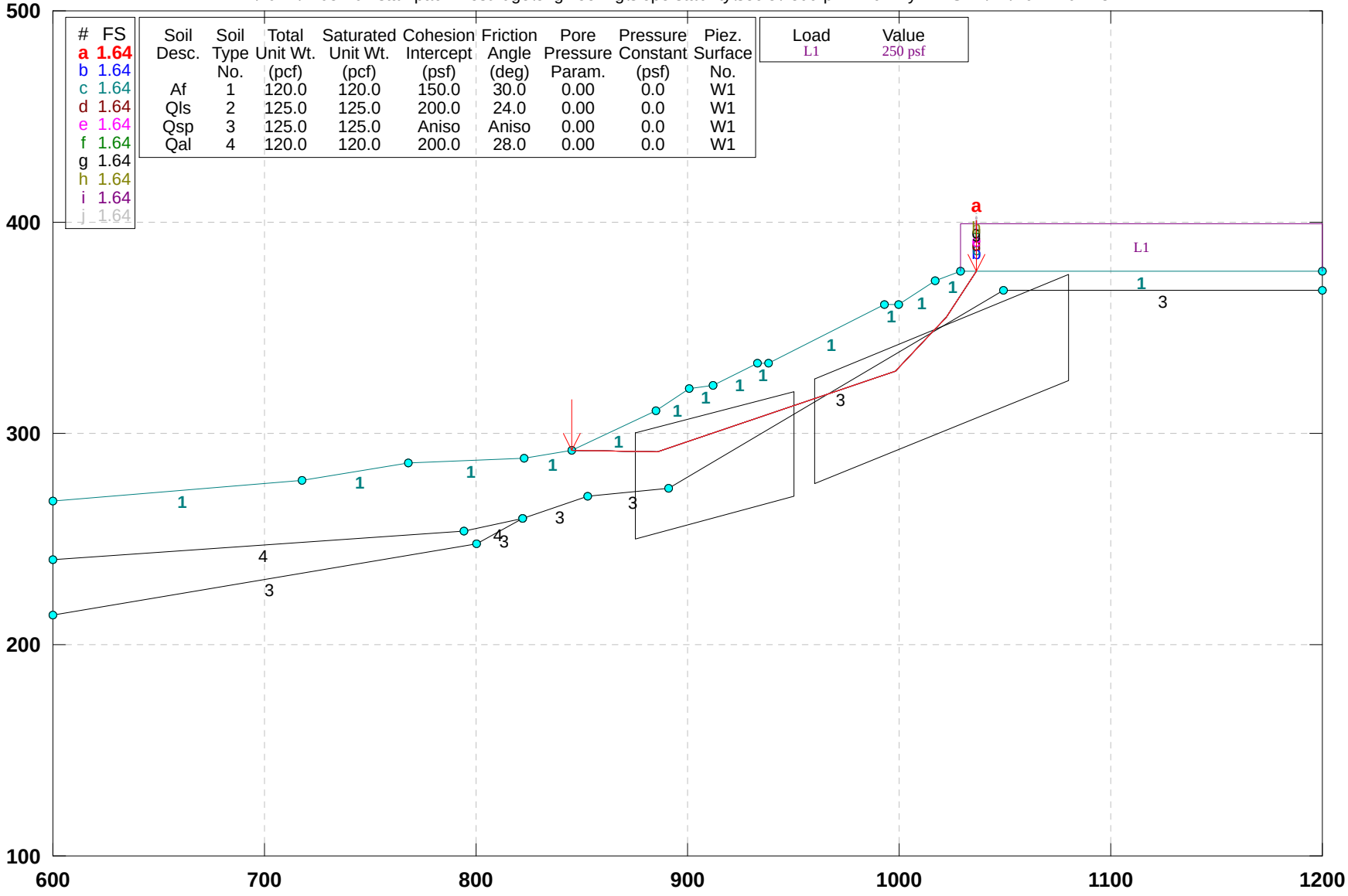
Circle Center At X = 873.181 ; Y = 406.138 ; and Radius = 149.941

Factor of Safety
*** 1.469 ***

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

# Westridge/14057-01/Sec 5-5'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 5\x5du.pl2 Run By: KMS 4/14/2017 01:13PM



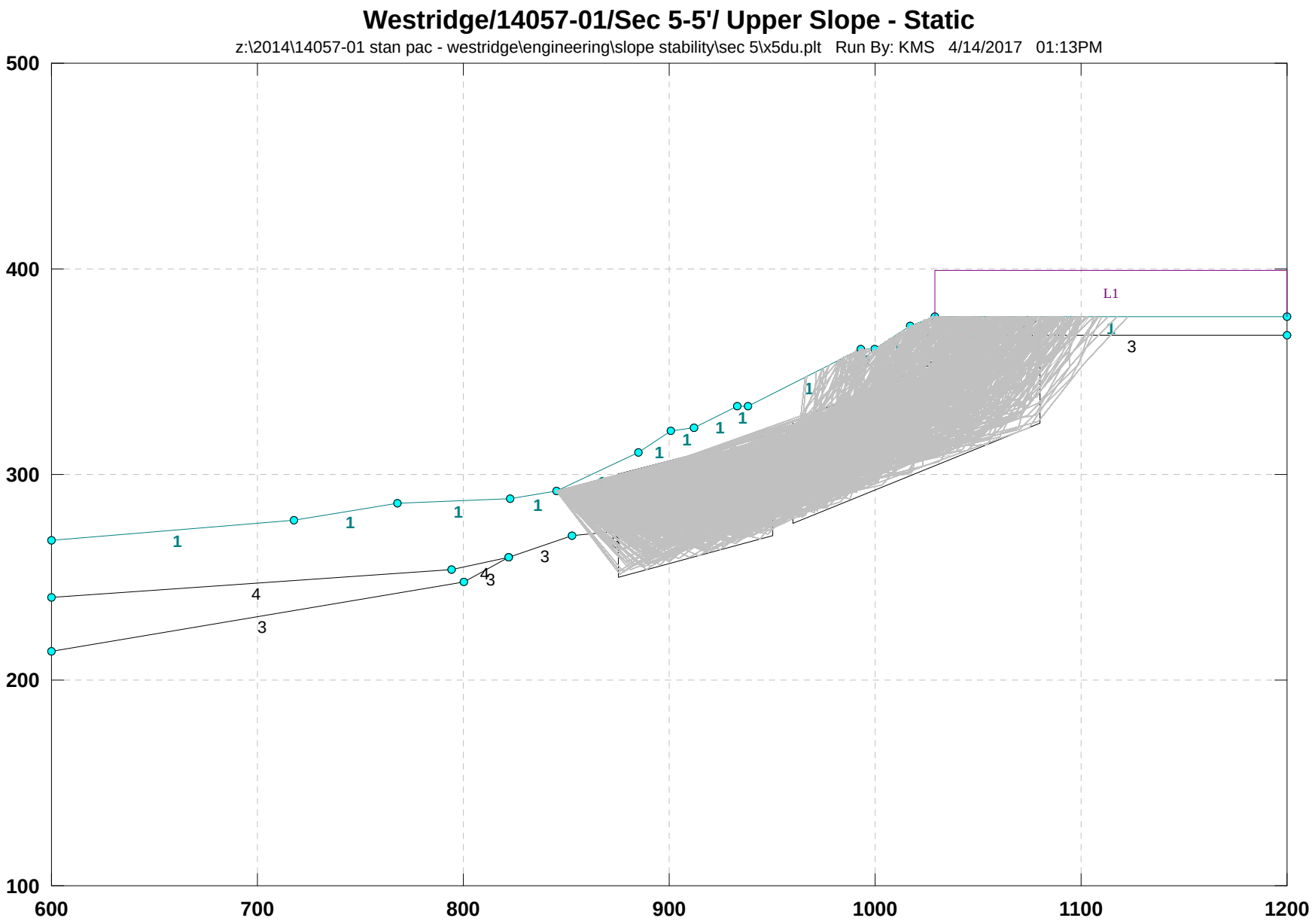

| # | FS |
|---|---|
| a | 1.64 |
| b | 1.64 |
| c | 1.64 |
| d | 1.64 |
| e | 1.64 |
| f | 1.64 |
| g | 1.64 |
| h | 1.64 |
| i | 1.64 |
| j | 1.64 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=1.64**

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


Westridge/14057-01/Sec 5-5'/ Upper Slope - Static
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500
400
300
200
100
600
700
800
900
1000
1100
1200
L1
1
3
4

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:13PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5du.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5du.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5du.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 5-5'/
Upper Slope - Static

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 268.00 | 718.00 | 278.00 | 1 |
| 2 | 718.00 | 278.00 | 768.00 | 286.00 | 1 |
| 3 | 768.00 | 286.00 | 823.00 | 288.00 | 1 |
| 4 | 823.00 | 288.00 | 845.00 | 292.00 | 1 |
| 5 | 845.00 | 292.00 | 885.00 | 311.00 | 1 |
| 6 | 885.00 | 311.00 | 901.00 | 321.00 | 1 |
| 7 | 901.00 | 321.00 | 912.00 | 323.00 | 1 |
| 8 | 912.00 | 323.00 | 933.00 | 333.00 | 1 |
| 9 | 933.00 | 333.00 | 938.00 | 333.00 | 1 |
| 10 | 938.00 | 333.00 | 993.00 | 361.00 | 1 |
| 11 | 993.00 | 361.00 | 1000.00 | 361.00 | 1 |
| 12 | 1000.00 | 361.00 | 1017.00 | 372.00 | 1 |
| 13 | 1017.00 | 372.00 | 1029.00 | 377.00 | 1 |
| 14 | 1029.00 | 377.00 | 1200.00 | 377.00 | 1 |
| 15 | 600.00 | 240.00 | 794.00 | 254.00 | 4 |
| 16 | 794.00 | 254.00 | 822.00 | 260.00 | 4 |
| 17 | 822.00 | 260.00 | 853.00 | 270.00 | 3 |
| 18 | 853.00 | 270.00 | 891.00 | 274.00 | 3 |
| 19 | 891.00 | 274.00 | 1049.00 | 368.00 | 3 |
| 20 | 1049.00 | 368.00 | 1200.00 | 368.00 | 3 |
| 21 | 600.00 | 214.00 | 800.00 | 248.00 | 3 |
| 22 | 800.00 | 248.00 | 822.00 | 260.00 | 3 |

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 22.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1029.00 | 1200.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

3 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 35.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 845.00 | 292.00 | 845.00 | 292.00 | 0.00 |
| 2 | 875.00 | 275.00 | 950.00 | 295.00 | 50.00 |
| 3 | 960.00 | 301.00 | 1080.00 | 350.00 | 50.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |

| | | |
|---|---|---|
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

Individual data on the 15 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 40.0 | 47527.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 1.1 | 2640.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 14.9 | 40429.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 11.0 | 31411.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 21.0 | 61202.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 5.0 | 14885.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 28.3 | 89226.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 26.7 | 99175.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 5.1 | 19769.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 1.9 | 7047.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 15.7 | 49493.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 1.3 | 3521.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 5.3 | 13120.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 6.7 | 12359.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 7.3 | 4990.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1823.0 |

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety
*** 1.640 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 845.000 | 292.000 |

| | | |
|---|---|---|
| 2 | 886.092 | 291.175 |
| 3 | 998.079 | 329.742 |
| 4 | 1022.257 | 355.048 |
| 5 | 1036.292 | 377.000 |

Factor of Safety

*** 1.640 ***

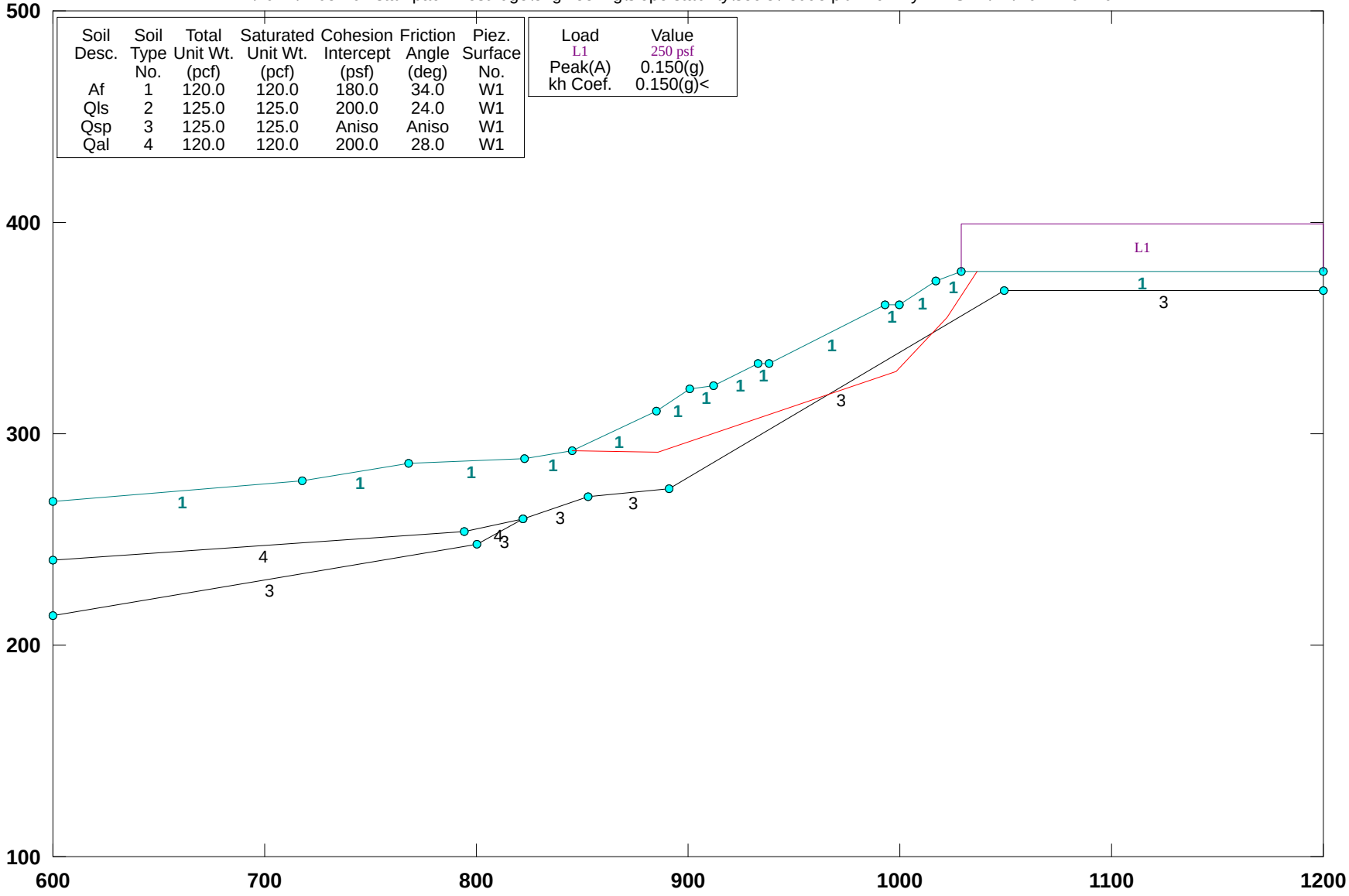
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 5-5'/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 5\x5due.plt Run By: KMS 4/14/2017 01:20PM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.33**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:20PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5due.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5due.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5due.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 5-5'/
Upper Slope - Seismic

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 268.00 | 718.00 | 278.00 | 1 |
| 2 | 718.00 | 278.00 | 768.00 | 286.00 | 1 |
| 3 | 768.00 | 286.00 | 823.00 | 288.00 | 1 |
| 4 | 823.00 | 288.00 | 845.00 | 292.00 | 1 |
| 5 | 845.00 | 292.00 | 885.00 | 311.00 | 1 |
| 6 | 885.00 | 311.00 | 901.00 | 321.00 | 1 |
| 7 | 901.00 | 321.00 | 912.00 | 323.00 | 1 |
| 8 | 912.00 | 323.00 | 933.00 | 333.00 | 1 |
| 9 | 933.00 | 333.00 | 938.00 | 333.00 | 1 |
| 10 | 938.00 | 333.00 | 993.00 | 361.00 | 1 |
| 11 | 993.00 | 361.00 | 1000.00 | 361.00 | 1 |
| 12 | 1000.00 | 361.00 | 1017.00 | 372.00 | 1 |
| 13 | 1017.00 | 372.00 | 1029.00 | 377.00 | 1 |
| 14 | 1029.00 | 377.00 | 1200.00 | 377.00 | 1 |
| 15 | 600.00 | 240.00 | 794.00 | 254.00 | 4 |
| 16 | 794.00 | 254.00 | 822.00 | 260.00 | 4 |
| 17 | 822.00 | 260.00 | 853.00 | 270.00 | 3 |
| 18 | 853.00 | 270.00 | 891.00 | 274.00 | 3 |
| 19 | 891.00 | 274.00 | 1049.00 | 368.00 | 3 |
| 20 | 1049.00 | 368.00 | 1200.00 | 368.00 | 3 |
| 21 | 600.00 | 214.00 | 800.00 | 248.00 | 3 |
| 22 | 800.00 | 248.00 | 822.00 | 260.00 | 3 |

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |

```
            2   125.0    125.0     200.0     24.0    0.00       0.0
1
            3   125.0    125.0     500.0     34.0    0.00       0.0
1
            4   120.0    120.0     200.0     28.0    0.00       0.0
1


          ANISOTROPIC STRENGTH PARAMETERS
               1 soil type(s)


           Soil Type  3 Is Anisotropic

           Number Of Direction Ranges Specified =  3


           Direction    Counterclockwise     Cohesion     Friction
             Range       Direction Limit    Intercept       Angle
              No.            (deg)            (psf)         (deg)

               1              7.0             500.00         34.00
               2             22.0             200.00         27.00
               3             90.0             500.00         34.00

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

1


          BOUNDARY LOAD(S)

               1 Load(s) Specified


           Load        X-Left      X-Right     Intensity     Deflection
            No.          (ft)        (ft)        (psf)         (deg)


             1        1029.00      1200.00        250.0          0.0


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

           Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
```

```
           Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
           Specified Vertical Earthquake Coefficient (kv) =   0.000(g)

           Specified Seismic Pore-Pressure Factor =   0.000


           Janbu's Empirical Coef. is being used for the case of  c & phi
both > 0
1


           Trial Failure Surface Specified By  5 Coordinate Points


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

               1        845.000      292.000
               2        886.092      291.175
               3        998.079      329.742
               4       1022.257      355.048
               5       1036.292      377.000


           Janbu's Empirical Coefficient (fo) =  1.054

           * * Factor Of Safety Is Calculated By The Simplified Janbu
Method * *



           Factor Of Safety For The Preceding Specified Surface =  1.326


                ***Table 1 - Individual Data on the   15 Slices***

                                  Water  Water     Tie     Tie     Earthquake
                                  Force  Force    Force   Force       Force
Surcharge
 Slice  Width   Weight    Top     Bot     Norm     Tan     Hor      Ver
Load
  No.    (ft)    (lbs)   (lbs)   (lbs)    (lbs)   (lbs)   (lbs)    (lbs)
(lbs)

   1     40.0   47527.3     0.0     0.0      0.0     0.0  7129.1     0.0
0.0
   2      1.1    2641.2     0.0     0.0      0.0     0.0   396.2     0.0
0.0
   3     14.9   40428.9     0.0     0.0      0.0     0.0  6064.3     0.0
0.0
```

```
   4     11.0   31411.7     0.0     0.0      0.0     0.0  4711.8     0.0
0.0
   5     21.0   61202.0     0.0     0.0      0.0     0.0  9180.3     0.0
0.0
   6      5.0   14885.7     0.0     0.0      0.0     0.0  2232.9     0.0
0.0
   7     28.3   89229.7     0.0     0.0      0.0     0.0 13384.5     0.0
0.0
   8     26.7   99170.5     0.0     0.0      0.0     0.0 14875.6     0.0
0.0
   9      5.1   19770.1     0.0     0.0      0.0     0.0  2965.5     0.0
0.0
  10      1.9    7046.2     0.0     0.0      0.0     0.0  1056.9     0.0
0.0
  11     15.7   49492.2     0.0     0.0      0.0     0.0  7423.8     0.0
0.0
  12      1.3    3522.0     0.0     0.0      0.0     0.0   528.3     0.0
0.0
  13      5.3   13120.5     0.0     0.0      0.0     0.0  1968.1     0.0
0.0
  14      6.7   12358.9     0.0     0.0      0.0     0.0  1853.8     0.0
0.0
  15      7.3    4989.9     0.0     0.0      0.0     0.0   748.5     0.0
1823.0
```

***Table 2 - Base Stress Data on the 15 Slices***

```
 Slice   Alpha     X-Coord.      Base          Available
Mobilized
  No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear
Stress
   *                 (ft)        (ft)           (psf)
(psf)

   1      -1.15      865.00       40.01            991.77
154.34
   2      -1.15      885.55        1.09           1830.45
314.17
   3      19.00      893.55       15.77           1808.18
1267.66
   4      19.00      906.50       11.63           1895.42
1334.84
   5      19.00      922.50       22.21           1931.10
1362.31
   6      19.00      935.50        5.29           1969.19
1391.65
   7      19.00      952.15       29.93           2076.21
1474.06
   8      19.00      979.65       28.24           1954.16
1735.94
   9      19.00      995.54        5.37           2039.28
1819.55
  10      46.31      999.04        2.78           2809.24
3032.15
  11      46.31     1007.85       22.74           2479.75
2604.64
  12      46.31     1016.35        1.87           1906.50
2253.05
  13      46.31     1019.63        7.61           1760.16
2063.17
  14      57.41     1025.63       12.52           1464.13
1692.32
  15      57.41     1032.65       13.54            837.57
842.46

     Sum of the Resisting Forces (including Pier/Pile, Tieback,
Reinforcing
     Soil Nail, and Applied Forces if applicable) =  380829.44 (lbs)


     Average Available Shear Strength (including Tieback, Pier/Pile,
Reinforcing,
     Soil Nail, and Applied Forces if applicable) =   1726.36(psf)


     Sum of the Driving Forces =   302730.03 (lbs)


     Average Mobilized Shear Stress =    1372.32(psf)


     Total length of the failure surface =     220.60(ft)


           *** SEISMIC SLOPE DISPLACEMENT DATA ***
      (Note: kv is set = zero for displacement calculations)
      Seismic Yield Coefficient (ky) =  0.3010(g)
      Calculated Newmark Seismic Displacement =   0.004(ft)

      Non-Symmetrical Sliding Resistance Has Been Specified
      for Downhill Sliding.


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

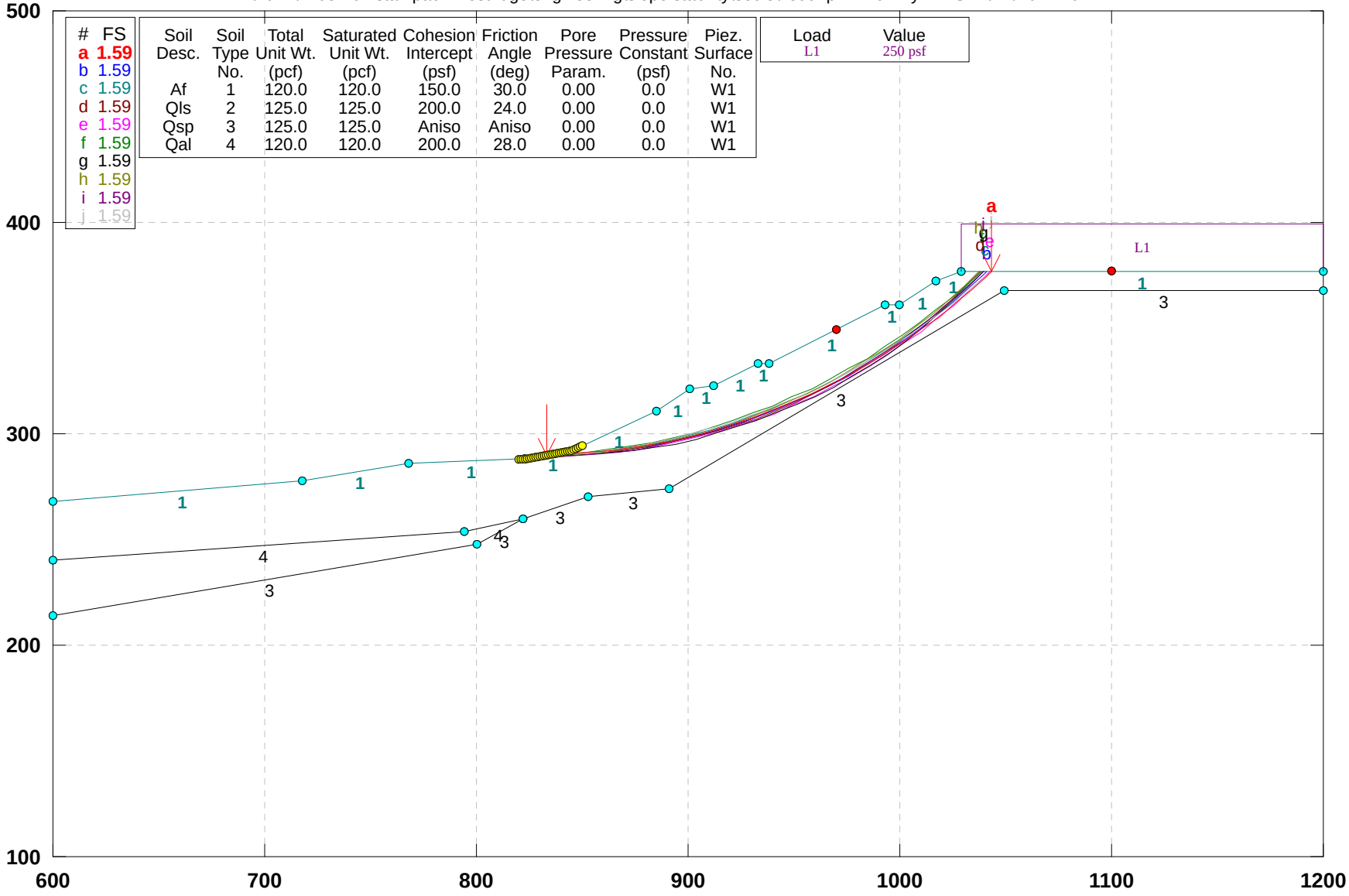
# Westridge/14057-01/Sec 5-5'/ Upper Slope - Rotational - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 5\x5dur.pl2 Run By: KMS 4/14/2017 01:17PM

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

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |




**GSTABL7 v.2 FSmin=1.59**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:17PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5dur.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5dur.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5dur.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 5-5'/
Upper Slope - Rotational - Static

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 268.00 | 718.00 | 278.00 | 1 |
| 2 | 718.00 | 278.00 | 768.00 | 286.00 | 1 |
| 3 | 768.00 | 286.00 | 823.00 | 288.00 | 1 |
| 4 | 823.00 | 288.00 | 845.00 | 292.00 | 1 |
| 5 | 845.00 | 292.00 | 885.00 | 311.00 | 1 |
| 6 | 885.00 | 311.00 | 901.00 | 321.00 | 1 |
| 7 | 901.00 | 321.00 | 912.00 | 323.00 | 1 |
| 8 | 912.00 | 323.00 | 933.00 | 333.00 | 1 |
| 9 | 933.00 | 333.00 | 938.00 | 333.00 | 1 |
| 10 | 938.00 | 333.00 | 993.00 | 361.00 | 1 |
| 11 | 993.00 | 361.00 | 1000.00 | 361.00 | 1 |
| 12 | 1000.00 | 361.00 | 1017.00 | 372.00 | 1 |
| 13 | 1017.00 | 372.00 | 1029.00 | 377.00 | 1 |
| 14 | 1029.00 | 377.00 | 1200.00 | 377.00 | 1 |
| 15 | 600.00 | 240.00 | 794.00 | 254.00 | 4 |
| 16 | 794.00 | 254.00 | 822.00 | 260.00 | 4 |
| 17 | 822.00 | 260.00 | 853.00 | 270.00 | 3 |
| 18 | 853.00 | 270.00 | 891.00 | 274.00 | 3 |
| 19 | 891.00 | 274.00 | 1049.00 | 368.00 | 3 |
| 20 | 1049.00 | 368.00 | 1200.00 | 368.00 | 3 |
| 21 | 600.00 | 214.00 | 800.00 | 248.00 | 3 |
| 22 | 800.00 | 248.00 | 822.00 | 260.00 | 3 |

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 22.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1029.00 | 1200.00 | 250.0 | 0.0 |

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

1

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

9982 Trial Surfaces Have Been Generated.

322 Surface(s) Initiate(s) From Each Of 31 Points Equally Spaced
Along The Ground Surface Between X = 820.00(ft)
and X = 850.00(ft)

Each Surface Terminates Between X = 970.00(ft)
and X =1100.00(ft)

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

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

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 = 0

Number of Trial Surfaces With Valid FS = 0

Statistical Data On All Valid FS Values:
FS Max = 0.000 FS Min = 500.000 FS Ave = NaN
Standard Deviation = 0.000 Coefficient of Variation = NaN %

Failure Surface Specified By 25 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 833.000 | 289.818 |
| 2 | 842.993 | 290.190 |
| 3 | 852.969 | 290.881 |
| 4 | 862.918 | 291.888 |
| 5 | 872.830 | 293.212 |
| 6 | 882.695 | 294.851 |
| 7 | 892.503 | 296.803 |
| 8 | 902.243 | 299.067 |
| 9 | 911.906 | 301.640 |
| 10 | 921.483 | 304.519 |
| 11 | 930.963 | 307.702 |
| 12 | 940.337 | 311.185 |
| 13 | 949.595 | 314.965 |
| 14 | 958.728 | 319.038 |
| 15 | 967.726 | 323.400 |
| 16 | 976.582 | 328.046 |
| 17 | 985.284 | 332.972 |
| 18 | 993.826 | 338.172 |
| 19 | 1002.197 | 343.642 |
| 20 | 1010.390 | 349.376 |
| 21 | 1018.396 | 355.367 |
| 22 | 1026.208 | 361.611 |
| 23 | 1033.816 | 368.100 |
| 24 | 1041.214 | 374.829 |
| 25 | 1043.454 | 377.000 |

Circle Center At X = 826.316 ; Y = 603.682 ; and Radius = 313.935

Factor of Safety
*** 1.587 ***

Individual data on the 0 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|

Failure Surface Specified By 25 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 832.000 | 289.636 |
| 2 | 841.997 | 289.897 |
| 3 | 851.979 | 290.489 |
| 4 | 861.936 | 291.413 |
| 5 | 871.857 | 292.667 |
| 6 | 881.731 | 294.250 |
| 7 | 891.547 | 296.161 |
| 8 | 901.294 | 298.396 |
| 9 | 910.961 | 300.954 |
| 10 | 920.538 | 303.832 |
| 11 | 930.014 | 307.026 |
| 12 | 939.379 | 310.533 |
| 13 | 948.622 | 314.350 |
| 14 | 957.733 | 318.471 |
| 15 | 966.703 | 322.893 |
| 16 | 975.520 | 327.611 |
| 17 | 984.176 | 332.618 |
| 18 | 992.660 | 337.911 |
| 19 | 1000.964 | 343.483 |
| 20 | 1009.078 | 349.327 |
| 21 | 1016.994 | 355.438 |
| 22 | 1024.702 | 361.808 |
| 23 | 1032.195 | 368.431 |
| 24 | 1039.463 | 375.300 |
| 25 | 1041.147 | 377.000 |

Circle Center At X = 829.159 ; Y = 590.570 ; and Radius = 300.947

Factor of Safety
*** 1.587 ***

1

Failure Surface Specified By 25 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 832.000 | 289.636 |
| 2 | 841.991 | 290.067 |
| 3 | 851.962 | 290.818 |
| 4 | 861.905 | 291.889 |
| 5 | 871.808 | 293.279 |
| 6 | 881.661 | 294.987 |
| 7 | 891.454 | 297.010 |
| 8 | 901.177 | 299.347 |
| 9 | 910.820 | 301.996 |
| 10 | 920.373 | 304.952 |
| 11 | 929.826 | 308.215 |

| | | |
|---|---|---|
| 12 | 939.169 | 311.779 |
| 13 | 948.393 | 315.642 |
| 14 | 957.488 | 319.799 |
| 15 | 966.444 | 324.247 |
| 16 | 975.253 | 328.980 |
| 17 | 983.906 | 333.993 |
| 18 | 992.393 | 339.282 |
| 19 | 1000.705 | 344.841 |
| 20 | 1008.835 | 350.664 |
| 21 | 1016.773 | 356.746 |
| 22 | 1024.512 | 363.079 |
| 23 | 1032.043 | 369.658 |
| 24 | 1039.359 | 376.476 |
| 25 | 1039.886 | 377.000 |

Circle Center At X = 823.609 ; Y = 600.661 ; and Radius = 311.138

Factor of Safety
*** 1.587 ***

Failure Surface Specified By 24 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 834.000 | 290.000 |
| 2 | 843.999 | 290.150 |
| 3 | 853.986 | 290.654 |
| 4 | 863.949 | 291.513 |
| 5 | 873.875 | 292.726 |
| 6 | 883.752 | 294.290 |
| 7 | 893.567 | 296.204 |
| 8 | 903.308 | 298.466 |
| 9 | 912.963 | 301.072 |
| 10 | 922.519 | 304.019 |
| 11 | 931.964 | 307.304 |
| 12 | 941.286 | 310.922 |
| 13 | 950.474 | 314.869 |
| 14 | 959.516 | 319.140 |
| 15 | 968.401 | 323.730 |
| 16 | 977.117 | 328.632 |
| 17 | 985.653 | 333.841 |
| 18 | 993.999 | 339.349 |
| 19 | 1002.144 | 345.151 |
| 20 | 1010.078 | 351.238 |
| 21 | 1017.791 | 357.603 |
| 22 | 1025.273 | 364.238 |
| 23 | 1032.514 | 371.134 |
| 24 | 1038.250 | 377.000 |

Circle Center At X = 834.818 ; Y = 571.341 ; and Radius = 281.342

Factor of Safety
*** 1.588 ***

1

Failure Surface Specified By 25 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 833.000 | 289.818 |
| 2 | 843.000 | 289.911 |
| 3 | 852.990 | 290.349 |
| 4 | 862.959 | 291.131 |
| 5 | 872.896 | 292.258 |
| 6 | 882.787 | 293.728 |
| 7 | 892.622 | 295.538 |
| 8 | 902.388 | 297.687 |
| 9 | 912.074 | 300.173 |
| 10 | 921.669 | 302.991 |
| 11 | 931.160 | 306.139 |
| 12 | 940.537 | 309.614 |
| 13 | 949.789 | 313.410 |
| 14 | 958.903 | 317.524 |
| 15 | 967.871 | 321.950 |
| 16 | 976.679 | 326.684 |
| 17 | 985.319 | 331.718 |
| 18 | 993.780 | 337.049 |
| 19 | 1002.052 | 342.669 |
| 20 | 1010.124 | 348.571 |
| 21 | 1017.988 | 354.748 |
| 22 | 1025.634 | 361.194 |
| 23 | 1033.052 | 367.900 |
| 24 | 1040.234 | 374.858 |
| 25 | 1042.298 | 377.000 |

Circle Center At X = 835.325 ; Y = 579.179 ; and Radius = 289.370

Factor of Safety
*** 1.589 ***

Failure Surface Specified By 24 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 833.000 | 289.818 |
| 2 | 842.982 | 290.420 |
| 3 | 852.940 | 291.333 |
| 4 | 862.865 | 292.558 |
| 5 | 872.746 | 294.093 |
| 6 | 882.575 | 295.936 |
| 7 | 892.341 | 298.086 |
| 8 | 902.035 | 300.540 |
| 9 | 911.648 | 303.296 |
| 10 | 921.170 | 306.352 |
| 11 | 930.591 | 309.704 |
| 12 | 939.903 | 313.349 |
| 13 | 949.097 | 317.283 |
| 14 | 958.162 | 321.504 |
| 15 | 967.092 | 326.006 |
| 16 | 975.876 | 330.785 |
| 17 | 984.506 | 335.836 |
| 18 | 992.974 | 341.156 |
| 19 | 1001.272 | 346.737 |
| 20 | 1009.390 | 352.575 |
| 21 | 1017.322 | 358.665 |
| 22 | 1025.060 | 364.999 |
| 23 | 1032.596 | 371.573 |
| 24 | 1038.438 | 377.000 |

Circle Center At X = 818.807 ; Y = 608.905 ; and Radius = 319.402

Factor of Safety
*** 1.589 ***

1

Failure Surface Specified By 24 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 834.000 | 290.000 |
| 2 | 844.000 | 289.983 |
| 3 | 853.994 | 290.331 |
| 4 | 863.969 | 291.044 |
| 5 | 873.910 | 292.121 |
| 6 | 883.806 | 293.560 |
| 7 | 893.643 | 295.360 |
| 8 | 903.407 | 297.518 |
| 9 | 913.086 | 300.032 |
| 10 | 922.667 | 302.897 |
| 11 | 932.136 | 306.111 |
| 12 | 941.482 | 309.668 |
| 13 | 950.692 | 313.564 |
| 14 | 959.753 | 317.795 |
| 15 | 968.654 | 322.353 |
| 16 | 977.382 | 327.234 |
| 17 | 985.926 | 332.430 |
| 18 | 994.274 | 337.935 |
| 19 | 1002.416 | 343.741 |
| 20 | 1010.340 | 349.841 |
| 21 | 1018.036 | 356.226 |
| 22 | 1025.494 | 362.888 |
| 23 | 1032.703 | 369.818 |
| 24 | 1039.647 | 377.000 |

Circle Center At X = 839.473 ; Y = 563.612 ; and Radius = 273.667

Factor of Safety
*** 1.590 ***

Failure Surface Specified By 25 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 831.000 | 289.455 |
| 2 | 840.995 | 289.773 |
| 3 | 850.974 | 290.426 |
| 4 | 860.925 | 291.414 |
| 5 | 870.837 | 292.735 |
| 6 | 880.700 | 294.387 |
| 7 | 890.501 | 296.370 |
| 8 | 900.231 | 298.680 |
| 9 | 909.877 | 301.315 |
| 10 | 919.430 | 304.272 |
| 11 | 928.878 | 307.548 |
| 12 | 938.211 | 311.138 |
| 13 | 947.419 | 315.040 |
| 14 | 956.490 | 319.249 |
| 15 | 965.415 | 323.759 |
| 16 | 974.184 | 328.566 |
| 17 | 982.786 | 333.665 |
| 18 | 991.213 | 339.049 |

| | | |
|---|---|---|
| 19 | 999.455 | 344.713 |
| 20 | 1007.501 | 350.650 |
| 21 | 1015.345 | 356.853 |
| 22 | 1022.975 | 363.316 |
| 23 | 1030.385 | 370.032 |
| 24 | 1037.565 | 376.992 |
| 25 | 1037.573 | 377.000 |

Circle Center At X = 826.510 ; Y = 587.538 ; and Radius = 298.118

Factor of Safety
*** 1.590 ***

1

Failure Surface Specified By 25 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 828.000 | 288.909 |
| 2 | 837.999 | 289.059 |
| 3 | 847.987 | 289.546 |
| 4 | 857.953 | 290.369 |
| 5 | 867.886 | 291.528 |
| 6 | 877.773 | 293.022 |
| 7 | 887.605 | 294.848 |
| 8 | 897.370 | 297.005 |
| 9 | 907.056 | 299.490 |
| 10 | 916.653 | 302.301 |
| 11 | 926.150 | 305.433 |
| 12 | 935.535 | 308.884 |
| 13 | 944.799 | 312.650 |
| 14 | 953.931 | 316.726 |
| 15 | 962.920 | 321.108 |
| 16 | 971.755 | 325.791 |
| 17 | 980.428 | 330.769 |
| 18 | 988.928 | 336.036 |
| 19 | 997.246 | 341.588 |
| 20 | 1005.372 | 347.417 |
| 21 | 1013.296 | 353.516 |
| 22 | 1021.010 | 359.880 |
| 23 | 1028.505 | 366.500 |
| 24 | 1035.772 | 373.369 |
| 25 | 1039.363 | 377.000 |

Circle Center At X = 828.564 ; Y = 585.311 ; and Radius = 296.403

Factor of Safety
*** 1.591 ***

Failure Surface Specified By 25 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 828.000 | 288.909 |
| 2 | 837.985 | 289.452 |
| 3 | 847.950 | 290.288 |
| 4 | 857.886 | 291.417 |
| 5 | 867.785 | 292.838 |
| 6 | 877.637 | 294.549 |
| 7 | 887.435 | 296.550 |
| 8 | 897.170 | 298.837 |
| 9 | 906.833 | 301.410 |
| 10 | 916.417 | 304.265 |
| 11 | 925.912 | 307.402 |
| 12 | 935.312 | 310.816 |
| 13 | 944.606 | 314.505 |
| 14 | 953.788 | 318.466 |
| 15 | 962.850 | 322.695 |
| 16 | 971.783 | 327.189 |
| 17 | 980.581 | 331.944 |
| 18 | 989.235 | 336.955 |
| 19 | 997.737 | 342.218 |
| 20 | 1006.082 | 347.729 |
| 21 | 1014.260 | 353.484 |
| 22 | 1022.266 | 359.476 |
| 23 | 1030.092 | 365.701 |
| 24 | 1037.732 | 372.154 |
| 25 | 1043.139 | 377.000 |

Circle Center At X = 814.532 ; Y = 628.669 ; and Radius = 340.027

Factor of Safety
*** 1.592 ***

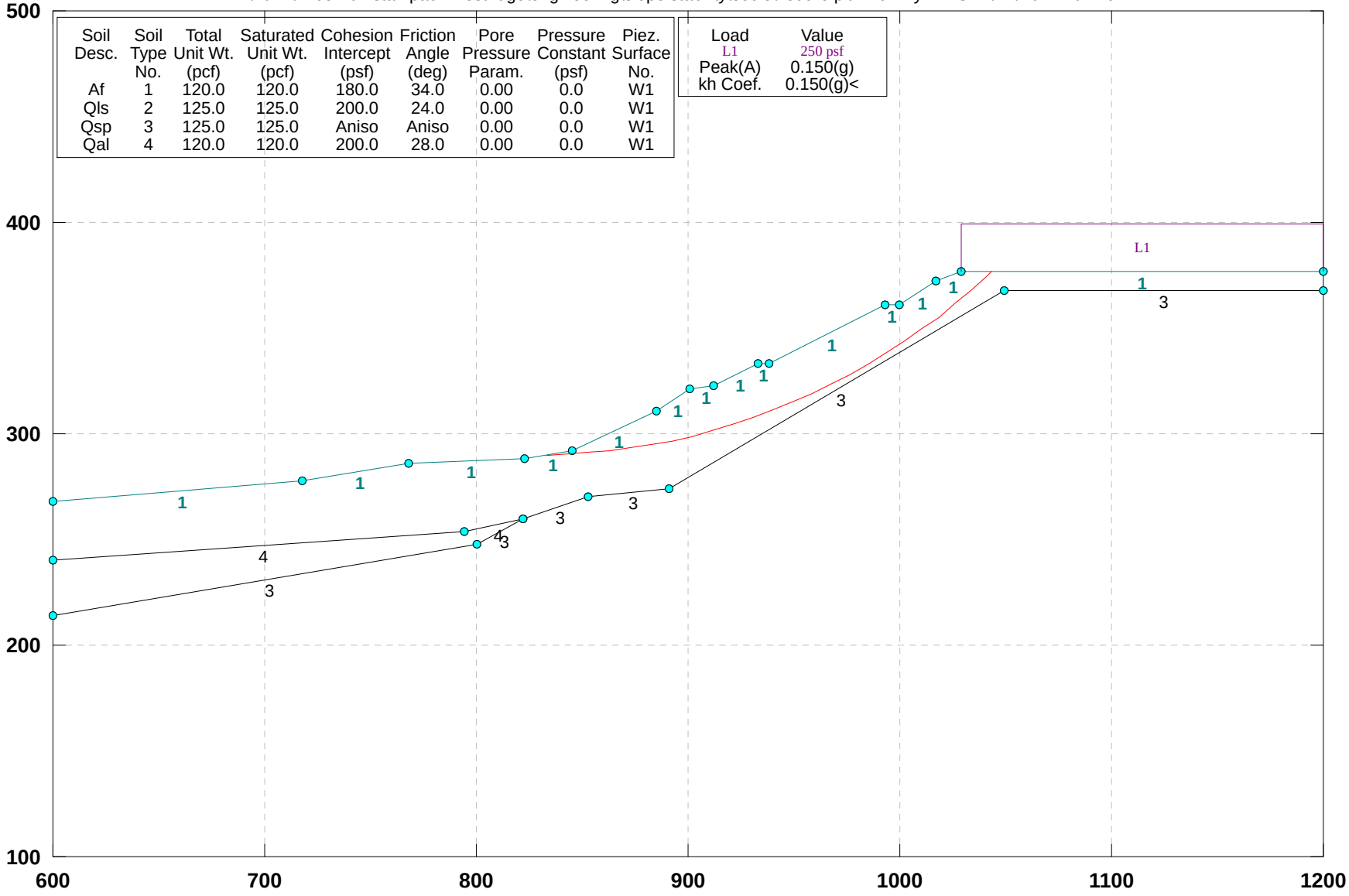
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 5-5'/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 5\x5dure.plt Run By: KMS 4/14/2017 01:19PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.33**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:19PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5dure.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5dure.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5dure.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 5-5'/
Upper Slope - Seismic

BOUNDARY COORDINATES

14 Top Boundaries

22 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 268.00 | 718.00 | 278.00 | 1 |
| 2 | 718.00 | 278.00 | 768.00 | 286.00 | 1 |
| 3 | 768.00 | 286.00 | 823.00 | 288.00 | 1 |
| 4 | 823.00 | 288.00 | 845.00 | 292.00 | 1 |
| 5 | 845.00 | 292.00 | 885.00 | 311.00 | 1 |
| 6 | 885.00 | 311.00 | 901.00 | 321.00 | 1 |
| 7 | 901.00 | 321.00 | 912.00 | 323.00 | 1 |
| 8 | 912.00 | 323.00 | 933.00 | 333.00 | 1 |
| 9 | 933.00 | 333.00 | 938.00 | 333.00 | 1 |
| 10 | 938.00 | 333.00 | 993.00 | 361.00 | 1 |
| 11 | 993.00 | 361.00 | 1000.00 | 361.00 | 1 |
| 12 | 1000.00 | 361.00 | 1017.00 | 372.00 | 1 |
| 13 | 1017.00 | 372.00 | 1029.00 | 377.00 | 1 |
| 14 | 1029.00 | 377.00 | 1200.00 | 377.00 | 1 |
| 15 | 600.00 | 240.00 | 794.00 | 254.00 | 4 |
| 16 | 794.00 | 254.00 | 822.00 | 260.00 | 4 |
| 17 | 822.00 | 260.00 | 853.00 | 270.00 | 3 |
| 18 | 853.00 | 270.00 | 891.00 | 274.00 | 3 |
| 19 | 891.00 | 274.00 | 1049.00 | 368.00 | 3 |
| 20 | 1049.00 | 368.00 | 1200.00 | 368.00 | 3 |
| 21 | 600.00 | 214.00 | 800.00 | 248.00 | 3 |
| 22 | 800.00 | 248.00 | 822.00 | 260.00 | 3 |

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 |

1

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 22.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1029.00 | 1200.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)

Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

Janbu's Empirical Coef. is being used for the case of c & phi both > 0
1

Trial Failure Surface Specified By 25 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 833.000 | 289.818 |
| 2 | 842.993 | 290.190 |
| 3 | 852.969 | 290.881 |
| 4 | 862.918 | 291.888 |
| 5 | 872.830 | 293.212 |
| 6 | 882.695 | 294.851 |
| 7 | 892.503 | 296.803 |
| 8 | 902.243 | 299.067 |
| 9 | 911.906 | 301.640 |
| 10 | 921.483 | 304.519 |
| 11 | 930.963 | 307.702 |
| 12 | 940.337 | 311.185 |
| 13 | 949.595 | 314.965 |
| 14 | 958.728 | 319.038 |
| 15 | 967.726 | 323.400 |
| 16 | 976.582 | 328.046 |
| 17 | 985.284 | 332.972 |
| 18 | 993.826 | 338.172 |
| 19 | 1002.197 | 343.642 |
| 20 | 1010.390 | 349.376 |
| 21 | 1018.396 | 355.367 |
| 22 | 1026.208 | 361.611 |
| 23 | 1033.816 | 368.100 |
| 24 | 1041.214 | 374.829 |
| 25 | 1043.454 | 377.000 |

Janbu's Empirical Coefficient (fo) = 1.041

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.330

***Table 1 - Individual Data on the 34 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.0 | 866.5 | 0.0 | 0.0 | 0.0 | 0.0 | 130.0 | 0.0 | 0.0 |
| 2 | 2.0 | 375.2 | 0.0 | 0.0 | 0.0 | 0.0 | 56.3 | 0.0 | 0.0 |
| 3 | 8.0 | 3143.9 | 0.0 | 0.0 | 0.0 | 0.0 | 471.6 | 0.0 | 0.0 |
| 4 | 9.9 | 8075.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1211.3 | 0.0 | 0.0 |
| 5 | 9.9 | 12269.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1840.4 | 0.0 | 0.0 |
| 6 | 9.9 | 16017.6 | 0.0 | 0.0 | 0.0 | 0.0 | 2402.6 | 0.0 | 0.0 |
| 7 | 2.3 | 4251.9 | 0.0 | 0.0 | 0.0 | 0.0 | 637.8 | 0.0 | 0.0 |
| 8 | 7.5 | 15565.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2334.9 | 0.0 | 0.0 |
| 9 | 8.5 | 20957.8 | 0.0 | 0.0 | 0.0 | 0.0 | 3143.7 | 0.0 | 0.0 |
| 10 | 1.2 | 3309.9 | 0.0 | 0.0 | 0.0 | 0.0 | 496.5 | 0.0 | 0.0 |
| 11 | 9.7 | 25221.6 | 0.0 | 0.0 | 0.0 | 0.0 | 3783.2 | 0.0 | 0.0 |
| 12 | 0.1 | 240.7 | 0.0 | 0.0 | 0.0 | 0.0 | 36.1 | 0.0 | 0.0 |
| 13 | 9.5 | 25222.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3783.3 | 0.0 | 0.0 |
| 14 | 9.5 | 26918.2 | 0.0 | 0.0 | 0.0 | 0.0 | 4037.7 | 0.0 | 0.0 |
| 15 | 2.0 | 5972.7 | 0.0 | 0.0 | 0.0 | 0.0 | 895.9 | 0.0 | 0.0 |
| 16 | 5.0 | 14167.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2125.1 | 0.0 | 0.0 |
| 17 | 2.3 | 6406.5 | 0.0 | 0.0 | 0.0 | 0.0 | 961.0 | 0.0 | 0.0 |
| 18 | 9.3 | 26075.7 | 0.0 | 0.0 | 0.0 | 0.0 | 3911.4 | 0.0 | 0.0 |
| 19 | 9.1 | 26550.9 | 0.0 | 0.0 | 0.0 | 0.0 | 3982.6 | 0.0 | 0.0 |
| 20 | 9.0 | 26587.8 | 0.0 | 0.0 | 0.0 | 0.0 | 3988.2 | 0.0 | 0.0 |
| 21 | 8.9 | 26211.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3931.7 | 0.0 | 0.0 |
| 22 | 8.7 | 25425.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3813.8 | 0.0 | 0.0 |
| 23 | 7.7 | 21958.3 | 0.0 | 0.0 | 0.0 | 0.0 | 3293.8 | 0.0 | 0.0 |
| 24 | 0.8 | 2287.6 | 0.0 | 0.0 | 0.0 | 0.0 | 343.1 | 0.0 | 0.0 |
| 25 | 6.2 | 15418.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2312.8 | 0.0 | 0.0 |
| 26 | 2.2 | 4952.9 | 0.0 | 0.0 | 0.0 | 0.0 | 742.9 | 0.0 | 0.0 |
| 27 | 8.2 | 18250.6 | 0.0 | 0.0 | 0.0 | 0.0 | 2737.6 | 0.0 | 0.0 |
| 28 | 6.6 | 14287.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2143.1 | 0.0 | 0.0 |
| 29 | 1.4 | 2922.6 | 0.0 | 0.0 | 0.0 | 0.0 | 438.4 | 0.0 | 0.0 |
| 30 | 7.8 | 14736.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2210.5 | 0.0 | 0.0 |
| 31 | 2.8 | 4562.1 | 0.0 | 0.0 | 0.0 | 0.0 | 684.3 | 0.0 | 0.0 |
| 32 | 4.8 | 6330.5 | 0.0 | 0.0 | 0.0 | 0.0 | 949.6 | 0.0 | 1204.0 |
| 33 | 7.4 | 4914.2 | 0.0 | 0.0 | 0.0 | 0.0 | 737.1 | 0.0 | 1849.5 |
| 34 | 2.2 | 291.8 | 0.0 | 0.0 | 0.0 | 0.0 | 43.8 | 0.0 | 560.0 |

***Table 2 - Base Stress Data on the 34 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Shear Stress Mobilized * (psf) |
|---|---|---|---|---|---|
| 1 | 2.13 | 838.00 | 10.00 | 234.23 | 16.22 |
| 2 | 3.96 | 844.00 | 2.01 | 296.43 | 40.90 |
| 3 | 3.96 | 848.98 | 7.99 | 431.99 | 86.30 |
| 4 | 5.78 | 857.94 | 10.00 | 695.47 | 202.86 |
| 5 | 7.61 | 867.87 | 10.00 | 958.95 | 347.93 |
| 6 | 9.43 | 877.76 | 10.00 | 1192.19 | 506.37 |
| 7 | 11.26 | 883.85 | 2.35 | 1319.01 | 631.44 |
| 8 | 11.26 | 888.75 | 7.65 | 1462.64 | 710.15 |

| | | | | |
|---|---|---|---|---|
| 9 | 13.09 | 896.75 | 8.72 | 1693.17 |
| 918.80 | | | | |
| 10 | 13.09 | 901.62 | 1.28 | 1814.81 |
| 991.95 | | | | |
| 11 | 14.91 | 907.07 | 10.00 | 1769.18 |
| 1049.94 | | | | |
| 12 | 16.73 | 911.95 | 0.10 | 1727.87 |
| 1104.94 | | | | |
| 13 | 16.73 | 916.74 | 9.90 | 1788.52 |
| 1147.77 | | | | |
| 14 | 18.56 | 926.22 | 10.00 | 1888.53 |
| 1307.57 | | | | |
| 15 | 20.38 | 931.98 | 2.17 | 1936.82 |
| 1433.52 | | | | |
| 16 | 20.38 | 935.50 | 5.33 | 1877.08 |
| 1385.28 | | | | |
| 17 | 20.38 | 939.17 | 2.49 | 1821.27 |
| 1340.21 | | | | |
| 18 | 22.21 | 944.97 | 10.00 | 1861.01 |
| 1455.80 | | | | |
| 19 | 24.04 | 954.16 | 10.00 | 1911.66 |
| 1582.33 | | | | |
| 20 | 25.86 | 963.23 | 10.00 | 1938.30 |
| 1687.81 | | | | |
| 21 | 27.68 | 972.15 | 10.00 | 1941.09 |
| 1768.15 | | | | |
| 22 | 29.51 | 980.93 | 10.00 | 1920.05 |
| 1820.70 | | | | |
| 23 | 31.33 | 989.14 | 9.03 | 1878.02 |
| 1844.43 | | | | |
| 24 | 31.33 | 993.41 | 0.97 | 1831.97 |
| 1794.97 | | | | |
| 25 | 33.16 | 996.91 | 7.38 | 1672.72 |
| 1679.64 | | | | |
| 26 | 33.16 | 1001.10 | 2.62 | 1525.73 |
| 1516.26 | | | | |
| 27 | 34.99 | 1006.29 | 10.00 | 1515.57 |
| 1551.03 | | | | |
| 28 | 36.81 | 1013.70 | 8.26 | 1482.85 |
| 1554.60 | | | | |
| 29 | 36.81 | 1017.70 | 1.74 | 1441.37 |
| 1505.74 | | | | |
| 30 | 38.63 | 1022.30 | 10.00 | 1322.93 |
| 1398.83 | | | | |
| 31 | 40.46 | 1027.60 | 3.67 | 1176.23 |
| 1246.84 | | | | |
| 32 | 40.46 | 1031.41 | 6.33 | 1133.21 |
| 1165.25 | | | | |
| 33 | 42.29 | 1037.52 | 10.00 | 736.91 |
| 688.89 | | | | |
| 34 | 44.10 | 1042.33 | 3.12 | 407.50 |
| 278.68 | | | | |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 331110.34 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1420.34(psf)

Sum of the Driving Forces = 259179.06 (lbs)

Average Mobilized Shear Stress = 1111.78(psf)

Total length of the failure surface = 233.12(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3029(g)
Calculated Newmark Seismic Displacement = 0.004(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

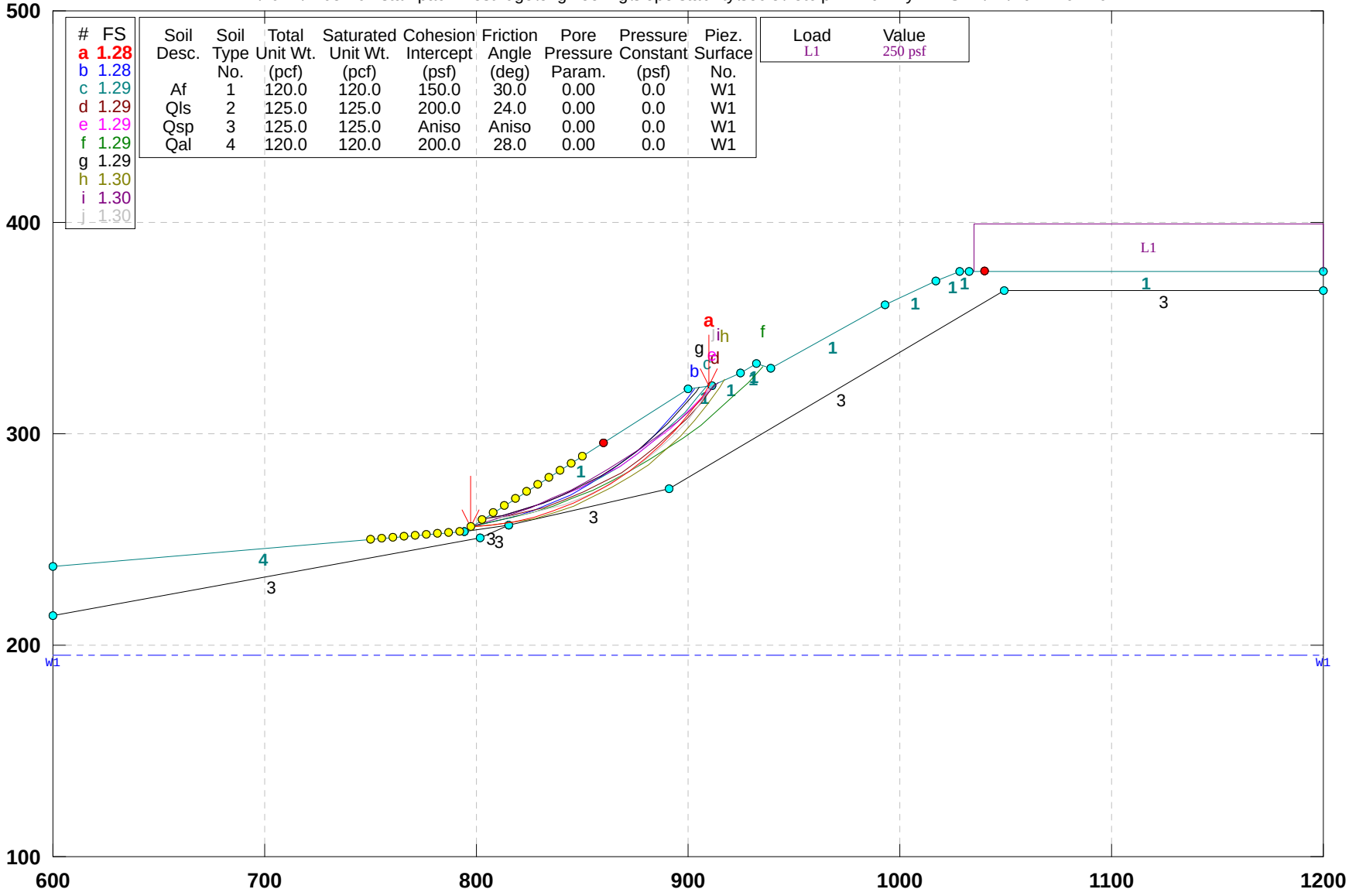
# Westridge/14057-01/Sec 5-5'/Temp Backcut Analysis/1.6H:1V

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 5\x5tc.pl2  Run By: KMS  4/14/2017  01:20PM

| # | FS |
|---|---|
| a | 1.28 |
| b | 1.28 |
| c | 1.29 |
| d | 1.29 |
| e | 1.29 |
| f | 1.29 |
| g | 1.29 |
| h | 1.30 |
| i | 1.30 |
| j | 1.30 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |




**GSTABL7 v.2  FSmin=1.28**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:20PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5tc.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5tc.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 5\x5tc.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 5-5'/Temp Backcut Analysis/1.6H:1V

BOUNDARY COORDINATES

11 Top Boundaries

17 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 237.00 | 794.00 | 254.00 | 4 |
| 2 | 794.00 | 254.00 | 900.00 | 321.00 | 1 |
| 3 | 900.00 | 321.00 | 911.00 | 323.00 | 1 |
| 4 | 911.00 | 323.00 | 925.00 | 329.00 | 1 |
| 5 | 925.00 | 329.00 | 932.00 | 333.00 | 1 |
| 6 | 932.00 | 333.00 | 939.00 | 331.00 | 1 |
| 7 | 939.00 | 331.00 | 993.00 | 361.00 | 1 |
| 8 | 993.00 | 361.00 | 1017.00 | 372.00 | 1 |
| 9 | 1017.00 | 372.00 | 1028.00 | 377.00 | 1 |
| 10 | 1028.00 | 377.00 | 1033.00 | 377.00 | 1 |
| 11 | 1033.00 | 377.00 | 1200.00 | 377.00 | 1 |
| 12 | 794.00 | 254.00 | 815.00 | 257.00 | 3 |
| 13 | 815.00 | 257.00 | 891.00 | 274.00 | 3 |
| 14 | 891.00 | 274.00 | 1049.00 | 368.00 | 3 |
| 15 | 1049.00 | 368.00 | 1200.00 | 368.00 | 3 |
| 16 | 600.00 | 214.00 | 802.00 | 251.00 | 3 |
| 17 | 802.00 | 251.00 | 815.00 | 257.00 | 3 |

User Specified Y-Origin = 100.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |

```
            4   120.0    120.0     200.0     28.0    0.00       0.0
1


          ANISOTROPIC STRENGTH PARAMETERS
               1 soil type(s)


           Soil Type  3 Is Anisotropic

           Number Of Direction Ranges Specified =  3


           Direction    Counterclockwise     Cohesion     Friction
             Range       Direction Limit    Intercept      Angle
              No.            (deg)            (psf)        (deg)

               1              7.0             300.00         32.00
               2             22.0             200.00         27.00
               3             90.0             300.00         32.00

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

1


           1 PIEZOMETRIC SURFACE(S) SPECIFIED


           Unit Weight of Water =  62.40 (pcf)



           Piezometric Surface No.  1 Specified by  2 Coordinate Points
           Pore Pressure Inclination Factor =  0.50


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

               1        600.00      195.00
               2       1200.00      195.00
1
```

```
          BOUNDARY LOAD(S)

              1 Load(s) Specified


           Load        X-Left      X-Right     Intensity     Deflection
            No.          (ft)        (ft)        (psf)         (deg)

             1        1035.00      1200.00        250.0          0.0


           NOTE - Intensity Is Specified As A Uniformly Distributed
                  Force Acting On A Horizontally Projected Surface.
1


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


           5000 Trial Surfaces Have Been Generated.


            250 Surface(s) Initiate(s) From Each Of    20 Points Equally
Spaced
           Along The Ground Surface Between  X = 750.00(ft)
                                       and  X = 850.00(ft)


           Each Surface Terminates Between   X = 860.00(ft)
                                       and   X =1040.00(ft)


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


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



           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 =  5000
```

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 6.298 FS Min = 1.282 FS Ave = 1.929
Standard Deviation = 0.364 Coefficient of Variation = 18.86 %

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.335 | 256.948 |
| 3 | 817.217 | 258.483 |
| 4 | 826.962 | 260.726 |
| 5 | 836.520 | 263.666 |
| 6 | 845.841 | 267.287 |
| 7 | 854.877 | 271.570 |
| 8 | 863.581 | 276.494 |
| 9 | 871.907 | 282.033 |
| 10 | 879.813 | 288.157 |
| 11 | 887.256 | 294.835 |
| 12 | 894.199 | 302.032 |
| 13 | 900.604 | 309.711 |
| 14 | 906.440 | 317.832 |
| 15 | 909.441 | 322.717 |

Circle Center At X = 791.010 ; Y = 394.623 ; and Radius = 138.639

Factor of Safety
*** 1.282 ***

Individual data on the 15 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.0 | 3277.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 9.9 | 9292.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.7 | 14208.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 9.6 | 17960.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 9.3 | 20520.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 9.0 | 21897.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 8.7 | 22139.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 8.3 | 21330.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 7.9 | 19586.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 7.4 | 17057.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 6.9 | 13917.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 5.8 | 9507.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 0.6 | 849.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 5.8 | 5510.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 3.0 | 781.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.207 | 257.922 |
| 3 | 816.911 | 260.336 |
| 4 | 826.443 | 263.360 |
| 5 | 835.763 | 266.983 |
| 6 | 844.835 | 271.190 |
| 7 | 853.622 | 275.965 |
| 8 | 862.088 | 281.287 |
| 9 | 870.199 | 287.136 |
| 10 | 877.923 | 293.488 |
| 11 | 885.228 | 300.317 |
| 12 | 892.085 | 307.595 |
| 13 | 898.466 | 315.295 |
| 14 | 903.012 | 321.548 |

Circle Center At X = 774.172 ; Y = 411.599 ; and Radius = 157.191

Factor of Safety
*** 1.283 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.439 | 261.412 |
| 3 | 822.115 | 263.936 |
| 4 | 831.628 | 267.019 |
| 5 | 840.945 | 270.650 |
| 6 | 850.035 | 274.819 |
| 7 | 858.867 | 279.509 |
| 8 | 867.410 | 284.706 |
| 9 | 875.636 | 290.392 |
| 10 | 883.517 | 296.548 |
| 11 | 891.026 | 303.152 |
| 12 | 898.138 | 310.182 |
| 13 | 904.829 | 317.614 |
| 14 | 908.819 | 322.603 |

Circle Center At X = 774.146 ; Y = 428.211 ; and Radius = 171.143

Factor of Safety
*** 1.287 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.545 | 260.767 |
| 3 | 822.352 | 262.725 |
| 4 | 832.009 | 265.320 |
| 5 | 841.476 | 268.542 |
| 6 | 850.712 | 272.377 |
| 7 | 859.676 | 276.808 |
| 8 | 868.332 | 281.816 |
| 9 | 876.641 | 287.380 |
| 10 | 884.568 | 293.477 |
| 11 | 892.079 | 300.079 |
| 12 | 899.141 | 307.158 |
| 13 | 905.725 | 314.685 |
| 14 | 911.802 | 322.626 |
| 15 | 912.471 | 323.631 |

Circle Center At X = 787.577 ; Y = 411.392 ; and Radius = 152.681

Factor of Safety
*** 1.287 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.414 | 261.530 |
| 3 | 822.070 | 264.133 |
| 4 | 831.569 | 267.257 |
| 5 | 840.885 | 270.893 |
| 6 | 849.988 | 275.031 |
| 7 | 858.854 | 279.657 |
| 8 | 867.455 | 284.759 |
| 9 | 875.765 | 290.321 |
| 10 | 883.761 | 296.327 |
| 11 | 891.418 | 302.759 |
| 12 | 898.714 | 309.598 |
| 13 | 905.627 | 316.823 |
| 14 | 910.911 | 322.984 |

Circle Center At X = 769.530 ; Y = 439.917 ; and Radius = 183.472

Factor of Safety
*** 1.288 ***

Failure Surface Specified By 18 Coordinate Points

| Point | X-Surf | Y-Surf |
|---|---|---|

| No. | (ft) | (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.198 | 257.970 |
| 3 | 816.941 | 260.223 |
| 4 | 826.580 | 262.886 |
| 5 | 836.098 | 265.953 |
| 6 | 845.478 | 269.419 |
| 7 | 854.703 | 273.278 |
| 8 | 863.757 | 277.523 |
| 9 | 872.624 | 282.147 |
| 10 | 881.288 | 287.140 |
| 11 | 889.734 | 292.495 |
| 12 | 897.946 | 298.201 |
| 13 | 905.910 | 304.249 |
| 14 | 913.611 | 310.628 |
| 15 | 921.036 | 317.326 |
| 16 | 928.172 | 324.332 |
| 17 | 935.006 | 331.632 |
| 18 | 935.358 | 332.041 |

Circle Center At X = 758.733 ; Y = 489.731 ; and Radius = 236.775

Factor of Safety
*** 1.294 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.426 | 261.473 |
| 3 | 822.080 | 264.082 |
| 4 | 831.557 | 267.274 |
| 5 | 840.822 | 271.036 |
| 6 | 849.841 | 275.355 |
| 7 | 858.581 | 280.215 |
| 8 | 867.009 | 285.597 |
| 9 | 875.094 | 291.482 |
| 10 | 882.806 | 297.848 |
| 11 | 890.116 | 304.672 |
| 12 | 896.998 | 311.927 |
| 13 | 903.425 | 319.588 |
| 14 | 905.166 | 321.939 |

Circle Center At X = 774.562 ; Y = 420.888 ; and Radius = 163.854

Factor of Safety
*** 1.294 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.351 | 256.725 |
| 3 | 817.268 | 258.012 |
| 4 | 827.071 | 259.984 |
| 5 | 836.715 | 262.632 |
| 6 | 846.151 | 265.942 |
| 7 | 855.335 | 269.899 |
| 8 | 864.222 | 274.483 |
| 9 | 872.770 | 279.673 |
| 10 | 880.937 | 285.443 |
| 11 | 888.684 | 291.766 |
| 12 | 895.974 | 298.611 |
| 13 | 902.772 | 305.945 |
| 14 | 909.044 | 313.734 |
| 15 | 914.761 | 321.939 |
| 16 | 916.912 | 325.534 |

Circle Center At X = 793.870 ; Y = 399.810 ; and Radius = 143.723

Factor of Safety
*** 1.296 ***

1

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.001 | 258.814 |
| 3 | 816.518 | 261.885 |
| 4 | 825.904 | 265.336 |

| | | |
|---|---|---|
| 5 | 835.143 | 269.163 |
| 6 | 844.220 | 273.359 |
| 7 | 853.121 | 277.916 |
| 8 | 861.831 | 282.828 |
| 9 | 870.337 | 288.087 |
| 10 | 878.624 | 293.685 |
| 11 | 886.678 | 299.611 |
| 12 | 894.488 | 305.857 |
| 13 | 902.040 | 312.412 |
| 14 | 909.321 | 319.266 |
| 15 | 914.415 | 324.464 |

Circle Center At X = 735.529 ; Y = 496.604 ; and Radius = 248.299

Factor of Safety
*** 1.297 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.604 | 260.203 |
| 3 | 822.492 | 261.693 |
| 4 | 832.242 | 263.917 |
| 5 | 841.798 | 266.865 |
| 6 | 851.106 | 270.518 |
| 7 | 860.116 | 274.856 |
| 8 | 868.777 | 279.856 |
| 9 | 877.039 | 285.489 |
| 10 | 884.858 | 291.724 |
| 11 | 892.188 | 298.525 |
| 12 | 898.990 | 305.856 |
| 13 | 905.225 | 313.674 |
| 14 | 910.858 | 321.936 |
| 15 | 911.628 | 323.269 |

Circle Center At X = 797.640 ; Y = 393.076 ; and Radius = 133.713

Factor of Safety
*** 1.298 ***

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

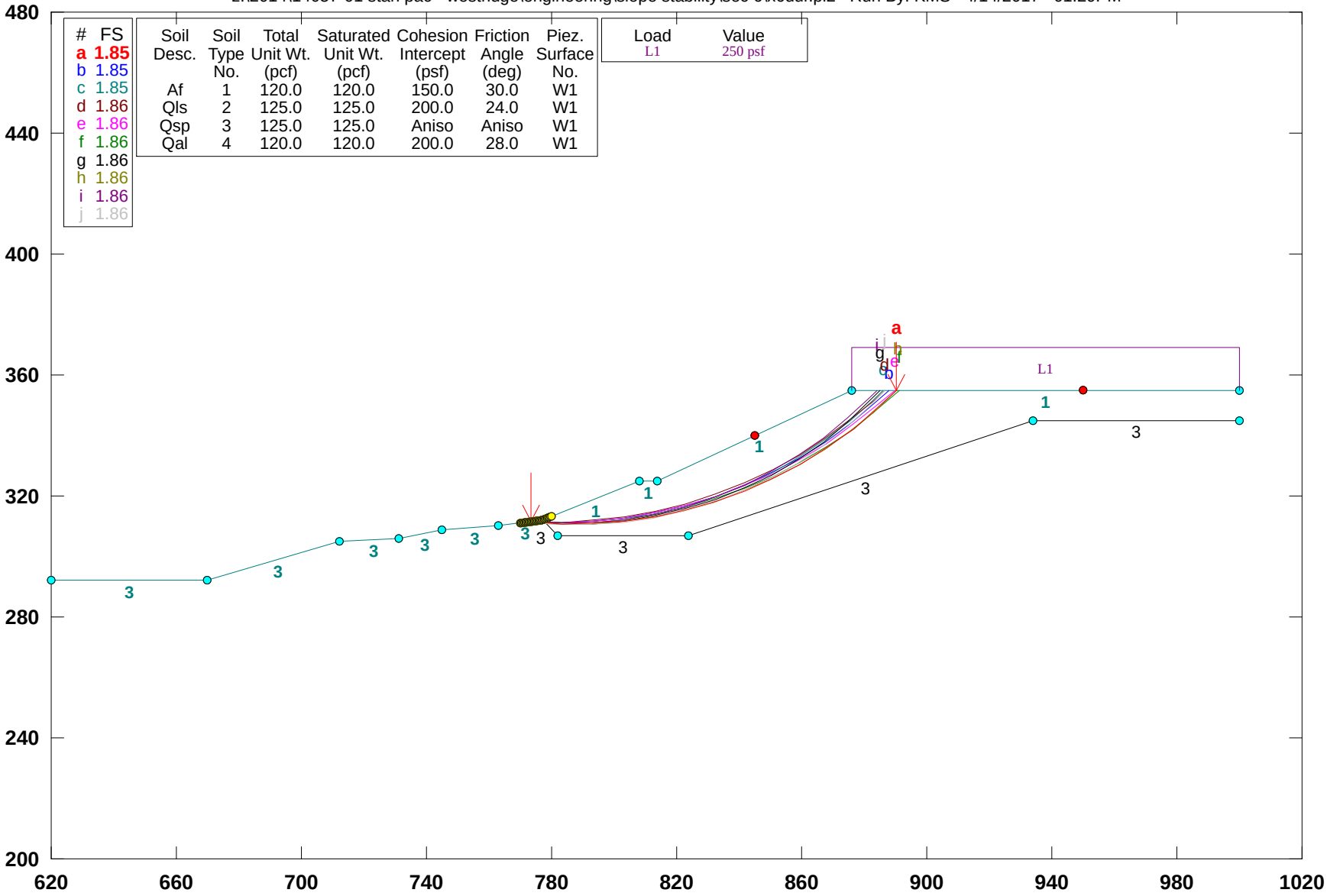
# Westridge/14057-01/Sec 6-6'/ Upper Slope - Rotational - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 6\x6dur.pl2 Run By: KMS 4/14/2017 01:29PM

| # | FS |
|---|---|
| a | 1.85 |
| b | 1.85 |
| c | 1.85 |
| d | 1.86 |
| e | 1.86 |
| f | 1.86 |
| g | 1.86 |
| h | 1.86 |
| i | 1.86 |
| j | 1.86 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |




**GSTABL7 v.2 FSmin=1.85**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:29PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6dur.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6dur.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6dur.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 6-6'/
Upper Slope - Rotational - Static

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 620.00 | 292.00 | 670.00 | 292.00 | 3 |
| 2 | 670.00 | 292.00 | 712.00 | 305.00 | 3 |
| 3 | 712.00 | 305.00 | 731.00 | 306.00 | 3 |
| 4 | 731.00 | 306.00 | 745.00 | 309.00 | 3 |
| 5 | 745.00 | 309.00 | 763.00 | 310.00 | 3 |
| 6 | 763.00 | 310.00 | 777.00 | 312.00 | 3 |
| 7 | 777.00 | 312.00 | 808.00 | 325.00 | 1 |
| 8 | 808.00 | 325.00 | 814.00 | 325.00 | 1 |
| 9 | 814.00 | 325.00 | 876.00 | 355.00 | 1 |
| 10 | 876.00 | 355.00 | 1000.00 | 355.00 | 1 |
| 11 | 777.00 | 312.00 | 782.00 | 307.00 | 3 |
| 12 | 782.00 | 307.00 | 824.00 | 307.00 | 3 |
| 13 | 824.00 | 307.00 | 934.00 | 345.00 | 3 |
| 14 | 934.00 | 345.00 | 1000.00 | 345.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 2.0 | 300.00 | 32.00 |
| 2 | 13.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 876.00 | 1000.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
1

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

15000 Trial Surfaces Have Been Generated.

500 Surface(s) Initiate(s) From Each Of 30 Points Equally Spaced
Along The Ground Surface Between X = 770.00(ft)
and X = 780.00(ft)

Each Surface Terminates Between X = 845.00(ft)
and X = 950.00(ft)

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

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

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 = 0

Number of Trial Surfaces With Valid FS = 0

Statistical Data On All Valid FS Values:
FS Max = 0.000 FS Min = 500.000 FS Ave = NaN
Standard Deviation = 0.000 Coefficient of Variation = NaN %

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.448 | 311.493 |
| 2 | 783.429 | 310.876 |
| 3 | 793.429 | 310.961 |
| 4 | 803.398 | 311.749 |
| 5 | 813.287 | 313.235 |
| 6 | 823.047 | 315.412 |
| 7 | 832.630 | 318.269 |
| 8 | 841.989 | 321.792 |

| | | |
|---|---|---|
| 9 | 851.078 | 325.964 |
| 10 | 859.850 | 330.764 |
| 11 | 868.264 | 336.168 |
| 12 | 876.278 | 342.149 |
| 13 | 883.852 | 348.679 |
| 14 | 890.219 | 355.000 |

Circle Center At X = 787.229 ; Y = 452.962 ; and Radius = 142.139

Factor of Safety
*** 1.853 ***

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 | 3.6 | 161.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 0.8 | 86.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 5.7 | 1669.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 10.0 | 7048.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 10.0 | 11513.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 4.6 | 6593.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 5.3 | 7716.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 0.7 | 999.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.0 | 13880.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 9.6 | 17083.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 9.4 | 18247.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 9.1 | 18391.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 8.8 | 17580.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 8.4 | 15908.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 7.7 | 13064.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 0.3 | 432.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 69.5 |
| 17 | 7.6 | 8712.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1893.4 |
| 18 | 6.4 | 2414.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1591.7 |

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.104 | 311.443 |
| 2 | 783.099 | 311.142 |
| 3 | 793.092 | 311.514 |
| 4 | 803.038 | 312.558 |
| 5 | 812.890 | 314.269 |
| 6 | 822.605 | 316.640 |
| 7 | 832.138 | 319.660 |
| 8 | 841.446 | 323.314 |
| 9 | 850.487 | 327.587 |
| 10 | 859.220 | 332.459 |
| 11 | 867.605 | 337.908 |
| 12 | 875.604 | 343.910 |
| 13 | 883.181 | 350.436 |
| 14 | 887.809 | 355.000 |

Circle Center At X = 782.634 ; Y = 459.161 ; and Radius = 148.025

Factor of Safety
*** 1.853 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.448 | 311.493 |
| 2 | 783.440 | 311.086 |
| 3 | 793.435 | 311.395 |
| 4 | 803.383 | 312.416 |
| 5 | 813.233 | 314.145 |

| | | |
|---|---|---|
| 6 | 822.933 | 316.573 |
| 7 | 832.436 | 319.687 |
| 8 | 841.692 | 323.472 |
| 9 | 850.654 | 327.908 |
| 10 | 859.277 | 332.973 |
| 11 | 867.516 | 338.640 |
| 12 | 875.329 | 344.882 |
| 13 | 882.676 | 351.665 |
| 14 | 885.807 | 355.000 |

Circle Center At X = 784.188 ; Y = 450.594 ; and Radius = 139.515

Factor of Safety
*** 1.853 ***

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.448 | 311.493 |
| 2 | 783.448 | 311.351 |
| 3 | 793.434 | 311.873 |
| 4 | 803.364 | 313.057 |
| 5 | 813.193 | 314.897 |
| 6 | 822.878 | 317.385 |
| 7 | 832.378 | 320.510 |
| 8 | 841.649 | 324.258 |
| 9 | 850.650 | 328.613 |
| 10 | 859.343 | 333.556 |
| 11 | 867.689 | 339.064 |
| 12 | 875.652 | 345.115 |
| 13 | 883.195 | 351.680 |
| 14 | 886.534 | 355.000 |

Circle Center At X = 780.650 ; Y = 461.495 ; and Radius = 150.176

Factor of Safety
*** 1.855 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.104 | 311.443 |
| 2 | 783.102 | 311.247 |
| 3 | 793.092 | 311.689 |
| 4 | 803.034 | 312.767 |
| 5 | 812.886 | 314.477 |
| 6 | 822.610 | 316.811 |
| 7 | 832.165 | 319.761 |
| 8 | 841.512 | 323.315 |
| 9 | 850.614 | 327.458 |
| 10 | 859.433 | 332.172 |
| 11 | 867.933 | 337.439 |
| 12 | 876.080 | 343.238 |
| 13 | 883.841 | 349.545 |
| 14 | 889.741 | 355.000 |

Circle Center At X = 781.219 ; Y = 467.657 ; and Radius = 156.425

Factor of Safety
*** 1.855 ***

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.104 | 311.443 |
| 2 | 783.097 | 311.087 |
| 3 | 793.093 | 311.383 |
| 4 | 803.048 | 312.329 |
| 5 | 812.920 | 313.921 |
| 6 | 822.668 | 316.153 |
| 7 | 832.250 | 319.015 |
| 8 | 841.625 | 322.495 |
| 9 | 850.753 | 326.578 |
| 10 | 859.597 | 331.246 |
| 11 | 868.117 | 336.481 |
| 12 | 876.278 | 342.260 |
| 13 | 884.046 | 348.558 |
| 14 | 891.011 | 355.000 |

Circle Center At X = 783.572 ; Y = 464.471 ; and Radius = 153.386

Factor of Safety
*** 1.856 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.104 | 311.443 |
| 2 | 783.081 | 310.777 |
| 3 | 793.081 | 310.870 |
| 4 | 803.045 | 311.722 |
| 5 | 812.915 | 313.327 |
| 6 | 822.635 | 315.677 |
| 7 | 832.148 | 318.758 |
| 8 | 841.401 | 322.552 |
| 9 | 850.339 | 327.038 |
| 10 | 858.910 | 332.188 |
| 11 | 867.066 | 337.975 |
| 12 | 874.759 | 344.363 |
| 13 | 881.945 | 351.318 |
| 14 | 885.213 | 355.000 |

Circle Center At X = 786.909 ; Y = 441.964 ; and Radius = 131.249

Factor of Safety
*** 1.858 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 772.414 | 311.345 |
| 2 | 782.395 | 310.728 |
| 3 | 792.395 | 310.802 |
| 4 | 802.365 | 311.565 |
| 5 | 812.260 | 313.016 |
| 6 | 822.030 | 315.146 |
| 7 | 831.630 | 317.945 |
| 8 | 841.014 | 321.401 |
| 9 | 850.137 | 325.496 |
| 10 | 858.956 | 330.211 |
| 11 | 867.428 | 335.524 |
| 12 | 875.513 | 341.409 |
| 13 | 883.172 | 347.838 |
| 14 | 890.370 | 354.780 |
| 15 | 890.568 | 355.000 |

Circle Center At X = 786.329 ; Y = 455.437 ; and Radius = 144.762

Factor of Safety
*** 1.859 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.448 | 311.493 |
| 2 | 783.435 | 310.983 |
| 3 | 793.433 | 311.225 |
| 4 | 803.383 | 312.217 |
| 5 | 813.231 | 313.955 |
| 6 | 822.921 | 316.427 |
| 7 | 832.397 | 319.621 |
| 8 | 841.606 | 323.518 |
| 9 | 850.497 | 328.097 |
| 10 | 859.018 | 333.330 |
| 11 | 867.122 | 339.189 |
| 12 | 874.762 | 345.641 |
| 13 | 881.896 | 352.648 |
| 14 | 883.956 | 355.000 |

Circle Center At X = 785.272 ; Y = 443.558 ; and Radius = 132.593

Factor of Safety
*** 1.860 ***

Failure Surface Specified By 14 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 772.414 | 311.345 |
| 2 | 782.380 | 310.524 |
| 3 | 792.380 | 310.465 |
| 4 | 802.355 | 311.167 |
| 5 | 812.248 | 312.626 |
| 6 | 822.002 | 314.834 |
| 7 | 831.559 | 317.777 |
| 8 | 840.864 | 321.440 |
| 9 | 849.863 | 325.800 |
| 10 | 858.504 | 330.833 |
| 11 | 866.737 | 336.509 |
| 12 | 874.515 | 342.795 |
| 13 | 881.791 | 349.655 |
| 14 | 886.659 | 355.000 |

Circle Center At X = 788.196 ; Y = 441.360 ; and Radius = 130.970

Factor of Safety

*** 1.860 ***

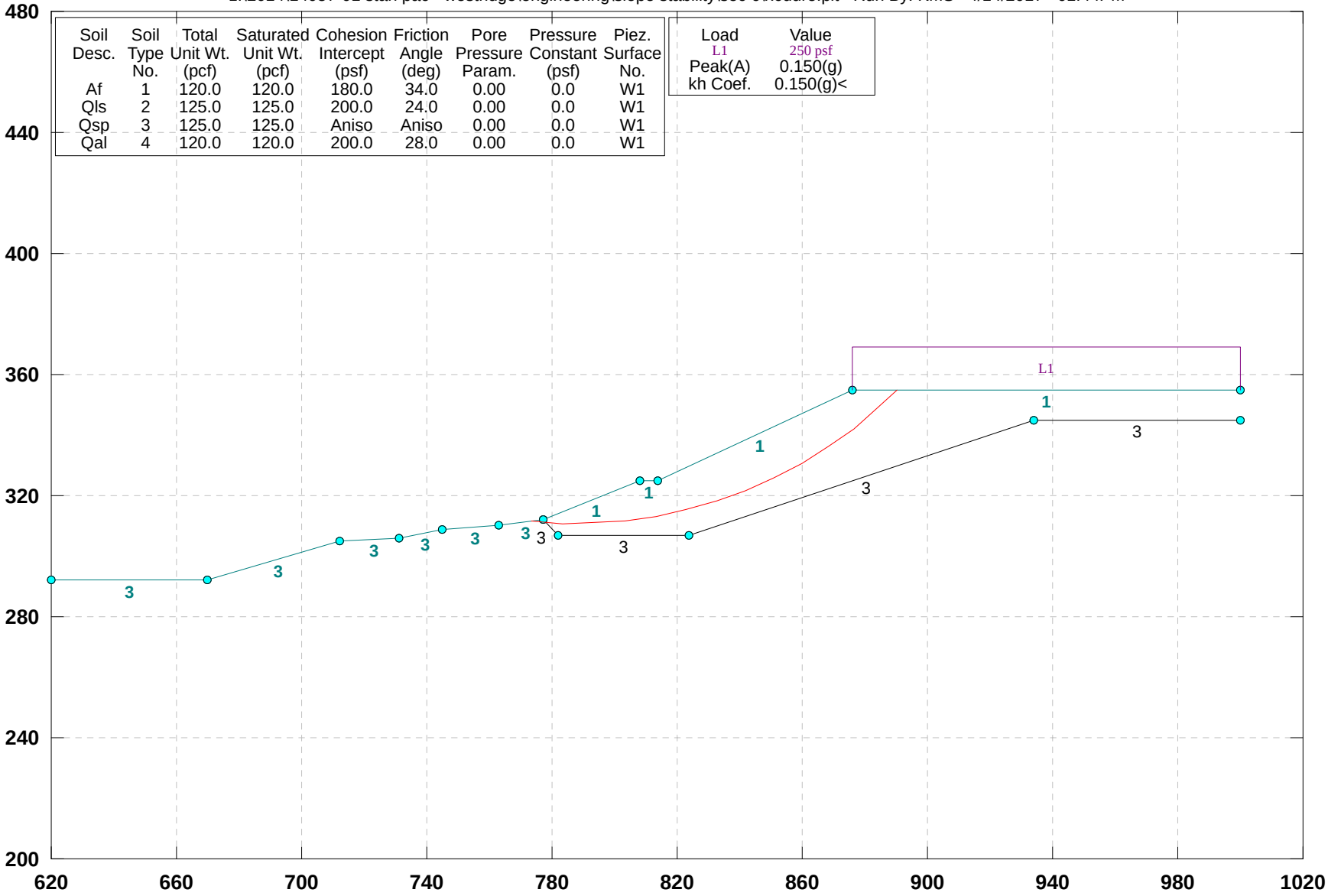
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 6-6'/ Upper Slope - Rotational - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 6\x6dure.plt Run By: KMS 4/14/2017 01:44PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.56**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:44PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6dure.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6dure.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6dure.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 6-6'/
Upper Slope - Rotational - Seismic

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 620.00 | 292.00 | 670.00 | 292.00 | 3 |
| 2 | 670.00 | 292.00 | 712.00 | 305.00 | 3 |
| 3 | 712.00 | 305.00 | 731.00 | 306.00 | 3 |
| 4 | 731.00 | 306.00 | 745.00 | 309.00 | 3 |
| 5 | 745.00 | 309.00 | 763.00 | 310.00 | 3 |
| 6 | 763.00 | 310.00 | 777.00 | 312.00 | 3 |
| 7 | 777.00 | 312.00 | 808.00 | 325.00 | 1 |
| 8 | 808.00 | 325.00 | 814.00 | 325.00 | 1 |
| 9 | 814.00 | 325.00 | 876.00 | 355.00 | 1 |
| 10 | 876.00 | 355.00 | 1000.00 | 355.00 | 1 |
| 11 | 777.00 | 312.00 | 782.00 | 307.00 | 3 |
| 12 | 782.00 | 307.00 | 824.00 | 307.00 | 3 |
| 13 | 824.00 | 307.00 | 934.00 | 345.00 | 3 |
| 14 | 934.00 | 345.00 | 1000.00 | 345.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 2.0 | 500.00 | 34.00 |
| 2 | 13.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 876.00 | 1000.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

Trial Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 773.448 | 311.493 |
| 2 | 783.429 | 310.876 |
| 3 | 793.429 | 310.961 |
| 4 | 803.398 | 311.749 |
| 5 | 813.287 | 313.235 |
| 6 | 823.047 | 315.412 |
| 7 | 832.630 | 318.269 |
| 8 | 841.989 | 321.792 |
| 9 | 851.078 | 325.964 |
| 10 | 859.850 | 330.764 |
| 11 | 868.264 | 336.168 |
| 12 | 876.278 | 342.149 |
| 13 | 883.852 | 348.679 |
| 14 | 890.219 | 355.000 |

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

| Angle/Segment No. | Deflection(Deg) | Segment Length(ft) |
|---|---|---|
| 1 | 4.02 | 10.00 |
| 2 | 4.03 | 10.00 |
| 3 | 4.03 | 10.00 |
| 4 | 4.03 | 10.00 |
| 5 | 4.03 | 10.00 |
| 6 | 4.03 | 10.00 |
| 7 | 4.03 | 10.00 |
| 8 | 4.03 | 10.00 |
| 9 | 4.02 | 10.00 |
| 10 | 4.02 | 10.00 |
| 11 | 4.03 | 10.00 |

Circle Center At X = 787.228(ft) ; Y = 452.964(ft); and Radius = 142.141(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.555

***Table 1 - 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 | 3.6 | 161.4 | 0.0 | 0.0 | 0.0 | 0.0 | 24.2 | 0.0 | 0.0 |
| 2 | 0.8 | 86.3 | 0.0 | 0.0 | 0.0 | 0.0 | 12.9 | 0.0 | 0.0 |
| 3 | 5.7 | 1669.0 | 0.0 | 0.0 | 0.0 | 0.0 | 250.4 | 0.0 | 0.0 |
| 4 | 10.0 | 7049.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1057.4 | 0.0 | 0.0 |
| 5 | 10.0 | 11514.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1727.1 | 0.0 | 0.0 |
| 6 | 4.6 | 6593.9 | 0.0 | 0.0 | 0.0 | 0.0 | 989.1 | 0.0 | 0.0 |
| 7 | 5.3 | 7716.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1157.4 | 0.0 | 0.0 |
| 8 | 0.7 | 999.7 | 0.0 | 0.0 | 0.0 | 0.0 | 150.0 | 0.0 | 0.0 |
| 9 | 9.0 | 13880.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2082.1 | 0.0 | 0.0 |
| 10 | 9.6 | 17083.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2562.5 | 0.0 | 0.0 |
| 11 | 9.4 | 18248.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2737.2 | 0.0 | 0.0 |
| 12 | 9.1 | 18393.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2759.0 | 0.0 | 0.0 |
| 13 | 8.8 | 17578.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2636.7 | 0.0 | 0.0 |
| 14 | 8.4 | 15907.8 | 0.0 | 0.0 | 0.0 | 0.0 | 2386.2 | 0.0 | 0.0 |
| 15 | 7.7 | 13064.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1959.7 | 0.0 | 0.0 |
| 16 | 0.3 | 432.2 | 0.0 | 0.0 | 0.0 | 0.0 | 64.8 | 0.0 | 69.5 |
| 17 | 7.6 | 8712.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1306.9 | 0.0 | 1893.5 |
| 18 | 6.4 | 2414.7 | 0.0 | 0.0 | 0.0 | 0.0 | 362.2 | 0.0 | 1591.8 |

***Table 2 - Base Stress Data on the 18 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress * (psf) |
|---|---|---|---|---|---|
| 1 | -3.53 | 775.22 | 3.56 | 545.25 | 3.98 |
| 2 | -3.53 | 777.39 | 0.78 | 590.98 | 9.74 |
| 3 | -3.53 | 780.60 | 5.67 | 389.54 | 25.56 |
| 4 | 0.49 | 788.43 | 10.00 | 653.06 | 109.54 |
| 5 | 4.52 | 798.41 | 10.00 | 927.25 | 257.06 |
| 6 | 8.55 | 805.70 | 4.65 | 1076.30 | 411.80 |
| 7 | 8.55 | 810.64 | 5.35 | 1093.16 | 419.29 |
| 8 | 12.57 | 813.64 | 0.73 | 1026.51 | 489.89 |
| 9 | 12.57 | 818.52 | 9.27 | 1107.71 | 535.14 |
| 10 | 16.60 | 827.84 | 10.00 | 1224.11 | 720.27 |
| 11 | 20.63 | 837.31 | 10.00 | 1285.27 | 883.39 |
| 12 | 24.66 | 846.53 | 10.00 | 1288.44 | 1001.61 |
| 13 | 28.69 | 855.46 | 10.00 | 1237.82 | 1059.69 |
| 14 | 32.71 | 864.06 | 10.00 | 1138.14 | 1047.21 |
| 15 | 36.73 | 872.13 | 9.65 | 996.51 | 962.17 |
| 16 | 36.73 | 876.14 | 0.35 | 1055.48 | 1006.24 |
| 17 | 40.77 | 880.07 | 10.00 | 818.43 | 787.10 |
| 18 | 44.79 | 887.04 | 8.97 | 422.49 | 342.82 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 125967.10 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 976.70(psf)

Sum of the Driving Forces = 81014.35 (lbs)

Average Mobilized Shear Stress = 628.15(psf)

Total length of the failure surface = 128.97(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

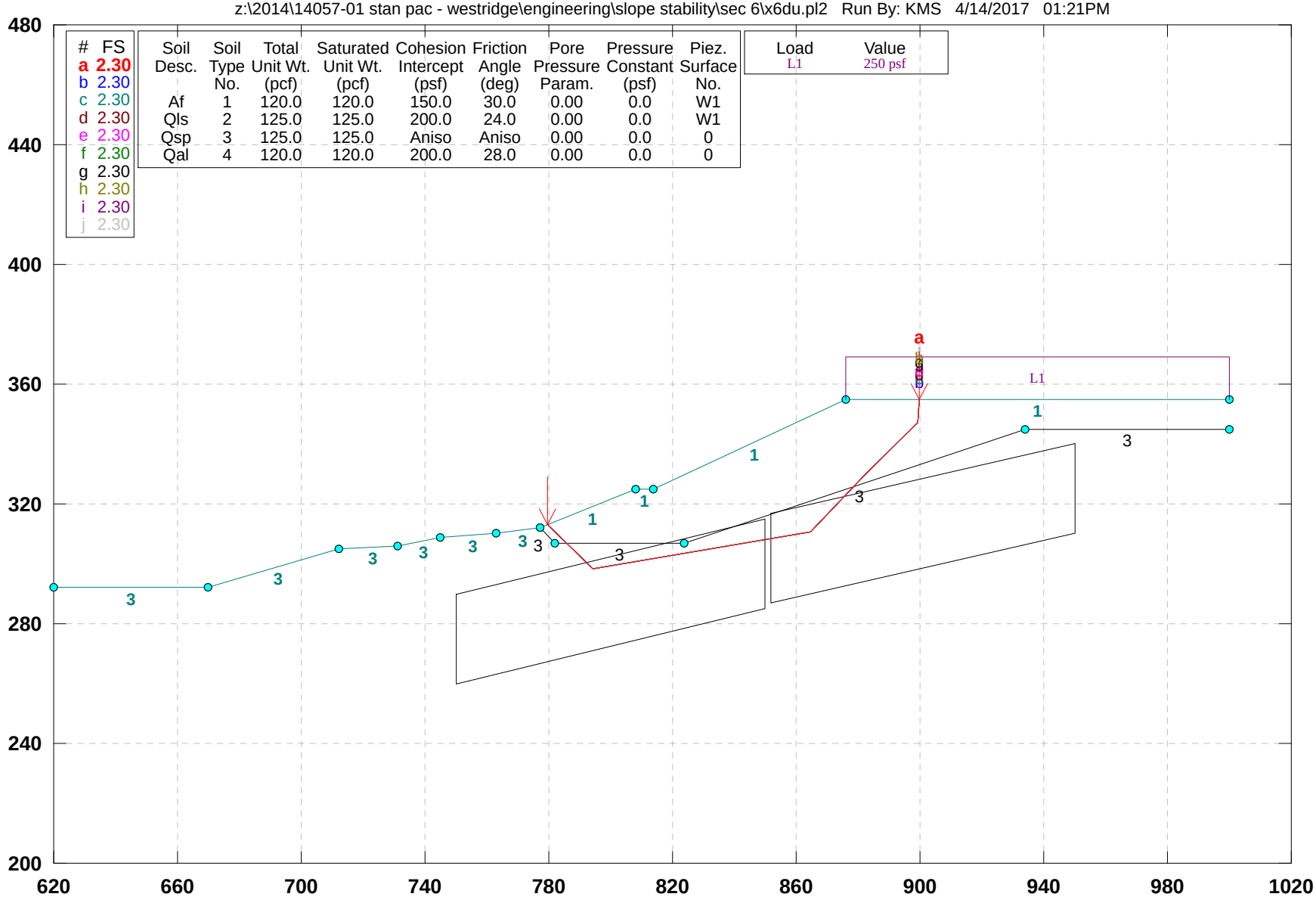
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.4091(g)
Calculated Newmark Seismic Displacement = 0.002(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 6-6'/ Upper Slope - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 6\x6du.pl2 Run By: KMS 4/14/2017 01:21PM




| # | FS |
|---|---|
| a | 2.30 |
| b | 2.30 |
| c | 2.30 |
| d | 2.30 |
| e | 2.30 |
| f | 2.30 |
| g | 2.30 |
| h | 2.30 |
| i | 2.30 |
| j | 2.30 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | 0 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

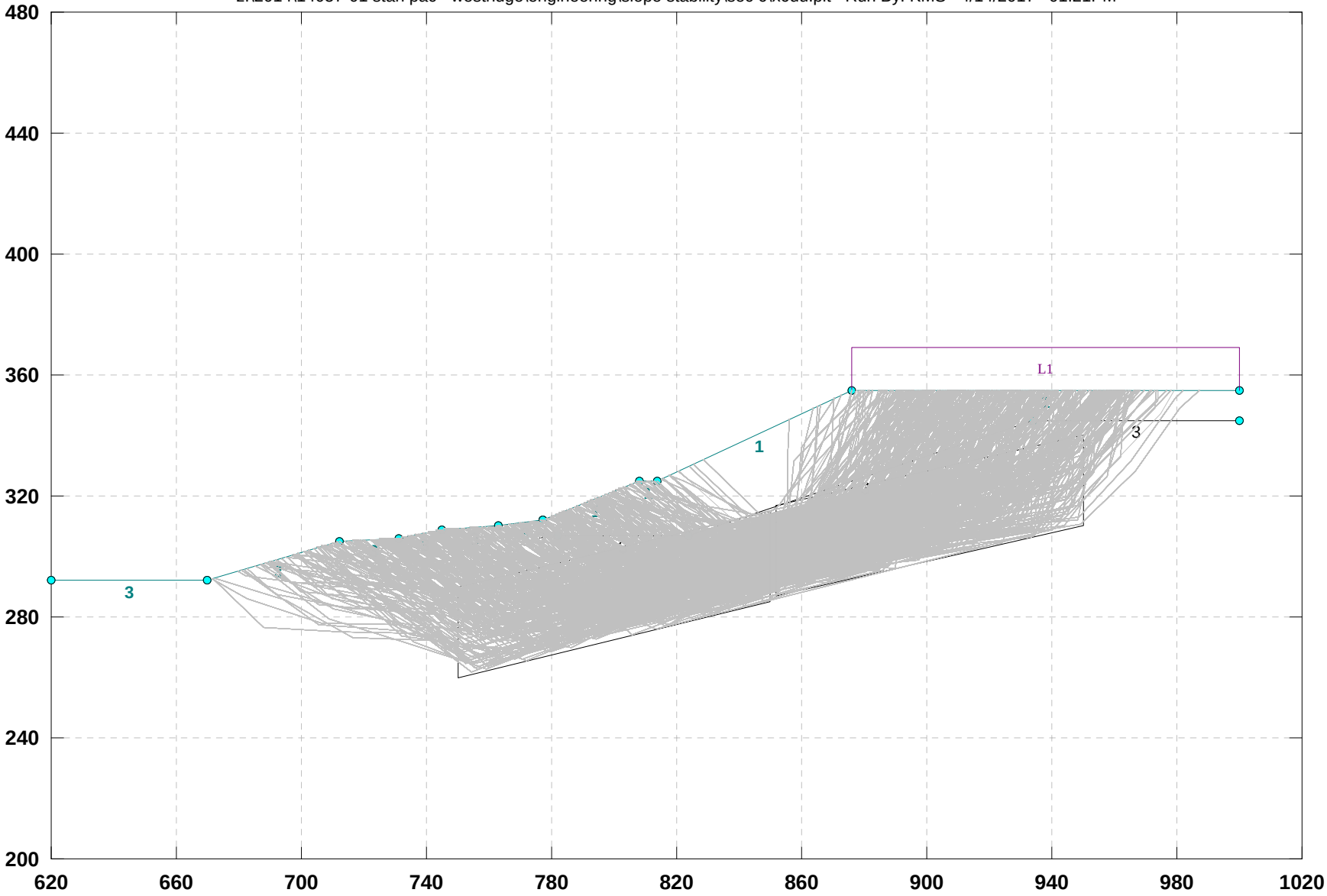
| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=2.30**

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

# Westridge/14057-01/Sec 6-6'/ Upper Slope - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 6\x6du.plt Run By: KMS 4/14/2017 01:21PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:21PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6du.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6du.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6du.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 6-6'/
Upper Slope - Block - Static

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 620.00 | 292.00 | 670.00 | 292.00 | 3 |
| 2 | 670.00 | 292.00 | 712.00 | 305.00 | 3 |
| 3 | 712.00 | 305.00 | 731.00 | 306.00 | 3 |
| 4 | 731.00 | 306.00 | 745.00 | 309.00 | 3 |
| 5 | 745.00 | 309.00 | 763.00 | 310.00 | 3 |
| 6 | 763.00 | 310.00 | 777.00 | 312.00 | 3 |
| 7 | 777.00 | 312.00 | 808.00 | 325.00 | 1 |
| 8 | 808.00 | 325.00 | 814.00 | 325.00 | 1 |
| 9 | 814.00 | 325.00 | 876.00 | 355.00 | 1 |
| 10 | 876.00 | 355.00 | 1000.00 | 355.00 | 1 |
| 11 | 777.00 | 312.00 | 782.00 | 307.00 | 3 |
| 12 | 782.00 | 307.00 | 824.00 | 307.00 | 3 |
| 13 | 824.00 | 307.00 | 934.00 | 345.00 | 3 |
| 14 | 934.00 | 345.00 | 1000.00 | 345.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 2.0 | 300.00 | 32.00 |
| 2 | 13.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 876.00 | 1000.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 25.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 750.00 | 275.00 | 850.00 | 300.00 | 30.00 |
| 2 | 852.00 | 302.00 | 950.00 | 325.00 | 30.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

Individual data on the 11 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.1 | 3126.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 8.9 | 16021.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 13.6 | 37605.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 6.0 | 17329.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 10.0 | 29992.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 40.8 | 160953.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 11.2 | 47544.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 2.2 | 8151.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 556.0 |
| 9 | 3.3 | 10924.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 830.0 |
| 10 | 17.7 | 35489.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 4419.1 |
| 11 | 0.6 | 283.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 149.5 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |

| | | |
|---|---|---|
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Factor of Safety
*** 2.304 ***

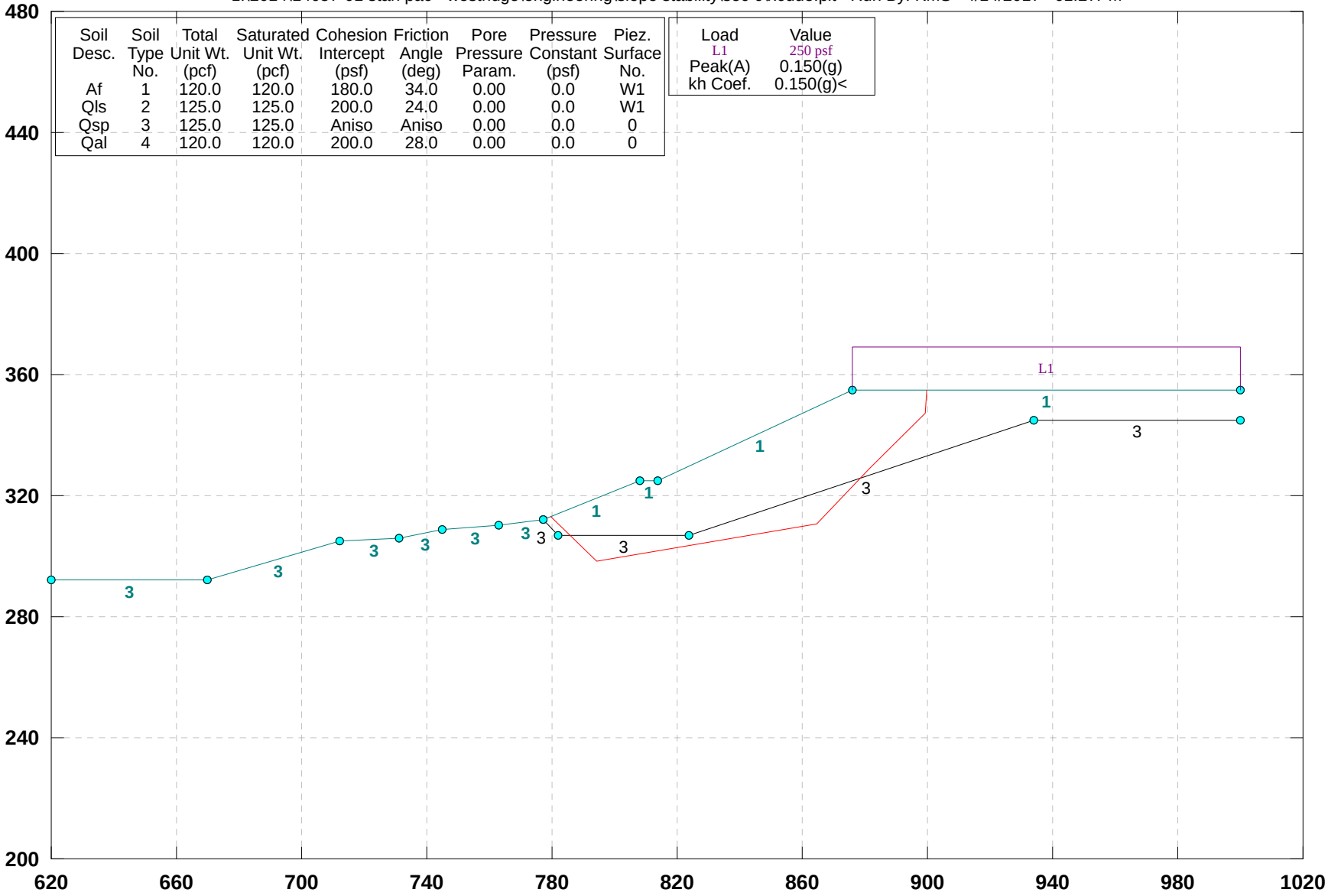
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 6-6'/ Upper Slope - Block - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 6\x6due.plt Run By: KMS 4/14/2017 01:27PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | 0 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.78**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:27PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6due.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6due.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 6\x6due.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 6-6'/
Upper Slope - Block - Seismic

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 620.00 | 292.00 | 670.00 | 292.00 | 3 |
| 2 | 670.00 | 292.00 | 712.00 | 305.00 | 3 |
| 3 | 712.00 | 305.00 | 731.00 | 306.00 | 3 |
| 4 | 731.00 | 306.00 | 745.00 | 309.00 | 3 |
| 5 | 745.00 | 309.00 | 763.00 | 310.00 | 3 |
| 6 | 763.00 | 310.00 | 777.00 | 312.00 | 3 |
| 7 | 777.00 | 312.00 | 808.00 | 325.00 | 1 |
| 8 | 808.00 | 325.00 | 814.00 | 325.00 | 1 |
| 9 | 814.00 | 325.00 | 876.00 | 355.00 | 1 |
| 10 | 876.00 | 355.00 | 1000.00 | 355.00 | 1 |
| 11 | 777.00 | 312.00 | 782.00 | 307.00 | 3 |
| 12 | 782.00 | 307.00 | 824.00 | 307.00 | 3 |
| 13 | 824.00 | 307.00 | 934.00 | 345.00 | 3 |
| 14 | 934.00 | 345.00 | 1000.00 | 345.00 | 3 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 2.0 | 500.00 | 34.00 |
| 2 | 13.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 876.00 | 1000.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

Janbu's Empirical Coef. is being used for the case of c & phi both > 0

1

Trial Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 779.433 | 313.020 |
| 2 | 794.403 | 298.199 |
| 3 | 864.842 | 310.828 |
| 4 | 881.544 | 329.430 |
| 5 | 899.221 | 347.109 |
| 6 | 899.819 | 355.000 |

Janbu's Empirical Coefficient (fo) = 1.079

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.784

***Table 1 - Individual Data on the 11 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.1 | 3126.8 | 0.0 | 0.0 | 0.0 | 0.0 | 469.0 | 0.0 | 0.0 |
| 2 | 8.9 | 16019.9 | 0.0 | 0.0 | 0.0 | 0.0 | 2403.0 | 0.0 | 0.0 |
| 3 | 13.6 | 37604.4 | 0.0 | 0.0 | 0.0 | 0.0 | 5640.7 | 0.0 | 0.0 |
| 4 | 6.0 | 17329.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2599.3 | 0.0 | 0.0 |
| 5 | 10.0 | 29992.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4498.8 | 0.0 | 0.0 |
| 6 | 40.8 | 160950.7 | 0.0 | 0.0 | 0.0 | 0.0 | 24142.6 | 0.0 | 0.0 |

```
   7     11.2   47544.7     0.0     0.0      0.0     0.0  7131.7     0.0
0.0
   8      2.2    8149.3     0.0     0.0      0.0     0.0  1222.4     0.0
555.9
   9      3.3   10925.4     0.0     0.0      0.0     0.0  1638.8     0.0
830.1
  10     17.7   35489.4     0.0     0.0      0.0     0.0  5323.4     0.0
4419.3
  11      0.6     283.1     0.0     0.0      0.0     0.0    42.5     0.0
149.5
```

***Table 2 - Base Stress Data on the 11 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Shear Mobilized Stress * (psf) |
|---|---|---|---|---|---|
| 1 | -44.71 | 782.47 | 8.56 | 1185.12 | -306.98 |
| 2 | -44.71 | 789.96 | 12.51 | 3859.12 | -1075.85 |
| 3 | 10.16 | 801.20 | 13.81 | 1555.17 | 896.40 |
| 4 | 10.16 | 811.00 | 6.10 | 1615.50 | 936.12 |
| 5 | 10.16 | 819.00 | 10.16 | 1670.18 | 972.10 |
| 6 | 10.16 | 844.42 | 41.49 | 2133.86 | 1277.30 |
| 7 | 48.08 | 870.42 | 16.70 | 3553.62 | 3597.58 |
| 8 | 48.08 | 877.11 | 3.33 | 3307.83 | 3280.41 |
| 9 | 48.08 | 879.88 | 4.97 | 2704.58 | 2964.01 |
| 10 | 45.00 | 890.38 | 25.00 | 1747.38 | 1809.43 |
| 11 | 85.67 | 899.52 | 7.91 | 1475.60 | 726.71 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 333196.81 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2213.32(psf)

Sum of the Driving Forces = 201601.78 (lbs)

Average Mobilized Shear Stress = 1339.17(psf)

Total length of the failure surface = 150.54(ft)

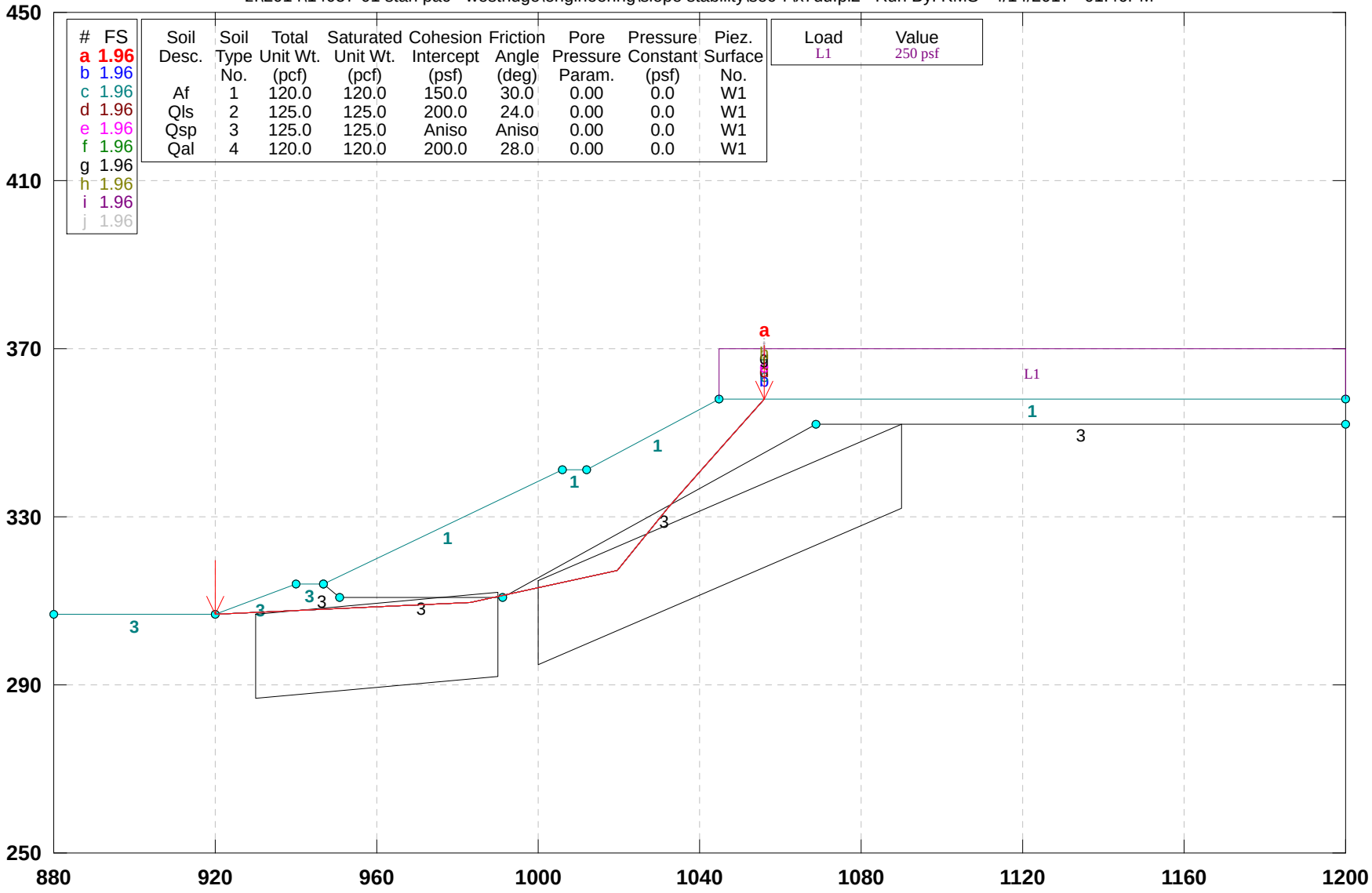
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.6819(g)
Calculated Newmark Seismic Displacement = 0.001(ft)

Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

# Westridge/14057-01/Sec 7-7'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 7\x7du.pl2 Run By: KMS 4/14/2017 01:46PM




| # | FS |
|---|---|
| a | 1.96 |
| b | 1.96 |
| c | 1.96 |
| d | 1.96 |
| e | 1.96 |
| f | 1.96 |
| g | 1.96 |
| h | 1.96 |
| i | 1.96 |
| j | 1.96 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

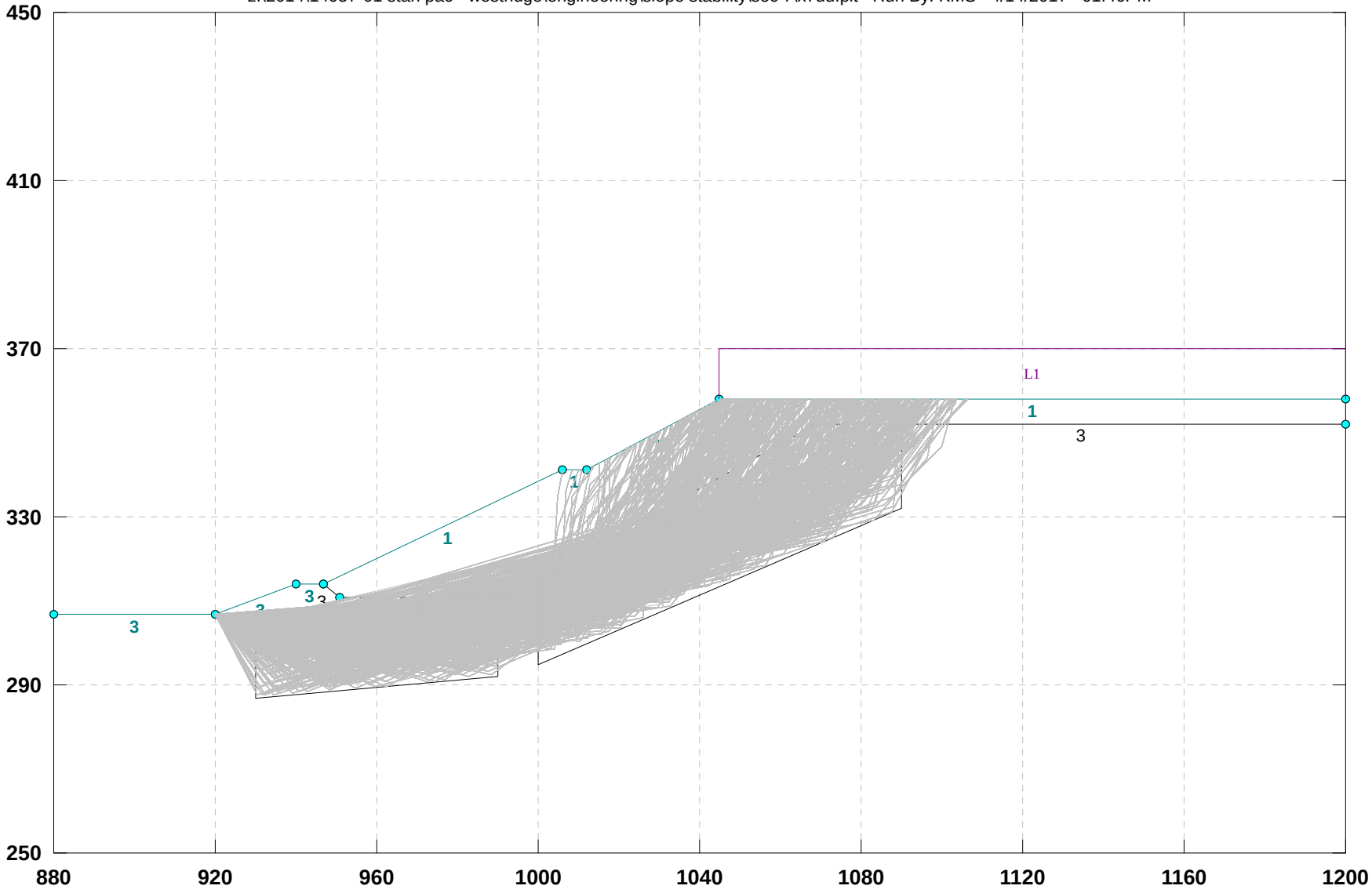
| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=1.96**

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

# Westridge/14057-01/Sec 7-7'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 7\x7du.plt  Run By: KMS  4/14/2017  01:46PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:46PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 7\x7du.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 7\x7du.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 7\x7du.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 7-7'/
Upper Slope - Static

BOUNDARY COORDINATES

7 Top Boundaries

11 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 880.00 | 307.00 | 920.00 | 307.00 | 3 |
| 2 | 920.00 | 307.00 | 940.00 | 314.00 | 3 |
| 3 | 940.00 | 314.00 | 947.00 | 314.00 | 3 |
| 4 | 947.00 | 314.00 | 1006.00 | 341.00 | 1 |
| 5 | 1006.00 | 341.00 | 1012.00 | 341.00 | 1 |
| 6 | 1012.00 | 341.00 | 1045.00 | 358.00 | 1 |
| 7 | 1045.00 | 358.00 | 1200.00 | 358.00 | 1 |
| 8 | 947.00 | 314.00 | 951.00 | 311.00 | 3 |
| 9 | 951.00 | 311.00 | 991.00 | 311.00 | 3 |
| 10 | 991.00 | 311.00 | 1069.00 | 352.00 | 3 |
| 11 | 1069.00 | 352.00 | 1200.00 | 352.00 | 3 |

User Specified Y-Origin = 250.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1045.00 | 1200.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

3 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 920.00 | 307.00 | 920.00 | 307.00 | 0.00 |
| 2 | 930.00 | 297.00 | 990.00 | 302.00 | 20.00 |
| 3 | 1000.00 | 305.00 | 1090.00 | 342.00 | 20.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

Individual data on the 14 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 20.0 | 7681.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 7.0 | 5246.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 4.0 | 3289.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 32.2 | 55018.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 6.3 | 16401.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 2.5 | 6899.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 14.0 | 41898.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 6.0 | 18864.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 7.6 | 24390.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 12.8 | 36032.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 0.3 | 657.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 12.4 | 22834.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 1.1 | 1529.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 277.6 |
| 14 | 10.0 | 6560.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 2509.3 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

1

Failure Surface Specified By 6 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Factor of Safety
*** 1.961 ***

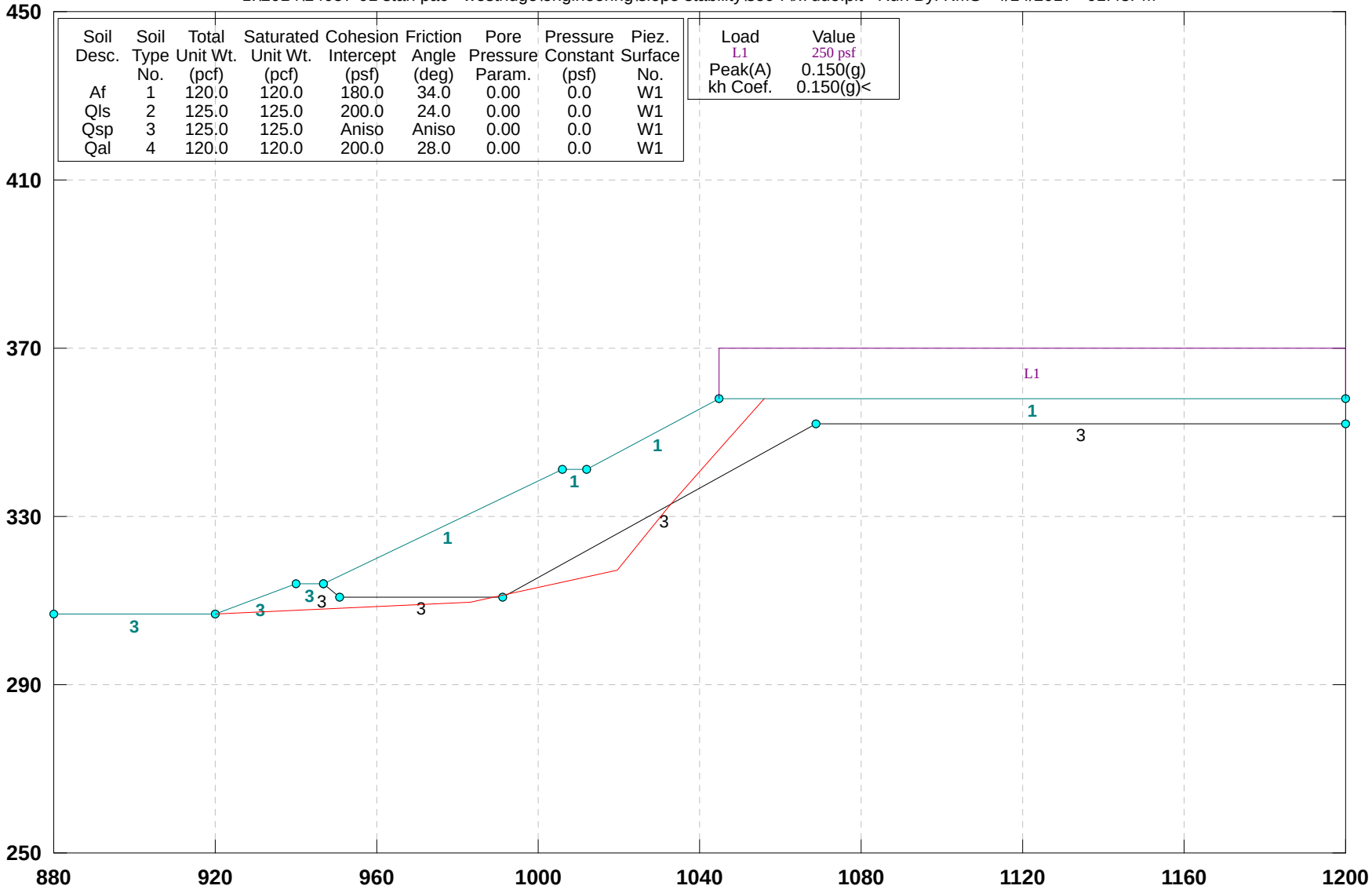
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 7-7'/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 7\x7due.plt Run By: KMS 4/14/2017 01:48PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.47**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:48PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 7\x7due.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 7\x7due.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 7\x7due.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 7-7'/
Upper Slope - Seismic

BOUNDARY COORDINATES

7 Top Boundaries

11 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 880.00 | 307.00 | 920.00 | 307.00 | 3 |
| 2 | 920.00 | 307.00 | 940.00 | 314.00 | 3 |
| 3 | 940.00 | 314.00 | 947.00 | 314.00 | 3 |
| 4 | 947.00 | 314.00 | 1006.00 | 341.00 | 1 |
| 5 | 1006.00 | 341.00 | 1012.00 | 341.00 | 1 |
| 6 | 1012.00 | 341.00 | 1045.00 | 358.00 | 1 |
| 7 | 1045.00 | 358.00 | 1200.00 | 358.00 | 1 |
| 8 | 947.00 | 314.00 | 951.00 | 311.00 | 3 |
| 9 | 951.00 | 311.00 | 991.00 | 311.00 | 3 |
| 10 | 991.00 | 311.00 | 1069.00 | 352.00 | 3 |
| 11 | 1069.00 | 352.00 | 1200.00 | 352.00 | 3 |

User Specified Y-Origin = 250.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1045.00 | 1200.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

Janbu's Empirical Coef. is being used for the case of c & phi both > 0
1

Trial Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 920.000 | 307.000 |
| 2 | 983.156 | 309.700 |
| 3 | 1019.572 | 317.205 |
| 4 | 1032.358 | 332.585 |
| 5 | 1046.110 | 347.106 |
| 6 | 1056.148 | 358.000 |

Janbu's Empirical Coefficient (fo) = 1.066

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.465

***Table 1 - Individual Data on the 14 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 20.0 | 7681.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1152.2 | 0.0 | 0.0 |
| 2 | 7.0 | 5245.9 | 0.0 | 0.0 | 0.0 | 0.0 | 786.9 | 0.0 | 0.0 |
| 3 | 4.0 | 3289.4 | 0.0 | 0.0 | 0.0 | 0.0 | 493.4 | 0.0 | 0.0 |
| 4 | 32.2 | 55019.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8252.8 | 0.0 | 0.0 |
| 5 | 6.3 | 16400.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2460.0 | 0.0 | 0.0 |
| 6 | 2.5 | 6898.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1034.8 | 0.0 | 0.0 |
| 7 | 14.0 | 41898.9 | 0.0 | 0.0 | 0.0 | 0.0 | 6284.8 | 0.0 | 0.0 |
| 8 | 6.0 | 18864.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2829.6 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 7.6 | 24390.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3658.5 | 0.0 | 0.0 |
| 10 | 12.8 | 36035.3 | 0.0 | 0.0 | 0.0 | 0.0 | 5405.3 | 0.0 | 0.0 |
| 11 | 0.3 | 658.6 | 0.0 | 0.0 | 0.0 | 0.0 | 98.8 | 0.0 | 0.0 |
| 12 | 12.4 | 22831.6 | 0.0 | 0.0 | 0.0 | 0.0 | 3424.7 | 0.0 | 0.0 |
| 13 | 1.1 | 1529.1 | 0.0 | 0.0 | 0.0 | 0.0 | 229.4 | 0.0 | 277.5 |
| 14 | 10.0 | 6561.3 | 0.0 | 0.0 | 0.0 | 0.0 | 984.2 | 0.0 | 2509.5 |

***Table 2 - Base Stress Data on the 14 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress * (psf) |
|---|---|---|---|---|---|
| 1 | 2.45 | 930.00 | 20.02 | 390.25 | 73.96 |
| 2 | 2.45 | 943.50 | 7.01 | 573.85 | 144.32 |
| 3 | 2.45 | 949.00 | 4.00 | 610.50 | 158.37 |
| 4 | 2.45 | 967.08 | 32.19 | 1057.06 | 329.50 |
| 5 | 11.65 | 986.31 | 6.44 | 1452.66 | 906.76 |
| 6 | 11.65 | 990.73 | 2.58 | 1885.05 | 952.13 |
| 7 | 11.65 | 999.00 | 14.30 | 1642.39 | 1043.08 |
| 8 | 11.65 | 1009.00 | 6.13 | 1716.77 | 1096.52 |
| 9 | 11.65 | 1015.79 | 7.73 | 1754.18 | 1123.39 |
| 10 | 50.26 | 1025.97 | 20.00 | 2417.05 | 2437.46 |
| 11 | 46.56 | 1032.50 | 0.42 | 1980.44 | 1873.40 |
| 12 | 46.56 | 1038.82 | 17.96 | 1396.32 | 1532.94 |
| 13 | 46.56 | 1045.55 | 1.61 | 1250.42 | 1323.86 |
| 14 | 47.34 | 1051.13 | 14.81 | 776.90 | 730.98 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 195691.58 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1260.83(psf)

Sum of the Driving Forces = 142393.45 (lbs)

Average Mobilized Shear Stress = 917.43(psf)

Total length of the failure surface = 155.21(ft)

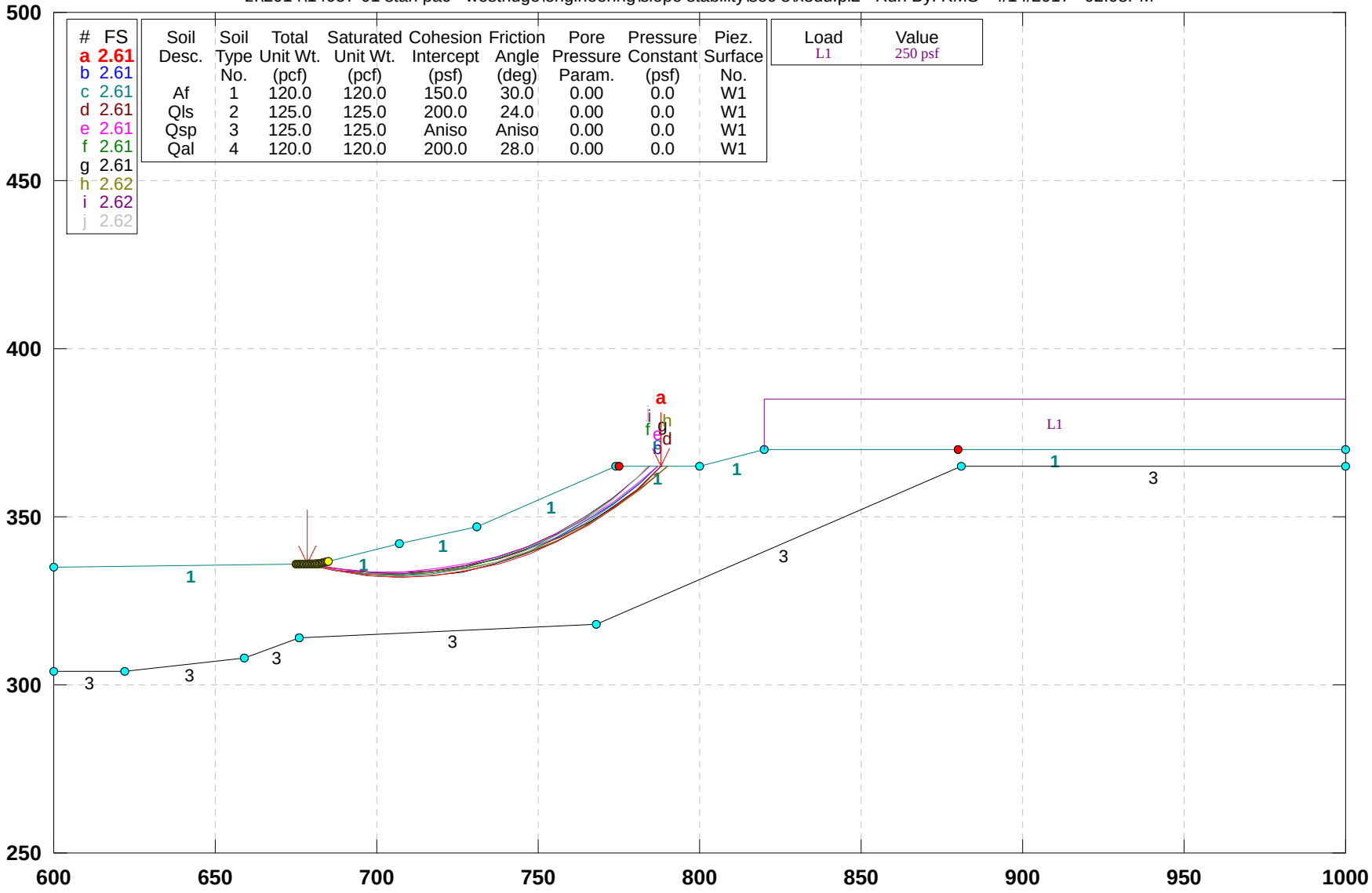
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3545(g)
Calculated Newmark Seismic Displacement = 0.003(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 8-8'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8du.pl2 Run By: KMS 4/14/2017 02:08PM




| # | FS |
|---|---|
| a | 2.61 |
| b | 2.61 |
| c | 2.61 |
| d | 2.61 |
| e | 2.61 |
| f | 2.61 |
| g | 2.61 |
| h | 2.62 |
| i | 2.62 |
| j | 2.62 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=2.61**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:08PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8du.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8du.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8du.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 8-8'/
Upper Slope - Static

BOUNDARY COORDINATES

7 Top Boundaries

13 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 335.00 | 682.00 | 336.00 | 1 |
| 2 | 682.00 | 336.00 | 707.00 | 342.00 | 1 |
| 3 | 707.00 | 342.00 | 731.00 | 347.00 | 1 |
| 4 | 731.00 | 347.00 | 774.00 | 365.00 | 1 |
| 5 | 774.00 | 365.00 | 800.00 | 365.00 | 1 |
| 6 | 800.00 | 365.00 | 820.00 | 370.00 | 1 |
| 7 | 820.00 | 370.00 | 1000.00 | 370.00 | 1 |
| 8 | 676.00 | 314.00 | 768.00 | 318.00 | 3 |
| 9 | 768.00 | 318.00 | 881.00 | 365.00 | 3 |
| 10 | 881.00 | 365.00 | 1000.00 | 365.00 | 3 |
| 11 | 600.00 | 304.00 | 622.00 | 304.00 | 3 |
| 12 | 622.00 | 304.00 | 659.00 | 308.00 | 3 |
| 13 | 659.00 | 308.00 | 676.00 | 314.00 | 3 |

User Specified Y-Origin = 250.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 820.00 | 1000.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
1

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

15000 Trial Surfaces Have Been Generated.

500 Surface(s) Initiate(s) From Each Of 30 Points Equally Spaced
Along The Ground Surface Between X = 675.00(ft)
and X = 685.00(ft)

Each Surface Terminates Between X = 775.00(ft)
and X = 880.00(ft)

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

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

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 = 0

Number of Trial Surfaces With Valid FS = 0

Statistical Data On All Valid FS Values:
FS Max = 0.000 FS Min = 500.000 FS Ave = NaN
Standard Deviation = 0.000 Coefficient of Variation = NaN %

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.448 | 335.957 |
| 2 | 688.217 | 333.818 |
| 3 | 698.135 | 332.538 |
| 4 | 708.126 | 332.127 |
| 5 | 718.116 | 332.587 |
| 6 | 728.027 | 333.915 |
| 7 | 737.785 | 336.101 |
| 8 | 747.316 | 339.129 |

| | | |
|---|---|---|
| 9 | 756.547 | 342.974 |
| 10 | 765.408 | 347.609 |
| 11 | 773.832 | 352.998 |
| 12 | 781.754 | 359.100 |
| 13 | 788.170 | 365.000 |

Circle Center At X = 707.847 ; Y = 446.862 ; and Radius = 114.735

Factor of Safety
*** 2.606 ***

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 | 3.6 | 174.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 6.2 | 1676.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.9 | 6550.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 8.9 | 9128.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 1.1 | 1347.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 10.0 | 13088.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 9.9 | 14388.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 3.0 | 4438.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 6.8 | 10649.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 9.5 | 16263.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 9.2 | 16295.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 8.9 | 15159.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 8.4 | 13001.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 0.2 | 240.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 7.8 | 8268.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 6.4 | 2271.0 | 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 | 677.759 | 335.948 |
| 2 | 687.595 | 334.147 |
| 3 | 697.546 | 333.156 |
| 4 | 707.544 | 332.982 |
| 5 | 717.524 | 333.627 |
| 6 | 727.417 | 335.087 |
| 7 | 737.157 | 337.351 |
| 8 | 746.679 | 340.405 |
| 9 | 755.920 | 344.227 |
| 10 | 764.817 | 348.793 |
| 11 | 773.310 | 354.071 |
| 12 | 781.343 | 360.027 |
| 13 | 787.015 | 365.000 |

Circle Center At X = 704.661 ; Y = 455.065 ; and Radius = 122.116

Factor of Safety
*** 2.608 ***

1

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 677.414 | 335.944 |
| 2 | 687.209 | 333.931 |
| 3 | 697.140 | 332.759 |
| 4 | 707.135 | 332.439 |
| 5 | 717.121 | 332.971 |
| 6 | 727.025 | 334.352 |
| 7 | 736.776 | 336.573 |
| 8 | 746.301 | 339.616 |
| 9 | 755.533 | 343.460 |
| 10 | 764.403 | 348.077 |

| | | |
|---|---|---|
| 11 | 772.848 | 353.433 |
| 12 | 780.806 | 359.489 |
| 13 | 786.892 | 365.000 |

Circle Center At X = 705.894 ; Y = 449.667 ; and Radius = 117.235

Factor of Safety
*** 2.609 ***

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.448 | 335.957 |
| 2 | 688.315 | 334.326 |
| 3 | 698.277 | 333.455 |
| 4 | 708.276 | 333.347 |
| 5 | 718.255 | 334.004 |
| 6 | 728.154 | 335.422 |
| 7 | 737.915 | 337.592 |
| 8 | 747.482 | 340.502 |
| 9 | 756.799 | 344.135 |
| 10 | 765.811 | 348.469 |
| 11 | 774.466 | 353.479 |
| 12 | 782.712 | 359.137 |
| 13 | 789.995 | 365.000 |

Circle Center At X = 704.682 ; Y = 464.038 ; and Radius = 130.740

Factor of Safety
*** 2.612 ***

1

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 677.759 | 335.948 |
| 2 | 687.632 | 334.363 |
| 3 | 697.599 | 333.551 |
| 4 | 707.599 | 333.519 |
| 5 | 717.571 | 334.266 |
| 6 | 727.455 | 335.787 |
| 7 | 737.190 | 338.073 |
| 8 | 746.717 | 341.111 |
| 9 | 755.979 | 344.883 |
| 10 | 764.919 | 349.364 |
| 11 | 773.482 | 354.528 |
| 12 | 781.618 | 360.343 |
| 13 | 787.162 | 365.000 |

Circle Center At X = 703.016 ; Y = 461.701 ; and Radius = 128.264

Factor of Safety
*** 2.612 ***

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 677.759 | 335.948 |
| 2 | 687.563 | 333.978 |
| 3 | 697.502 | 332.880 |
| 4 | 707.500 | 332.664 |
| 5 | 717.478 | 333.329 |
| 6 | 727.358 | 334.873 |
| 7 | 737.064 | 337.282 |
| 8 | 746.519 | 340.537 |
| 9 | 755.650 | 344.614 |
| 10 | 764.386 | 349.480 |
| 11 | 772.659 | 355.098 |
| 12 | 780.404 | 361.424 |
| 13 | 784.069 | 365.000 |

Circle Center At X = 704.954 ; Y = 445.899 ; and Radius = 113.264

Factor of Safety
*** 2.613 ***

1

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 677.069 | 335.940 |
| 2 | 686.838 | 333.801 |
| 3 | 696.753 | 332.505 |
| 4 | 706.743 | 332.060 |
| 5 | 716.735 | 332.469 |
| 6 | 726.655 | 333.731 |
| 7 | 736.431 | 335.835 |
| 8 | 745.992 | 338.766 |
| 9 | 755.267 | 342.503 |
| 10 | 764.190 | 347.019 |
| 11 | 772.694 | 352.280 |
| 12 | 780.718 | 358.248 |
| 13 | 788.203 | 364.880 |
| 14 | 788.317 | 365.000 |

Circle Center At X = 706.950 ; Y = 449.019 ; and Radius = 116.960

Factor of Safety
*** 2.614 ***

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 677.414 | 335.944 |
| 2 | 687.242 | 334.098 |
| 3 | 697.185 | 333.035 |
| 4 | 707.182 | 332.762 |
| 5 | 717.168 | 333.280 |
| 6 | 727.083 | 334.585 |
| 7 | 736.863 | 336.670 |
| 8 | 746.448 | 339.522 |
| 9 | 755.777 | 343.123 |
| 10 | 764.792 | 347.450 |
| 11 | 773.437 | 352.477 |
| 12 | 781.658 | 358.171 |
| 13 | 789.402 | 364.497 |
| 14 | 789.928 | 365.000 |

Circle Center At X = 705.639 ; Y = 459.020 ; and Radius = 126.271

Factor of Safety
*** 2.615 ***

1

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 677.759 | 335.948 |
| 2 | 687.603 | 334.191 |
| 3 | 697.560 | 333.269 |
| 4 | 707.560 | 333.189 |
| 5 | 717.531 | 333.952 |
| 6 | 727.402 | 335.552 |
| 7 | 737.103 | 337.978 |
| 8 | 746.566 | 341.213 |
| 9 | 755.722 | 345.234 |
| 10 | 764.506 | 350.012 |
| 11 | 772.858 | 355.513 |
| 12 | 780.715 | 361.698 |
| 13 | 784.252 | 365.000 |

Circle Center At X = 703.506 ; Y = 451.708 ; and Radius = 118.589

Factor of Safety
*** 2.615 ***

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 677.759 | 335.948 |
| 2 | 687.519 | 333.770 |
| 3 | 697.438 | 332.500 |
| 4 | 707.432 | 332.148 |
| 5 | 717.415 | 332.718 |
| 6 | 727.304 | 334.204 |
| 7 | 737.014 | 336.595 |
| 8 | 746.463 | 339.869 |
| 9 | 755.570 | 343.999 |
| 10 | 764.259 | 348.950 |
| 11 | 772.454 | 354.680 |

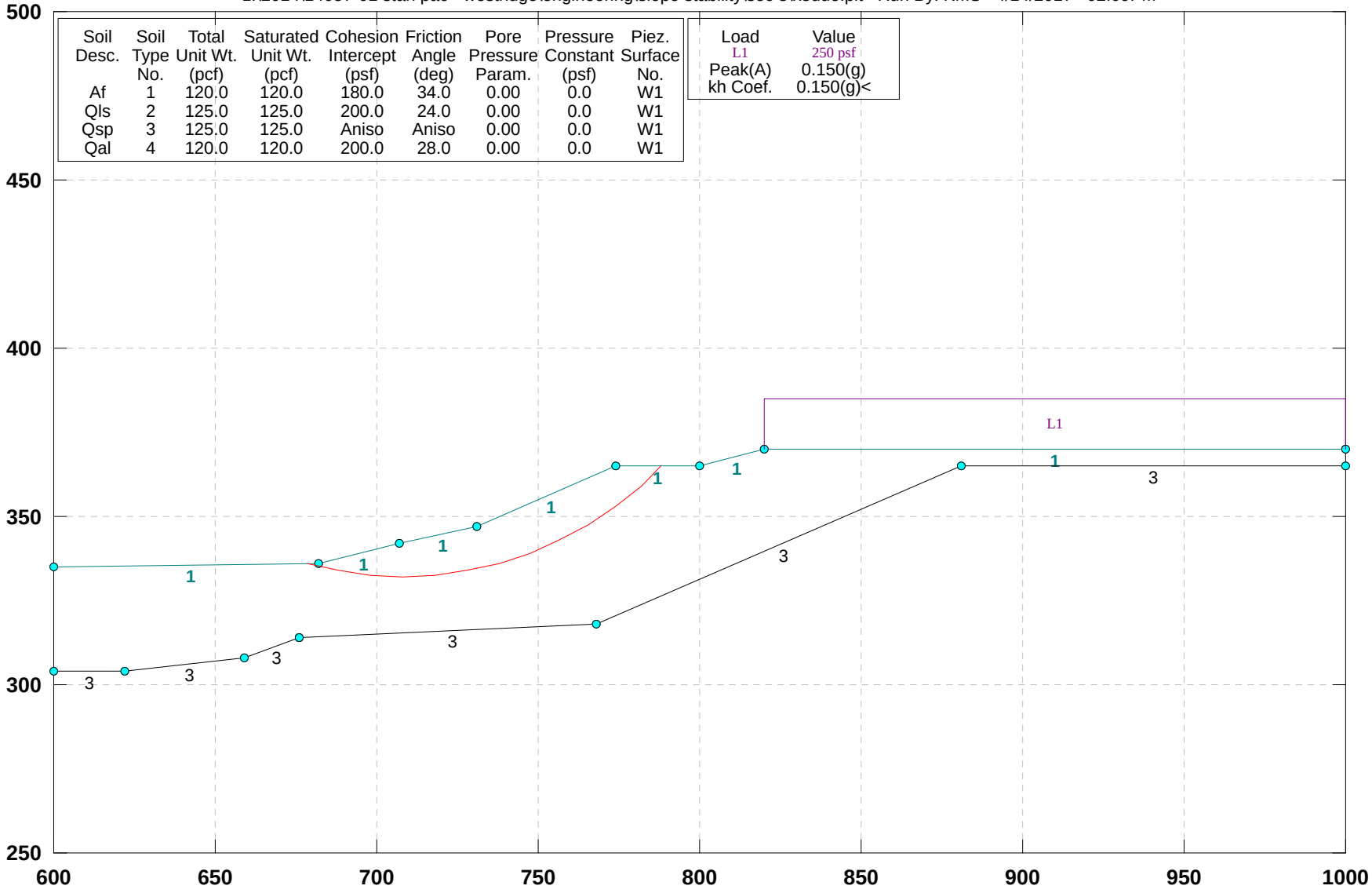
```
              12        780.088      361.140
              13        783.878      365.000

          Circle Center At X =   706.247 ; Y =   440.653 ; and Radius =
108.511


                Factor of Safety
               ***    2.615   ***



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

# Westridge/14057-01/Sec 8-8'/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8due.plt Run By: KMS 4/14/2017 02:09PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=2.00**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:09PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8due.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8due.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8due.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 8-8'/
Upper Slope - Seismic

BOUNDARY COORDINATES

7 Top Boundaries

13 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 335.00 | 682.00 | 336.00 | 1 |
| 2 | 682.00 | 336.00 | 707.00 | 342.00 | 1 |
| 3 | 707.00 | 342.00 | 731.00 | 347.00 | 1 |
| 4 | 731.00 | 347.00 | 774.00 | 365.00 | 1 |
| 5 | 774.00 | 365.00 | 800.00 | 365.00 | 1 |
| 6 | 800.00 | 365.00 | 820.00 | 370.00 | 1 |
| 7 | 820.00 | 370.00 | 1000.00 | 370.00 | 1 |
| 8 | 676.00 | 314.00 | 768.00 | 318.00 | 3 |
| 9 | 768.00 | 318.00 | 881.00 | 365.00 | 3 |
| 10 | 881.00 | 365.00 | 1000.00 | 365.00 | 3 |
| 11 | 600.00 | 304.00 | 622.00 | 304.00 | 3 |
| 12 | 622.00 | 304.00 | 659.00 | 308.00 | 3 |
| 13 | 659.00 | 308.00 | 676.00 | 314.00 | 3 |

User Specified Y-Origin = 250.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 820.00 | 1000.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000
1

Trial Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.448 | 335.957 |
| 2 | 688.217 | 333.818 |
| 3 | 698.135 | 332.538 |
| 4 | 708.126 | 332.127 |
| 5 | 718.116 | 332.587 |
| 6 | 728.027 | 333.915 |
| 7 | 737.785 | 336.101 |
| 8 | 747.316 | 339.129 |
| 9 | 756.547 | 342.974 |
| 10 | 765.408 | 347.609 |
| 11 | 773.832 | 352.998 |
| 12 | 781.754 | 359.100 |
| 13 | 788.170 | 365.000 |

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

| Angle/Segment No. | Deflection(Deg) | Segment Length(ft) |
|---|---|---|
| 1 | 4.99 | 10.00 |
| 2 | 5.00 | 10.00 |
| 3 | 4.99 | 10.00 |
| 4 | 5.00 | 10.00 |
| 5 | 5.00 | 10.00 |
| 6 | 5.00 | 10.00 |
| 7 | 4.99 | 10.00 |
| 8 | 5.00 | 10.00 |
| 9 | 4.99 | 10.00 |
| 10 | 5.00 | 10.00 |

Circle Center At X = 707.847(ft) ; Y = 446.866(ft); and Radius = 114.739(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.996

***Table 1 - 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 | 3.6 | 175.0 | 0.0 | 0.0 | 0.0 | 0.0 | 26.2 | 0.0 | 0.0 |
| 2 | 6.2 | 1676.7 | 0.0 | 0.0 | 0.0 | 0.0 | 251.5 | 0.0 | 0.0 |
| 3 | 9.9 | 6550.9 | 0.0 | 0.0 | 0.0 | 0.0 | 982.6 | 0.0 | 0.0 |
| 4 | 8.9 | 9128.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1369.2 | 0.0 | 0.0 |
| 5 | 1.1 | 1346.7 | 0.0 | 0.0 | 0.0 | 0.0 | 202.0 | 0.0 | 0.0 |
| 6 | 10.0 | 13088.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1963.3 | 0.0 | 0.0 |
| 7 | 9.9 | 14387.6 | 0.0 | 0.0 | 0.0 | 0.0 | 2158.1 | 0.0 | 0.0 |
| 8 | 3.0 | 4438.9 | 0.0 | 0.0 | 0.0 | 0.0 | 665.8 | 0.0 | 0.0 |
| 9 | 6.8 | 10649.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1597.4 | 0.0 | 0.0 |
| 10 | 9.5 | 16263.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2439.6 | 0.0 | 0.0 |
| 11 | 9.2 | 16295.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2444.3 | 0.0 | 0.0 |
| 12 | 8.9 | 15160.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2274.0 | 0.0 | 0.0 |
| 13 | 8.4 | 13003.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1950.5 | 0.0 | 0.0 |
| 14 | 0.2 | 239.9 | 0.0 | 0.0 | 0.0 | 0.0 | 36.0 | 0.0 | 0.0 |
| 15 | 7.8 | 8268.6 | 0.0 | 0.0 | 0.0 | 0.0 | 1240.3 | 0.0 | 0.0 |
| 16 | 6.4 | 2271.2 | 0.0 | 0.0 | 0.0 | 0.0 | 340.7 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 16 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress * (psf) |
|---|---|---|---|---|---|
| 1 | -12.35 | 680.22 | 3.64 | 230.26 | -3.25 |
| 2 | -12.35 | 685.11 | 6.36 | 390.84 | -18.13 |
| 3 | -7.35 | 693.18 | 10.00 | 654.05 | 11.25 |
| 4 | -2.36 | 702.57 | 8.87 | 886.85 | 106.13 |
| 5 | -2.36 | 707.56 | 1.13 | 1000.66 | 122.20 |
| 6 | 2.64 | 713.12 | 10.00 | 1047.43 | 246.97 |
| 7 | 7.63 | 723.07 | 10.00 | 1108.94 | 393.62 |
| 8 | 12.63 | 729.51 | 3.05 | 1103.53 | 519.91 |
| 9 | 12.63 | 734.39 | 6.95 | 1151.45 | 545.88 |
| 10 | 17.63 | 742.55 | 10.00 | 1201.92 | 709.80 |
| 11 | 22.61 | 751.93 | 10.00 | 1201.52 | 836.55 |
| 12 | 27.61 | 760.98 | 10.00 | 1133.58 | 890.03 |
| 13 | 32.61 | 769.62 | 10.00 | 1004.05 | 854.06 |
| 14 | 37.61 | 773.92 | 0.21 | 907.19 | 816.13 |
| 15 | 37.61 | 777.88 | 9.79 | 713.51 | 611.00 |
| 16 | 42.60 | 784.96 | 8.72 | 319.48 | 204.65 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 107146.65 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 902.54(psf)

Sum of the Driving Forces = 53691.95 (lbs)

Average Mobilized Shear Stress = 452.27(psf)

Total length of the failure surface = 118.72(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

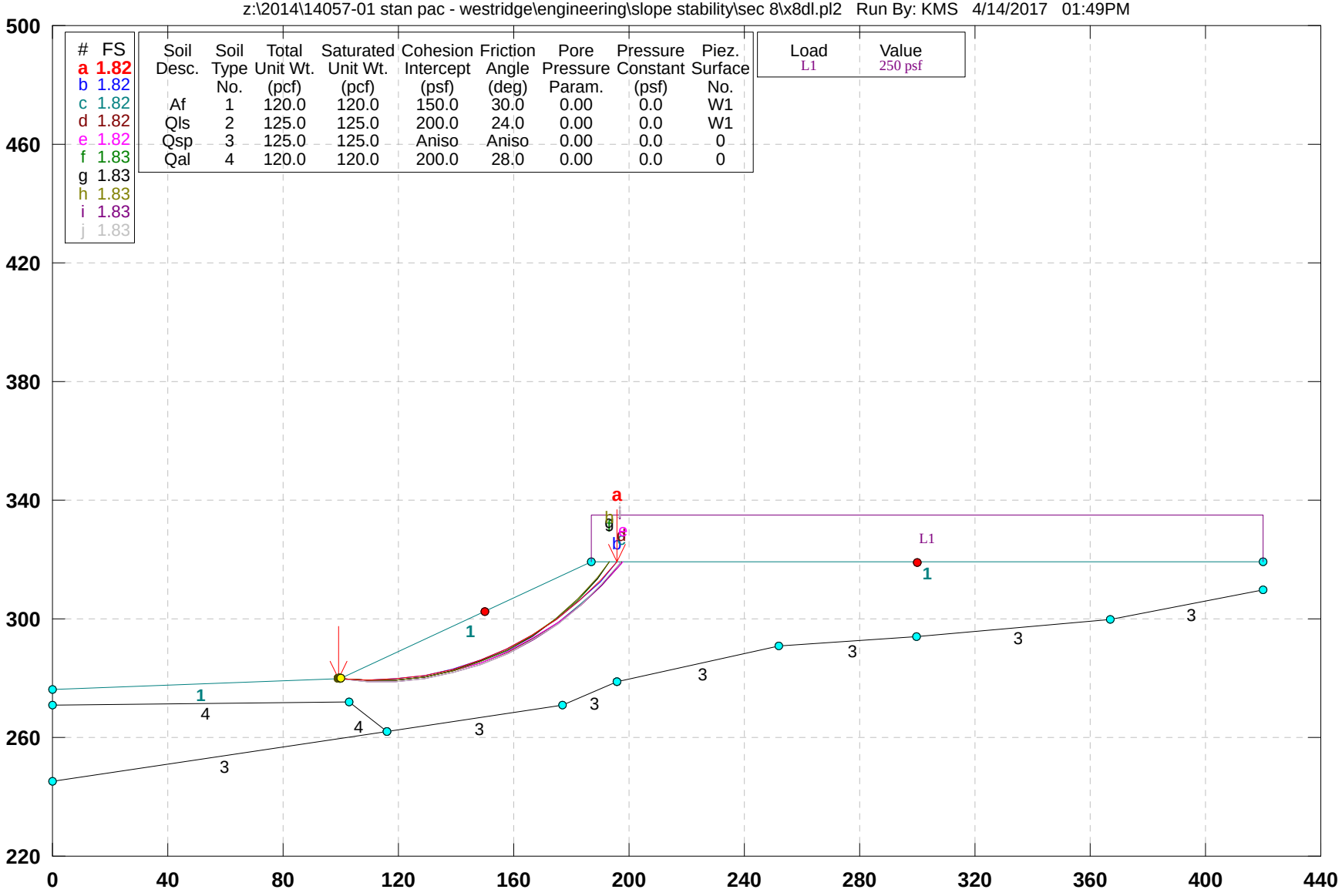
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.5406(g)
Calculated Newmark Seismic Displacement = 0.001(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 8-8'/ Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8dl.pl2 Run By: KMS 4/14/2017 01:49PM




| # | FS |
|---|---|
| a | 1.82 |
| b | 1.82 |
| c | 1.82 |
| d | 1.82 |
| e | 1.82 |
| f | 1.83 |
| g | 1.83 |
| h | 1.83 |
| i | 1.83 |
| j | 1.83 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | 0 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=1.82**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:49PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dl.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dl.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dl.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 8-8'/
Lower Slope - Static

BOUNDARY COORDINATES

3 Top Boundaries

12 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 276.00 | 100.00 | 280.00 | 1 |
| 2 | 100.00 | 280.00 | 187.00 | 319.00 | 1 |
| 3 | 187.00 | 319.00 | 420.00 | 319.00 | 1 |
| 4 | 0.00 | 271.00 | 103.00 | 272.00 | 4 |
| 5 | 103.00 | 272.00 | 116.00 | 262.00 | 4 |
| 6 | 196.00 | 279.00 | 252.00 | 291.00 | 3 |
| 7 | 252.00 | 291.00 | 300.00 | 294.00 | 3 |
| 8 | 300.00 | 294.00 | 367.00 | 300.00 | 3 |
| 9 | 367.00 | 300.00 | 420.00 | 310.00 | 3 |
| 10 | 0.00 | 245.00 | 116.00 | 262.00 | 3 |
| 11 | 116.00 | 262.00 | 177.00 | 271.00 | 3 |
| 12 | 177.00 | 271.00 | 196.00 | 279.00 | 3 |

User Specified Y-Origin = 220.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 187.00 | 420.00 | 250.0 | 0.0 |

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

1

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

15000 Trial Surfaces Have Been Generated.

500 Surface(s) Initiate(s) From Each Of 30 Points Equally Spaced

Along The Ground Surface Between X = 99.00(ft)
and X = 100.00(ft)

Each Surface Terminates Between X = 150.00(ft)
and X = 300.00(ft)

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

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

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 = 0

Number of Trial Surfaces With Valid FS = 0

Statistical Data On All Valid FS Values:
FS Max = 0.000 FS Min = 500.000 FS Ave = NaN
Standard Deviation = 0.000 Coefficient of Variation = NaN %

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.207 | 279.968 |
| 2 | 109.192 | 279.416 |
| 3 | 119.186 | 279.753 |
| 4 | 129.111 | 280.978 |
| 5 | 138.887 | 283.081 |
| 6 | 148.438 | 286.046 |
| 7 | 157.687 | 289.847 |
| 8 | 166.561 | 294.457 |
| 9 | 174.990 | 299.837 |
| 10 | 182.908 | 305.946 |

| | | |
|---|---|---|
| 11 | 190.250 | 312.734 |
| 12 | 195.920 | 319.000 |

Circle Center At X = 110.430 ; Y = 391.495 ; and Radius = 112.090

Factor of Safety
*** 1.816 ***

Individual data on the 0 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.103 | 279.964 |
| 2 | 109.088 | 279.412 |
| 3 | 119.083 | 279.747 |
| 4 | 129.008 | 280.967 |
| 5 | 138.786 | 283.062 |
| 6 | 148.339 | 286.017 |
| 7 | 157.593 | 289.806 |
| 8 | 166.475 | 294.402 |
| 9 | 174.914 | 299.767 |
| 10 | 182.844 | 305.860 |
| 11 | 190.202 | 312.631 |
| 12 | 195.995 | 319.000 |

Circle Center At X = 110.342 ; Y = 391.835 ; and Radius = 112.434

Factor of Safety
*** 1.816 ***



Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.345 | 279.974 |
| 2 | 109.320 | 279.275 |
| 3 | 119.318 | 279.472 |
| 4 | 129.259 | 280.561 |
| 5 | 139.062 | 282.535 |
| 6 | 148.650 | 285.378 |
| 7 | 157.944 | 289.067 |
| 8 | 166.872 | 293.573 |
| 9 | 175.361 | 298.858 |
| 10 | 183.343 | 304.882 |
| 11 | 190.755 | 311.595 |
| 12 | 197.536 | 318.944 |
| 13 | 197.579 | 319.000 |

Circle Center At X = 112.128 ; Y = 390.954 ; and Radius = 111.714

Factor of Safety
*** 1.822 ***

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.207 | 279.968 |
| 2 | 109.182 | 279.270 |
| 3 | 119.181 | 279.463 |
| 4 | 129.122 | 280.546 |
| 5 | 138.927 | 282.510 |
| 6 | 148.518 | 285.340 |
| 7 | 157.819 | 289.014 |
| 8 | 166.756 | 293.501 |
| 9 | 175.257 | 298.767 |
| 10 | 183.255 | 304.769 |
| 11 | 190.687 | 311.460 |
| 12 | 197.493 | 318.786 |
| 13 | 197.659 | 319.000 |

Circle Center At X = 112.019 ; Y = 391.366 ; and Radius = 112.132

Factor of Safety
*** 1.822 ***

1

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.069 | 279.963 |
| 2 | 109.045 | 279.264 |
| 3 | 119.043 | 279.454 |
| 4 | 128.985 | 280.530 |
| 5 | 138.792 | 282.485 |
| 6 | 148.387 | 285.302 |
| 7 | 157.694 | 288.960 |
| 8 | 166.639 | 293.430 |
| 9 | 175.153 | 298.676 |
| 10 | 183.167 | 304.657 |
| 11 | 190.619 | 311.325 |
| 12 | 197.449 | 318.629 |
| 13 | 197.739 | 319.000 |

Circle Center At X = 111.911 ; Y = 391.779 ; and Radius = 112.551

Factor of Safety
*** 1.822 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.000 | 279.960 |
| 2 | 108.960 | 279.072 |
| 3 | 118.960 | 279.175 |
| 4 | 128.900 | 280.268 |
| 5 | 138.683 | 282.341 |
| 6 | 148.212 | 285.373 |
| 7 | 157.394 | 289.334 |
| 8 | 166.138 | 294.186 |
| 9 | 174.359 | 299.880 |
| 10 | 181.975 | 306.361 |
| 11 | 188.911 | 313.564 |
| 12 | 193.193 | 319.000 |

Circle Center At X = 112.963 ; Y = 379.422 ; and Radius = 100.437

Factor of Safety
*** 1.828 ***

1

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.103 | 279.964 |
| 2 | 109.064 | 279.076 |
| 3 | 119.063 | 279.182 |
| 4 | 129.003 | 280.281 |
| 5 | 138.784 | 282.362 |
| 6 | 148.310 | 285.404 |
| 7 | 157.486 | 289.378 |
| 8 | 166.222 | 294.244 |
| 9 | 174.432 | 299.954 |
| 10 | 182.033 | 306.452 |
| 11 | 188.952 | 313.672 |
| 12 | 193.125 | 319.000 |

Circle Center At X = 113.043 ; Y = 379.136 ; and Radius = 100.147

Factor of Safety
*** 1.828 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.241 | 279.970 |
| 2 | 109.202 | 279.081 |
| 3 | 119.201 | 279.191 |
| 4 | 129.140 | 280.297 |
| 5 | 138.919 | 282.389 |

| | | |
|---|---|---|
| 6 | 148.440 | 285.446 |
| 7 | 157.609 | 289.437 |
| 8 | 166.334 | 294.322 |
| 9 | 174.529 | 300.054 |
| 10 | 182.111 | 306.574 |
| 11 | 189.005 | 313.817 |
| 12 | 193.034 | 319.000 |

Circle Center At X = 113.150 ; Y = 378.757 ; and Radius = 99.762

Factor of Safety
*** 1.828 ***

1

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.276 | 279.971 |
| 2 | 109.232 | 279.034 |
| 3 | 119.232 | 279.041 |
| 4 | 129.187 | 279.993 |
| 5 | 139.007 | 281.880 |
| 6 | 148.605 | 284.686 |
| 7 | 157.896 | 288.385 |
| 8 | 166.795 | 292.946 |
| 9 | 175.224 | 298.326 |
| 10 | 183.108 | 304.478 |
| 11 | 190.376 | 311.347 |
| 12 | 196.962 | 318.872 |
| 13 | 197.055 | 319.000 |

Circle Center At X = 114.155 ; Y = 384.711 ; and Radius = 105.791

Factor of Safety
*** 1.829 ***

Failure Surface Specified By 13 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.138 | 279.966 |
| 2 | 109.094 | 279.029 |
| 3 | 119.094 | 279.032 |
| 4 | 129.049 | 279.977 |
| 5 | 138.871 | 281.854 |
| 6 | 148.474 | 284.647 |
| 7 | 157.770 | 288.331 |
| 8 | 166.679 | 292.873 |
| 9 | 175.122 | 298.233 |
| 10 | 183.022 | 304.363 |
| 11 | 190.311 | 311.210 |
| 12 | 196.923 | 318.712 |
| 13 | 197.132 | 319.000 |

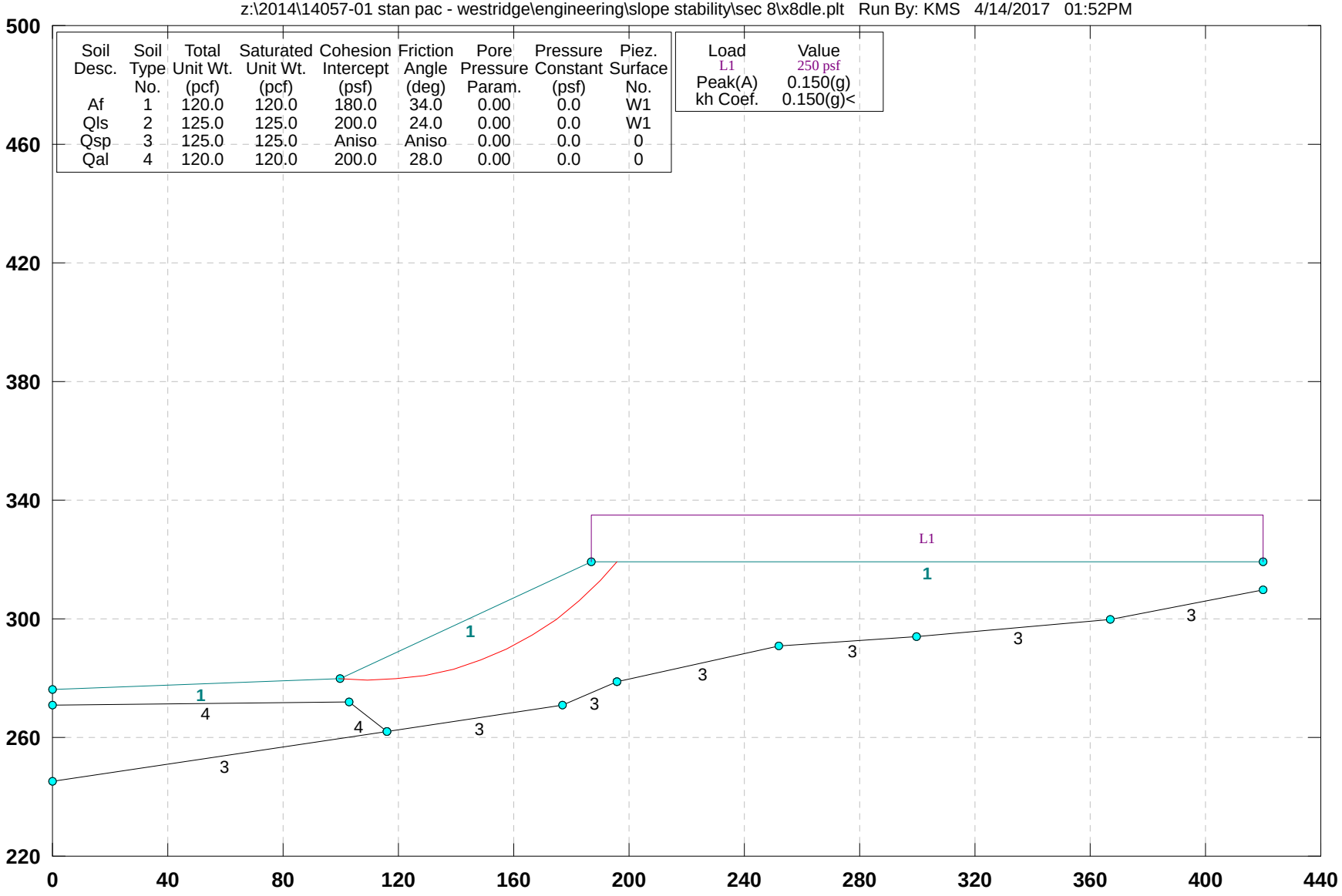
Circle Center At X = 114.053 ; Y = 385.088 ; and Radius = 106.176

Factor of Safety
*** 1.829 ***

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

# Westridge/14057-01/Sec 8-8'/ Lower Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8dle.plt Run By: KMS 4/14/2017 01:52PM




**GSTABL7 v.2 FSmin=1.53**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:52PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dle.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dle.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dle.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 8-8'/
Lower Slope - Seismic

BOUNDARY COORDINATES

3 Top Boundaries

12 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 276.00 | 100.00 | 280.00 | 1 |
| 2 | 100.00 | 280.00 | 187.00 | 319.00 | 1 |
| 3 | 187.00 | 319.00 | 420.00 | 319.00 | 1 |
| 4 | 0.00 | 271.00 | 103.00 | 272.00 | 4 |
| 5 | 103.00 | 272.00 | 116.00 | 262.00 | 4 |
| 6 | 196.00 | 279.00 | 252.00 | 291.00 | 3 |
| 7 | 252.00 | 291.00 | 300.00 | 294.00 | 3 |
| 8 | 300.00 | 294.00 | 367.00 | 300.00 | 3 |
| 9 | 367.00 | 300.00 | 420.00 | 310.00 | 3 |
| 10 | 0.00 | 245.00 | 116.00 | 262.00 | 3 |
| 11 | 116.00 | 262.00 | 177.00 | 271.00 | 3 |
| 12 | 177.00 | 271.00 | 196.00 | 279.00 | 3 |

User Specified Y-Origin = 220.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 187.00 | 420.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

Trial Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 99.207 | 279.968 |
| 2 | 109.192 | 279.416 |
| 3 | 119.186 | 279.753 |
| 4 | 129.111 | 280.978 |
| 5 | 138.887 | 283.081 |
| 6 | 148.438 | 286.046 |
| 7 | 157.687 | 289.847 |
| 8 | 166.561 | 294.457 |
| 9 | 174.990 | 299.837 |
| 10 | 182.908 | 305.946 |
| 11 | 190.250 | 312.734 |
| 12 | 195.920 | 319.000 |

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

| Angle/Segment No. | Deflection(Deg) | Segment Length(ft) |
|---|---|---|
| 1 | 5.10 | 10.00 |
| 2 | 5.11 | 10.00 |
| 3 | 5.10 | 10.00 |
| 4 | 5.11 | 10.00 |
| 5 | 5.09 | 10.00 |
| 6 | 5.11 | 10.00 |
| 7 | 5.10 | 10.00 |
| 8 | 5.10 | 10.00 |
| 9 | 5.10 | 10.00 |

Circle Center At X = 110.429(ft) ; Y = 391.496(ft); and Radius = 112.091(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.528

***Table 1 - Individual Data on the 13 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.8 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| 2 | 9.2 | 2636.3 | 0.0 | 0.0 | 0.0 | 0.0 | 395.4 | 0.0 | 0.0 |
| 3 | 10.0 | 8126.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1219.0 | 0.0 | 0.0 |
| 4 | 9.9 | 12457.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1868.6 | 0.0 | 0.0 |
| 5 | 9.8 | 15498.6 | 0.0 | 0.0 | 0.0 | 0.0 | 2324.8 | 0.0 | 0.0 |
| 6 | 9.6 | 17202.5 | 0.0 | 0.0 | 0.0 | 0.0 | 2580.4 | 0.0 | 0.0 |
| 7 | 9.2 | 17580.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2637.1 | 0.0 | 0.0 |
| 8 | 8.9 | 16715.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2507.3 | 0.0 | 0.0 |
| 9 | 8.4 | 14747.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2212.1 | 0.0 | 0.0 |
| 10 | 7.9 | 11876.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1781.5 | 0.0 | 0.0 |
| 11 | 4.1 | 5030.8 | 0.0 | 0.0 | 0.0 | 0.0 | 754.6 | 0.0 | 0.0 |
| 12 | 3.2 | 3029.7 | 0.0 | 0.0 | 0.0 | 0.0 | 454.4 | 0.0 | 812.5 |
| 13 | 5.7 | 2131.7 | 0.0 | 0.0 | 0.0 | 0.0 | 319.8 | 0.0 | 1417.5 |

***Table 2 - Base Stress Data on the 13 Slices***

| Slice No. | Alpha (deg) * | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Shear Mobilized Stress (psf) |
|---|---|---|---|---|---|
| 1 | -3.17 | 99.60 | 0.79 | 187.64 | 0.43 |
| 2 | -3.17 | 104.60 | 9.21 | 382.80 | 26.62 |
| 3 | 1.93 | 114.19 | 10.00 | 717.78 | 145.53 |
| 4 | 7.04 | 124.15 | 10.00 | 973.57 | 329.33 |
| 5 | 12.14 | 134.00 | 10.00 | 1140.99 | 539.55 |
| 6 | 17.25 | 143.66 | 10.00 | 1226.75 | 739.14 |
| 7 | 22.34 | 153.06 | 10.00 | 1237.59 | 893.58 |
| 8 | 27.45 | 162.12 | 10.00 | 1179.91 | 975.51 |
| 9 | 32.55 | 170.78 | 10.00 | 1061.12 | 965.55 |
| 10 | 37.65 | 178.95 | 10.00 | 888.94 | 856.53 |
| 11 | 42.75 | 184.95 | 5.57 | 716.73 | 706.06 |
| 12 | 42.75 | 188.62 | 4.43 | 694.11 | 661.12 |
| 13 | 47.86 | 193.08 | 8.45 | 404.75 | 336.28 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 98390.69 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 907.24(psf)

Sum of the Driving Forces = 64395.62 (lbs)

Average Mobilized Shear Stress = 593.78(psf)

Total length of the failure surface = 108.45(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

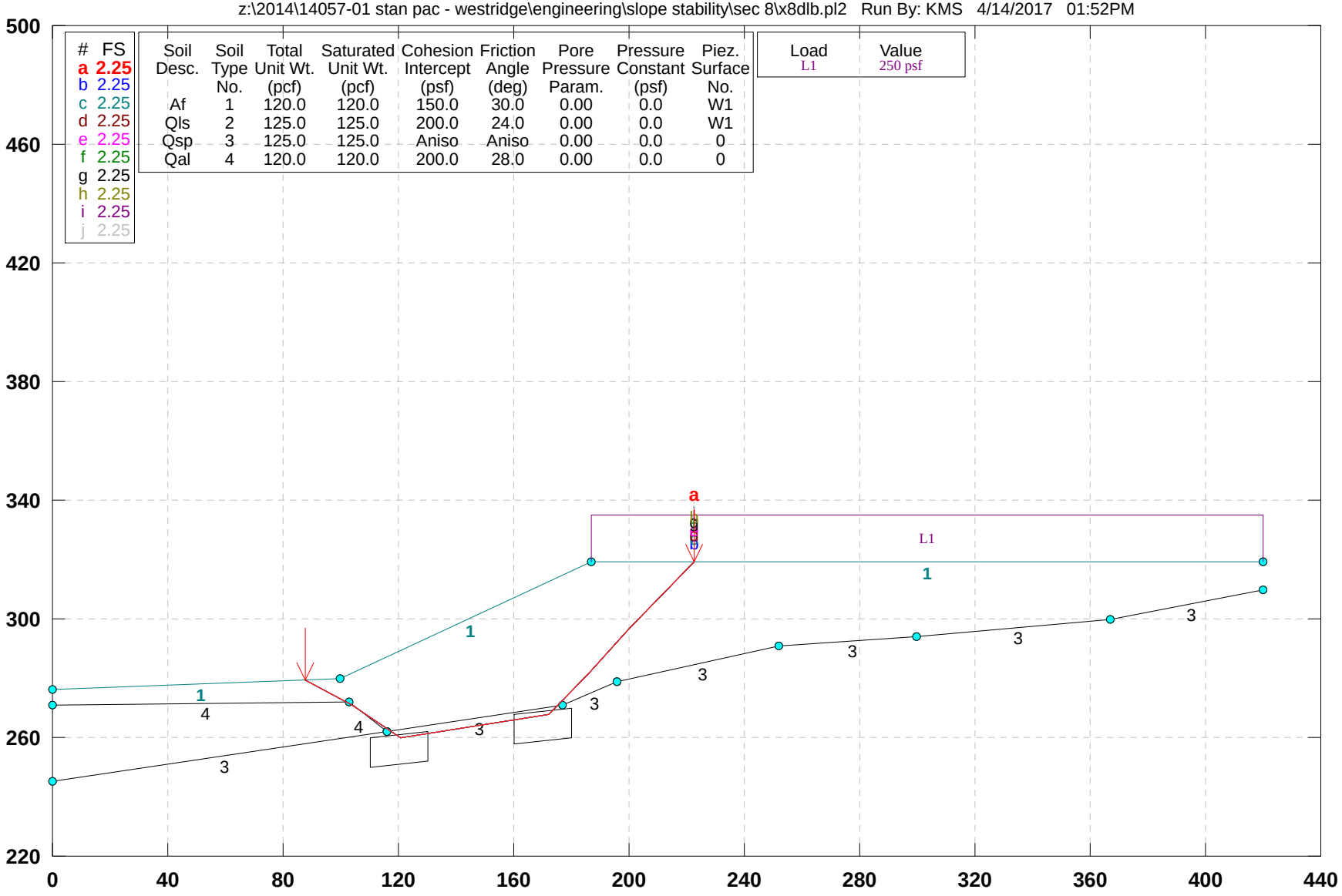
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.4010(g)
Calculated Newmark Seismic Displacement = 0.002(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 8-8'/ Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8dlb.pl2 Run By: KMS 4/14/2017 01:52PM




| # | FS |
|---|---|
| a | 2.25 |
| b | 2.25 |
| c | 2.25 |
| d | 2.25 |
| e | 2.25 |
| f | 2.25 |
| g | 2.25 |
| h | 2.25 |
| i | 2.25 |
| j | 2.25 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | 0 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

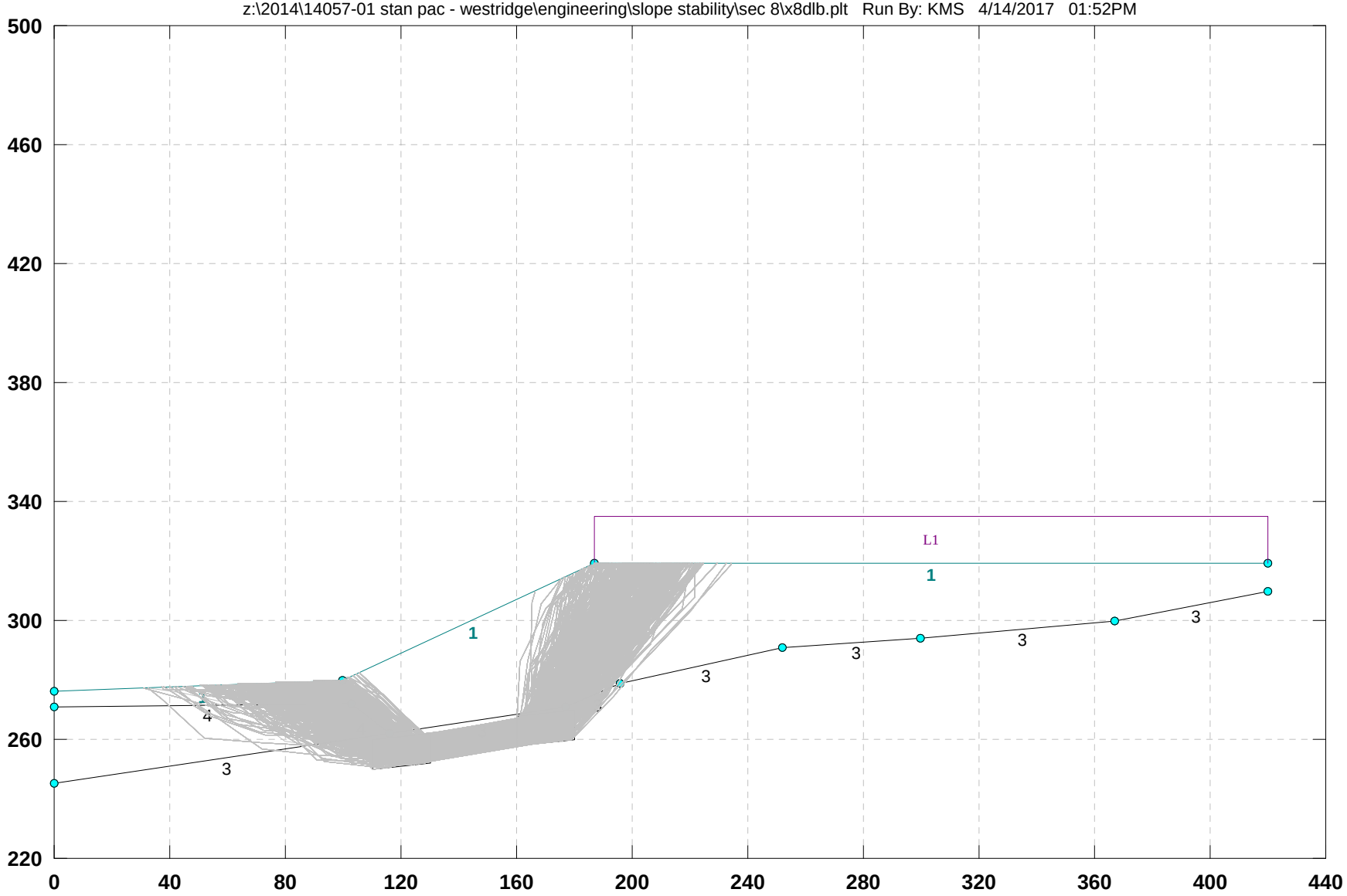
| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2 FSmin=2.25**

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

# Westridge/14057-01/Sec 8-8'/ Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8dlb.plt  Run By: KMS  4/14/2017  01:52PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:52PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dlb.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dlb.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dlb.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 8-8'/
Lower Slope - Static

BOUNDARY COORDINATES

3 Top Boundaries

12 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 276.00 | 100.00 | 280.00 | 1 |
| 2 | 100.00 | 280.00 | 187.00 | 319.00 | 1 |
| 3 | 187.00 | 319.00 | 420.00 | 319.00 | 1 |
| 4 | 0.00 | 271.00 | 103.00 | 272.00 | 4 |
| 5 | 103.00 | 272.00 | 116.00 | 262.00 | 4 |
| 6 | 196.00 | 279.00 | 252.00 | 291.00 | 3 |
| 7 | 252.00 | 291.00 | 300.00 | 294.00 | 3 |
| 8 | 300.00 | 294.00 | 367.00 | 300.00 | 3 |
| 9 | 367.00 | 300.00 | 420.00 | 310.00 | 3 |
| 10 | 0.00 | 245.00 | 116.00 | 262.00 | 3 |
| 11 | 116.00 | 262.00 | 177.00 | 271.00 | 3 |
| 12 | 177.00 | 271.00 | 196.00 | 279.00 | 3 |

User Specified Y-Origin = 220.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 187.00 | 420.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

5000 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 110.00 | 255.00 | 130.00 | 257.00 | 10.00 |
| 2 | 160.00 | 263.00 | 180.00 | 265.00 | 10.00 |

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

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

Total Number of Trial Surfaces Attempted = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 6.857 FS Min = 2.249 FS Ave = 2.945
Standard Deviation = 0.678 Coefficient of Variation = 23.02 %

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
| 8 | 222.607 | 319.000 |

Factor of Safety

*** 2.249 ***

Individual data on the 14 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.5 | 5422.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 1.4 | 1364.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 1.6 | 1776.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 0.8 | 1008.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 4.8 | 7778.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 8.8 | 22016.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.4 | 11106.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 51.6 | 229165.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 2.8 | 14872.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 11.1 | 52914.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 0.7 | 3229.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 13.2 | 46565.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 3310.7 |
| 13 | 14.1 | 26227.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 3534.5 |
| 14 | 8.2 | 4139.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 2056.6 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
| 8 | 222.607 | 319.000 |

Factor of Safety
*** 2.249 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
| 8 | 222.607 | 319.000 |

Factor of Safety
*** 2.249 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
| 8 | 222.607 | 319.000 |

Factor of Safety
*** 2.249 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
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| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
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Factor of Safety
*** 2.249 ***

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Factor of Safety
*** 2.249 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point | X-Surf | Y-Surf |
|---|---|---|

| No. | (ft) | (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
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Factor of Safety
*** 2.249 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
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Factor of Safety
*** 2.249 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |

| | | |
|---|---|---|
| 8 | 222.607 | 319.000 |

Factor of Safety
*** 2.249 ***

Failure Surface Specified By 8 Coordinate Points

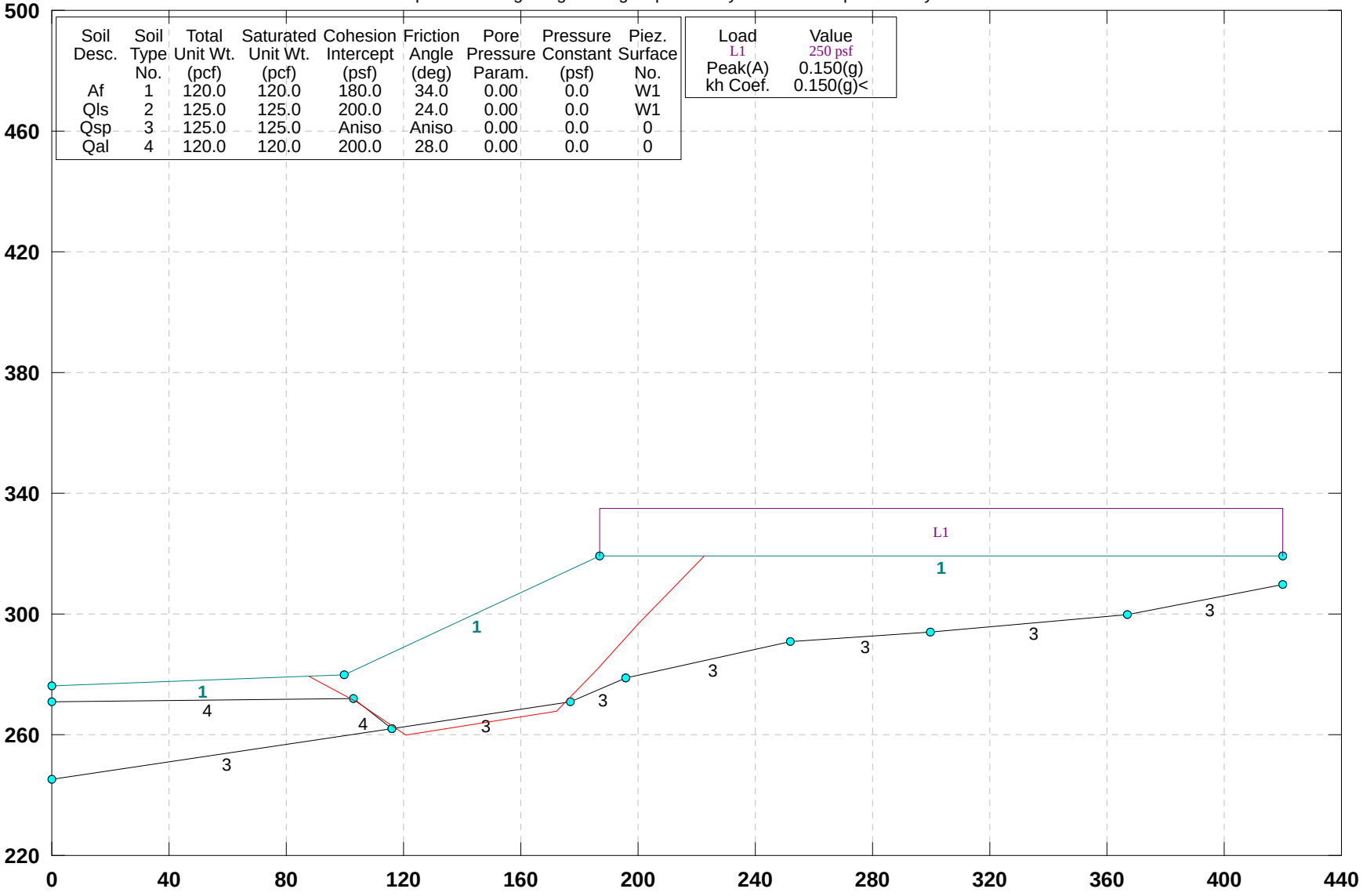
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
| 8 | 222.607 | 319.000 |

Factor of Safety
*** 2.249 ***

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

# Westridge/14057-01/Sec 8-8'/ Lower Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8dlbe.plt Run By: KMS 4/14/2017 01:53PM




**GSTABL7 v.2 FSmin=1.59**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 01:53PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dlbe.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dlbe.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8dlbe.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 8-8'/
Lower Slope - Seismic

BOUNDARY COORDINATES

3 Top Boundaries

12 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 276.00 | 100.00 | 280.00 | 1 |
| 2 | 100.00 | 280.00 | 187.00 | 319.00 | 1 |
| 3 | 187.00 | 319.00 | 420.00 | 319.00 | 1 |
| 4 | 0.00 | 271.00 | 103.00 | 272.00 | 4 |
| 5 | 103.00 | 272.00 | 116.00 | 262.00 | 4 |
| 6 | 196.00 | 279.00 | 252.00 | 291.00 | 3 |
| 7 | 252.00 | 291.00 | 300.00 | 294.00 | 3 |
| 8 | 300.00 | 294.00 | 367.00 | 300.00 | 3 |
| 9 | 367.00 | 300.00 | 420.00 | 310.00 | 3 |
| 10 | 0.00 | 245.00 | 116.00 | 262.00 | 3 |
| 11 | 116.00 | 262.00 | 177.00 | 271.00 | 3 |
| 12 | 177.00 | 271.00 | 196.00 | 279.00 | 3 |

User Specified Y-Origin = 220.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 0 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 187.00 | 420.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

Trial Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 87.522 | 279.501 |
| 2 | 103.793 | 270.708 |
| 3 | 120.741 | 260.090 |
| 4 | 172.333 | 267.814 |
| 5 | 186.258 | 282.170 |
| 6 | 200.243 | 296.468 |
| 7 | 214.381 | 310.614 |
| 8 | 222.607 | 319.000 |

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.586

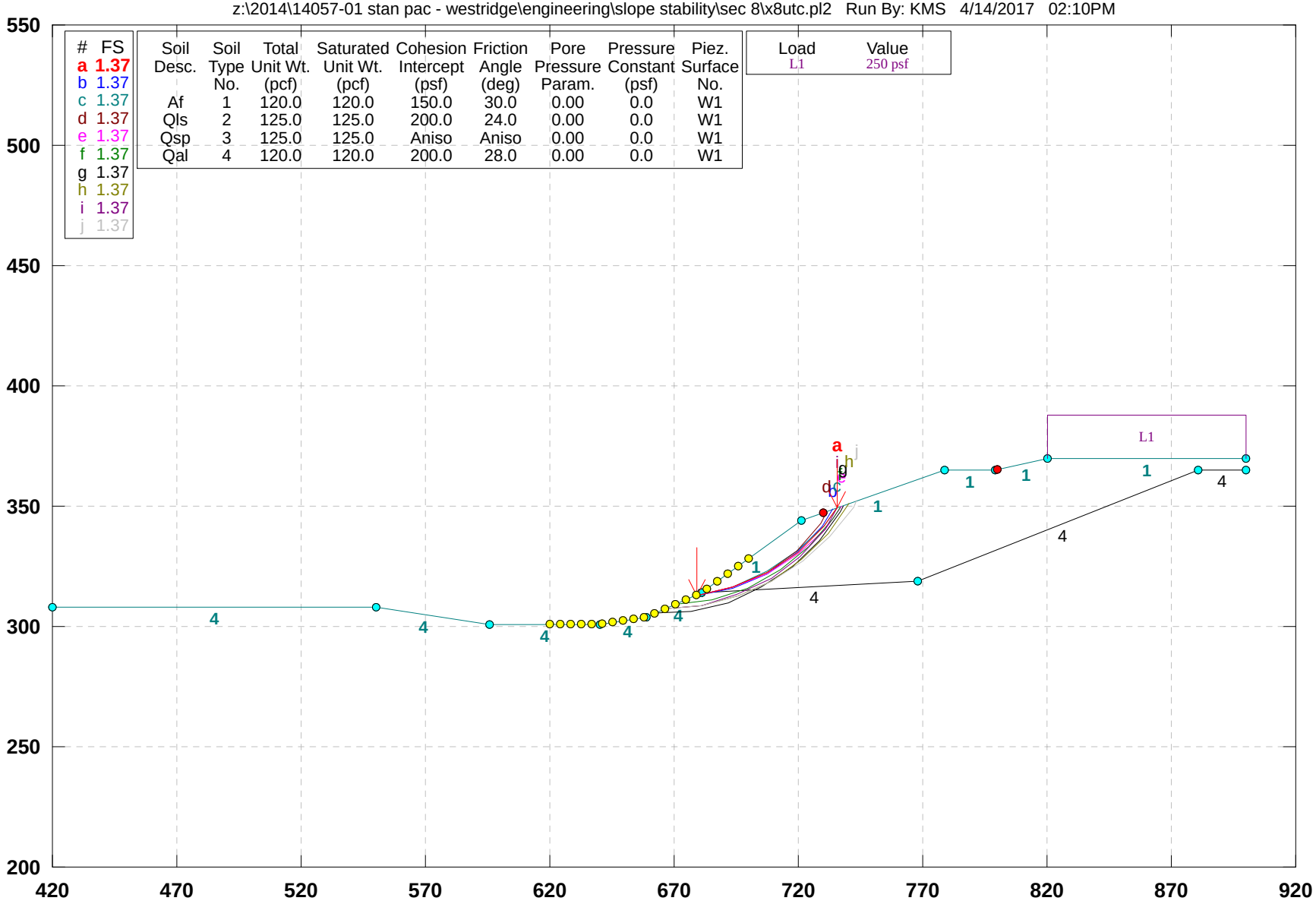
***Table 1 - Individual Data on the 14 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.5 | 5422.1 | 0.0 | 0.0 | 0.0 | 0.0 | 813.3 | 0.0 | 0.0 |
| 2 | 1.4 | 1364.5 | 0.0 | 0.0 | 0.0 | 0.0 | 204.7 | 0.0 | 0.0 |
| 3 | 1.6 | 1776.6 | 0.0 | 0.0 | 0.0 | 0.0 | 266.5 | 0.0 | 0.0 |
| 4 | 0.8 | 1008.7 | 0.0 | 0.0 | 0.0 | 0.0 | 151.3 | 0.0 | 0.0 |
| 5 | 4.8 | 7775.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1166.3 | 0.0 | 0.0 |
| 6 | 8.8 | 22020.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3303.0 | 0.0 | 0.0 |
| 7 | 3.4 | 11105.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1665.8 | 0.0 | 0.0 |
| 8 | 51.6 | 229166.5 | 0.0 | 0.0 | 0.0 | 0.0 | 34375.0 | 0.0 | 0.0 |
| 9 | 2.8 | 14872.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2230.8 | 0.0 | 0.0 |
| 10 | 11.1 | 52911.5 | 0.0 | 0.0 | 0.0 | 0.0 | 7936.7 | 0.0 | 0.0 |

```
  11      0.7    3230.8     0.0     0.0      0.0     0.0   484.6     0.0
0.0
  12     13.2   46565.1     0.0     0.0      0.0     0.0  6984.8     0.0
3310.7
  13     14.1   26227.1     0.0     0.0      0.0     0.0  3934.1     0.0
3534.5
  14      8.2    4139.0     0.0     0.0      0.0     0.0   620.8     0.0
2056.5
              ***Table 2 - Base Stress Data on the   14 Slices***


 Slice   Alpha     X-Coord.      Base          Available
Mobilized
  No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear
Stress
   *                 (ft)        (ft)           (psf)
(psf)

   1     -28.39       93.76       14.18            698.27              -
149.24
   2     -28.39      100.72        1.63           1215.34              -
327.63
   3     -28.39      102.22        1.78           1113.13              -
388.76
   4     -28.39      103.40        0.90           1216.58              -
436.89
   5     -32.07      106.18        5.64           1591.28              -
657.08
   6     -32.07      112.97       10.38           3005.38             -
1010.61
   7     -32.07      119.06        3.98           4378.85             -
1330.14
   8       8.51      146.54       52.17           2376.39
1316.62
   9      45.87      173.75        4.06           4042.05
4325.58
  10      45.87      180.71       15.94           3390.50
3920.16
  11      45.63      186.63        1.06           3106.56
3569.40
  12      45.63      193.62       18.94           2711.32
3061.21
  13      45.02      207.31       20.00           1587.56
1685.64
  14      45.55      218.49       11.75            685.32
590.52

     Sum of the Resisting Forces (including Pier/Pile, Tieback,
Reinforcing
     Soil Nail, and Applied Forces if applicable) =  361419.59 (lbs)


     Average Available Shear Strength (including Tieback, Pier/Pile,
Reinforcing,
     Soil Nail, and Applied Forces if applicable) =   2225.37(psf)


     Sum of the Driving Forces =   227921.25 (lbs)


     Average Mobilized Shear Stress =    1403.38(psf)


     Total length of the failure surface =     162.41(ft)


              *** SEISMIC SLOPE DISPLACEMENT DATA ***
       (Note: kv is set = zero for displacement calculations)
       Seismic Yield Coefficient (ky) =  0.4378(g)
       Calculated Newmark Seismic Displacement =   0.002(ft)

       Non-Symmetrical Sliding Resistance Has Been Specified
       for Downhill Sliding.


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

# Westridge/14057-01/Sec 8-8'/Temp Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 8\x8utc.pl2  Run By: KMS  4/14/2017  02:10PM




**GSTABL7 v.2  FSmin=1.37**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:10PM
Run By: KMS
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Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8utc.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 8\x8utc.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 8-8'/Temp Backcut Analysis

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 | 420.00 | 308.00 | 550.00 | 308.00 | 4 |
| 2 | 550.00 | 308.00 | 596.00 | 301.00 | 4 |
| 3 | 596.00 | 301.00 | 640.00 | 301.00 | 4 |
| 4 | 640.00 | 301.00 | 659.00 | 304.00 | 4 |
| 5 | 659.00 | 304.00 | 681.00 | 314.00 | 4 |
| 6 | 681.00 | 314.00 | 721.00 | 344.00 | 1 |
| 7 | 721.00 | 344.00 | 779.00 | 365.00 | 1 |
| 8 | 779.00 | 365.00 | 799.00 | 365.00 | 1 |
| 9 | 799.00 | 365.00 | 820.00 | 370.00 | 1 |
| 10 | 820.00 | 370.00 | 900.00 | 370.00 | 1 |
| 11 | 681.00 | 314.00 | 768.00 | 319.00 | 4 |
| 12 | 768.00 | 319.00 | 881.00 | 365.00 | 4 |
| 13 | 881.00 | 365.00 | 900.00 | 365.00 | 4 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 820.00 | 900.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
1

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

5000 Trial Surfaces Have Been Generated.

250 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 620.00(ft)
and X = 700.00(ft)

Each Surface Terminates Between X = 730.00(ft)
and X = 800.00(ft)

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

15.00(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 = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 3.159 FS Min = 1.365 FS Ave = 1.917
Standard Deviation = 0.344 Coefficient of Variation = 17.94 %

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.615 | 316.208 |
| 3 | 707.394 | 322.135 |
| 4 | 719.762 | 330.622 |
| 5 | 730.248 | 341.348 |
| 6 | 735.385 | 349.208 |

Circle Center At X = 670.707 ; Y = 388.071 ; and Radius = 75.455

Factor of Safety
*** 1.365 ***

Individual data on the 8 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.1 | 60.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 3.1 | 505.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.5 | 5357.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 13.8 | 15637.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 12.4 | 17890.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 1.2 | 1824.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 9.2 | 10049.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 5.1 | 1849.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.679 | 315.889 |
| 3 | 707.460 | 321.812 |
| 4 | 719.645 | 330.560 |
| 5 | 729.665 | 341.723 |
| 6 | 733.516 | 348.532 |

Circle Center At X = 673.803 ; Y = 380.697 ; and Radius = 67.826

Factor of Safety
*** 1.367 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.521 | 316.615 |
| 3 | 707.222 | 322.722 |
| 4 | 719.603 | 331.191 |
| 5 | 730.262 | 341.745 |
| 6 | 735.506 | 349.252 |

Circle Center At X = 667.178 ; Y = 393.757 ; and Radius = 81.544

Factor of Safety
*** 1.367 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.614 | 316.212 |
| 3 | 707.240 | 322.483 |
| 4 | 719.169 | 331.577 |
| 5 | 728.826 | 343.055 |
| 6 | 731.246 | 347.710 |

Circle Center At X = 672.537 ; Y = 379.543 ; and Radius = 66.784

Factor of Safety
*** 1.367 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.633 | 316.123 |
| 3 | 707.484 | 321.880 |
| 4 | 720.009 | 330.134 |
| 5 | 730.763 | 340.591 |
| 6 | 737.272 | 349.891 |

Circle Center At X = 670.487 ; Y = 391.067 ; and Radius = 78.458

Factor of Safety
*** 1.367 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 670.526 | 309.239 |
| 2 | 685.388 | 311.269 |
| 3 | 699.618 | 316.014 |
| 4 | 712.724 | 323.310 |
| 5 | 724.254 | 332.905 |
| 6 | 733.809 | 344.467 |
| 7 | 736.688 | 349.680 |

Circle Center At X = 667.081 ; Y = 389.883 ; and Radius = 80.717

Factor of Safety
*** 1.368 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 662.105 | 305.411 |
| 2 | 677.070 | 306.432 |
| 3 | 691.618 | 310.089 |
| 4 | 705.287 | 316.266 |
| 5 | 717.645 | 324.768 |
| 6 | 728.301 | 335.324 |
| 7 | 736.918 | 347.602 |
| 8 | 738.121 | 350.199 |

Circle Center At X = 664.041 ; Y = 389.028 ; and Radius = 83.639

Factor of Safety
*** 1.368 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 666.316 | 307.325 |
| 2 | 681.255 | 308.675 |
| 3 | 695.723 | 312.634 |
| 4 | 709.268 | 319.079 |
| 5 | 721.466 | 327.808 |
| 6 | 731.936 | 338.550 |
| 7 | 740.351 | 350.967 |
| 8 | 740.372 | 351.014 |

Circle Center At X = 666.186 ; Y = 392.155 ; and Radius = 84.830

Factor of Safety
*** 1.369 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 666.316 | 307.325 |
| 2 | 681.240 | 308.834 |

| | | |
|---|---|---|
| 3 | 695.619 | 313.105 |
| 4 | 708.947 | 319.987 |
| 5 | 720.755 | 329.237 |
| 6 | 730.627 | 340.531 |
| 7 | 735.804 | 349.360 |

Circle Center At X = 665.771 ; Y = 387.259 ; and Radius = 79.936

Factor of Safety
*** 1.370 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 666.316 | 307.325 |
| 2 | 681.248 | 308.749 |
| 3 | 695.746 | 312.598 |
| 4 | 709.417 | 318.770 |
| 5 | 721.893 | 327.097 |
| 6 | 732.837 | 337.355 |
| 7 | 741.954 | 349.267 |
| 8 | 743.482 | 352.140 |

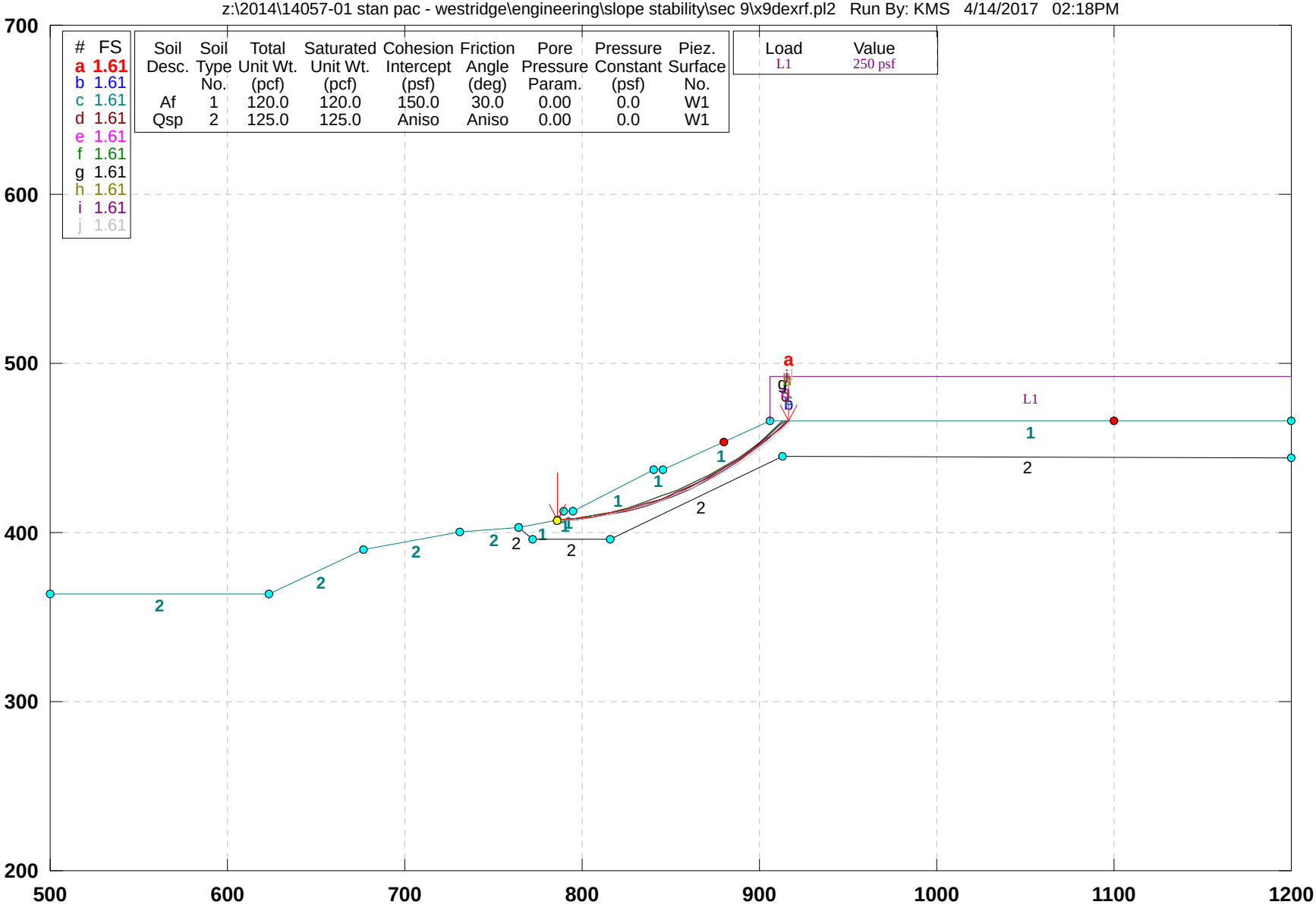
Circle Center At X = 665.358 ; Y = 397.819 ; and Radius = 90.499

Factor of Safety
*** 1.370 ***

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

# Westridge/14057-01/Sec 9-9'/ Upper Slope - Rotational - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 9\x9dexrf.pl2 Run By: KMS 4/14/2017 02:18PM




**GSTABL7 v.2 FSmin=1.61**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:18PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexrf.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexrf.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexrf.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 9-9'/
Upper Slope - Rotational - Static

BOUNDARY COORDINATES

11 Top Boundaries

15 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 500.00 | 364.00 | 623.00 | 364.00 | 2 |
| 2 | 623.00 | 364.00 | 677.00 | 390.00 | 2 |
| 3 | 677.00 | 390.00 | 731.00 | 400.00 | 2 |
| 4 | 731.00 | 400.00 | 764.00 | 403.00 | 2 |
| 5 | 764.00 | 403.00 | 786.00 | 407.00 | 1 |
| 6 | 786.00 | 407.00 | 790.00 | 413.00 | 1 |
| 7 | 790.00 | 413.00 | 795.00 | 413.00 | 1 |
| 8 | 795.00 | 413.00 | 840.00 | 437.00 | 1 |
| 9 | 840.00 | 437.00 | 846.00 | 437.00 | 1 |
| 10 | 846.00 | 437.00 | 906.00 | 466.00 | 1 |
| 11 | 906.00 | 466.00 | 1200.00 | 466.00 | 1 |
| 12 | 764.00 | 403.00 | 772.00 | 396.00 | 2 |
| 13 | 772.00 | 396.00 | 816.00 | 396.00 | 2 |
| 14 | 816.00 | 396.00 | 913.00 | 445.00 | 2 |
| 15 | 913.00 | 445.00 | 1200.00 | 444.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type  2 Is Anisotropic

Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | -4.0 | 300.00 | 32.00 |
| 2 | 10.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 906.00 | 1200.00 | 250.0 | 0.0 |

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

1

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

15000 Trial Surfaces Have Been Generated.

500 Surface(s) Initiate(s) From Each Of 30 Points Equally Spaced
Along The Ground Surface Between X = 786.00(ft)
and X = 786.00(ft)

Each Surface Terminates Between X = 880.00(ft)
and X =1100.00(ft)

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

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

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 = 0

Number of Trial Surfaces With Valid FS = 0

Statistical Data On All Valid FS Values:
FS Max = 0.000 FS Min = 500.000 FS Ave = NaN
Standard Deviation = 0.000 Coefficient of Variation = NaN %

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.949 | 408.008 |
| 3 | 805.839 | 409.489 |
| 4 | 815.647 | 411.440 |
| 5 | 825.351 | 413.855 |
| 6 | 834.929 | 416.729 |
| 7 | 844.359 | 420.056 |
| 8 | 853.620 | 423.829 |
| 9 | 862.691 | 428.038 |
| 10 | 871.551 | 432.674 |
| 11 | 880.181 | 437.727 |

| | | |
|---|---|---|
| 12 | 888.560 | 443.185 |
| 13 | 896.670 | 449.036 |
| 14 | 904.491 | 455.267 |
| 15 | 912.008 | 461.862 |
| 16 | 916.293 | 466.000 |

Circle Center At X = 769.921 ; Y = 615.875 ; and Radius = 209.493

Factor of Safety
*** 1.611 ***

Individual data on the 0 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.949 | 408.008 |
| 3 | 805.839 | 409.489 |
| 4 | 815.647 | 411.440 |
| 5 | 825.351 | 413.855 |
| 6 | 834.929 | 416.729 |
| 7 | 844.359 | 420.056 |
| 8 | 853.620 | 423.829 |
| 9 | 862.691 | 428.038 |
| 10 | 871.551 | 432.674 |
| 11 | 880.181 | 437.727 |
| 12 | 888.560 | 443.185 |
| 13 | 896.670 | 449.036 |
| 14 | 904.491 | 455.267 |
| 15 | 912.008 | 461.862 |
| 16 | 916.293 | 466.000 |

Circle Center At X = 769.921 ; Y = 615.875 ; and Radius = 209.493

Factor of Safety
*** 1.611 ***

1

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.949 | 408.008 |
| 3 | 805.839 | 409.489 |
| 4 | 815.647 | 411.440 |
| 5 | 825.351 | 413.855 |
| 6 | 834.929 | 416.729 |
| 7 | 844.359 | 420.056 |
| 8 | 853.620 | 423.829 |
| 9 | 862.691 | 428.038 |
| 10 | 871.551 | 432.674 |
| 11 | 880.181 | 437.727 |
| 12 | 888.560 | 443.185 |
| 13 | 896.670 | 449.036 |
| 14 | 904.491 | 455.267 |
| 15 | 912.008 | 461.862 |
| 16 | 916.293 | 466.000 |

Circle Center At X = 769.921 ; Y = 615.875 ; and Radius = 209.493

Factor of Safety
*** 1.611 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.926 | 408.218 |
| 3 | 805.785 | 409.891 |
| 4 | 815.557 | 412.014 |
| 5 | 825.221 | 414.583 |
| 6 | 834.757 | 417.594 |
| 7 | 844.145 | 421.038 |

| | | |
|---|---|---|
| 8 | 853.365 | 424.910 |
| 9 | 862.398 | 429.201 |
| 10 | 871.224 | 433.902 |
| 11 | 879.825 | 439.003 |
| 12 | 888.183 | 444.494 |
| 13 | 896.280 | 450.362 |
| 14 | 904.099 | 456.596 |
| 15 | 911.624 | 463.182 |
| 16 | 914.560 | 466.000 |

Circle Center At X = 764.562 ; Y = 623.279 ; and Radius = 217.339

Factor of Safety
*** 1.612 ***

1

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.926 | 408.218 |
| 3 | 805.785 | 409.891 |
| 4 | 815.557 | 412.014 |
| 5 | 825.221 | 414.583 |
| 6 | 834.757 | 417.594 |
| 7 | 844.145 | 421.038 |
| 8 | 853.365 | 424.910 |
| 9 | 862.398 | 429.201 |
| 10 | 871.224 | 433.902 |
| 11 | 879.825 | 439.003 |
| 12 | 888.183 | 444.494 |
| 13 | 896.280 | 450.362 |
| 14 | 904.099 | 456.596 |
| 15 | 911.624 | 463.182 |
| 16 | 914.560 | 466.000 |

Circle Center At X = 764.562 ; Y = 623.279 ; and Radius = 217.339

Factor of Safety
*** 1.612 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.926 | 408.218 |
| 3 | 805.785 | 409.891 |
| 4 | 815.557 | 412.014 |
| 5 | 825.221 | 414.583 |
| 6 | 834.757 | 417.594 |
| 7 | 844.145 | 421.038 |
| 8 | 853.365 | 424.910 |
| 9 | 862.398 | 429.201 |
| 10 | 871.224 | 433.902 |
| 11 | 879.825 | 439.003 |
| 12 | 888.183 | 444.494 |
| 13 | 896.280 | 450.362 |
| 14 | 904.099 | 456.596 |
| 15 | 911.624 | 463.182 |
| 16 | 914.560 | 466.000 |

Circle Center At X = 764.562 ; Y = 623.279 ; and Radius = 217.339

Factor of Safety
*** 1.612 ***

1

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.968 | 407.799 |
| 3 | 805.880 | 409.123 |
| 4 | 815.708 | 410.968 |
| 5 | 825.426 | 413.328 |
| 6 | 835.005 | 416.198 |
| 7 | 844.420 | 419.569 |
| 8 | 853.643 | 423.433 |
| 9 | 862.651 | 427.777 |
| 10 | 871.416 | 432.590 |
| 11 | 879.915 | 437.859 |
| 12 | 888.125 | 443.569 |
| 13 | 896.022 | 449.704 |
| 14 | 903.584 | 456.247 |

| | | |
|---|---|---|
| 15 | 910.791 | 463.180 |
| 16 | 913.428 | 466.000 |

Circle Center At X = 775.948 ; Y = 595.821 ; and Radius = 189.088

Factor of Safety
*** 1.613 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.976 | 407.690 |
| 3 | 805.902 | 408.904 |
| 4 | 815.751 | 410.637 |
| 5 | 825.495 | 412.885 |
| 6 | 835.108 | 415.641 |
| 7 | 844.562 | 418.899 |
| 8 | 853.832 | 422.649 |
| 9 | 862.893 | 426.880 |
| 10 | 871.719 | 431.582 |
| 11 | 880.286 | 436.740 |
| 12 | 888.570 | 442.341 |
| 13 | 896.548 | 448.370 |
| 14 | 904.199 | 454.810 |
| 15 | 911.501 | 461.642 |
| 16 | 915.693 | 466.000 |

Circle Center At X = 777.947 ; Y = 596.747 ; and Radius = 189.918

Factor of Safety
*** 1.613 ***

1

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.977 | 407.681 |
| 3 | 805.904 | 408.887 |
| 4 | 815.754 | 410.613 |
| 5 | 825.499 | 412.856 |
| 6 | 835.113 | 415.608 |
| 7 | 844.568 | 418.864 |
| 8 | 853.839 | 422.612 |
| 9 | 862.899 | 426.844 |
| 10 | 871.725 | 431.546 |
| 11 | 880.290 | 436.707 |
| 12 | 888.572 | 442.312 |
| 13 | 896.547 | 448.345 |
| 14 | 904.193 | 454.789 |
| 15 | 911.490 | 461.627 |
| 16 | 915.689 | 466.000 |

Circle Center At X = 778.157 ; Y = 596.274 ; and Radius = 189.437

Factor of Safety
*** 1.613 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.968 | 407.805 |
| 3 | 805.883 | 409.099 |
| 4 | 815.724 | 410.878 |
| 5 | 825.465 | 413.138 |
| 6 | 835.083 | 415.875 |
| 7 | 844.556 | 419.080 |
| 8 | 853.859 | 422.747 |
| 9 | 862.971 | 426.867 |
| 10 | 871.870 | 431.429 |
| 11 | 880.534 | 436.423 |
| 12 | 888.941 | 441.837 |
| 13 | 897.073 | 447.657 |
| 14 | 904.909 | 453.869 |
| 15 | 912.431 | 460.459 |
| 16 | 918.160 | 466.000 |

Circle Center At X = 774.674 ; Y = 609.890 ; and Radius = 203.206

Factor of Safety

*** 1.614 ***

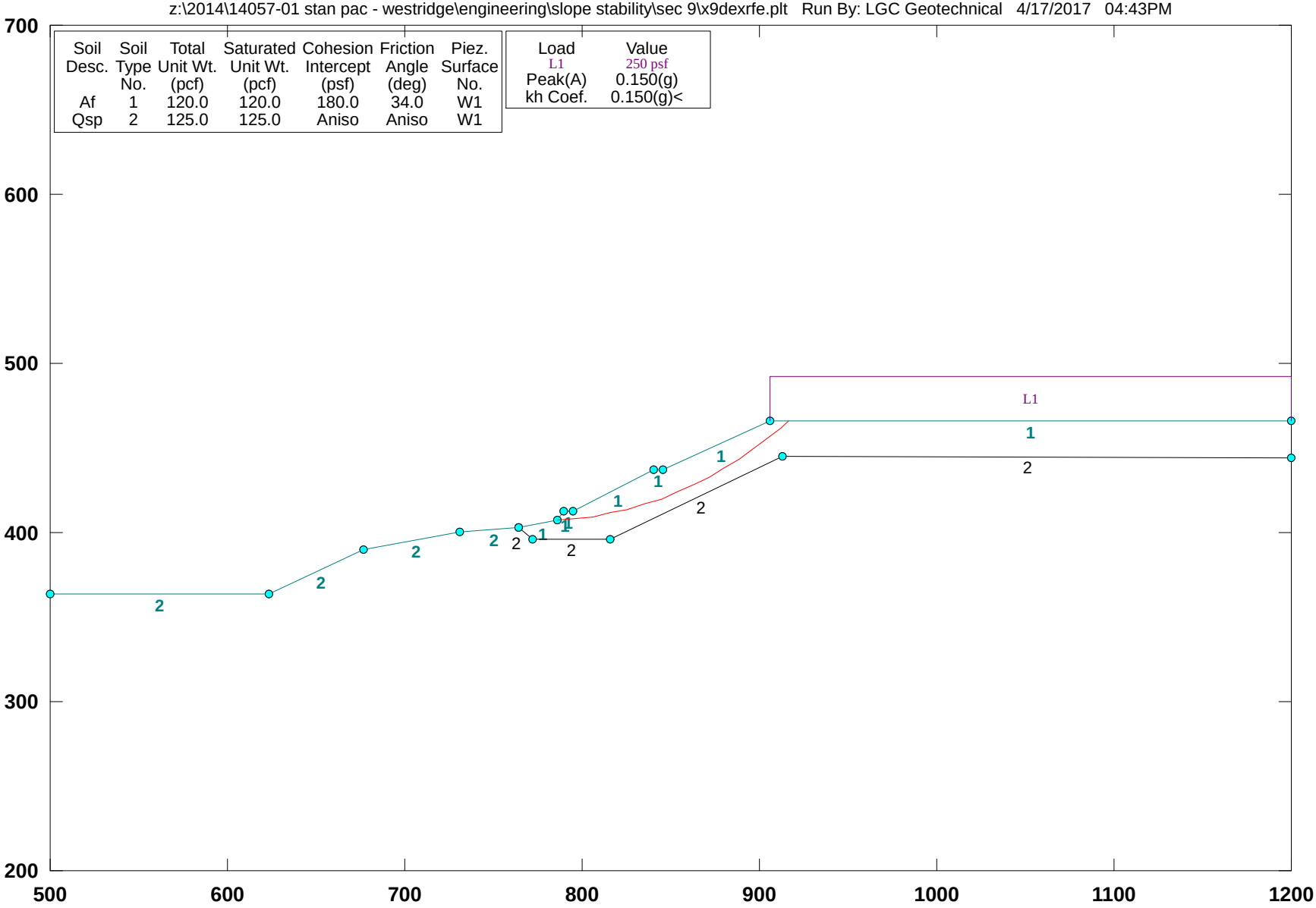
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 9-9'/ Upper Slope - Rotational - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 9\x9dexrfe.plt Run By: LGC Geotechnical 4/17/2017 04:43PM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.36**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 04:43PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexrfe.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexrfe.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexrfe.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 9-9'/
Upper Slope - Rotational - Seismic

BOUNDARY COORDINATES
11 Top Boundaries
15 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 500.00 | 364.00 | 623.00 | 364.00 | 2 |
| 2 | 623.00 | 364.00 | 677.00 | 390.00 | 2 |
| 3 | 677.00 | 390.00 | 731.00 | 400.00 | 2 |
| 4 | 731.00 | 400.00 | 764.00 | 403.00 | 2 |
| 5 | 764.00 | 403.00 | 786.00 | 407.00 | 1 |
| 6 | 786.00 | 407.00 | 790.00 | 413.00 | 1 |
| 7 | 790.00 | 413.00 | 795.00 | 413.00 | 1 |
| 8 | 795.00 | 413.00 | 840.00 | 437.00 | 1 |
| 9 | 840.00 | 437.00 | 846.00 | 437.00 | 1 |
| 10 | 846.00 | 437.00 | 906.00 | 466.00 | 1 |
| 11 | 906.00 | 466.00 | 1200.00 | 466.00 | 1 |
| 12 | 764.00 | 403.00 | 772.00 | 396.00 | 2 |
| 13 | 772.00 | 396.00 | 816.00 | 396.00 | 2 |
| 14 | 816.00 | 396.00 | 913.00 | 445.00 | 2 |
| 15 | 913.00 | 445.00 | 1200.00 | 444.00 | 2 |

User Specified Y-Origin = 200.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | -4.0 | 500.00 | 34.00 |
| 2 | 10.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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



(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 906.00 | 1200.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Trial Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 786.000 | 407.000 |
| 2 | 795.949 | 408.008 |
| 3 | 805.839 | 409.489 |
| 4 | 815.647 | 411.440 |
| 5 | 825.351 | 413.855 |
| 6 | 834.929 | 416.729 |
| 7 | 844.359 | 420.056 |
| 8 | 853.620 | 423.829 |
| 9 | 862.691 | 428.038 |
| 10 | 871.551 | 432.674 |
| 11 | 880.181 | 437.727 |
| 12 | 888.560 | 443.185 |
| 13 | 896.670 | 449.036 |
| 14 | 904.491 | 455.267 |
| 15 | 912.008 | 461.862 |
| 16 | 916.293 | 466.000 |

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

| Angle/Segment No. | Deflection(Deg) | Segment Length(ft) |
|---|---|---|
| 1 | 2.73 | 10.00 |
| 2 | 2.73 | 10.00 |
| 3 | 2.72 | 10.00 |
| 4 | 2.73 | 10.00 |
| 5 | 2.73 | 10.00 |
| 6 | 2.73 | 10.00 |
| 7 | 2.73 | 10.00 |
| 8 | 2.73 | 10.00 |
| 9 | 2.73 | 10.00 |
| 10 | 2.73 | 10.00 |
| 11 | 2.73 | 10.00 |
| 12 | 2.74 | 10.00 |
| 13 | 2.72 | 10.00 |

Circle Center At X = 769.919(ft) ; Y = 615.879(ft); and Radius = 209.497(ft)
* * Factor Of Safety Is Calculated By The Modified Bishop Method * *
Factor Of Safety For The Preceding Specified Surface = 1.359
***Table 1 - Individual Data on the 20 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.0 | 1342.7 | 0.0 | 0.0 | 0.0 | 0.0 | 201.4 | 0.0 | 0.0 |
| 2 | 5.0 | 3204.9 | 0.0 | 0.0 | 0.0 | 0.0 | 480.7 | 0.0 | 0.0 |
| 3 | 0.9 | 602.8 | 0.0 | 0.0 | 0.0 | 0.0 | 90.4 | 0.0 | 0.0 |
| 4 | 9.9 | 8776.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1316.5 | 0.0 | 0.0 |
| 5 | 9.8 | 12866.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1929.9 | 0.0 | 0.0 |
| 6 | 9.7 | 16246.8 | 0.0 | 0.0 | 0.0 | 0.0 | 2437.0 | 0.0 | 0.0 |
| 7 | 9.6 | 18906.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2836.0 | 0.0 | 0.0 |
| 8 | 5.1 | 10968.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1645.2 | 0.0 | 0.0 |
| 9 | 4.4 | 9265.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1389.8 | 0.0 | 0.0 |
| 10 | 1.6 | 3270.9 | 0.0 | 0.0 | 0.0 | 0.0 | 490.6 | 0.0 | 0.0 |
| 11 | 7.6 | 15146.8 | 0.0 | 0.0 | 0.0 | 0.0 | 2272.0 | 0.0 | 0.0 |
| 12 | 9.1 | 18441.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2766.2 | 0.0 | 0.0 |
| 13 | 8.9 | 17917.5 | 0.0 | 0.0 | 0.0 | 0.0 | 2687.6 | 0.0 | 0.0 |
| 14 | 8.6 | 16812.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2521.9 | 0.0 | 0.0 |
| 15 | 8.4 | 15172.5 | 0.0 | 0.0 | 0.0 | 0.0 | 2275.9 | 0.0 | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 8.1 | 13060.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1959.1 | 0.0 | 0.0 |
| 17 | 7.8 | 10538.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1580.8 | 0.0 | 0.0 |
| 18 | 1.5 | 1757.6 | 0.0 | 0.0 | 0.0 | 0.0 | 263.6 | 0.0 | 0.0 |
| 19 | 6.0 | 4883.4 | 0.0 | 0.0 | 0.0 | 0.0 | 732.5 | 0.0 | 1502.0 |
| 20 | 4.3 | 1063.9 | 0.0 | 0.0 | 0.0 | 0.0 | 159.6 | 0.0 | 1071.3 |

***Table 2 - Base Stress Data on the 20 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | 5.79 | 788.00 | 4.02 | 386.97 | 83.17 |
| 2 | 5.79 | 792.50 | 5.03 | 583.03 | 158.23 |
| 3 | 5.79 | 795.47 | 0.95 | 579.31 | 156.81 |
| 4 | 8.52 | 800.89 | 10.00 | 724.71 | 257.84 |
| 5 | 11.25 | 810.74 | 10.00 | 969.17 | 435.26 |
| 6 | 13.98 | 820.50 | 10.00 | 1165.37 | 620.73 |
| 7 | 16.70 | 830.14 | 10.00 | 1315.55 | 803.87 |
| 8 | 19.43 | 837.46 | 5.38 | 1394.72 | 953.99 |
| 9 | 19.43 | 842.18 | 4.62 | 1373.28 | 937.74 |
| 10 | 22.17 | 845.18 | 1.77 | 1268.06 | 941.87 |
| 11 | 22.17 | 849.81 | 8.23 | 1265.03 | 939.35 |
| 12 | 24.89 | 858.16 | 10.00 | 1260.94 | 1015.95 |
| 13 | 27.62 | 867.12 | 10.00 | 1225.78 | 1058.06 |
| 14 | 30.35 | 875.87 | 10.00 | 1157.70 | 1057.31 |
| 15 | 33.08 | 884.37 | 10.00 | 1059.06 | 1010.64 |
| 16 | 35.81 | 892.61 | 10.00 | 932.43 | 916.71 |
| 17 | 38.54 | 900.58 | 10.00 | 780.38 | 776.12 |
| 18 | 41.26 | 905.25 | 2.01 | 672.76 | 673.11 |
| 19 | 41.26 | 909.00 | 7.99 | 624.85 | 594.31 |
| 20 | 44.00 | 914.15 | 5.96 | 348.90 | 268.13 |

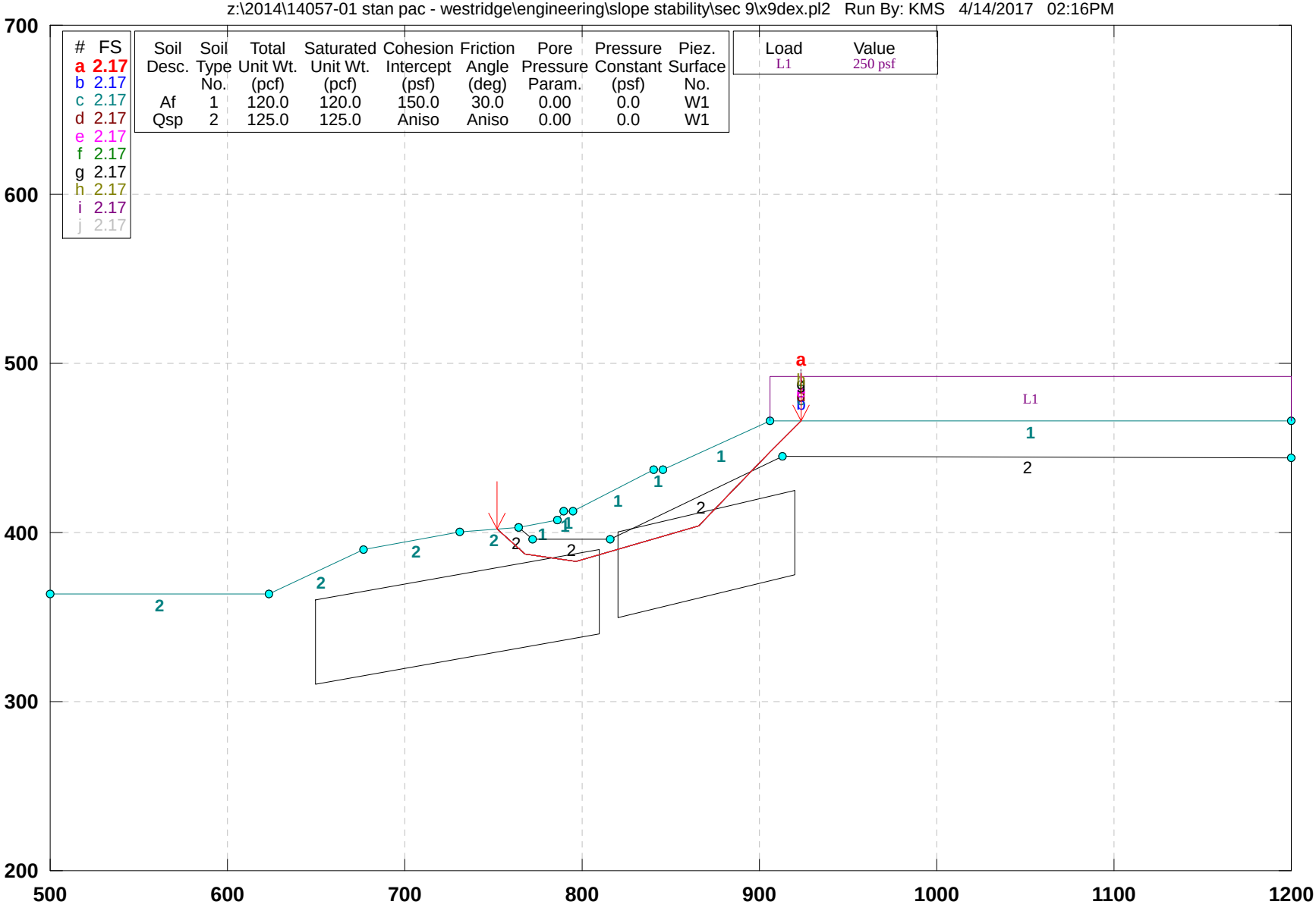
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 145941.08 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 999.89(psf)
Sum of the Driving Forces = 107364.94 (lbs)
Average Mobilized Shear Stress = 735.59(psf)
Total length of the failure surface = 145.96(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3215(g)
Calculated Newmark Seismic Displacement = 0.003(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 9-9'/ Upper Slope - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 9\x9dex.pl2  Run By: KMS  4/14/2017  02:16PM




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

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |

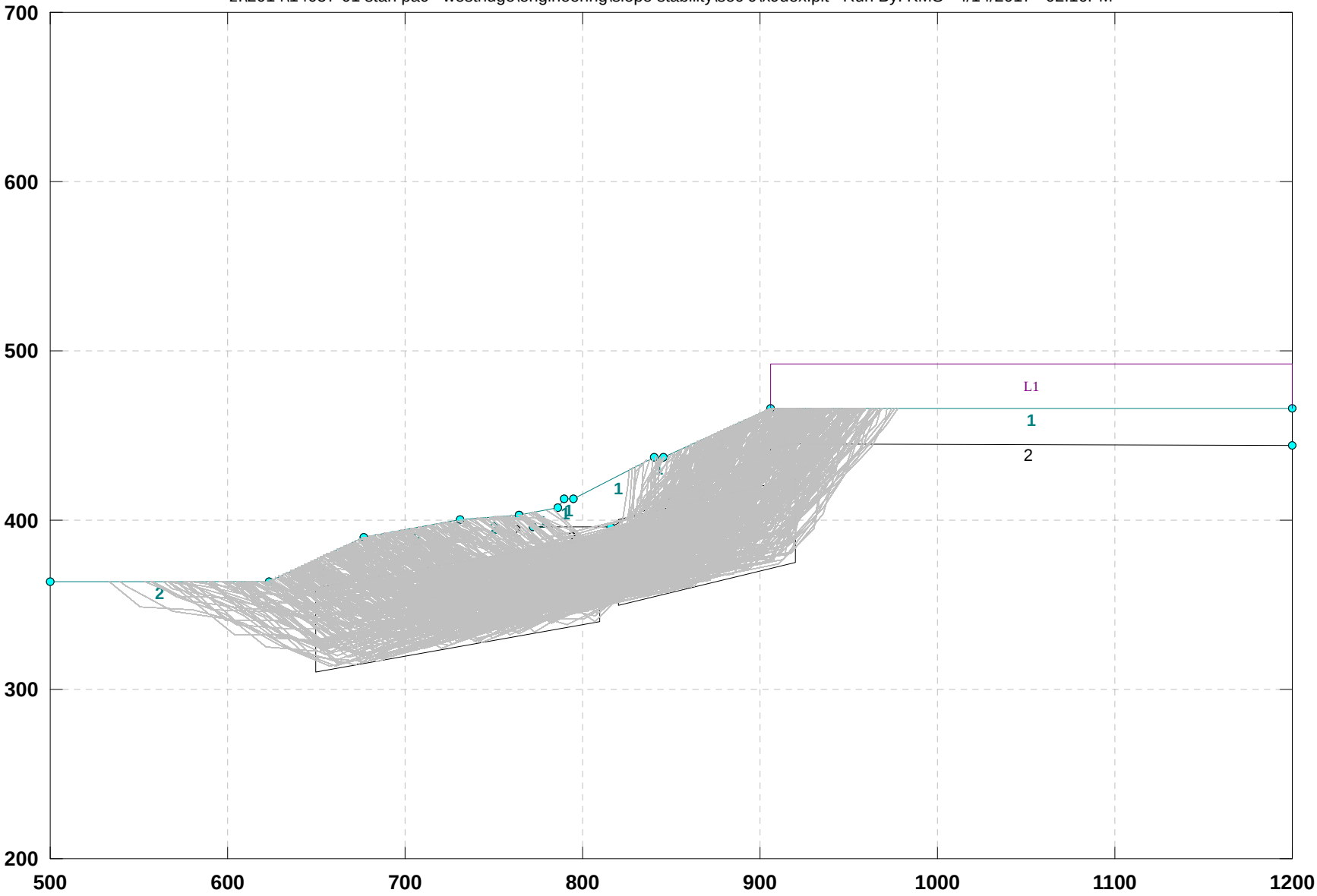
| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2  FSmin=2.17**

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

# Westridge/14057-01/Sec 9-9'/ Upper Slope - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 9\x9dex.plt Run By: KMS 4/14/2017 02:16PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:16PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dex.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dex.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dex.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 9-9'/
Upper Slope - Block - Static

BOUNDARY COORDINATES

11 Top Boundaries

15 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 500.00 | 364.00 | 623.00 | 364.00 | 2 |
| 2 | 623.00 | 364.00 | 677.00 | 390.00 | 2 |
| 3 | 677.00 | 390.00 | 731.00 | 400.00 | 2 |
| 4 | 731.00 | 400.00 | 764.00 | 403.00 | 2 |
| 5 | 764.00 | 403.00 | 786.00 | 407.00 | 1 |
| 6 | 786.00 | 407.00 | 790.00 | 413.00 | 1 |
| 7 | 790.00 | 413.00 | 795.00 | 413.00 | 1 |
| 8 | 795.00 | 413.00 | 840.00 | 437.00 | 1 |
| 9 | 840.00 | 437.00 | 846.00 | 437.00 | 1 |
| 10 | 846.00 | 437.00 | 906.00 | 466.00 | 1 |
| 11 | 906.00 | 466.00 | 1200.00 | 466.00 | 1 |
| 12 | 764.00 | 403.00 | 772.00 | 396.00 | 2 |
| 13 | 772.00 | 396.00 | 816.00 | 396.00 | 2 |
| 14 | 816.00 | 396.00 | 913.00 | 445.00 | 2 |
| 15 | 913.00 | 445.00 | 1200.00 | 444.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type  2 Is Anisotropic

Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | -4.0 | 300.00 | 32.00 |
| 2 | 10.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 906.00 | 1200.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of  c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is  30.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 650.00 | 335.00 | 810.00 | 365.00 | 50.00 |
| 2 | 820.00 | 375.00 | 920.00 | 400.00 | 50.00 |

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

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

Total Number of Trial Surfaces Attempted =  9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By  7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety
*** 2.165 ***

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 | 11.6 | 9104.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 3.4 | 6050.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 4.6 | 9856.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 14.0 | 34710.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 4.0 | 12602.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 5.0 | 17950.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 2.1 | 7661.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 18.9 | 76757.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 24.0 | 111621.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 6.0 | 29361.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 19.4 | 97112.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 20.2 | 89961.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 9.4 | 31157.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 10.9 | 28160.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 0.1 | 309.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 17.1 | 18524.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 4269.1 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety

*** 2.165 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety

*** 2.165 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety

*** 2.165 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety
*** 2.165 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety
*** 2.165 ***



Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety
*** 2.165 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety
*** 2.165 ***



Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Factor of Safety
*** 2.165 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

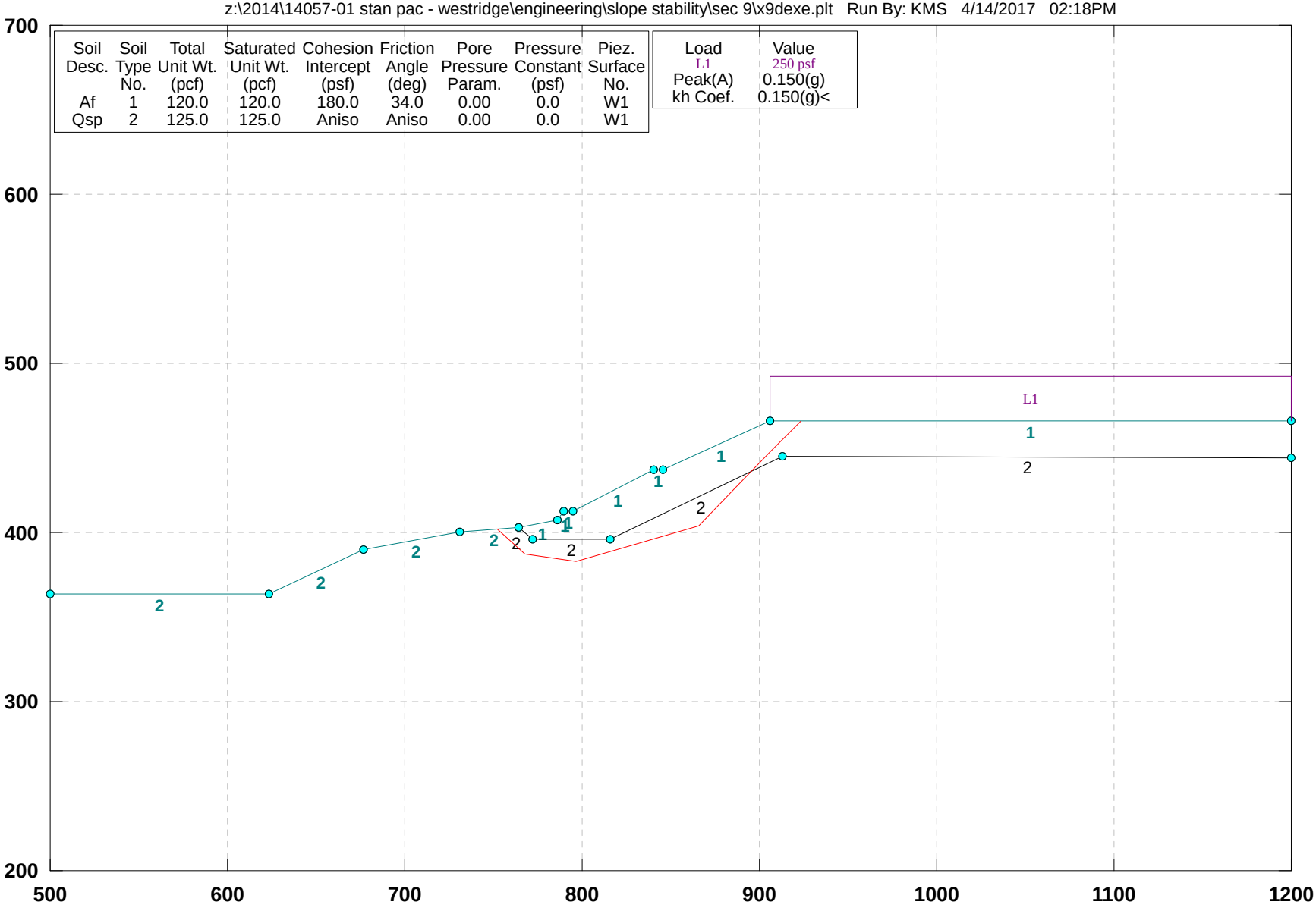
Factor of Safety

*** 2.165 ***

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

# Westridge/14057-01/Sec 9-9'/ Upper Slope - Block - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 9\x9dexe.plt Run By: KMS 4/14/2017 02:18PM




**GSTABL7 v.2 FSmin=1.82**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:18PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexe.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexe.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 9\x9dexe.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 9-9'/
Upper Slope - Block - Seismic

BOUNDARY COORDINATES

11 Top Boundaries

15 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 500.00 | 364.00 | 623.00 | 364.00 | 2 |
| 2 | 623.00 | 364.00 | 677.00 | 390.00 | 2 |
| 3 | 677.00 | 390.00 | 731.00 | 400.00 | 2 |
| 4 | 731.00 | 400.00 | 764.00 | 403.00 | 2 |
| 5 | 764.00 | 403.00 | 786.00 | 407.00 | 1 |
| 6 | 786.00 | 407.00 | 790.00 | 413.00 | 1 |
| 7 | 790.00 | 413.00 | 795.00 | 413.00 | 1 |
| 8 | 795.00 | 413.00 | 840.00 | 437.00 | 1 |
| 9 | 840.00 | 437.00 | 846.00 | 437.00 | 1 |
| 10 | 846.00 | 437.00 | 906.00 | 466.00 | 1 |
| 11 | 906.00 | 466.00 | 1200.00 | 466.00 | 1 |
| 12 | 764.00 | 403.00 | 772.00 | 396.00 | 2 |
| 13 | 772.00 | 396.00 | 816.00 | 396.00 | 2 |
| 14 | 816.00 | 396.00 | 913.00 | 445.00 | 2 |
| 15 | 913.00 | 445.00 | 1200.00 | 444.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type  2 Is Anisotropic

Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | -4.0 | 500.00 | 34.00 |
| 2 | 10.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 906.00 | 1200.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) =  0.150(g)
Specified Horizontal Earthquake Coefficient (kh) =  0.150(g)
Specified Vertical Earthquake Coefficient (kv) =  0.000(g)

Specified Seismic Pore-Pressure Factor =  0.000

Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
1

Trial Failure Surface Specified By  7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 752.382 | 401.944 |
| 2 | 767.354 | 387.146 |
| 3 | 797.061 | 382.957 |
| 4 | 865.380 | 403.481 |
| 5 | 885.563 | 425.676 |
| 6 | 905.858 | 447.769 |
| 7 | 923.076 | 466.000 |

Janbu's Empirical Coefficient (fo) =  1.074

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface =  1.822

***Table 1 - 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 | 11.6 | 9104.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1365.7 | 0.0 | 0.0 |
| 2 | 3.4 | 6050.0 | 0.0 | 0.0 | 0.0 | 0.0 | 907.5 | 0.0 | 0.0 |
| 3 | 4.6 | 9857.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1478.6 | 0.0 | 0.0 |
| 4 | 14.0 | 34710.2 | 0.0 | 0.0 | 0.0 | 0.0 | 5206.5 | 0.0 | 0.0 |
| 5 | 4.0 | 12602.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1890.4 | 0.0 | 0.0 |
| 6 | 5.0 | 17949.9 | 0.0 | 0.0 | 0.0 | 0.0 | 2692.5 | 0.0 | 0.0 |
| 7 | 2.1 | 7663.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1149.5 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 18.9 | 76754.8 | 0.0 | 0.0 | 0.0 | 0.0 | 11513.2 | 0.0 | 0.0 |
| 9 | 24.0 | 111621.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16743.1 | 0.0 | 0.0 |
| 10 | 6.0 | 29360.9 | 0.0 | 0.0 | 0.0 | 0.0 | 4404.1 | 0.0 | 0.0 |
| 11 | 19.4 | 97113.6 | 0.0 | 0.0 | 0.0 | 0.0 | 14567.0 | 0.0 | 0.0 |
| 12 | 20.2 | 89960.6 | 0.0 | 0.0 | 0.0 | 0.0 | 13494.1 | 0.0 | 0.0 |
| 13 | 9.4 | 31158.9 | 0.0 | 0.0 | 0.0 | 0.0 | 4673.8 | 0.0 | 0.0 |
| 14 | 10.9 | 28159.4 | 0.0 | 0.0 | 0.0 | 0.0 | 4223.9 | 0.0 | 0.0 |
| 15 | 0.1 | 308.9 | 0.0 | 0.0 | 0.0 | 0.0 | 46.3 | 0.0 | 0.0 |
| 16 | 17.1 | 18524.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2778.7 | 0.0 | 4269.0 |

***Table 2 - Base Stress Data on the 16 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -44.66 | 758.19 | 16.34 | 2280.60 | -467.29 |
| 2 | -44.66 | 765.68 | 4.72 | 3806.20 | -1075.56 |
| 3 | -8.03 | 769.68 | 4.69 | 2057.63 | 18.88 |
| 4 | -8.03 | 779.00 | 14.14 | 2314.62 | 22.06 |
| 5 | -8.03 | 788.00 | 4.04 | 2797.12 | 28.04 |
| 6 | -8.03 | 792.50 | 5.05 | 3112.86 | 31.95 |
| 7 | -8.03 | 796.03 | 2.08 | 3204.99 | 33.09 |
| 8 | 16.72 | 806.53 | 19.78 | 3038.48 | 1748.22 |
| 9 | 16.72 | 828.00 | 25.06 | 3417.59 | 2006.24 |
| 10 | 16.72 | 843.00 | 6.26 | 3571.35 | 2110.90 |
| 11 | 16.72 | 855.69 | 20.24 | 3645.85 | 2161.60 |
| 12 | 47.72 | 875.47 | 30.00 | 3704.11 | 3747.49 |
| 13 | 47.43 | 890.25 | 13.84 | 2891.30 | 2787.81 |
| 14 | 47.43 | 900.39 | 16.16 | 2020.64 | 2158.81 |
| 15 | 46.64 | 905.93 | 0.21 | 1723.04 | 1804.92 |
| 16 | 46.64 | 914.54 | 24.87 | 1130.40 | 1082.18 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 581949.75 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2805.08(psf)

Sum of the Driving Forces = 343032.72 (lbs)

Average Mobilized Shear Stress = 1653.47(psf)

Total length of the failure surface = 207.46(ft)

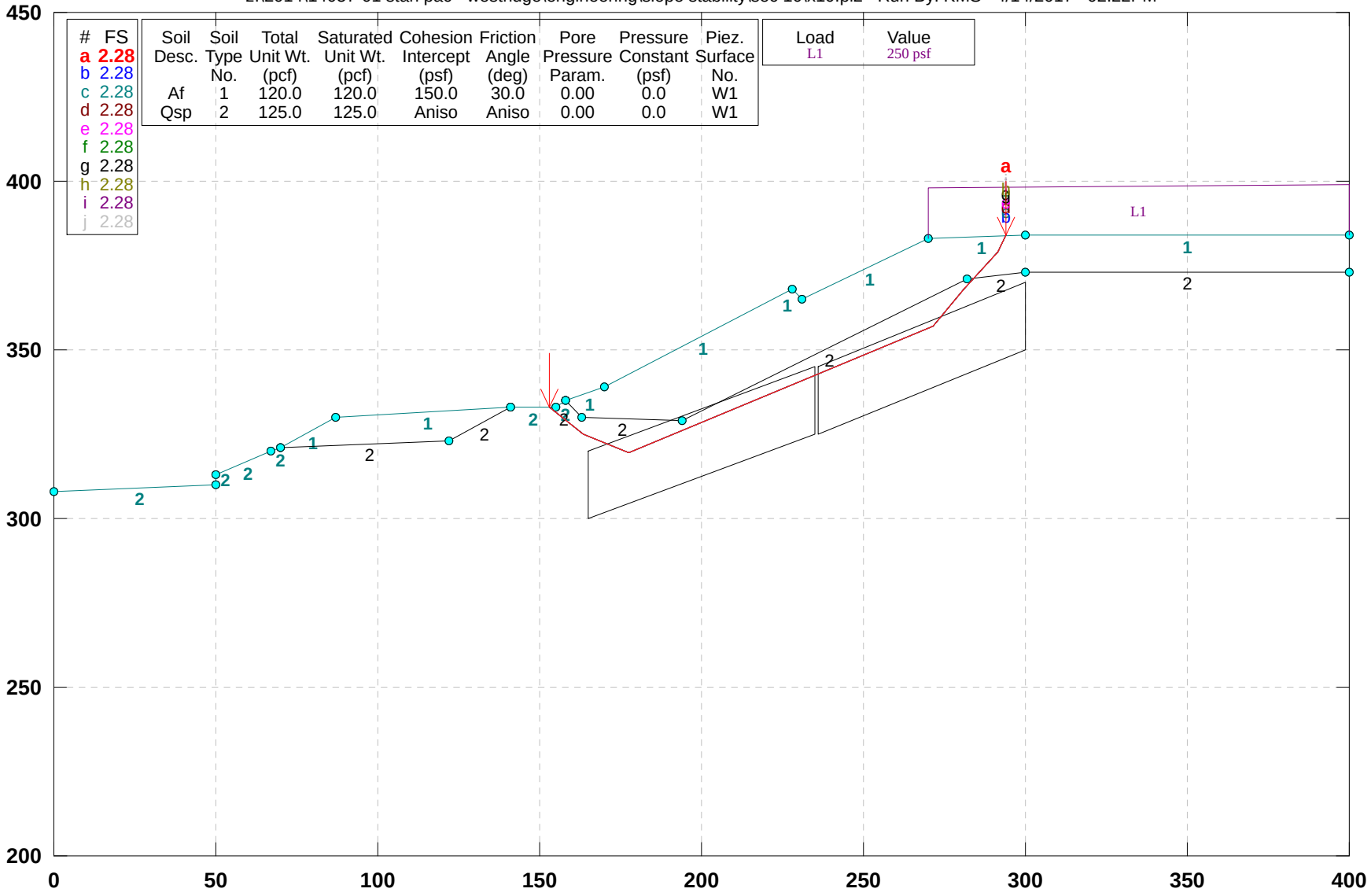
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.6530(g)
Calculated Newmark Seismic Displacement = 0.001(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 10-10'/ Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 10\x10.pl2  Run By: KMS  4/14/2017  02:22PM

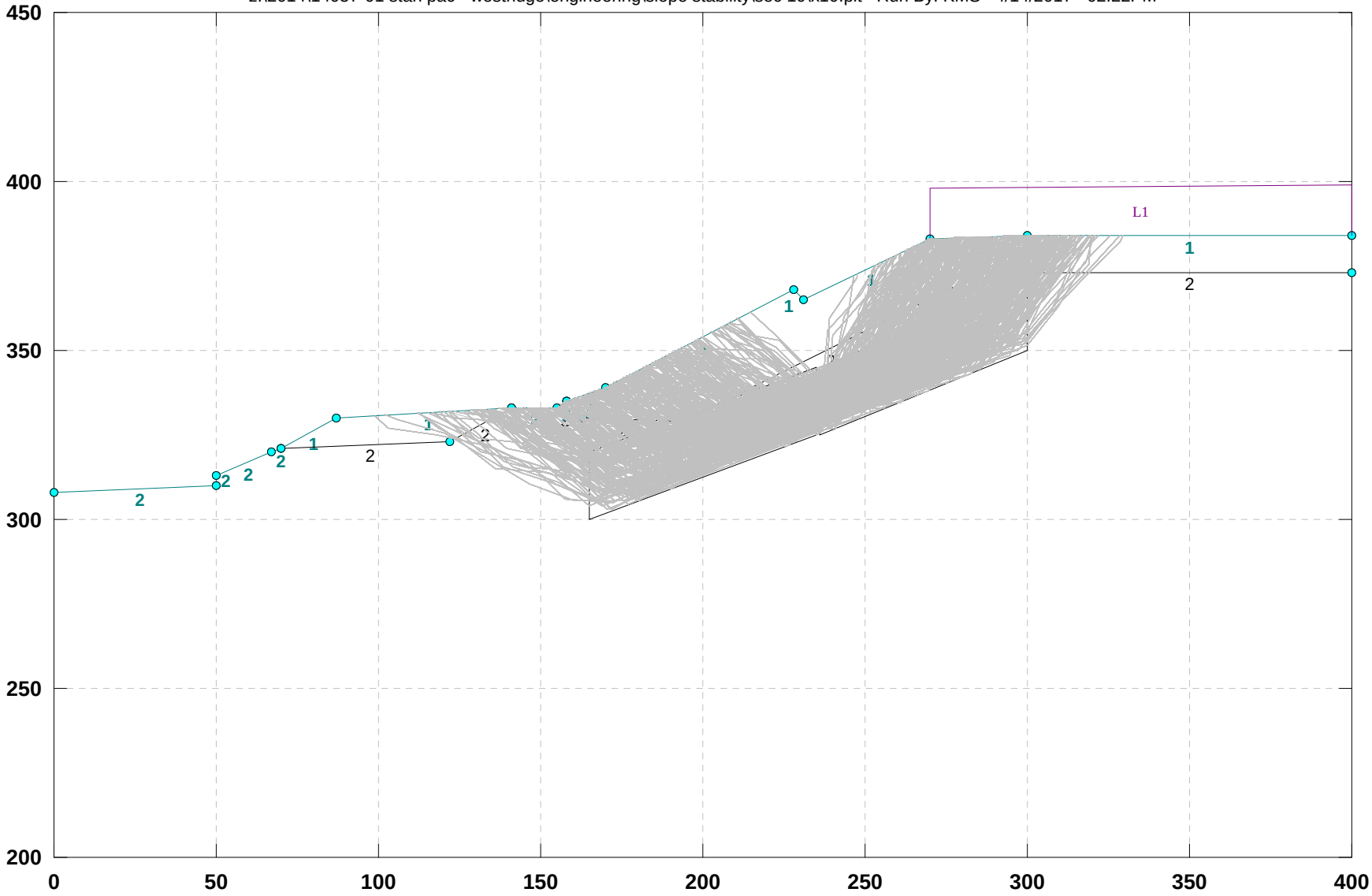



**GSTABL7 v.2  FSmin=2.28**

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

# Westridge/14057-01/Sec 10-10'/ Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 10\x10.plt  Run By: KMS  4/14/2017  02:22PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:22PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 10-10'/ Static

BOUNDARY COORDINATES

14 Top Boundaries

21 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 308.00 | 50.00 | 310.00 | 2 |
| 2 | 50.00 | 310.00 | 50.10 | 313.00 | 2 |
| 3 | 50.10 | 313.00 | 67.00 | 320.00 | 2 |
| 4 | 67.00 | 320.00 | 70.00 | 321.00 | 2 |
| 5 | 70.00 | 321.00 | 87.00 | 330.00 | 1 |
| 6 | 87.00 | 330.00 | 141.00 | 333.00 | 1 |
| 7 | 141.00 | 333.00 | 155.00 | 333.00 | 2 |
| 8 | 155.00 | 333.00 | 158.00 | 335.00 | 2 |
| 9 | 158.00 | 335.00 | 170.00 | 339.00 | 1 |
| 10 | 170.00 | 339.00 | 228.00 | 368.00 | 1 |
| 11 | 228.00 | 368.00 | 231.00 | 365.00 | 1 |
| 12 | 231.00 | 365.00 | 270.00 | 383.00 | 1 |
| 13 | 270.00 | 383.00 | 300.00 | 384.00 | 1 |
| 14 | 300.00 | 384.00 | 400.00 | 384.00 | 1 |
| 15 | 70.00 | 321.00 | 122.00 | 323.00 | 2 |
| 16 | 122.00 | 323.00 | 141.00 | 333.00 | 2 |
| 17 | 158.00 | 335.00 | 163.00 | 330.00 | 2 |
| 18 | 163.00 | 330.00 | 194.00 | 329.00 | 2 |
| 19 | 194.00 | 329.00 | 282.00 | 371.00 | 2 |
| 20 | 282.00 | 371.00 | 300.00 | 373.00 | 2 |
| 21 | 300.00 | 373.00 | 400.00 | 373.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |

2 125.0 125.0 300.0 32.0 0.00 0.0
1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | -4.0 | 300.00 | 32.00 |
| 2 | 4.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 270.00 | 400.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 165.00 | 310.00 | 235.00 | 335.00 | 20.00 |
| 2 | 236.00 | 335.00 | 300.00 | 360.00 | 20.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

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 | 2.0 | 192.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 3.0 | 1366.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 5.0 | 5214.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 0.6 | 907.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 6.4 | 10977.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 7.7 | 18539.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 16.3 | 47511.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 34.0 | 109290.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 3.0 | 9549.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 39.0 | 120666.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 1.4 | 4622.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 358.4 |
| 12 | 9.7 | 24435.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 2432.5 |
| 13 | 0.8 | 1488.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 209.1 |
| 14 | 2.2 | 3449.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 539.4 |
| 15 | 7.6 | 7778.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1896.1 |
| 16 | 2.4 | 706.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 605.5 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

Failure Surface Specified By 7 Coordinate Points

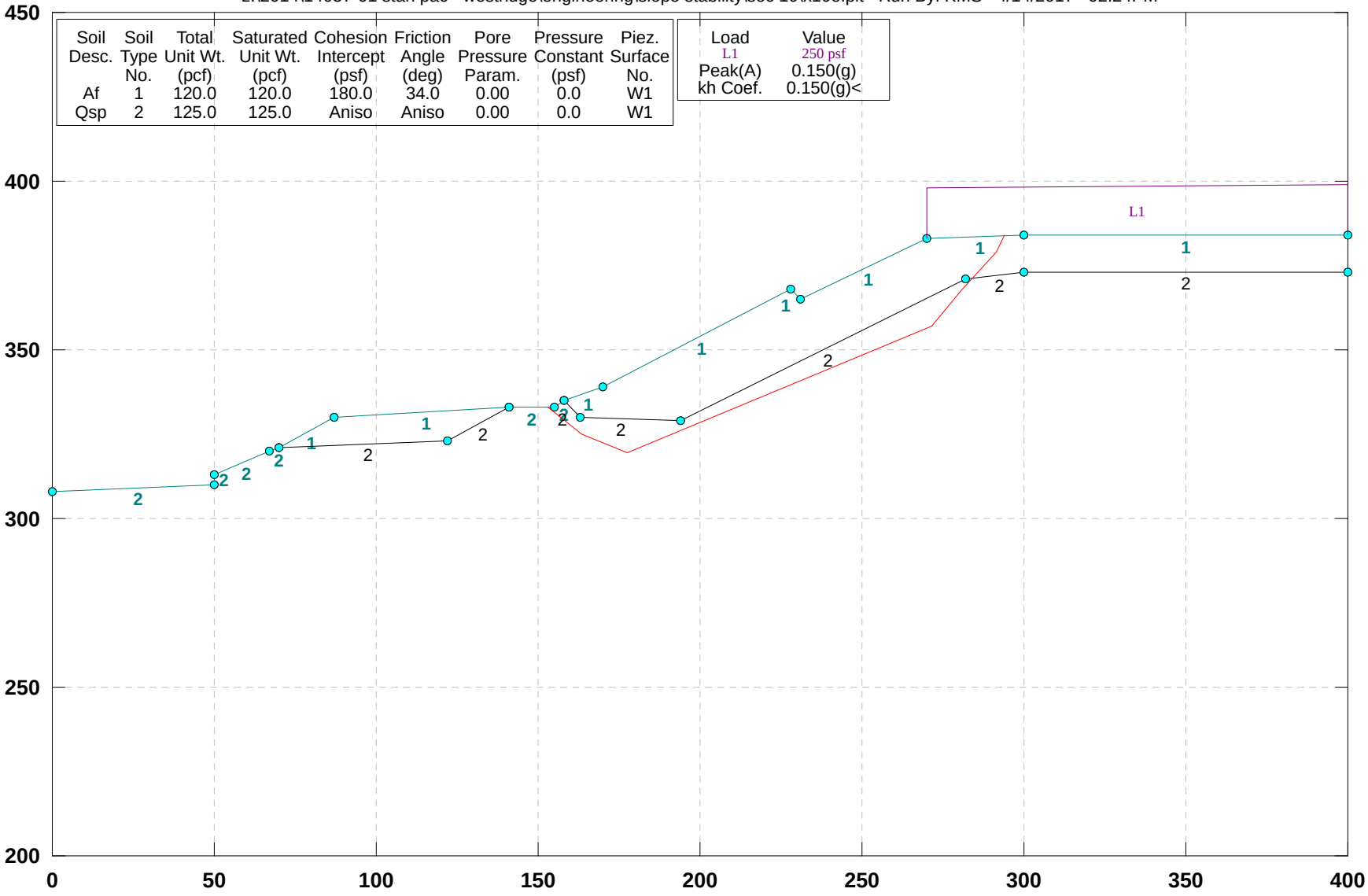
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 152.972 | 333.000 |
| 2 | 163.645 | 325.000 |
| 3 | 177.676 | 319.697 |
| 4 | 271.434 | 356.814 |
| 5 | 281.164 | 368.230 |
| 6 | 291.742 | 378.864 |
| 7 | 294.164 | 383.805 |

Factor of Safety
*** 2.277 ***

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

# Westridge/14057-01/Sec 10-10'/ Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 10\x10e.plt Run By: KMS 4/14/2017 02:24PM




**GSTABL7 v.2 FSmin=1.90**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:24PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10e.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10e.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10e.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 10-10'/ Seismic

BOUNDARY COORDINATES

14 Top Boundaries

21 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 308.00 | 50.00 | 310.00 | 2 |
| 2 | 50.00 | 310.00 | 50.10 | 313.00 | 2 |
| 3 | 50.10 | 313.00 | 67.00 | 320.00 | 2 |
| 4 | 67.00 | 320.00 | 70.00 | 321.00 | 2 |
| 5 | 70.00 | 321.00 | 87.00 | 330.00 | 1 |
| 6 | 87.00 | 330.00 | 141.00 | 333.00 | 1 |
| 7 | 141.00 | 333.00 | 155.00 | 333.00 | 2 |
| 8 | 155.00 | 333.00 | 158.00 | 335.00 | 2 |
| 9 | 158.00 | 335.00 | 170.00 | 339.00 | 1 |
| 10 | 170.00 | 339.00 | 228.00 | 368.00 | 1 |
| 11 | 228.00 | 368.00 | 231.00 | 365.00 | 1 |
| 12 | 231.00 | 365.00 | 270.00 | 383.00 | 1 |
| 13 | 270.00 | 383.00 | 300.00 | 384.00 | 1 |
| 14 | 300.00 | 384.00 | 400.00 | 384.00 | 1 |
| 15 | 70.00 | 321.00 | 122.00 | 323.00 | 2 |
| 16 | 122.00 | 323.00 | 141.00 | 333.00 | 2 |
| 17 | 158.00 | 335.00 | 163.00 | 330.00 | 2 |
| 18 | 163.00 | 330.00 | 194.00 | 329.00 | 2 |
| 19 | 194.00 | 329.00 | 282.00 | 371.00 | 2 |
| 20 | 282.00 | 371.00 | 300.00 | 373.00 | 2 |
| 21 | 300.00 | 373.00 | 400.00 | 373.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |

```
            2   125.0    125.0     500.0     34.0    0.00       0.0
1


          ANISOTROPIC STRENGTH PARAMETERS
               1 soil type(s)


           Soil Type  2 Is Anisotropic

           Number Of Direction Ranges Specified =  3


           Direction    Counterclockwise     Cohesion     Friction
             Range       Direction Limit    Intercept      Angle
              No.            (deg)            (psf)        (deg)

               1              -4.0             500.00         34.00
               2               4.0             200.00         27.00
               3              90.0             500.00         34.00

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

1


          BOUNDARY LOAD(S)

               1 Load(s) Specified


           Load        X-Left      X-Right     Intensity     Deflection
            No.         (ft)         (ft)        (psf)         (deg)


             1         270.00       400.00        250.0          0.0


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

           Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
           Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
           Specified Vertical Earthquake Coefficient (kv) =   0.000(g)

           Specified Seismic Pore-Pressure Factor =   0.000
```

```
          Janbu's Empirical Coef. is being used for the case of  c & phi
both > 0
1


          Trial Failure Surface Specified By  7 Coordinate Points


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

              1       152.972      333.000
              2       163.645      325.000
              3       177.676      319.697
              4       271.434      356.814
              5       281.164      368.230
              6       291.742      378.864
              7       294.164      383.805


          Janbu's Empirical Coefficient (fo) =  1.056

          * * Factor Of Safety Is Calculated By The Simplified Janbu
Method * *



          Factor Of Safety For The Preceding Specified Surface =  1.897


              ***Table 1 - Individual Data on the   16 Slices***

                                  Water  Water     Tie     Tie     Earthquake
                                  Force  Force    Force   Force       Force
Surcharge
 Slice  Width   Weight    Top     Bot     Norm     Tan     Hor     Ver
Load
  No.    (ft)    (lbs)   (lbs)   (lbs)    (lbs)   (lbs)   (lbs)   (lbs)
(lbs)

   1      2.0     192.7     0.0     0.0      0.0     0.0    28.9     0.0
0.0
   2      3.0    1366.7     0.0     0.0      0.0     0.0   205.0     0.0
0.0
   3      5.0    5214.2     0.0     0.0      0.0     0.0   782.1     0.0
0.0
   4      0.6     907.9     0.0     0.0      0.0     0.0   136.2     0.0
0.0
```

```
   5      6.4   10977.6     0.0     0.0      0.0     0.0  1646.6     0.0
0.0
   6      7.7   18538.2     0.0     0.0      0.0     0.0  2780.7     0.0
0.0
   7     16.3   47512.2     0.0     0.0      0.0     0.0  7126.8     0.0
0.0
   8     34.0  109289.7     0.0     0.0      0.0     0.0 16393.5     0.0
0.0
   9      3.0    9549.2     0.0     0.0      0.0     0.0  1432.4     0.0
0.0
  10     39.0  120666.1     0.0     0.0      0.0     0.0 18099.9     0.0
0.0
  11      1.4    4624.2     0.0     0.0      0.0     0.0   693.6     0.0
358.5
  12      9.7   24435.3     0.0     0.0      0.0     0.0  3665.3     0.0
2432.5
  13      0.8    1487.3     0.0     0.0      0.0     0.0   223.1     0.0
209.0
  14      2.2    3449.5     0.0     0.0      0.0     0.0   517.4     0.0
539.5
  15      7.6    7778.1     0.0     0.0      0.0     0.0  1166.7     0.0
1896.0
  16      2.4     706.4     0.0     0.0      0.0     0.0   106.0     0.0
605.5
```

***Table 2 - Base Stress Data on the 16 Slices***

```
 Slice   Alpha     X-Coord.      Base          Available
Mobilized
  No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear
Stress
   *                 (ft)        (ft)           (psf)
(psf)

   1     -36.85      153.99        2.53            961.05              -
45.58
   2     -36.85      156.50        3.75           1375.39              -
218.55
   3     -36.85      160.50        6.25           2050.28              -
500.29
   4     -36.85      163.32        0.81           2469.51              -
675.31
   5     -20.70      166.82        6.79           2056.42              -
368.33
   6     -20.70      173.84        8.21           2629.27              -
514.96
   7      21.60      185.84       17.56           2322.35
1477.28
   8      21.60      211.00       36.57           2515.57
1631.49
   9      21.60      229.50        3.23           2495.64
1615.59
  10      21.60      250.50       41.94           2439.00
1570.38
  11      21.60      270.72        1.54           2681.08
1728.72
  12      49.56      276.30       15.00           2570.10
2345.93
  13      45.15      281.58        1.19           1951.99
1626.74
  14      45.15      283.08        3.06           1824.78
1479.65
  15      45.15      287.95       10.75           1086.80
1012.83
  16      63.89      292.95        5.50            718.19
505.63
```

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 365303.91 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2218.29(psf)

Sum of the Driving Forces = 203329.00 (lbs)

Average Mobilized Shear Stress = 1234.71(psf)

Total length of the failure surface = 164.68(ft)

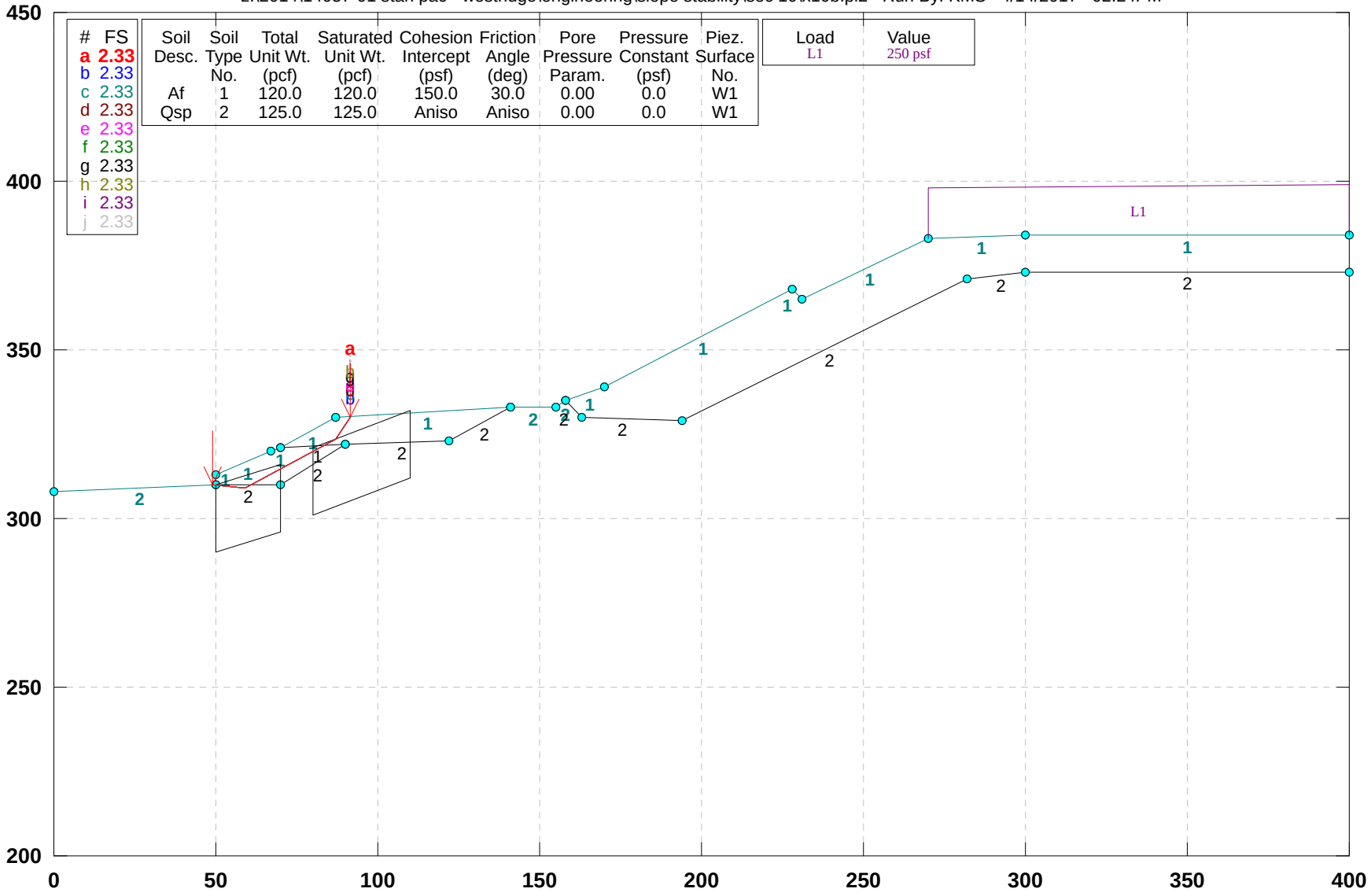
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.5906(g)
Calculated Newmark Seismic Displacement = 0.001(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 10-10'/ Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 10\x10b.pl2 Run By: KMS 4/14/2017 02:24PM

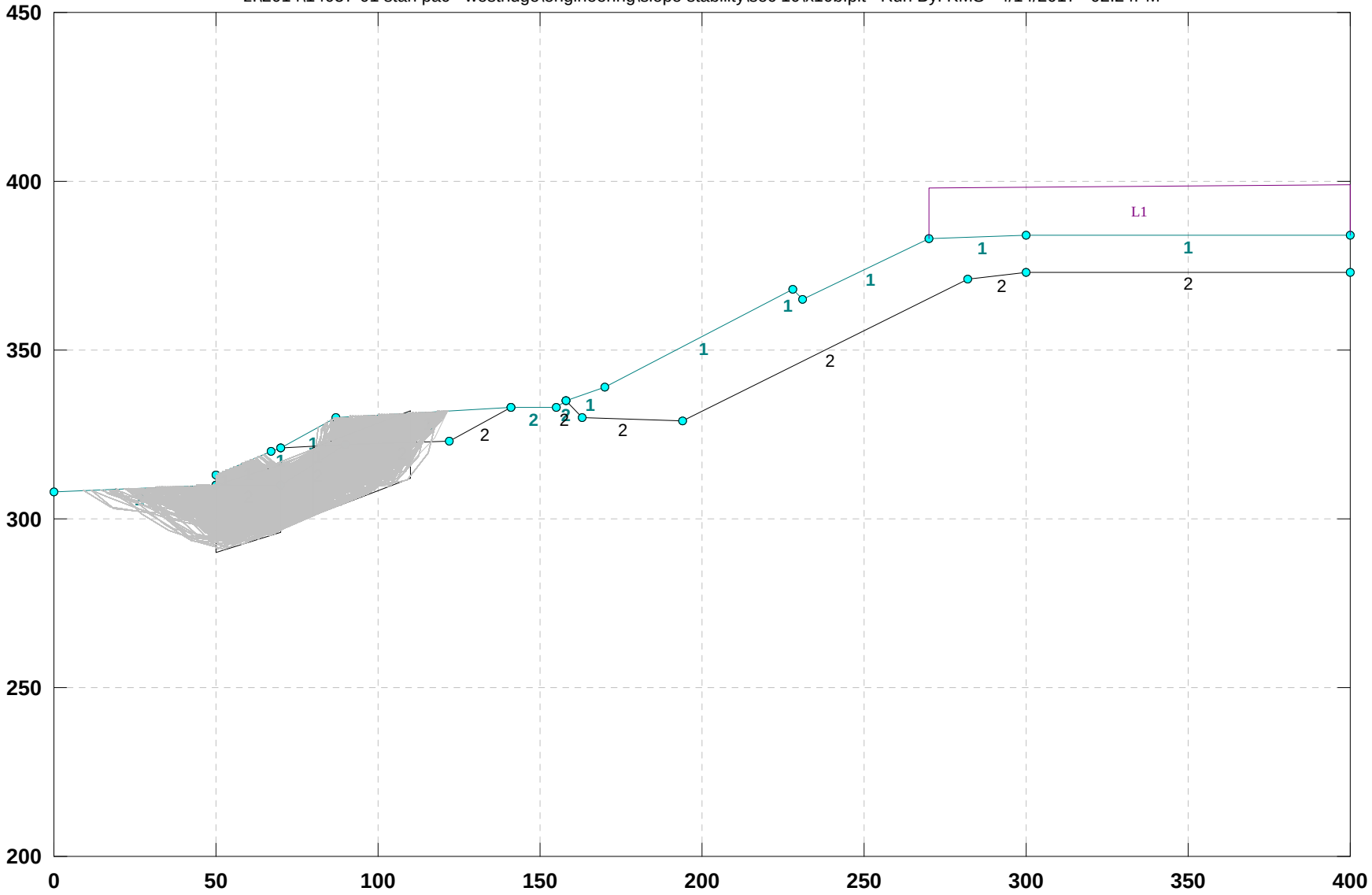



**GSTABL7 v.2 FSmin=2.33**

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

# Westridge/14057-01/Sec 10-10'/ Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 10\x10b.plt Run By: KMS 4/14/2017 02:24PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:24PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10b.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10b.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10b.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 10-10'/
Lower Slope - Static

BOUNDARY COORDINATES

14 Top Boundaries

24 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 308.00 | 50.00 | 310.00 | 2 |
| 2 | 50.00 | 310.00 | 50.10 | 313.00 | 1 |
| 3 | 50.10 | 313.00 | 67.00 | 320.00 | 1 |
| 4 | 67.00 | 320.00 | 70.00 | 321.00 | 1 |
| 5 | 70.00 | 321.00 | 87.00 | 330.00 | 1 |
| 6 | 87.00 | 330.00 | 141.00 | 333.00 | 1 |
| 7 | 141.00 | 333.00 | 155.00 | 333.00 | 2 |
| 8 | 155.00 | 333.00 | 158.00 | 335.00 | 2 |
| 9 | 158.00 | 335.00 | 170.00 | 339.00 | 1 |
| 10 | 170.00 | 339.00 | 228.00 | 368.00 | 1 |
| 11 | 228.00 | 368.00 | 231.00 | 365.00 | 1 |
| 12 | 231.00 | 365.00 | 270.00 | 383.00 | 1 |
| 13 | 270.00 | 383.00 | 300.00 | 384.00 | 1 |
| 14 | 300.00 | 384.00 | 400.00 | 384.00 | 1 |
| 15 | 70.00 | 321.00 | 90.00 | 322.00 | 1 |
| 16 | 90.00 | 322.00 | 122.00 | 323.00 | 2 |
| 17 | 122.00 | 323.00 | 141.00 | 333.00 | 2 |
| 18 | 158.00 | 335.00 | 163.00 | 330.00 | 2 |
| 19 | 163.00 | 330.00 | 194.00 | 329.00 | 2 |
| 20 | 194.00 | 329.00 | 282.00 | 371.00 | 2 |
| 21 | 282.00 | 371.00 | 300.00 | 373.00 | 2 |
| 22 | 300.00 | 373.00 | 400.00 | 373.00 | 2 |
| 23 | 50.00 | 310.00 | 70.00 | 310.00 | 2 |
| 24 | 70.00 | 310.00 | 90.00 | 322.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 |

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | -4.0 | 300.00 | 32.00 |
| 2 | 4.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 270.00 | 400.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

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

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 50.00 | 300.00 | 70.00 | 306.00 | 20.00 |
| 2 | 80.00 | 311.00 | 110.00 | 322.00 | 20.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

Individual data on the 11 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 0.9 | 11.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 0.1 | 20.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 8.9 | 5842.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 2.0 | 1794.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 6.0 | 5198.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.0 | 2369.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 13.4 | 10242.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 3.6 | 2777.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 0.1 | 39.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 4.3 | 1642.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |

| | | |
|---|---|---|
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

Failure Surface Specified By 5 Coordinate Points

| Point | X-Surf | Y-Surf |
|---|---|---|

| No. | (ft) | (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

1

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

Failure Surface Specified By 5 Coordinate Points

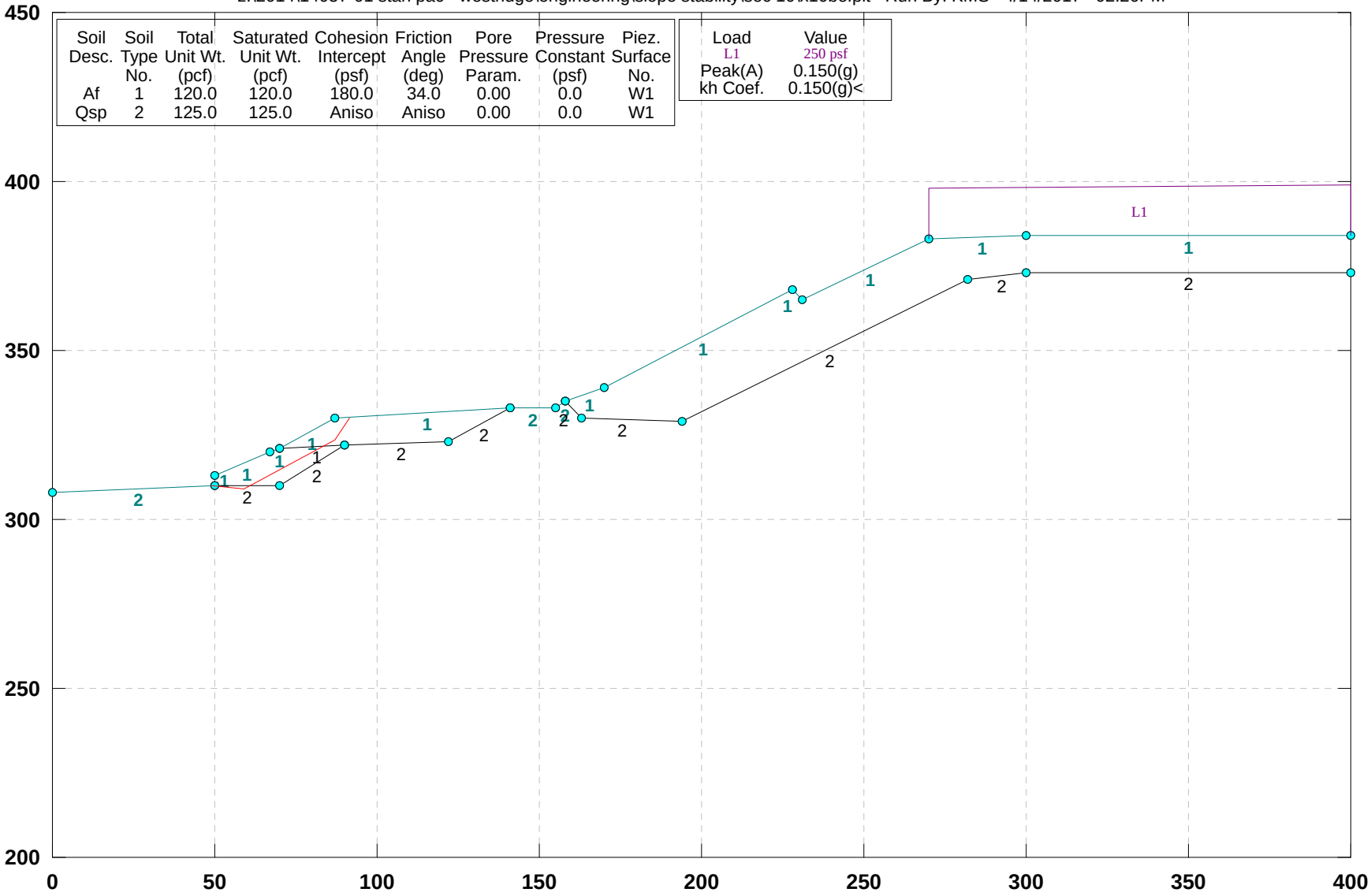
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

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

# Westridge/14057-01/Sec 10-10'/ Lower Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 10\x10be.plt Run By: KMS 4/14/2017 02:26PM




**GSTABL7 v.2 FSmin=2.08**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:26PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10be.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10be.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 10\x10be.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 10-10'/
Lower Slope - Seismic

BOUNDARY COORDINATES

14 Top Boundaries

24 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 308.00 | 50.00 | 310.00 | 2 |
| 2 | 50.00 | 310.00 | 50.10 | 313.00 | 1 |
| 3 | 50.10 | 313.00 | 67.00 | 320.00 | 1 |
| 4 | 67.00 | 320.00 | 70.00 | 321.00 | 1 |
| 5 | 70.00 | 321.00 | 87.00 | 330.00 | 1 |
| 6 | 87.00 | 330.00 | 141.00 | 333.00 | 1 |
| 7 | 141.00 | 333.00 | 155.00 | 333.00 | 2 |
| 8 | 155.00 | 333.00 | 158.00 | 335.00 | 2 |
| 9 | 158.00 | 335.00 | 170.00 | 339.00 | 1 |
| 10 | 170.00 | 339.00 | 228.00 | 368.00 | 1 |
| 11 | 228.00 | 368.00 | 231.00 | 365.00 | 1 |
| 12 | 231.00 | 365.00 | 270.00 | 383.00 | 1 |
| 13 | 270.00 | 383.00 | 300.00 | 384.00 | 1 |
| 14 | 300.00 | 384.00 | 400.00 | 384.00 | 1 |
| 15 | 70.00 | 321.00 | 90.00 | 322.00 | 1 |
| 16 | 90.00 | 322.00 | 122.00 | 323.00 | 2 |
| 17 | 122.00 | 323.00 | 141.00 | 333.00 | 2 |
| 18 | 158.00 | 335.00 | 163.00 | 330.00 | 2 |
| 19 | 163.00 | 330.00 | 194.00 | 329.00 | 2 |
| 20 | 194.00 | 329.00 | 282.00 | 371.00 | 2 |
| 21 | 282.00 | 371.00 | 300.00 | 373.00 | 2 |
| 22 | 300.00 | 373.00 | 400.00 | 373.00 | 2 |
| 23 | 50.00 | 310.00 | 70.00 | 310.00 | 2 |
| 24 | 70.00 | 310.00 | 90.00 | 322.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Surface Constant (psf) No. |
|---|---|---|---|---|---|---|

```
            1   120.0    120.0     180.0     34.0    0.00       0.0
1
            2   125.0    125.0     500.0     34.0    0.00       0.0
1


          ANISOTROPIC STRENGTH PARAMETERS
               1 soil type(s)


           Soil Type  2 Is Anisotropic

           Number Of Direction Ranges Specified =  3


           Direction    Counterclockwise     Cohesion     Friction
             Range       Direction Limit    Intercept      Angle
              No.            (deg)            (psf)        (deg)

               1             -4.0             500.00        34.00
               2              4.0             200.00        27.00
               3             90.0             500.00        34.00

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

1


          BOUNDARY LOAD(S)

               1 Load(s) Specified


           Load        X-Left      X-Right     Intensity     Deflection
            No.         (ft)        (ft)        (psf)         (deg)


             1         270.00       400.00        250.0          0.0


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

           Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
           Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
           Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
```

```
           Specified Seismic Pore-Pressure Factor =   0.000

           Janbu's Empirical Coef. is being used for the case of  c & phi
both > 0
1


           Trial Failure Surface Specified By  5 Coordinate Points


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

               1         49.004      309.960
               2         49.053      309.927
               3         59.008      308.980
               4         87.051      323.565
               5         91.303      330.239


           Janbu's Empirical Coefficient (fo) =  1.047

           * * Factor Of Safety Is Calculated By The Simplified Janbu
Method * *




           Factor Of Safety For The Preceding Specified Surface =  2.077


                ***Table 1 - Individual Data on the   11 Slices***

                                    Water  Water     Tie     Tie      Earthquake
                                    Force  Force    Force   Force       Force
Surcharge
 Slice  Width   Weight     Top     Bot     Norm     Tan     Hor      Ver
Load
  No.    (ft)    (lbs)   (lbs)   (lbs)    (lbs)   (lbs)   (lbs)    (lbs)
(lbs)

   1      0.0       0.1     0.0     0.0      0.0     0.0     0.0      0.0
0.0
   2      0.9      11.7     0.0     0.0      0.0     0.0     1.8      0.0
0.0
   3      0.1      20.1     0.0     0.0      0.0     0.0     3.0      0.0
0.0
   4      8.9    5842.9     0.0     0.0      0.0     0.0   876.4      0.0
0.0
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 2.0 | 1795.0 | 0.0 | 0.0 | 0.0 | 0.0 | 269.3 | 0.0 | 0.0 |
| 6 | 6.0 | 5198.1 | 0.0 | 0.0 | 0.0 | 0.0 | 779.7 | 0.0 | 0.0 |
| 7 | 3.0 | 2370.0 | 0.0 | 0.0 | 0.0 | 0.0 | 355.5 | 0.0 | 0.0 |
| 8 | 13.4 | 10242.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1536.3 | 0.0 | 0.0 |
| 9 | 3.6 | 2777.8 | 0.0 | 0.0 | 0.0 | 0.0 | 416.7 | 0.0 | 0.0 |
| 10 | 0.1 | 39.5 | 0.0 | 0.0 | 0.0 | 0.0 | 5.9 | 0.0 | 0.0 |
| 11 | 4.3 | 1642.4 | 0.0 | 0.0 | 0.0 | 0.0 | 246.4 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 11 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress * (psf) |
|---|---|---|---|---|---|
| 1 | -34.12 | 49.03 | 0.06 | 776.72 | -0.96 |
| 2 | -5.43 | 49.53 | 0.95 | 526.93 | 0.68 |
| 3 | -5.43 | 50.05 | 0.10 | 658.79 | 10.98 |
| 4 | -5.43 | 54.55 | 8.95 | 976.86 | 35.83 |
| 5 | 27.48 | 59.99 | 2.21 | 1077.45 | 544.12 |
| 6 | 27.48 | 63.98 | 6.80 | 734.19 | 512.41 |
| 7 | 27.48 | 68.50 | 3.38 | 687.40 | 469.65 |
| 8 | 27.48 | 76.70 | 15.11 | 670.41 | 454.12 |
| 9 | 27.48 | 85.20 | 4.05 | 676.59 | 459.77 |
| 10 | 27.48 | 87.03 | 0.06 | 676.98 | 460.12 |
| 11 | 57.50 | 89.18 | 7.91 | 543.07 | 356.90 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 36052.39 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 727.13(psf)

Sum of the Driving Forces = 18171.83 (lbs)

Average Mobilized Shear Stress = 366.50(psf)

Total length of the failure surface = 49.58(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.6669(g)
Calculated Newmark Seismic Displacement = 0.001(ft)

Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

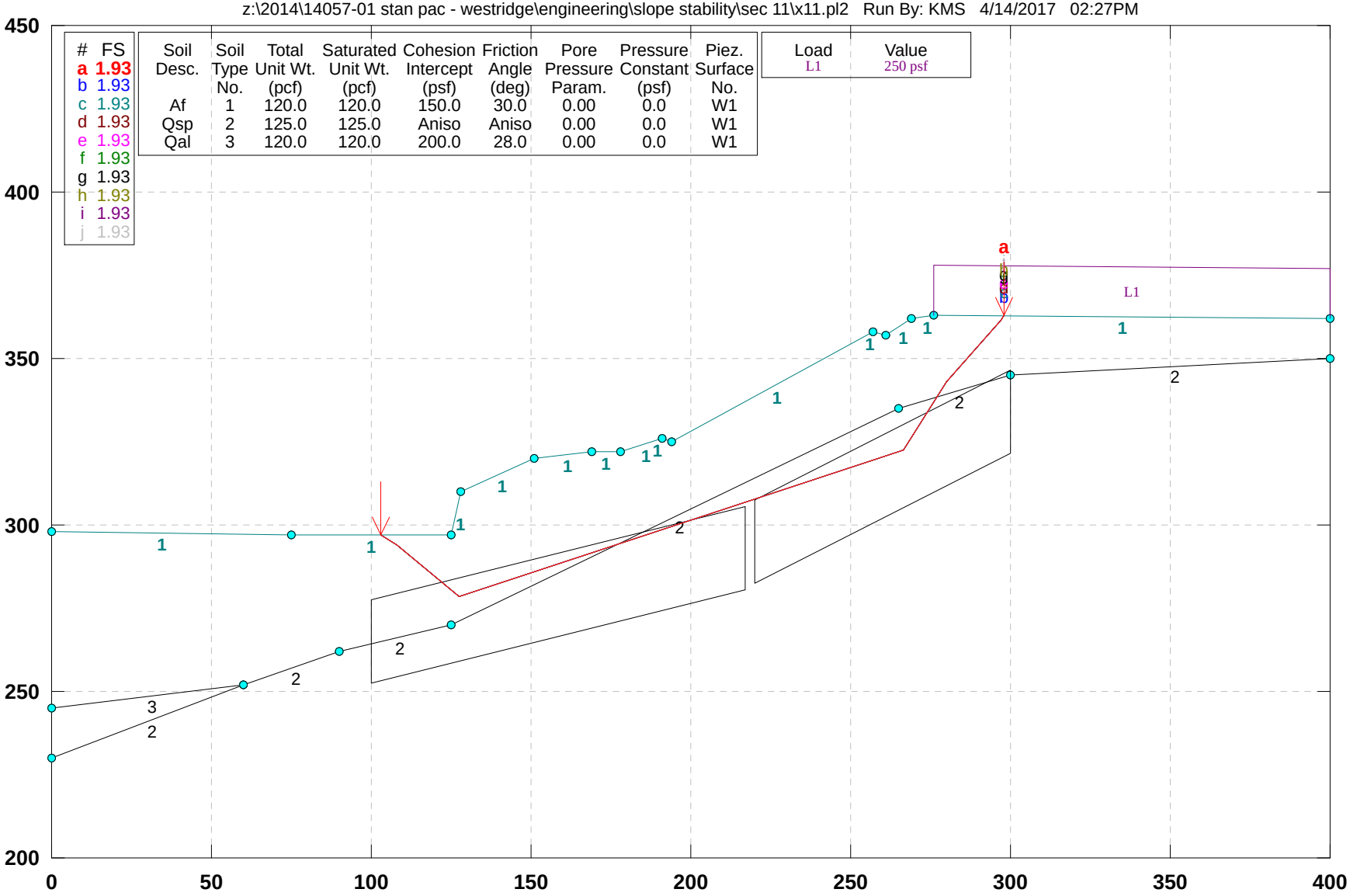
# Westridge/14057-01/Sec 11-11'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 11\x11.pl2 Run By: KMS 4/14/2017 02:27PM

| # | FS |
|---|---|
| a | 1.93 |
| b | 1.93 |
| c | 1.93 |
| d | 1.93 |
| e | 1.93 |
| f | 1.93 |
| g | 1.93 |
| h | 1.93 |
| i | 1.93 |
| j | 1.93 |

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |

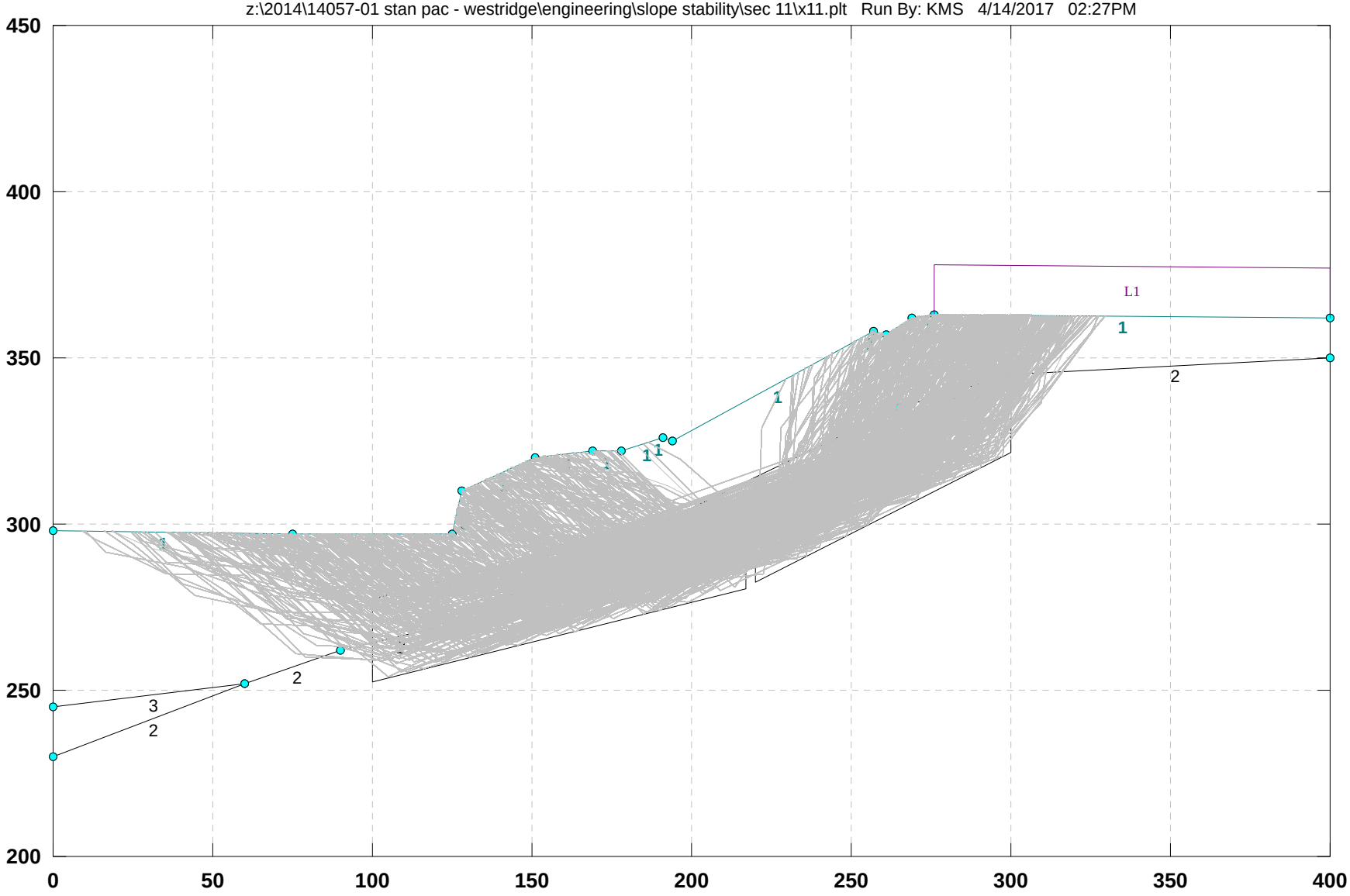



**GSTABL7 v.2 FSmin=1.93**

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

# Westridge/14057-01/Sec 11-11'/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 11\x11.plt Run By: KMS 4/14/2017 02:27PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:27PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 11-11'/
Upper Slope - Static

BOUNDARY COORDINATES

13 Top Boundaries

20 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 298.00 | 75.00 | 297.00 | 1 |
| 2 | 75.00 | 297.00 | 125.00 | 297.00 | 1 |
| 3 | 125.00 | 297.00 | 128.00 | 310.00 | 1 |
| 4 | 128.00 | 310.00 | 151.00 | 320.00 | 1 |
| 5 | 151.00 | 320.00 | 169.00 | 322.00 | 1 |
| 6 | 169.00 | 322.00 | 178.00 | 322.00 | 1 |
| 7 | 178.00 | 322.00 | 191.00 | 326.00 | 1 |
| 8 | 191.00 | 326.00 | 194.00 | 325.00 | 1 |
| 9 | 194.00 | 325.00 | 257.00 | 358.00 | 1 |
| 10 | 257.00 | 358.00 | 261.00 | 357.00 | 1 |
| 11 | 261.00 | 357.00 | 269.00 | 362.00 | 1 |
| 12 | 269.00 | 362.00 | 276.00 | 363.00 | 1 |
| 13 | 276.00 | 363.00 | 400.00 | 362.00 | 1 |
| 14 | 0.00 | 245.00 | 60.00 | 252.00 | 3 |
| 15 | 60.00 | 252.00 | 90.00 | 262.00 | 2 |
| 16 | 90.00 | 262.00 | 125.00 | 270.00 | 2 |
| 17 | 125.00 | 270.00 | 265.00 | 335.00 | 2 |
| 18 | 265.00 | 335.00 | 300.00 | 345.00 | 2 |
| 19 | 300.00 | 345.00 | 400.00 | 350.00 | 2 |
| 20 | 0.00 | 230.00 | 60.00 | 252.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |

3 120.0 120.0 200.0 28.0 0.00 0.0
1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 276.00 | 400.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 25.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 100.00 | 265.00 | 217.00 | 293.00 | 25.00 |
| 2 | 220.00 | 295.00 | 300.00 | 334.00 | 25.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

Individual data on the 20 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.7 | 845.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 17.2 | 20279.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 2.4 | 6595.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 0.6 | 2115.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 23.0 | 90165.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 18.0 | 69571.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 8.0 | 28057.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 1.0 | 3214.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 13.0 | 42955.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 3.0 | 9563.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 63.0 | 244725.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 4.0 | 18251.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 4.0 | 18018.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 1.4 | 6274.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 2.6 | 11820.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 7.0 | 26130.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 1.0 | 2979.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 245.0 |
| 18 | 3.1 | 8345.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 784.0 |
| 19 | 16.9 | 21362.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 4231.8 |
| 20 | 0.8 | 59.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 197.2 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

Failure Surface Specified By 7 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

1

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

1

Failure Surface Specified By 7 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Factor of Safety
*** 1.927 ***

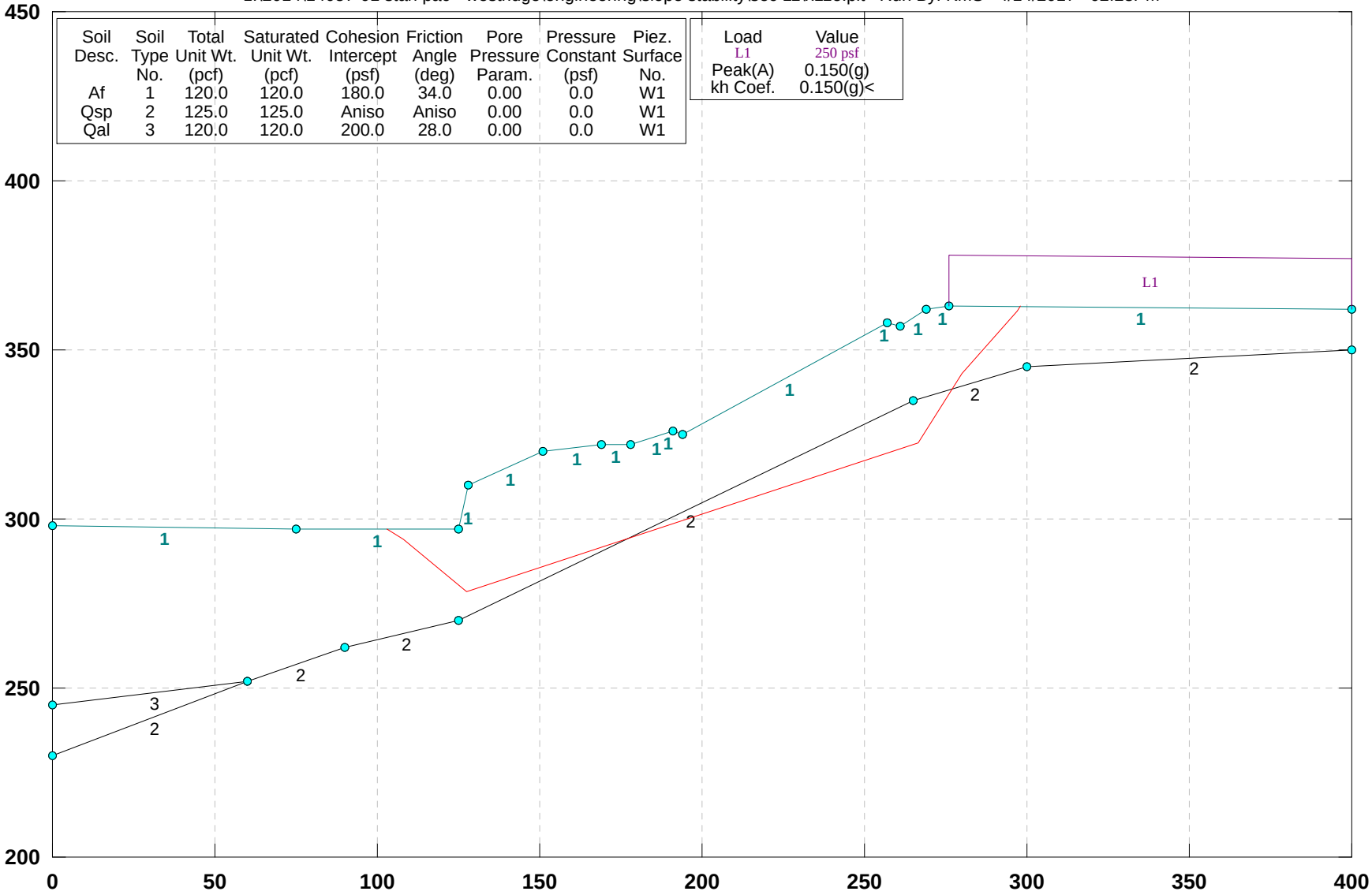
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 11-11'/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 11\x11e.plt Run By: KMS 4/14/2017 02:28PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.49**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:28PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11e.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11e.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 11\x11e.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 11-11'/
Upper Slope - Seismic

BOUNDARY COORDINATES

13 Top Boundaries

20 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 298.00 | 75.00 | 297.00 | 1 |
| 2 | 75.00 | 297.00 | 125.00 | 297.00 | 1 |
| 3 | 125.00 | 297.00 | 128.00 | 310.00 | 1 |
| 4 | 128.00 | 310.00 | 151.00 | 320.00 | 1 |
| 5 | 151.00 | 320.00 | 169.00 | 322.00 | 1 |
| 6 | 169.00 | 322.00 | 178.00 | 322.00 | 1 |
| 7 | 178.00 | 322.00 | 191.00 | 326.00 | 1 |
| 8 | 191.00 | 326.00 | 194.00 | 325.00 | 1 |
| 9 | 194.00 | 325.00 | 257.00 | 358.00 | 1 |
| 10 | 257.00 | 358.00 | 261.00 | 357.00 | 1 |
| 11 | 261.00 | 357.00 | 269.00 | 362.00 | 1 |
| 12 | 269.00 | 362.00 | 276.00 | 363.00 | 1 |
| 13 | 276.00 | 363.00 | 400.00 | 362.00 | 1 |
| 14 | 0.00 | 245.00 | 60.00 | 252.00 | 3 |
| 15 | 60.00 | 252.00 | 90.00 | 262.00 | 2 |
| 16 | 90.00 | 262.00 | 125.00 | 270.00 | 2 |
| 17 | 125.00 | 270.00 | 265.00 | 335.00 | 2 |
| 18 | 265.00 | 335.00 | 300.00 | 345.00 | 2 |
| 19 | 300.00 | 345.00 | 400.00 | 350.00 | 2 |
| 20 | 0.00 | 230.00 | 60.00 | 252.00 | 2 |

User Specified Y-Origin = 200.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |

3 120.0 120.0 200.0 28.0 0.00 0.0

1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 500.00 | 34.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 276.00 | 400.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

Janbu's Empirical Coef. is being used for the case of c & phi both > 0
1

Trial Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 103.104 | 297.000 |
| 2 | 107.760 | 293.973 |
| 3 | 127.415 | 278.523 |
| 4 | 266.362 | 322.306 |
| 5 | 280.116 | 343.183 |
| 6 | 297.043 | 361.581 |
| 7 | 297.832 | 362.824 |

Janbu's Empirical Coefficient (fo) = 1.056

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.485

***Table 1 - Individual Data on the 20 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.7 | 845.6 | 0.0 | 0.0 | 0.0 | 0.0 | 126.8 | 0.0 | 0.0 |
| 2 | 17.2 | 20280.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3042.0 | 0.0 | 0.0 |
| 3 | 2.4 | 6596.0 | 0.0 | 0.0 | 0.0 | 0.0 | 989.4 | 0.0 | 0.0 |
| 4 | 0.6 | 2114.2 | 0.0 | 0.0 | 0.0 | 0.0 | 317.1 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 23.0 | 90166.4 | 0.0 | 0.0 | 0.0 | 0.0 | 13525.0 | 0.0 | 0.0 |
| 6 | 18.0 | 69572.1 | 0.0 | 0.0 | 0.0 | 0.0 | 10435.8 | 0.0 | 0.0 |
| 7 | 8.0 | 28052.5 | 0.0 | 0.0 | 0.0 | 0.0 | 4207.9 | 0.0 | 0.0 |
| 8 | 1.0 | 3219.6 | 0.0 | 0.0 | 0.0 | 0.0 | 482.9 | 0.0 | 0.0 |
| 9 | 13.0 | 42955.6 | 0.0 | 0.0 | 0.0 | 0.0 | 6443.3 | 0.0 | 0.0 |
| 10 | 3.0 | 9563.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1434.5 | 0.0 | 0.0 |
| 11 | 63.0 | 244725.7 | 0.0 | 0.0 | 0.0 | 0.0 | 36708.9 | 0.0 | 0.0 |
| 12 | 4.0 | 18251.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2737.7 | 0.0 | 0.0 |
| 13 | 4.0 | 18018.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2702.7 | 0.0 | 0.0 |
| 14 | 1.4 | 6272.9 | 0.0 | 0.0 | 0.0 | 0.0 | 940.9 | 0.0 | 0.0 |
| 15 | 2.6 | 11821.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1773.3 | 0.0 | 0.0 |
| 16 | 7.0 | 26130.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3919.5 | 0.0 | 0.0 |
| 17 | 1.0 | 2980.2 | 0.0 | 0.0 | 0.0 | 0.0 | 447.0 | 0.0 | 245.0 |
| 18 | 3.1 | 8345.6 | 0.0 | 0.0 | 0.0 | 0.0 | 1251.8 | 0.0 | 784.0 |
| 19 | 16.9 | 21361.6 | 0.0 | 0.0 | 0.0 | 0.0 | 3204.2 | 0.0 | 4231.7 |
| 20 | 0.8 | 59.1 | 0.0 | 0.0 | 0.0 | 0.0 | 8.9 | 0.0 | 197.3 |

***Table 2 - Base Stress Data on the 20 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Shear Mobilized Stress (psf) |
|---|---|---|---|---|---|
| 1 | -33.03 | 105.43 | 5.55 | 512.06 | -76.15 |
| 2 | -38.17 | 116.38 | 21.93 | 1926.03 | -588.24 |
| 3 | -38.17 | 126.21 | 3.07 | 4001.13 | -1365.79 |
| 4 | 17.49 | 127.71 | 0.61 | 2400.90 | 1603.22 |
| 5 | 17.49 | 139.50 | 24.11 | 2590.33 | 1739.05 |
| 6 | 17.49 | 160.00 | 18.87 | 2556.20 | 1714.58 |
| 7 | 17.49 | 173.02 | 8.42 | 2325.97 | 1549.49 |
| 8 | 17.49 | 177.52 | 1.02 | 1791.29 | 1474.17 |
| 9 | 17.49 | 184.50 | 13.63 | 1782.18 | 1465.79 |
| 10 | 17.49 | 192.50 | 3.15 | 1726.00 | 1414.09 |
| 11 | 17.49 | 225.50 | 66.05 | 2061.92 | 1723.20 |
| 12 | 17.49 | 259.00 | 4.19 | 2388.90 | 2024.08 |
| 13 | 17.49 | 263.00 | 4.19 | 2360.81 | 1998.23 |
| 14 | 17.49 | 265.68 | 1.43 | 2409.55 | 2043.07 |
| 15 | 56.62 | 267.68 | 4.80 | 3789.76 | 4112.07 |
| 16 | 56.62 | 272.50 | 12.72 | 3246.61 | 3425.24 |
| 17 | 56.62 | 276.49 | 1.78 | 2926.01 | 2999.20 |
| 18 | 56.62 | 278.55 | 5.70 | 2306.11 | 2650.64 |
| 19 | 47.38 | 288.58 | 25.00 | 1186.30 | 1240.86 |
| 20 | 57.59 | 297.44 | 1.47 | 434.14 | 280.38 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 485976.84 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2134.20(psf)

Sum of the Driving Forces = 345528.53 (lbs)

Average Mobilized Shear Stress = 1517.41(psf)

Total length of the failure surface = 227.71(ft)

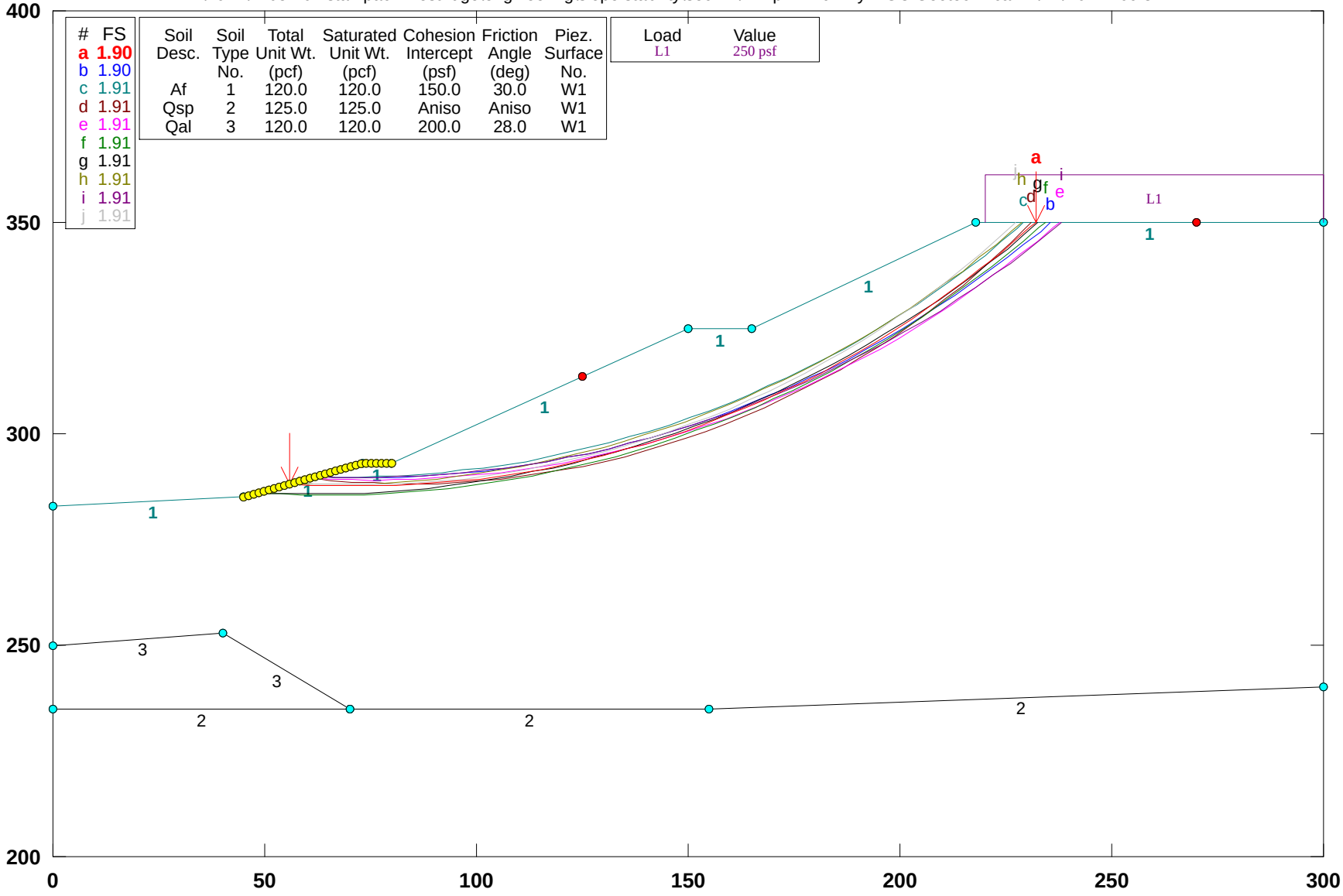
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3995(g)
Calculated Newmark Seismic Displacement = 0.002(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 12'-12"/ Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12.pl2  Run By: LGC Geotechnical  4/17/2017  09:37AM




**GSTABL7 v.2  FSmin=1.90**

**Safety Factors Are Calculated By The Modified Bishop Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 09:37AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12'-12"/
Upper Slope - Static

BOUNDARY COORDINATES
7 Top Boundaries
12 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 283.00 | 45.00 | 285.00 | 1 |
| 2 | 45.00 | 285.00 | 73.00 | 293.00 | 1 |
| 3 | 73.00 | 293.00 | 80.00 | 293.00 | 1 |
| 4 | 80.00 | 293.00 | 150.00 | 325.00 | 1 |
| 5 | 150.00 | 325.00 | 165.00 | 325.00 | 1 |
| 6 | 165.00 | 325.00 | 218.00 | 350.00 | 1 |
| 7 | 218.00 | 350.00 | 300.00 | 350.00 | 1 |
| 8 | 0.00 | 250.00 | 40.00 | 253.00 | 3 |
| 9 | 40.00 | 253.00 | 70.00 | 235.00 | 3 |
| 10 | 70.00 | 235.00 | 155.00 | 235.00 | 2 |
| 11 | 155.00 | 235.00 | 300.00 | 240.00 | 2 |
| 12 | 0.00 | 235.00 | 70.00 | 235.00 | 2 |

User Specified Y-Origin = 200.00(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 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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



BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 220.00 | 300.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
9990 Trial Surfaces Have Been Generated.
333 Surface(s) Initiate(s) From Each Of 30 Points Equally Spaced
Along The Ground Surface Between X = 45.00(ft)
and X = 80.00(ft)
Each Surface Terminates Between X = 125.00(ft)
and X = 270.00(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 = 0
Number of Trial Surfaces With Valid FS = 0
Statistical Data On All Valid FS Values:
FS Max = 0.000 FS Min = 500.000 FS Ave = NaN
Standard Deviation = 0.000 Coefficient of Variation = NaN %
Failure Surface Specified By 40 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 55.862 | 288.103 |
| 2 | 60.854 | 287.823 |
| 3 | 65.851 | 287.647 |
| 4 | 70.851 | 287.577 |
| 5 | 75.851 | 287.613 |
| 6 | 80.849 | 287.754 |
| 7 | 85.842 | 288.000 |
| 8 | 90.830 | 288.351 |
| 9 | 95.809 | 288.807 |
| 10 | 100.778 | 289.369 |
| 11 | 105.733 | 290.035 |
| 12 | 110.673 | 290.805 |
| 13 | 115.596 | 291.679 |
| 14 | 120.500 | 292.657 |
| 15 | 125.382 | 293.737 |
| 16 | 130.240 | 294.921 |
| 17 | 135.071 | 296.207 |
| 18 | 139.875 | 297.594 |
| 19 | 144.649 | 299.082 |
| 20 | 149.389 | 300.671 |
| 21 | 154.096 | 302.359 |
| 22 | 158.766 | 304.146 |
| 23 | 163.397 | 306.031 |
| 24 | 167.987 | 308.013 |
| 25 | 172.535 | 310.091 |
| 26 | 177.037 | 312.265 |
| 27 | 181.493 | 314.534 |
| 28 | 185.900 | 316.895 |
| 29 | 190.256 | 319.350 |
| 30 | 194.560 | 321.895 |
| 31 | 198.809 | 324.531 |
| 32 | 203.001 | 327.255 |
| 33 | 207.136 | 330.067 |
| 34 | 211.209 | 332.966 |
| 35 | 215.221 | 335.950 |
| 36 | 219.169 | 339.018 |
| 37 | 223.052 | 342.169 |
| 38 | 226.867 | 345.401 |
| 39 | 230.614 | 348.712 |
| 40 | 232.010 | 350.000 |

Circle Center At X = 71.682 ; Y = 524.677 ; and Radius = 237.102

Factor of Safety

*** 1.903 ***

Individual data on the 0 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|

Failure Surface Specified By 39 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 61.897 | 289.828 |
| 2 | 66.894 | 289.659 |
| 3 | 71.893 | 289.590 |
| 4 | 76.893 | 289.622 |
| 5 | 81.891 | 289.754 |
| 6 | 86.886 | 289.986 |
| 7 | 91.875 | 290.318 |
| 8 | 96.856 | 290.750 |
| 9 | 101.828 | 291.282 |
| 10 | 106.788 | 291.914 |
| 11 | 111.734 | 292.644 |
| 12 | 116.665 | 293.474 |
| 13 | 121.578 | 294.402 |
| 14 | 126.471 | 295.429 |
| 15 | 131.343 | 296.553 |
| 16 | 136.192 | 297.775 |
| 17 | 141.015 | 299.094 |
| 18 | 145.810 | 300.509 |
| 19 | 150.576 | 302.021 |
| 20 | 155.311 | 303.627 |
| 21 | 160.013 | 305.328 |
| 22 | 164.680 | 307.123 |
| 23 | 169.310 | 309.011 |
| 24 | 173.901 | 310.991 |
| 25 | 178.451 | 313.063 |
| 26 | 182.959 | 315.226 |
| 27 | 187.423 | 317.479 |
| 28 | 191.841 | 319.820 |
| 29 | 196.211 | 322.250 |
| 30 | 200.531 | 324.767 |
| 31 | 204.800 | 327.370 |
| 32 | 209.016 | 330.058 |
| 33 | 213.177 | 332.830 |
| 34 | 217.282 | 335.685 |
| 35 | 221.329 | 338.622 |
| 36 | 225.316 | 341.639 |
| 37 | 229.242 | 344.735 |
| 38 | 233.105 | 347.910 |
| 39 | 235.547 | 350.000 |

Circle Center At X = 72.811 ; Y = 539.031 ; and Radius = 249.442

Factor of Safety

*** 1.904 ***

Failure Surface Specified By 38 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 61.897 | 289.828 |
| 2 | 66.896 | 289.740 |
| 3 | 71.896 | 289.755 |
| 4 | 76.894 | 289.873 |
| 5 | 81.890 | 290.093 |
| 6 | 86.879 | 290.415 |
| 7 | 91.861 | 290.839 |
| 8 | 96.833 | 291.365 |
| 9 | 101.794 | 291.993 |
| 10 | 106.740 | 292.722 |
| 11 | 111.671 | 293.552 |
| 12 | 116.583 | 294.484 |
| 13 | 121.476 | 295.515 |
| 14 | 126.346 | 296.647 |



| | | |
|---|---|---|
| 15 | 131.192 | 297.878 |
| 16 | 136.012 | 299.207 |
| 17 | 140.804 | 300.636 |
| 18 | 145.565 | 302.162 |
| 19 | 150.294 | 303.785 |
| 20 | 154.989 | 305.505 |
| 21 | 159.648 | 307.321 |
| 22 | 164.269 | 309.231 |
| 23 | 168.849 | 311.236 |
| 24 | 173.388 | 313.334 |
| 25 | 177.882 | 315.525 |
| 26 | 182.331 | 317.807 |
| 27 | 186.732 | 320.180 |
| 28 | 191.084 | 322.642 |
| 29 | 195.384 | 325.193 |
| 30 | 199.631 | 327.832 |
| 31 | 203.823 | 330.557 |
| 32 | 207.959 | 333.367 |
| 33 | 212.036 | 336.262 |
| 34 | 216.053 | 339.239 |
| 35 | 220.008 | 342.298 |
| 36 | 223.900 | 345.437 |
| 37 | 227.726 | 348.655 |
| 38 | 229.261 | 350.000 |

Circle Center At X = 68.671 ; Y = 533.826 ; and Radius = 244.092

Factor of Safety

*** 1.905 ***

Failure Surface Specified By 39 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 60.690 | 289.483 |
| 2 | 65.664 | 288.982 |
| 3 | 70.650 | 288.601 |
| 4 | 75.643 | 288.342 |
| 5 | 80.641 | 288.204 |
| 6 | 85.641 | 288.188 |
| 7 | 90.640 | 288.293 |
| 8 | 95.635 | 288.519 |
| 9 | 100.623 | 288.866 |
| 10 | 105.601 | 289.334 |
| 11 | 110.566 | 289.923 |
| 12 | 115.516 | 290.632 |
| 13 | 120.447 | 291.460 |
| 14 | 125.356 | 292.409 |
| 15 | 130.241 | 293.476 |
| 16 | 135.098 | 294.661 |
| 17 | 139.925 | 295.964 |
| 18 | 144.720 | 297.384 |
| 19 | 149.478 | 298.919 |
| 20 | 154.198 | 300.570 |
| 21 | 158.876 | 302.334 |
| 22 | 163.510 | 304.212 |
| 23 | 168.097 | 306.201 |
| 24 | 172.635 | 308.301 |
| 25 | 177.120 | 310.511 |
| 26 | 181.550 | 312.829 |
| 27 | 185.923 | 315.254 |
| 28 | 190.236 | 317.784 |
| 29 | 194.486 | 320.417 |
| 30 | 198.671 | 323.154 |
| 31 | 202.788 | 325.991 |
| 32 | 206.835 | 328.927 |
| 33 | 210.810 | 331.960 |
| 34 | 214.710 | 335.089 |
| 35 | 218.533 | 338.312 |
| 36 | 222.276 | 341.626 |
| 37 | 225.938 | 345.031 |
| 38 | 229.517 | 348.523 |
| 39 | 230.958 | 350.000 |

Circle Center At X = 83.825 ; Y = 494.230 ; and Radius = 206.050

Factor of Safety
*** 1.907 ***

Failure Surface Specified By 40 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 60.690 | 289.483 |
| 2 | 65.683 | 289.229 |
| 3 | 70.681 | 289.077 |
| 4 | 75.681 | 289.026 |
| 5 | 80.680 | 289.077 |
| 6 | 85.678 | 289.230 |
| 7 | 90.672 | 289.485 |
| 8 | 95.659 | 289.841 |
| 9 | 100.638 | 290.299 |
| 10 | 105.607 | 290.858 |
| 11 | 110.563 | 291.517 |
| 12 | 115.505 | 292.278 |
| 13 | 120.430 | 293.139 |
| 14 | 125.337 | 294.100 |
| 15 | 130.223 | 295.160 |
| 16 | 135.087 | 296.320 |
| 17 | 139.926 | 297.579 |
| 18 | 144.738 | 298.935 |
| 19 | 149.522 | 300.390 |
| 20 | 154.275 | 301.941 |
| 21 | 158.996 | 303.589 |
| 22 | 163.682 | 305.333 |
| 23 | 168.332 | 307.171 |
| 24 | 172.943 | 309.104 |
| 25 | 177.514 | 311.130 |
| 26 | 182.043 | 313.249 |
| 27 | 186.528 | 315.459 |
| 28 | 190.967 | 317.761 |
| 29 | 195.358 | 320.152 |
| 30 | 199.699 | 322.632 |
| 31 | 203.990 | 325.199 |
| 32 | 208.227 | 327.854 |
| 33 | 212.409 | 330.594 |
| 34 | 216.535 | 333.419 |
| 35 | 220.602 | 336.327 |
| 36 | 224.609 | 339.318 |
| 37 | 228.555 | 342.389 |
| 38 | 232.437 | 345.540 |
| 39 | 236.254 | 348.769 |
| 40 | 237.651 | 350.000 |

Circle Center At X = 75.673 ; Y = 534.660 ; and Radius = 245.635

Factor of Safety
*** 1.908 ***

Failure Surface Specified By 42 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 48.621 | 286.034 |
| 2 | 53.613 | 285.754 |
| 3 | 58.609 | 285.572 |
| 4 | 63.609 | 285.488 |
| 5 | 68.609 | 285.504 |
| 6 | 73.607 | 285.618 |
| 7 | 78.603 | 285.830 |
| 8 | 83.593 | 286.142 |
| 9 | 88.576 | 286.551 |
| 10 | 93.551 | 287.059 |
| 11 | 98.514 | 287.665 |
| 12 | 103.464 | 288.369 |
| 13 | 108.399 | 289.171 |
| 14 | 113.318 | 290.070 |
| 15 | 118.218 | 291.065 |
| 16 | 123.097 | 292.158 |
| 17 | 127.954 | 293.346 |
| 18 | 132.786 | 294.630 |
| 19 | 137.592 | 296.009 |



| | | |
|---|---|---|
| 20 | 142.370 | 297.483 |
| 21 | 147.118 | 299.051 |
| 22 | 151.834 | 300.712 |
| 23 | 156.516 | 302.466 |
| 24 | 161.163 | 304.312 |
| 25 | 165.772 | 306.249 |
| 26 | 170.342 | 308.277 |
| 27 | 174.872 | 310.395 |
| 28 | 179.358 | 312.602 |
| 29 | 183.800 | 314.897 |
| 30 | 188.196 | 317.279 |
| 31 | 192.545 | 319.748 |
| 32 | 196.843 | 322.302 |
| 33 | 201.090 | 324.940 |
| 34 | 205.285 | 327.662 |
| 35 | 209.425 | 330.466 |
| 36 | 213.508 | 333.351 |
| 37 | 217.534 | 336.316 |
| 38 | 221.501 | 339.360 |
| 39 | 225.407 | 342.481 |
| 40 | 229.250 | 345.680 |
| 41 | 233.029 | 348.953 |
| 42 | 234.191 | 350.000 |

Circle Center At X = 65.342 ; Y = 538.686 ; and Radius = 253.204

Factor of Safety
*** 1.908 ***

Failure Surface Specified By 41 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 48.621 | 286.034 |
| 2 | 53.617 | 285.839 |
| 3 | 58.616 | 285.739 |
| 4 | 63.616 | 285.735 |
| 5 | 68.615 | 285.827 |
| 6 | 73.611 | 286.015 |
| 7 | 78.603 | 286.299 |
| 8 | 83.589 | 286.678 |
| 9 | 88.566 | 287.153 |
| 10 | 93.534 | 287.724 |
| 11 | 98.489 | 288.390 |
| 12 | 103.431 | 289.151 |
| 13 | 108.357 | 290.006 |
| 14 | 113.266 | 290.956 |
| 15 | 118.156 | 292.000 |
| 16 | 123.025 | 293.138 |
| 17 | 127.871 | 294.368 |
| 18 | 132.693 | 295.692 |
| 19 | 137.488 | 297.108 |
| 20 | 142.255 | 298.616 |
| 21 | 146.993 | 300.215 |
| 22 | 151.699 | 301.904 |
| 23 | 156.371 | 303.684 |
| 24 | 161.009 | 305.552 |
| 25 | 165.610 | 307.510 |
| 26 | 170.172 | 309.555 |
| 27 | 174.694 | 311.688 |
| 28 | 179.175 | 313.907 |
| 29 | 183.612 | 316.212 |
| 30 | 188.004 | 318.601 |
| 31 | 192.350 | 321.074 |
| 32 | 196.647 | 323.631 |
| 33 | 200.894 | 326.269 |
| 34 | 205.090 | 328.988 |
| 35 | 209.233 | 331.787 |
| 36 | 213.322 | 334.665 |
| 37 | 217.354 | 337.621 |
| 38 | 221.329 | 340.654 |
| 39 | 225.245 | 343.763 |
| 40 | 229.101 | 346.947 |
| 41 | 232.658 | 350.000 |

Circle Center At X = 61.321 ; Y = 546.240 ; and Radius = 260.515
Factor of Safety
*** 1.909 ***
Failure Surface Specified By 39 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 55.862 | 288.103 |
| 2 | 60.861 | 287.994 |
| 3 | 65.861 | 287.983 |
| 4 | 70.860 | 288.073 |
| 5 | 75.856 | 288.263 |
| 6 | 80.848 | 288.552 |
| 7 | 85.833 | 288.940 |
| 8 | 90.809 | 289.429 |
| 9 | 95.774 | 290.016 |
| 10 | 100.727 | 290.702 |
| 11 | 105.665 | 291.487 |
| 12 | 110.586 | 292.371 |
| 13 | 115.489 | 293.353 |
| 14 | 120.371 | 294.432 |
| 15 | 125.231 | 295.608 |
| 16 | 130.066 | 296.881 |
| 17 | 134.875 | 298.251 |
| 18 | 139.655 | 299.716 |
| 19 | 144.406 | 301.276 |
| 20 | 149.124 | 302.931 |
| 21 | 153.808 | 304.680 |
| 22 | 158.456 | 306.522 |
| 23 | 163.067 | 308.456 |
| 24 | 167.638 | 310.482 |
| 25 | 172.168 | 312.599 |
| 26 | 176.655 | 314.806 |
| 27 | 181.097 | 317.101 |
| 28 | 185.492 | 319.486 |
| 29 | 189.838 | 321.957 |
| 30 | 194.134 | 324.514 |
| 31 | 198.379 | 327.157 |
| 32 | 202.570 | 329.884 |
| 33 | 206.705 | 332.695 |
| 34 | 210.784 | 335.587 |
| 35 | 214.804 | 338.560 |
| 36 | 218.764 | 341.612 |
| 37 | 222.662 | 344.743 |
| 38 | 226.497 | 347.952 |
| 39 | 228.849 | 350.000 |

Circle Center At X = 63.868 ; Y = 538.454 ; and Radius = 250.478
Factor of Safety
*** 1.909 ***
Failure Surface Specified By 40 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 61.897 | 289.828 |
| 2 | 66.894 | 289.682 |
| 3 | 71.894 | 289.632 |
| 4 | 76.894 | 289.679 |
| 5 | 81.892 | 289.823 |
| 6 | 86.886 | 290.063 |
| 7 | 91.875 | 290.399 |
| 8 | 96.856 | 290.832 |
| 9 | 101.828 | 291.360 |
| 10 | 106.789 | 291.985 |
| 11 | 111.737 | 292.705 |
| 12 | 116.670 | 293.520 |
| 13 | 121.586 | 294.431 |
| 14 | 126.484 | 295.436 |
| 15 | 131.362 | 296.535 |
| 16 | 136.217 | 297.729 |
| 17 | 141.049 | 299.016 |
| 18 | 145.855 | 300.396 |
| 19 | 150.633 | 301.868 |



| | | |
|---|---|---|
| 20 | 155.382 | 303.433 |
| 21 | 160.100 | 305.089 |
| 22 | 164.785 | 306.835 |
| 23 | 169.435 | 308.672 |
| 24 | 174.049 | 310.598 |
| 25 | 178.625 | 312.613 |
| 26 | 183.162 | 314.715 |
| 27 | 187.657 | 316.905 |
| 28 | 192.109 | 319.181 |
| 29 | 196.516 | 321.543 |
| 30 | 200.876 | 323.989 |
| 31 | 205.189 | 326.519 |
| 32 | 209.452 | 329.132 |
| 33 | 213.664 | 331.827 |
| 34 | 217.823 | 334.602 |
| 35 | 221.928 | 337.457 |
| 36 | 225.976 | 340.391 |
| 37 | 229.968 | 343.402 |
| 38 | 233.900 | 346.490 |
| 39 | 237.773 | 349.653 |
| 40 | 238.181 | 350.000 |

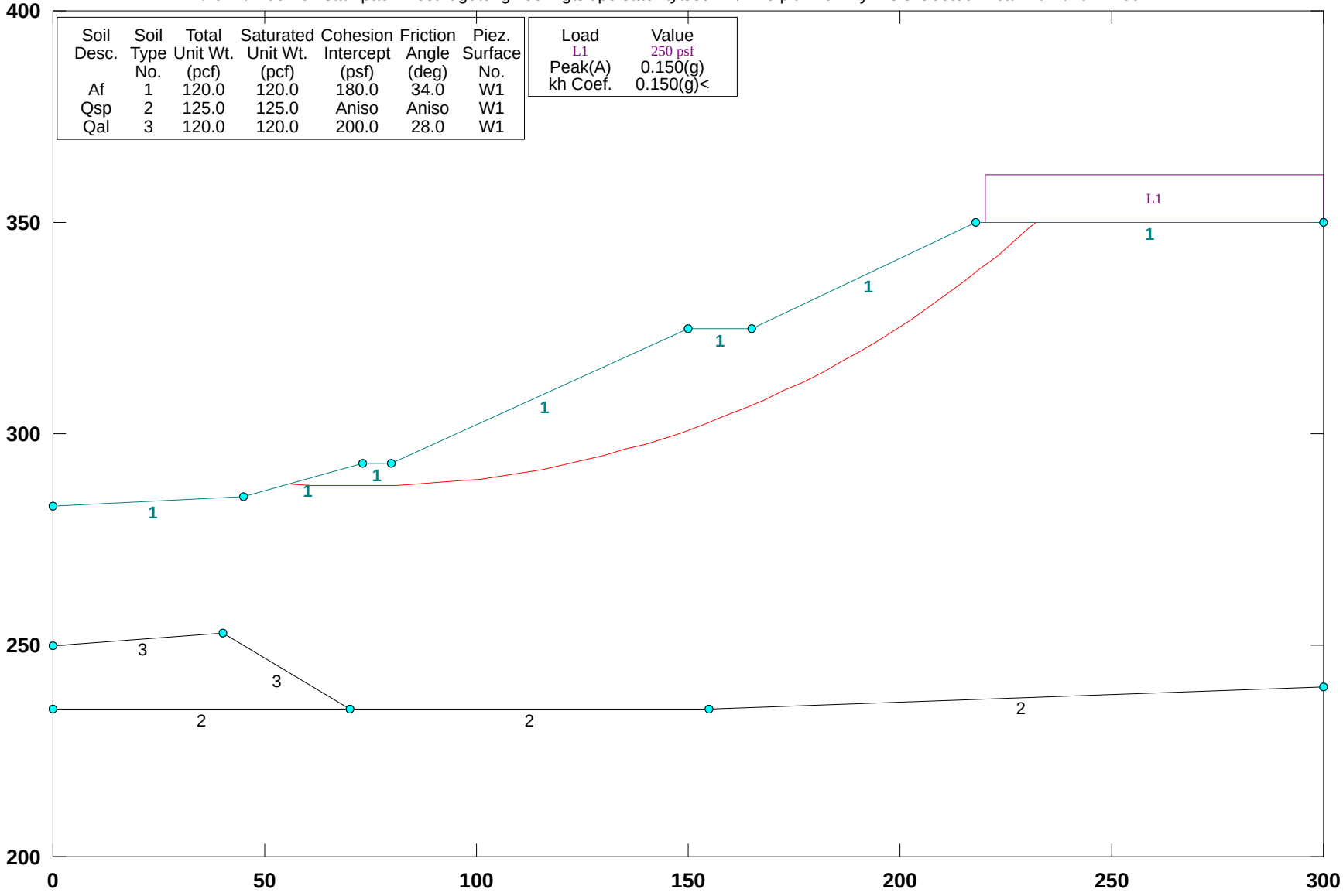
Circle Center At X = 71.962 ; Y = 548.652 ; and Radius = 259.020
Factor of Safety
*** 1.909 ***
Failure Surface Specified By 39 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 57.069 | 288.448 |
| 2 | 62.062 | 288.185 |
| 3 | 67.060 | 288.033 |
| 4 | 72.060 | 287.990 |
| 5 | 77.059 | 288.059 |
| 6 | 82.056 | 288.238 |
| 7 | 87.048 | 288.527 |
| 8 | 92.032 | 288.926 |
| 9 | 97.006 | 289.435 |
| 10 | 101.967 | 290.055 |
| 11 | 106.914 | 290.783 |
| 12 | 111.843 | 291.621 |
| 13 | 116.753 | 292.567 |
| 14 | 121.640 | 293.622 |
| 15 | 126.503 | 294.784 |
| 16 | 131.339 | 296.054 |
| 17 | 136.146 | 297.430 |
| 18 | 140.921 | 298.912 |
| 19 | 145.663 | 300.499 |
| 20 | 150.368 | 302.191 |
| 21 | 155.035 | 303.986 |
| 22 | 159.661 | 305.884 |
| 23 | 164.243 | 307.883 |
| 24 | 168.781 | 309.983 |
| 25 | 173.271 | 312.183 |
| 26 | 177.711 | 314.482 |
| 27 | 182.100 | 316.878 |
| 28 | 186.434 | 319.371 |
| 29 | 190.712 | 321.959 |
| 30 | 194.932 | 324.640 |
| 31 | 199.092 | 327.414 |
| 32 | 203.189 | 330.280 |
| 33 | 207.223 | 333.235 |
| 34 | 211.189 | 336.279 |
| 35 | 215.088 | 339.410 |
| 36 | 218.917 | 342.626 |
| 37 | 222.673 | 345.925 |
| 38 | 226.356 | 349.307 |
| 39 | 227.077 | 350.000 |

Circle Center At X = 71.468 ; Y = 514.272 ; and Radius = 226.283
Factor of Safety
*** 1.910 ***
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 12'-12"/ Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12e.plt Run By: LGC Geotechnical 4/17/2017 09:41AM




**GSTABL7 v.2 FSmin=1.54**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 09:41AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12e.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12e.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12e.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12'-12"/
Upper Slope - Seismic

BOUNDARY COORDINATES
7 Top Boundaries
12 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 283.00 | 45.00 | 285.00 | 1 |
| 2 | 45.00 | 285.00 | 73.00 | 293.00 | 1 |
| 3 | 73.00 | 293.00 | 80.00 | 293.00 | 1 |
| 4 | 80.00 | 293.00 | 150.00 | 325.00 | 1 |
| 5 | 150.00 | 325.00 | 165.00 | 325.00 | 1 |
| 6 | 165.00 | 325.00 | 218.00 | 350.00 | 1 |
| 7 | 218.00 | 350.00 | 300.00 | 350.00 | 1 |
| 8 | 0.00 | 250.00 | 40.00 | 253.00 | 3 |
| 9 | 40.00 | 253.00 | 70.00 | 235.00 | 3 |
| 10 | 70.00 | 235.00 | 155.00 | 235.00 | 2 |
| 11 | 155.00 | 235.00 | 300.00 | 240.00 | 2 |
| 12 | 0.00 | 235.00 | 70.00 | 235.00 | 2 |

User Specified Y-Origin = 200.00(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 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 500.00 | 34.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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



BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 220.00 | 300.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Trial Failure Surface Specified By 40 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 55.862 | 288.103 |
| 2 | 60.854 | 287.823 |
| 3 | 65.851 | 287.647 |
| 4 | 70.851 | 287.577 |
| 5 | 75.851 | 287.613 |
| 6 | 80.849 | 287.754 |
| 7 | 85.842 | 288.000 |
| 8 | 90.830 | 288.351 |
| 9 | 95.809 | 288.807 |
| 10 | 100.778 | 289.369 |
| 11 | 105.733 | 290.035 |
| 12 | 110.673 | 290.805 |
| 13 | 115.596 | 291.679 |
| 14 | 120.500 | 292.657 |
| 15 | 125.382 | 293.737 |
| 16 | 130.240 | 294.921 |
| 17 | 135.071 | 296.207 |
| 18 | 139.875 | 297.594 |
| 19 | 144.649 | 299.082 |
| 20 | 149.389 | 300.671 |
| 21 | 154.096 | 302.359 |
| 22 | 158.766 | 304.146 |
| 23 | 163.397 | 306.031 |
| 24 | 167.987 | 308.013 |
| 25 | 172.535 | 310.091 |
| 26 | 177.037 | 312.265 |
| 27 | 181.493 | 314.534 |
| 28 | 185.900 | 316.895 |
| 29 | 190.256 | 319.350 |
| 30 | 194.560 | 321.895 |
| 31 | 198.809 | 324.531 |
| 32 | 203.001 | 327.255 |
| 33 | 207.136 | 330.067 |
| 34 | 211.209 | 332.966 |
| 35 | 215.221 | 335.950 |
| 36 | 219.169 | 339.018 |
| 37 | 223.052 | 342.169 |
| 38 | 226.867 | 345.401 |
| 39 | 230.614 | 348.712 |
| 40 | 232.010 | 350.000 |

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

| Angle/Segment No. | Deflection(Deg) | Segment Length(ft) |
|---|---|---|
| 1 | 1.20 | 5.00 |
| 2 | 1.21 | 5.00 |
| 3 | 1.21 | 5.00 |
| 4 | 1.20 | 5.00 |
| 5 | 1.20 | 5.00 |
| 6 | 1.20 | 5.00 |
| 7 | 1.21 | 5.00 |
| 8 | 1.22 | 5.00 |
| 9 | 1.20 | 5.00 |
| 10 | 1.20 | 5.00 |
| 11 | 1.21 | 5.00 |
| 12 | 1.21 | 5.00 |
| 13 | 1.20 | 5.00 |
| 14 | 1.22 | 5.00 |

| | | |
|---|---|---|
| 15 | 1.21 | 5.00 |
| 16 | 1.20 | 5.00 |
| 17 | 1.21 | 5.00 |
| 18 | 1.22 | 5.00 |
| 19 | 1.20 | 5.00 |
| 20 | 1.21 | 5.00 |
| 21 | 1.21 | 5.00 |
| 22 | 1.21 | 5.00 |
| 23 | 1.20 | 5.00 |
| 24 | 1.22 | 5.00 |
| 25 | 1.21 | 5.00 |
| 26 | 1.19 | 5.00 |
| 27 | 1.23 | 5.00 |
| 28 | 1.19 | 5.00 |
| 29 | 1.22 | 5.00 |
| 30 | 1.20 | 5.00 |
| 31 | 1.20 | 5.00 |
| 32 | 1.22 | 5.00 |
| 33 | 1.20 | 5.00 |
| 34 | 1.21 | 5.00 |
| 35 | 1.21 | 5.00 |
| 36 | 1.21 | 5.00 |
| 37 | 1.19 | 5.00 |

Circle Center At X = 71.680(ft) ; Y = 524.681(ft); and Radius = 237.106(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.540

***Table 1 - Individual Data on the 45 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 | 511.2 | 0.0 | 0.0 | 0.0 | 0.0 | 76.7 | 0.0 | 0.0 |
| 2 | 5.0 | 1504.2 | 0.0 | 0.0 | 0.0 | 0.0 | 225.6 | 0.0 | 0.0 |
| 3 | 5.0 | 2435.8 | 0.0 | 0.0 | 0.0 | 0.0 | 365.4 | 0.0 | 0.0 |
| 4 | 2.1 | 1317.3 | 0.0 | 0.0 | 0.0 | 0.0 | 197.6 | 0.0 | 0.0 |
| 5 | 2.9 | 1846.5 | 0.0 | 0.0 | 0.0 | 0.0 | 277.0 | 0.0 | 0.0 |
| 6 | 4.1 | 2652.9 | 0.0 | 0.0 | 0.0 | 0.0 | 397.9 | 0.0 | 0.0 |
| 7 | 0.8 | 555.5 | 0.0 | 0.0 | 0.0 | 0.0 | 83.3 | 0.0 | 0.0 |
| 8 | 5.0 | 3985.8 | 0.0 | 0.0 | 0.0 | 0.0 | 597.9 | 0.0 | 0.0 |
| 9 | 5.0 | 5168.7 | 0.0 | 0.0 | 0.0 | 0.0 | 775.3 | 0.0 | 0.0 |
| 10 | 5.0 | 6279.5 | 0.0 | 0.0 | 0.0 | 0.0 | 941.9 | 0.0 | 0.0 |
| 11 | 5.0 | 7319.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1097.9 | 0.0 | 0.0 |
| 12 | 5.0 | 8282.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1242.3 | 0.0 | 0.0 |
| 13 | 4.9 | 9172.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1375.8 | 0.0 | 0.0 |
| 14 | 4.9 | 9986.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1498.0 | 0.0 | 0.0 |
| 15 | 4.9 | 10725.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1608.8 | 0.0 | 0.0 |
| 16 | 4.9 | 11384.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1707.7 | 0.0 | 0.0 |
| 17 | 4.9 | 11966.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1795.0 | 0.0 | 0.0 |
| 18 | 4.8 | 12468.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1870.2 | 0.0 | 0.0 |
| 19 | 4.8 | 12897.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1934.6 | 0.0 | 0.0 |
| 20 | 4.8 | 13247.6 | 0.0 | 0.0 | 0.0 | 0.0 | 1987.1 | 0.0 | 0.0 |
| 21 | 4.7 | 13515.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2027.3 | 0.0 | 0.0 |
| 22 | 0.6 | 1765.5 | 0.0 | 0.0 | 0.0 | 0.0 | 264.8 | 0.0 | 0.0 |
| 23 | 4.1 | 11489.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1723.4 | 0.0 | 0.0 |
| 24 | 4.7 | 12187.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1828.1 | 0.0 | 0.0 |
| 25 | 4.6 | 11065.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1659.8 | 0.0 | 0.0 |
| 26 | 1.6 | 3582.3 | 0.0 | 0.0 | 0.0 | 0.0 | 537.3 | 0.0 | 0.0 |
| 27 | 3.0 | 6572.5 | 0.0 | 0.0 | 0.0 | 0.0 | 985.9 | 0.0 | 0.0 |
| 28 | 4.5 | 10058.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1508.7 | 0.0 | 0.0 |
| 29 | 4.5 | 9961.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1494.1 | 0.0 | 0.0 |
| 30 | 4.5 | 9801.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1470.2 | 0.0 | 0.0 |
| 31 | 4.4 | 9574.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1436.2 | 0.0 | 0.0 |
| 32 | 4.4 | 9285.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1392.8 | 0.0 | 0.0 |
| 33 | 4.3 | 8938.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1340.7 | 0.0 | 0.0 |
| 34 | 4.2 | 8531.6 | 0.0 | 0.0 | 0.0 | 0.0 | 1279.7 | 0.0 | 0.0 |
| 35 | 4.2 | 8070.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1210.6 | 0.0 | 0.0 |
| 36 | 4.1 | 7561.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1134.3 | 0.0 | 0.0 |
| 37 | 4.1 | 6998.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1049.8 | 0.0 | 0.0 |
| 38 | 4.0 | 6395.9 | 0.0 | 0.0 | 0.0 | 0.0 | 959.4 | 0.0 | 0.0 |
| 39 | 2.8 | 4106.7 | 0.0 | 0.0 | 0.0 | 0.0 | 616.0 | 0.0 | 0.0 |



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 40 | 1.2 | 1604.3 | 0.0 | 0.0 | 0.0 | 0.0 | 240.6 | 0.0 | 0.0 |
| 41 | 0.8 | 1061.5 | 0.0 | 0.0 | 0.0 | 0.0 | 159.2 | 0.0 | 0.0 |
| 42 | 3.1 | 3321.6 | 0.0 | 0.0 | 0.0 | 0.0 | 498.2 | 0.0 | 763.0 |
| 43 | 3.8 | 2845.2 | 0.0 | 0.0 | 0.0 | 0.0 | 426.8 | 0.0 | 953.8 |
| 44 | 3.7 | 1323.5 | 0.0 | 0.0 | 0.0 | 0.0 | 198.5 | 0.0 | 936.7 |
| 45 | 1.4 | 107.9 | 0.0 | 0.0 | 0.0 | 0.0 | 16.2 | 0.0 | 349.0 |

***Table 2 - Base Stress Data on the 45 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -3.22 | 58.36 | 5.00 | 255.36 | 9.55 |
| 2 | -2.02 | 63.35 | 5.00 | 389.05 | 34.27 |
| 3 | -0.80 | 68.35 | 5.00 | 511.74 | 65.62 |
| 4 | 0.41 | 71.93 | 2.15 | 591.60 | 95.37 |
| 5 | 0.41 | 74.43 | 2.85 | 614.92 | 100.70 |
| 6 | 1.62 | 77.93 | 4.15 | 603.83 | 112.78 |
| 7 | 1.62 | 80.42 | 0.85 | 613.71 | 115.37 |
| 8 | 2.82 | 83.35 | 5.00 | 703.27 | 157.01 |
| 9 | 4.03 | 88.34 | 5.00 | 852.67 | 224.40 |
| 10 | 5.23 | 93.32 | 5.00 | 990.94 | 297.97 |
| 11 | 6.45 | 98.29 | 5.00 | 1118.14 | 376.97 |
| 12 | 7.66 | 103.26 | 5.00 | 1234.74 | 459.66 |
| 13 | 8.86 | 108.20 | 5.00 | 1340.85 | 545.47 |
| 14 | 10.07 | 113.13 | 5.00 | 1436.61 | 633.47 |
| 15 | 11.28 | 118.05 | 5.00 | 1522.22 | 722.61 |
| 16 | 12.47 | 122.94 | 5.00 | 1598.09 | 811.30 |
| 17 | 13.70 | 127.81 | 5.00 | 1663.90 | 899.93 |
| 18 | 14.91 | 132.66 | 5.00 | 1720.24 | 986.10 |
| 19 | 16.10 | 137.47 | 5.00 | 1767.39 | 1068.96 |
| 20 | 17.31 | 142.26 | 5.00 | 1805.28 | 1148.35 |
| 21 | 18.53 | 147.02 | 5.00 | 1833.94 | 1223.45 |
| 22 | 19.73 | 149.69 | 0.65 | 1840.03 | 1281.48 |
| 23 | 19.73 | 152.05 | 4.35 | 1790.77 | 1244.58 |
| 24 | 20.94 | 156.43 | 5.00 | 1661.75 | 1195.77 |
| 25 | 22.15 | 161.08 | 5.00 | 1520.57 | 1127.86 |
| 26 | 23.36 | 164.20 | 1.75 | 1418.99 | 1083.78 |
| 27 | 23.36 | 166.49 | 3.25 | 1399.48 | 1067.28 |
| 28 | 24.56 | 170.26 | 5.00 | 1392.95 | 1098.67 |
| 29 | 25.78 | 174.79 | 5.00 | 1380.43 | 1123.91 |
| 30 | 26.99 | 179.26 | 5.00 | 1360.23 | 1140.02 |
| 31 | 28.18 | 183.70 | 5.00 | 1332.69 | 1146.59 |
| 32 | 29.41 | 188.08 | 5.00 | 1297.50 | 1143.98 |
| 33 | 30.60 | 192.41 | 5.00 | 1255.57 | 1130.87 |
| 34 | 31.81 | 196.68 | 5.00 | 1206.51 | 1107.93 |
| 35 | 33.02 | 200.90 | 5.00 | 1150.98 | 1074.45 |
| 36 | 34.22 | 205.07 | 5.00 | 1089.09 | 1030.62 |
| 37 | 35.44 | 209.17 | 5.00 | 1020.81 | 976.54 |
| 38 | 36.64 | 213.21 | 5.00 | 946.85 | 911.99 |
| 39 | 37.85 | 216.61 | 3.52 | 877.95 | 849.66 |
| 40 | 37.85 | 218.58 | 1.48 | 824.89 | 789.34 |
| 41 | 39.06 | 219.58 | 1.07 | 768.47 | 737.19 |
| 42 | 39.06 | 221.53 | 3.93 | 798.80 | 750.83 |
| 43 | 40.27 | 224.96 | 5.00 | 621.18 | 555.14 |
| 44 | 41.47 | 228.74 | 5.00 | 423.12 | 328.82 |
| 45 | 42.70 | 231.31 | 1.90 | 285.42 | 169.36 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 222811.59 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 1161.08(psf)

Sum of the Driving Forces = 144681.75 (lbs)

Average Mobilized Shear Stress = 753.94(psf)

Total length of the failure surface = 191.90(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***

(Note: kv is set = zero for displacement calculations)

Seismic Yield Coefficient (ky) = 0.3854(g)

Calculated Newmark Seismic Displacement = 0.002(ft)

Non-Symmetrical Sliding Resistance Has Been Specified

 for Downhill Sliding.
              **** END OF GSTABL7 OUTPUT ****

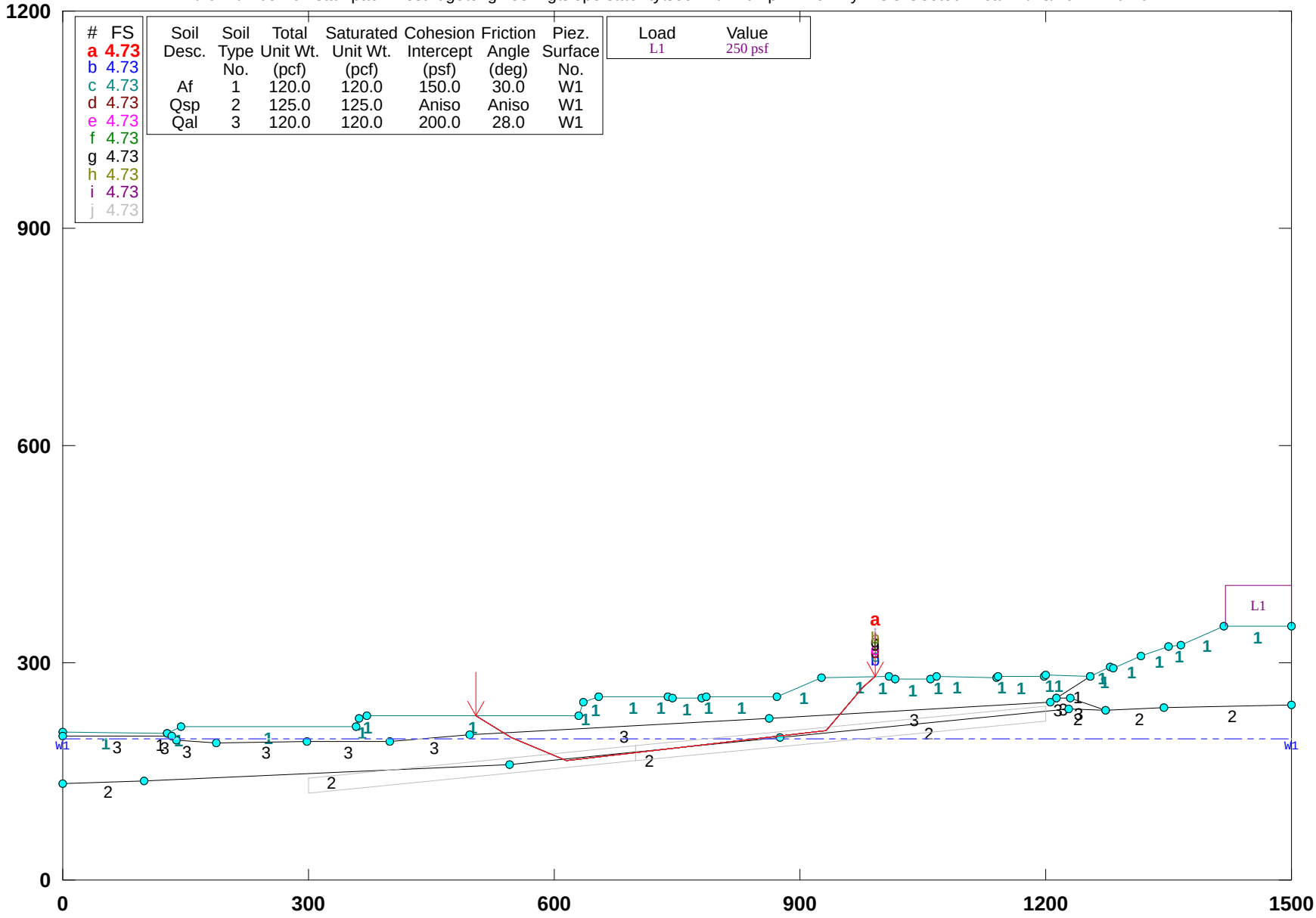
# Westridge/14057-01/Sec 12-12"/ Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12tlx.pl2  Run By: LGC Geotechnical  4/13/2017  10:26AM

| # | FS |
|---|---|
| a | 4.73 |
| b | 4.73 |
| c | 4.73 |
| d | 4.73 |
| e | 4.73 |
| f | 4.73 |
| g | 4.73 |
| h | 4.73 |
| i | 4.73 |
| j | 4.73 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |

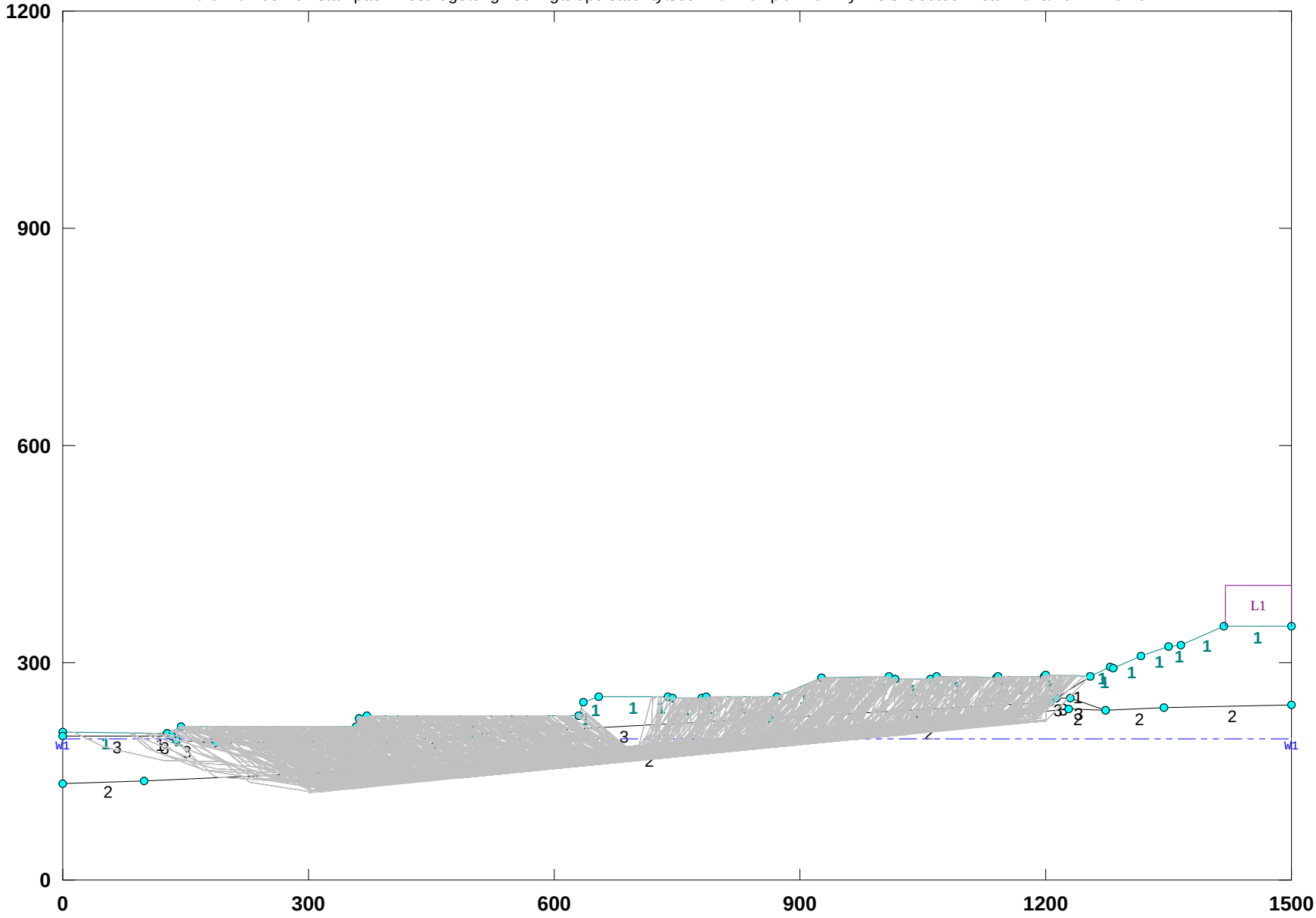



**GSTABL7 v.2  FSmin=4.73**

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

# Westridge/14057-01/Sec 12-12"/ Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12tlx.plt  Run By: LGC Geotechnical  4/13/2017  10:26AM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
(All Rights Reserved-Unauthorized Use Prohibited)

**********

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

**********

Analysis Run Date:  4/13/2017
Time of Run:  10:26AM
Run By:  LGC Geotechnical
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tlx.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tlx.OUT
Unit System:  English
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tlx.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 12-12"/ Entire Length / Static

BOUNDARY COORDINATES
30 Top Boundaries
50 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 204.00 | 128.00 | 203.00 | 1 |
| 2 | 128.00 | 203.00 | 145.00 | 212.00 | 1 |
| 3 | 145.00 | 212.00 | 358.00 | 211.00 | 1 |
| 4 | 358.00 | 211.00 | 361.00 | 224.00 | 1 |
| 5 | 361.00 | 224.00 | 371.00 | 226.00 | 1 |
| 6 | 371.00 | 226.00 | 630.00 | 226.00 | 1 |
| 7 | 630.00 | 226.00 | 635.00 | 245.00 | 1 |
| 8 | 635.00 | 245.00 | 655.00 | 254.00 | 1 |
| 9 | 655.00 | 254.00 | 738.00 | 254.00 | 1 |
| 10 | 738.00 | 254.00 | 744.00 | 251.00 | 1 |
| 11 | 744.00 | 251.00 | 780.00 | 251.00 | 1 |
| 12 | 780.00 | 251.00 | 786.00 | 253.00 | 1 |
| 13 | 786.00 | 253.00 | 872.00 | 253.00 | 1 |
| 14 | 872.00 | 253.00 | 926.00 | 279.00 | 1 |
| 15 | 926.00 | 279.00 | 1009.00 | 281.00 | 1 |
| 16 | 1009.00 | 281.00 | 1016.00 | 278.00 | 1 |
| 17 | 1016.00 | 278.00 | 1059.00 | 278.00 | 1 |
| 18 | 1059.00 | 278.00 | 1067.00 | 281.00 | 1 |
| 19 | 1067.00 | 281.00 | 1140.00 | 280.00 | 1 |
| 20 | 1140.00 | 280.00 | 1141.00 | 281.00 | 1 |
| 21 | 1141.00 | 281.00 | 1199.00 | 282.00 | 1 |
| 22 | 1199.00 | 282.00 | 1200.00 | 283.00 | 1 |
| 23 | 1200.00 | 283.00 | 1255.00 | 282.00 | 1 |
| 24 | 1255.00 | 282.00 | 1279.00 | 294.00 | 1 |
| 25 | 1279.00 | 294.00 | 1282.00 | 293.00 | 1 |
| 26 | 1282.00 | 293.00 | 1316.00 | 310.00 | 1 |
| 27 | 1316.00 | 310.00 | 1350.00 | 323.00 | 1 |
| 28 | 1350.00 | 323.00 | 1365.00 | 325.00 | 1 |
| 29 | 1365.00 | 325.00 | 1417.00 | 350.00 | 1 |
| 30 | 1417.00 | 350.00 | 1500.00 | 350.00 | 1 |
| 31 | 128.00 | 203.00 | 133.00 | 199.00 | 1 |
| 32 | 133.00 | 199.00 | 138.00 | 194.00 | 3 |
| 33 | 138.00 | 194.00 | 187.00 | 190.00 | 3 |
| 34 | 187.00 | 190.00 | 298.00 | 191.00 | 3 |
| 35 | 298.00 | 191.00 | 400.00 | 192.00 | 3 |
| 36 | 400.00 | 192.00 | 496.00 | 200.00 | 3 |
| 37 | 496.00 | 200.00 | 862.00 | 224.00 | 3 |
| 38 | 862.00 | 224.00 | 1205.00 | 246.00 | 3 |
| 39 | 1205.00 | 246.00 | 1213.00 | 252.00 | 3 |
| 40 | 1213.00 | 252.00 | 1255.00 | 282.00 | 1 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 0.00 | 199.00 | 133.00 | 199.00 | 3 |
| 42 | 1213.00 | 252.00 | 1230.00 | 252.00 | 3 |
| 43 | 1230.00 | 252.00 | 1273.00 | 235.00 | 3 |
| 44 | 0.00 | 134.00 | 100.00 | 137.00 | 2 |
| 45 | 100.00 | 137.00 | 546.00 | 160.00 | 2 |
| 46 | 546.00 | 160.00 | 875.00 | 197.00 | 2 |
| 47 | 875.00 | 197.00 | 1228.00 | 237.00 | 2 |
| 48 | 1228.00 | 237.00 | 1273.00 | 235.00 | 2 |
| 49 | 1273.00 | 235.00 | 1345.00 | 238.00 | 2 |
| 50 | 1345.00 | 238.00 | 1500.00 | 242.00 | 2 |

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

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1500.00 | 195.00 |

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1420.00 | 1500.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is  75.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 300.00 | 130.00 | 700.00 | 175.00 | 20.00 |
| 2 | 700.10 | 175.00 | 1200.00 | 230.00 | 20.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted =  5000

Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 43.711 FS Min = 4.734 FS Ave = 7.258
Standard Deviation = 2.538 Coefficient of Variation = 34.97 %
Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Individual data on the 21 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.6 | 46928.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 9.1 | 28783.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 3.3 | 11810.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 61.7 | 331948.3 | 0.0 | 58233.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 3.5 | 24761.4 | 0.0 | 6734.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 14.7 | 104532.7 | 0.0 | 26074.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 5.0 | 40518.2 | 0.0 | 8479.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 20.0 | 191835.9 | 0.0 | 31916.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 83.0 | 775335.6 | 0.0 | 98228.2 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 6.0 | 50870.5 | 0.0 | 4963.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 2.4 | 19893.1 | 0.0 | 1917.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 33.6 | 267289.0 | 0.0 | 21808.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 6.0 | 46659.2 | 0.0 | 2945.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 58.3 | 431858.2 | 0.0 | 13614.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 17.7 | 120685.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 10.0 | 66135.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 54.0 | 414978.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 5.8 | 51323.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 17.9 | 132334.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 27.6 | 106631.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 13.9 | 12083.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |



| | | |
|---|---|---|
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Factor of Safety
*** 4.734 ***

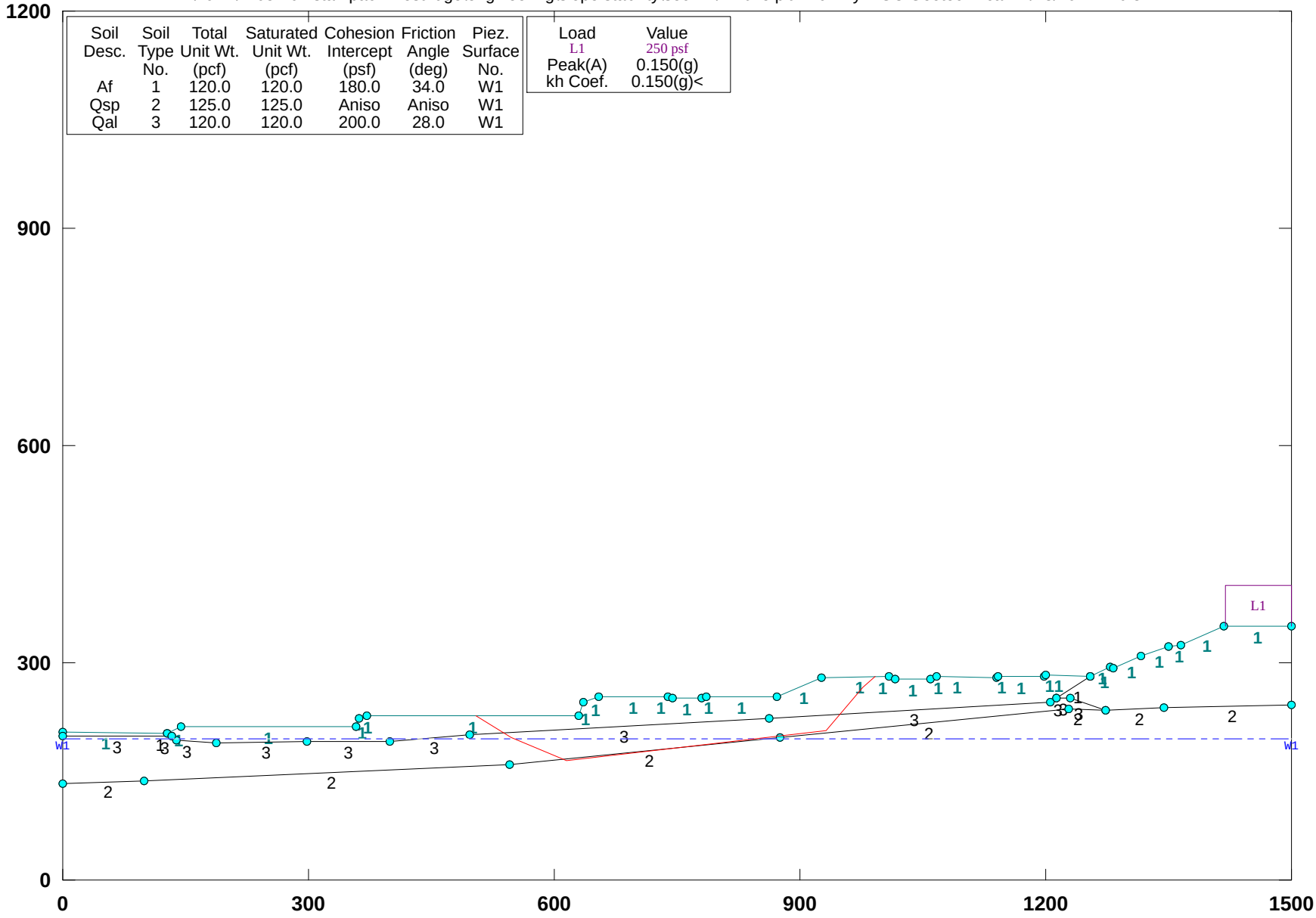
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 12-12"/ Entire Length / Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12tlxe.plt Run By: LGC Geotechnical 4/13/2017 10:31AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=2.22**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/13/2017
Time of Run: 10:31AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tlxe.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tlxe.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tlxe.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12-12"/ Entire Length / Seismic

BOUNDARY COORDINATES
30 Top Boundaries
50 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 204.00 | 128.00 | 203.00 | 1 |
| 2 | 128.00 | 203.00 | 145.00 | 212.00 | 1 |
| 3 | 145.00 | 212.00 | 358.00 | 211.00 | 1 |
| 4 | 358.00 | 211.00 | 361.00 | 224.00 | 1 |
| 5 | 361.00 | 224.00 | 371.00 | 226.00 | 1 |
| 6 | 371.00 | 226.00 | 630.00 | 226.00 | 1 |
| 7 | 630.00 | 226.00 | 635.00 | 245.00 | 1 |
| 8 | 635.00 | 245.00 | 655.00 | 254.00 | 1 |
| 9 | 655.00 | 254.00 | 738.00 | 254.00 | 1 |
| 10 | 738.00 | 254.00 | 744.00 | 251.00 | 1 |
| 11 | 744.00 | 251.00 | 780.00 | 251.00 | 1 |
| 12 | 780.00 | 251.00 | 786.00 | 253.00 | 1 |
| 13 | 786.00 | 253.00 | 872.00 | 253.00 | 1 |
| 14 | 872.00 | 253.00 | 926.00 | 279.00 | 1 |
| 15 | 926.00 | 279.00 | 1009.00 | 281.00 | 1 |
| 16 | 1009.00 | 281.00 | 1016.00 | 278.00 | 1 |
| 17 | 1016.00 | 278.00 | 1059.00 | 278.00 | 1 |
| 18 | 1059.00 | 278.00 | 1067.00 | 281.00 | 1 |
| 19 | 1067.00 | 281.00 | 1140.00 | 280.00 | 1 |
| 20 | 1140.00 | 280.00 | 1141.00 | 281.00 | 1 |
| 21 | 1141.00 | 281.00 | 1199.00 | 282.00 | 1 |
| 22 | 1199.00 | 282.00 | 1200.00 | 283.00 | 1 |
| 23 | 1200.00 | 283.00 | 1255.00 | 282.00 | 1 |
| 24 | 1255.00 | 282.00 | 1279.00 | 294.00 | 1 |
| 25 | 1279.00 | 294.00 | 1282.00 | 293.00 | 1 |
| 26 | 1282.00 | 293.00 | 1316.00 | 310.00 | 1 |
| 27 | 1316.00 | 310.00 | 1350.00 | 323.00 | 1 |
| 28 | 1350.00 | 323.00 | 1365.00 | 325.00 | 1 |
| 29 | 1365.00 | 325.00 | 1417.00 | 350.00 | 1 |
| 30 | 1417.00 | 350.00 | 1500.00 | 350.00 | 1 |
| 31 | 128.00 | 203.00 | 133.00 | 199.00 | 1 |
| 32 | 133.00 | 199.00 | 138.00 | 194.00 | 3 |
| 33 | 138.00 | 194.00 | 187.00 | 190.00 | 3 |
| 34 | 187.00 | 190.00 | 298.00 | 191.00 | 3 |
| 35 | 298.00 | 191.00 | 400.00 | 192.00 | 3 |
| 36 | 400.00 | 192.00 | 496.00 | 200.00 | 3 |
| 37 | 496.00 | 200.00 | 862.00 | 224.00 | 3 |
| 38 | 862.00 | 224.00 | 1205.00 | 246.00 | 3 |
| 39 | 1205.00 | 246.00 | 1213.00 | 252.00 | 3 |
| 40 | 1213.00 | 252.00 | 1255.00 | 282.00 | 1 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 0.00 | 199.00 | 133.00 | 199.00 | 3 |
| 42 | 1213.00 | 252.00 | 1230.00 | 252.00 | 3 |
| 43 | 1230.00 | 252.00 | 1273.00 | 235.00 | 3 |
| 44 | 0.00 | 134.00 | 100.00 | 137.00 | 2 |
| 45 | 100.00 | 137.00 | 546.00 | 160.00 | 2 |
| 46 | 546.00 | 160.00 | 875.00 | 197.00 | 2 |
| 47 | 875.00 | 197.00 | 1228.00 | 237.00 | 2 |
| 48 | 1228.00 | 237.00 | 1273.00 | 235.00 | 2 |
| 49 | 1273.00 | 235.00 | 1345.00 | 238.00 | 2 |
| 50 | 1345.00 | 238.00 | 1500.00 | 242.00 | 2 |

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

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 500.00 | 34.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1500.00 | 195.00 |

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1420.00 | 1500.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 504.127 | 226.000 |
| 2 | 546.834 | 196.453 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 977.355 | 265.745 |
| 6 | 991.252 | 280.572 |

Janbu's Empirical Coefficient (fo) = 1.058
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 2.218

***Table 1 - Individual Data on the 21 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.6 | 46929.2 | 0.0 | 0.0 | 0.0 | 0.0 | 7039.4 | 0.0 | 0.0 |
| 2 | 9.1 | 28782.7 | 0.0 | 0.0 | 0.0 | 0.0 | 4317.4 | 0.0 | 0.0 |
| 3 | 3.3 | 11811.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1771.7 | 0.0 | 0.0 |
| 4 | 61.7 | 331953.1 | 0.0 | 58234.2 | 0.0 | 0.0 | 49793.0 | 0.0 | 0.0 |
| 5 | 3.5 | 24758.7 | 0.0 | 6734.2 | 0.0 | 0.0 | 3713.8 | 0.0 | 0.0 |
| 6 | 14.7 | 104529.7 | 0.0 | 26073.8 | 0.0 | 0.0 | 15679.5 | 0.0 | 0.0 |
| 7 | 5.0 | 40518.1 | 0.0 | 8479.3 | 0.0 | 0.0 | 6077.7 | 0.0 | 0.0 |
| 8 | 20.0 | 191835.5 | 0.0 | 31915.7 | 0.0 | 0.0 | 28775.3 | 0.0 | 0.0 |
| 9 | 83.0 | 775334.6 | 0.0 | 98227.7 | 0.0 | 0.0 | ******* | 0.0 | 0.0 |
| 10 | 6.0 | 50870.5 | 0.0 | 4963.1 | 0.0 | 0.0 | 7630.6 | 0.0 | 0.0 |
| 11 | 2.4 | 19884.1 | 0.0 | 1916.2 | 0.0 | 0.0 | 2982.6 | 0.0 | 0.0 |
| 12 | 33.6 | 267298.1 | 0.0 | 21809.8 | 0.0 | 0.0 | 40094.7 | 0.0 | 0.0 |
| 13 | 6.0 | 46659.2 | 0.0 | 2945.6 | 0.0 | 0.0 | 6998.9 | 0.0 | 0.0 |
| 14 | 58.3 | 431866.0 | 0.0 | 13614.6 | 0.0 | 0.0 | 64779.9 | 0.0 | 0.0 |
| 15 | 17.7 | 120678.7 | 0.0 | 0.0 | 0.0 | 0.0 | 18101.8 | 0.0 | 0.0 |
| 16 | 10.0 | 66135.7 | 0.0 | 0.0 | 0.0 | 0.0 | 9920.4 | 0.0 | 0.0 |
| 17 | 54.0 | 414980.3 | 0.0 | 0.0 | 0.0 | 0.0 | 62247.1 | 0.0 | 0.0 |
| 18 | 5.8 | 51326.7 | 0.0 | 0.0 | 0.0 | 0.0 | 7699.0 | 0.0 | 0.0 |
| 19 | 17.9 | 132333.9 | 0.0 | 0.0 | 0.0 | 0.0 | 19850.1 | 0.0 | 0.0 |
| 20 | 27.6 | 106629.5 | 0.0 | 0.0 | 0.0 | 0.0 | 15994.4 | 0.0 | 0.0 |
| 21 | 13.9 | 12084.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1812.6 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 21 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -34.68 | 520.94 | 40.89 | 1726.97 | -621.94 |
| 2 | -34.68 | 542.29 | 11.05 | 2747.48 | -1411.92 |
| 3 | -24.08 | 548.46 | 3.56 | 2614.88 | -984.72 |
| 4 | -24.08 | 580.96 | 67.64 | 3190.14 | -1457.17 |
| 5 | -24.08 | 613.57 | 3.80 | 5215.69 | -1932.54 |
| 6 | 7.25 | 622.65 | 14.81 | 2867.90 | 1956.97 |
| 7 | 7.25 | 632.50 | 5.04 | 3400.43 | 2228.98 |
| 8 | 7.25 | 645.00 | 20.16 | 4192.63 | 2638.31 |
| 9 | 7.25 | 696.50 | 83.67 | 4271.79 | 2569.43 |
| 10 | 7.25 | 741.00 | 6.05 | 4017.51 | 2332.07 |
| 11 | 7.25 | 745.21 | 2.43 | 3912.13 | 2264.80 |
| 12 | 7.25 | 763.21 | 33.86 | 4000.22 | 2189.15 |
| 13 | 7.25 | 783.00 | 6.05 | 3987.16 | 2139.01 |
| 14 | 7.25 | 815.16 | 58.79 | 3926.95 | 2036.91 |
| 15 | 7.25 | 853.16 | 17.82 | 3745.52 | 1877.27 |
| 16 | 7.25 | 867.00 | 10.08 | 3635.57 | 1819.12 |
| 17 | 7.25 | 899.00 | 54.44 | 4192.76 | 2113.78 |
| 18 | 7.25 | 928.92 | 5.88 | 4770.88 | 2419.51 |
| 19 | 52.63 | 940.80 | 29.56 | 5169.42 | 6534.19 |
| 20 | 52.63 | 963.56 | 45.44 | 3285.14 | 3424.58 |
| 21 | 46.85 | 984.30 | 20.32 | 846.33 | 723.64 |

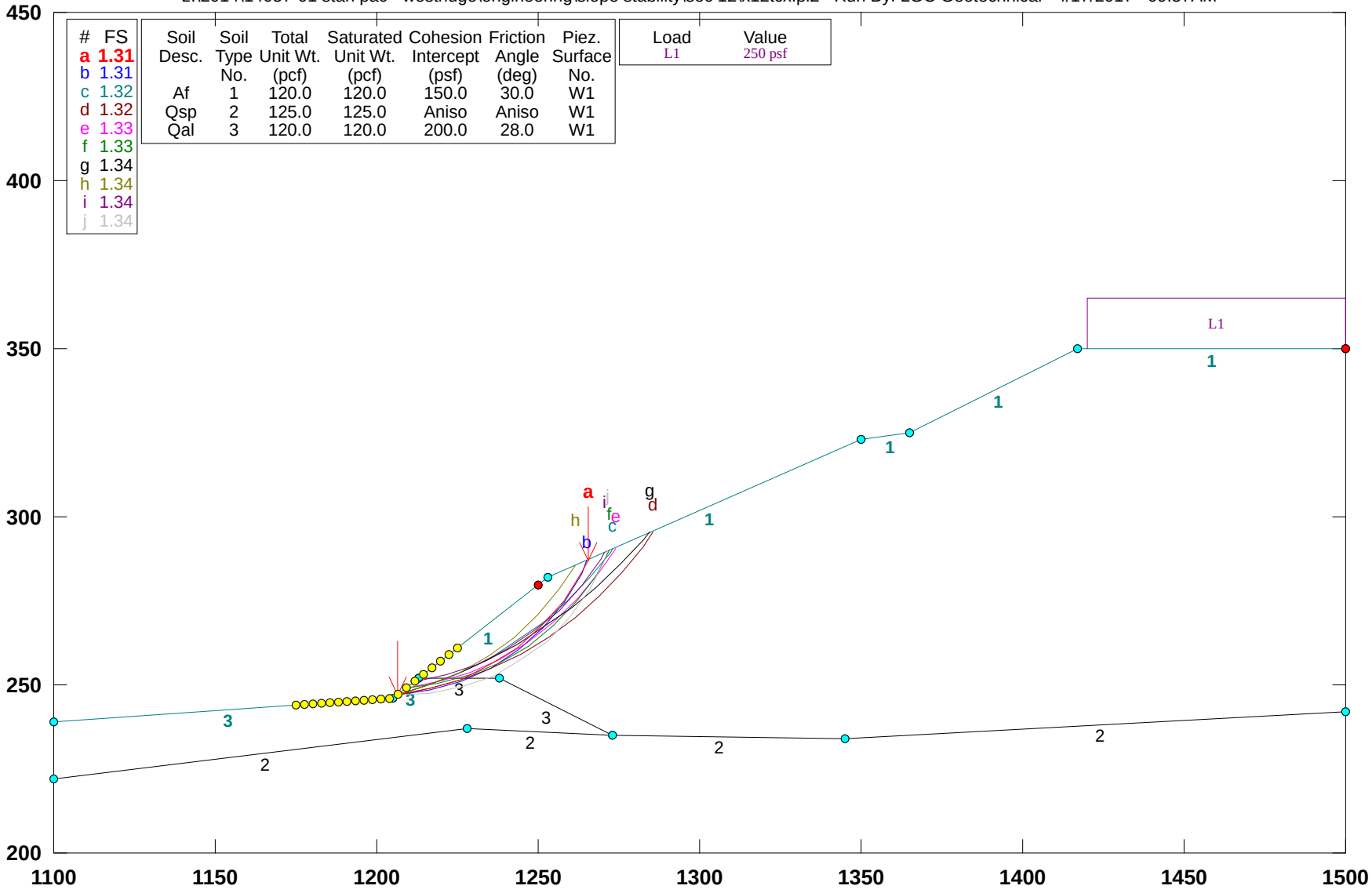
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 1946907.62 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 3596.50(psf)
Sum of the Driving Forces = 928930.69 (lbs)
Average Mobilized Shear Stress = 1716.00(psf)
Total length of the failure surface = 541.33(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.4860(g)
Calculated Newmark Seismic Displacement = 0.001(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 12'-12" / Temp. Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12tcx.pl2  Run By: LGC Geotechnical  4/17/2017  09:57AM




**GSTABL7 v.2  FSmin=1.31**

**Safety Factors Are Calculated By The Modified Bishop Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 09:57AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tcx.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tcx.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 12\x12tcx.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12'-12" / Temp.
Backcut Analysis

BOUNDARY COORDINATES
7 Top Boundaries
13 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 1100.00 | 239.00 | 1205.00 | 246.00 | 3 |
| 2 | 1205.00 | 246.00 | 1213.00 | 252.00 | 3 |
| 3 | 1213.00 | 252.00 | 1253.10 | 282.00 | 1 |
| 4 | 1253.10 | 282.00 | 1350.00 | 323.00 | 1 |
| 5 | 1350.00 | 323.00 | 1365.00 | 325.00 | 1 |
| 6 | 1365.00 | 325.00 | 1417.00 | 350.00 | 1 |
| 7 | 1417.00 | 350.00 | 1500.00 | 350.00 | 1 |
| 8 | 1213.00 | 252.00 | 1238.00 | 252.00 | 3 |
| 9 | 1238.00 | 252.00 | 1273.00 | 235.00 | 3 |
| 10 | 1273.00 | 235.00 | 1345.00 | 234.00 | 2 |
| 11 | 1345.00 | 234.00 | 1500.00 | 242.00 | 2 |
| 12 | 1100.00 | 222.00 | 1228.00 | 237.00 | 2 |
| 13 | 1228.00 | 237.00 | 1273.00 | 235.00 | 2 |

User Specified Y-Origin = 200.00(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 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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



C equal to zero, with water weight in the tension crack.

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1420.00 | 1500.00 | 250.0 | 0.0 |

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

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
250 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X =1175.00(ft)
and X =1225.00(ft)
Each Surface Terminates Between X =1250.00(ft)
and X =1500.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
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 = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 3.666 FS Min = 1.306 FS Ave = 2.338
Standard Deviation = 0.622 Coefficient of Variation = 26.61 %
Failure Surface Specified By 9 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.453 | 248.769 |
| 3 | 1226.020 | 251.679 |
| 4 | 1235.104 | 255.860 |
| 5 | 1243.536 | 261.236 |
| 6 | 1251.161 | 267.706 |
| 7 | 1257.836 | 275.152 |
| 8 | 1263.440 | 283.434 |
| 9 | 1265.276 | 287.152 |

Circle Center At X = 1199.896 ; Y = 320.388 ; and Radius = 73.508
Factor of Safety
*** 1.306 ***
Individual data on the 11 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.4 | 1458.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 3.5 | 1988.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.6 | 9113.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 0.7 | 851.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 8.4 | 11541.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 8.4 | 13298.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 7.6 | 12101.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 1.9 | 2905.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 4.7 | 5963.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 5.6 | 3965.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 1.8 | 323.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 9 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.505 | 248.402 |
| 3 | 1226.146 | 251.057 |
| 4 | 1235.296 | 255.091 |
| 5 | 1243.759 | 260.417 |
| 6 | 1251.354 | 266.923 |
| 7 | 1257.917 | 274.468 |
| 8 | 1263.308 | 282.890 |

| | | |
|---|---|---|
| 9 | 1265.214 | 287.126 |

Circle Center At X = 1203.245 ; Y = 315.400 ; and Radius = 68.297

Factor of Safety

*** 1.312 ***

Failure Surface Specified By 10 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.206 | 249.890 |
| 3 | 1225.567 | 253.407 |
| 4 | 1234.594 | 257.711 |
| 5 | 1243.221 | 262.768 |
| 6 | 1251.384 | 268.543 |
| 7 | 1259.026 | 274.994 |
| 8 | 1266.089 | 282.073 |
| 9 | 1272.522 | 289.729 |
| 10 | 1273.013 | 290.425 |

Circle Center At X = 1179.846 ; Y = 360.909 ; and Radius = 116.824

Factor of Safety

*** 1.318 ***

Failure Surface Specified By 11 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.430 | 248.905 |
| 3 | 1226.091 | 251.487 |
| 4 | 1235.487 | 254.910 |
| 5 | 1244.544 | 259.148 |
| 6 | 1253.193 | 264.168 |
| 7 | 1261.365 | 269.931 |
| 8 | 1268.998 | 276.392 |
| 9 | 1276.032 | 283.500 |
| 10 | 1282.412 | 291.200 |
| 11 | 1285.529 | 295.721 |

Circle Center At X = 1192.021 ; Y = 359.597 ; and Radius = 113.351

Factor of Safety

*** 1.320 ***

Failure Surface Specified By 9 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1209.211 | 249.158 |
| 2 | 1219.061 | 250.884 |
| 3 | 1228.648 | 253.726 |
| 4 | 1237.848 | 257.647 |
| 5 | 1246.538 | 262.595 |
| 6 | 1254.604 | 268.505 |
| 7 | 1261.941 | 275.300 |
| 8 | 1268.453 | 282.889 |
| 9 | 1273.759 | 290.741 |

Circle Center At X = 1199.107 ; Y = 335.792 ; and Radius = 87.221

Factor of Safety

*** 1.325 ***

Failure Surface Specified By 9 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1209.211 | 249.158 |
| 2 | 1219.137 | 250.371 |
| 3 | 1228.815 | 252.886 |
| 4 | 1238.076 | 256.659 |
| 5 | 1246.757 | 261.623 |
| 6 | 1254.705 | 267.692 |
| 7 | 1261.780 | 274.759 |
| 8 | 1267.858 | 282.700 |
| 9 | 1272.057 | 290.021 |

Circle Center At X = 1205.045 ; Y = 324.486 ; and Radius = 75.443

Factor of Safety

*** 1.332 ***

Failure Surface Specified By 11 Coordinate Points

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



| | | |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.164 | 250.036 |
| 3 | 1225.548 | 253.490 |
| 4 | 1234.695 | 257.533 |
| 5 | 1243.566 | 262.148 |
| 6 | 1252.127 | 267.317 |
| 7 | 1260.342 | 273.019 |
| 8 | 1268.179 | 279.231 |
| 9 | 1275.605 | 285.927 |
| 10 | 1282.592 | 293.082 |
| 11 | 1284.480 | 295.277 |

Circle Center At X = 1166.484 ; Y = 399.482 ; and Radius = 157.488

Factor of Safety

*** 1.335 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.225 | 249.823 |
| 3 | 1225.499 | 253.563 |
| 4 | 1234.277 | 258.354 |
| 5 | 1242.439 | 264.131 |
| 6 | 1249.876 | 270.816 |
| 7 | 1256.487 | 278.319 |
| 8 | 1261.502 | 285.555 |

Circle Center At X = 1188.870 ; Y = 331.027 ; and Radius = 85.692

Factor of Safety

*** 1.336 ***

Failure Surface Specified By 9 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1211.842 | 251.132 |
| 2 | 1221.650 | 253.082 |
| 3 | 1231.148 | 256.212 |
| 4 | 1240.194 | 260.475 |
| 5 | 1248.653 | 265.808 |
| 6 | 1256.400 | 272.131 |
| 7 | 1263.320 | 279.350 |
| 8 | 1269.310 | 287.358 |
| 9 | 1270.444 | 289.339 |

Circle Center At X = 1200.786 ; Y = 332.367 ; and Radius = 81.984

Factor of Safety

*** 1.336 ***

Failure Surface Specified By 10 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.573 | 247.543 |
| 3 | 1226.402 | 249.383 |
| 4 | 1235.849 | 252.661 |
| 5 | 1244.705 | 257.307 |
| 6 | 1252.772 | 263.216 |
| 7 | 1259.872 | 270.258 |
| 8 | 1265.847 | 278.277 |
| 9 | 1270.565 | 287.094 |
| 10 | 1271.528 | 289.797 |

Circle Center At X = 1209.280 ; Y = 313.871 ; and Radius = 66.742

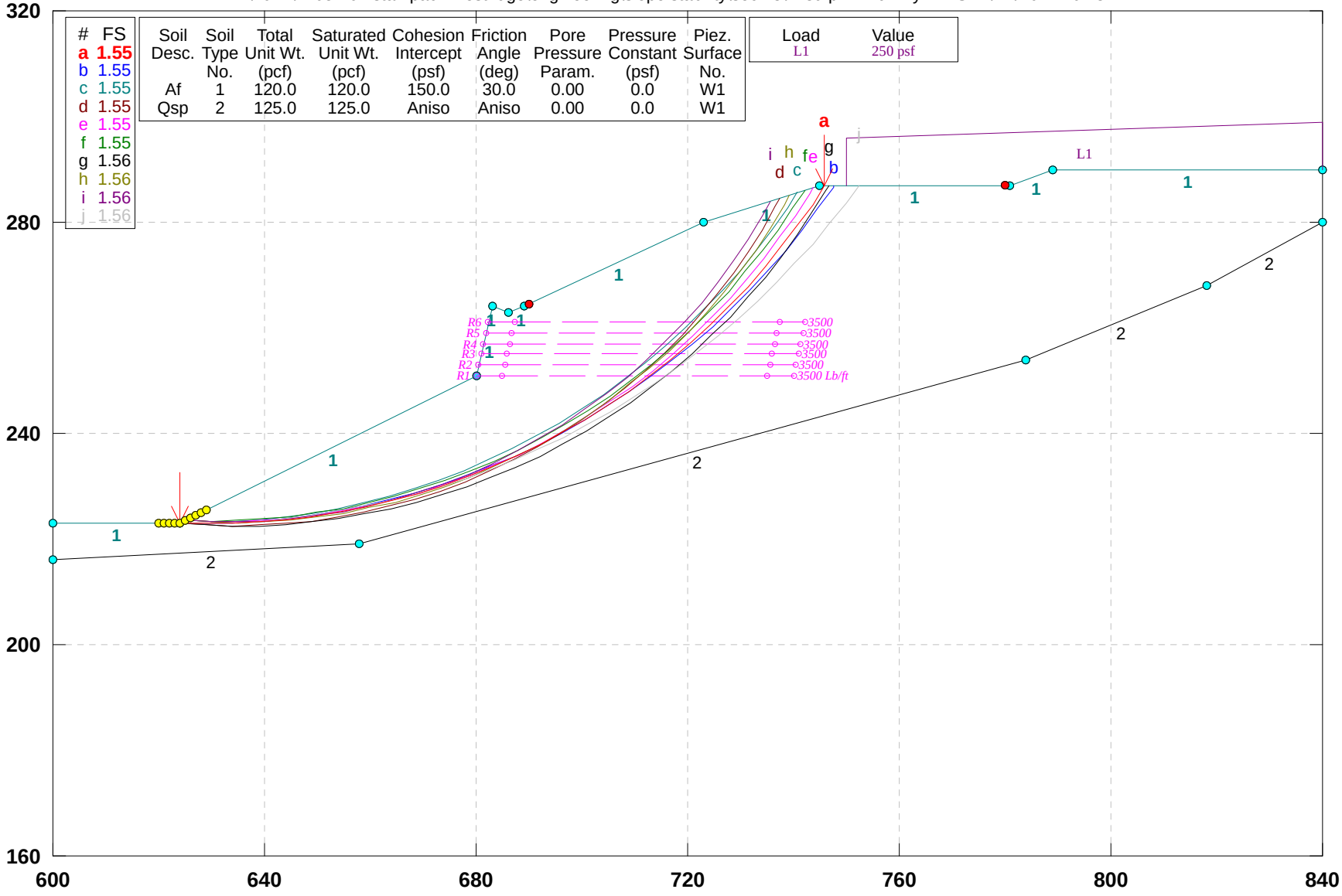
Factor of Safety

*** 1.339 ***

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

# Westridge/14057-01/Sec 13-13'/ MSE Wall - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13d.pl2 Run By: KMS 4/14/2017 02:32PM




**GSTABL7 v.2 FSmin=1.55**

**Safety Factors Are Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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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: 4/14/2017
Time of Run: 02:32PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13d.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13d.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13d.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 13-13'/
MSE Wall - Static

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 223.00 | 624.00 | 223.00 | 1 |
| 2 | 624.00 | 223.00 | 680.00 | 251.00 | 1 |
| 3 | 680.00 | 251.00 | 683.00 | 264.00 | 1 |
| 4 | 683.00 | 264.00 | 686.00 | 263.00 | 1 |
| 5 | 686.00 | 263.00 | 689.00 | 264.00 | 1 |
| 6 | 689.00 | 264.00 | 723.00 | 280.00 | 1 |
| 7 | 723.00 | 280.00 | 745.00 | 287.00 | 1 |
| 8 | 745.00 | 287.00 | 781.00 | 287.00 | 1 |
| 9 | 781.00 | 287.00 | 789.00 | 290.00 | 1 |
| 10 | 789.00 | 290.00 | 840.00 | 290.00 | 1 |
| 11 | 600.00 | 216.00 | 658.00 | 219.00 | 2 |
| 12 | 658.00 | 219.00 | 784.00 | 254.00 | 2 |
| 13 | 784.00 | 254.00 | 818.00 | 268.00 | 2 |
| 14 | 818.00 | 268.00 | 840.00 | 280.00 | 2 |

User Specified Y-Origin = 160.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 0.0 | 0.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type  2 Is Anisotropic

Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 750.00 | 840.00 | 250.0 | 0.0 |

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

1

REINFORCING LAYER(S)

6 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO.  1

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.00 | 251.00 | 0.00 | 0.000 |
| 2 | 685.00 | 251.00 | 3500.00 | 0.000 |
| 3 | 735.00 | 251.00 | 3500.00 | 0.000 |
| 4 | 740.00 | 251.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  2

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.46 | 253.00 | 0.00 | 0.000 |
| 2 | 685.46 | 253.00 | 3500.00 | 0.000 |
| 3 | 735.46 | 253.00 | 3500.00 | 0.000 |
| 4 | 740.46 | 253.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  3

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.92 | 255.00 | 0.00 | 0.000 |
| 2 | 685.92 | 255.00 | 3500.00 | 0.000 |
| 3 | 735.92 | 255.00 | 3500.00 | 0.000 |
| 4 | 740.92 | 255.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  4

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.38 | 257.00 | 0.00 | 0.000 |
| 2 | 686.38 | 257.00 | 3500.00 | 0.000 |
| 3 | 736.38 | 257.00 | 3500.00 | 0.000 |
| 4 | 741.38 | 257.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  5

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.85 | 259.00 | 0.00 | 0.000 |
| 2 | 686.85 | 259.00 | 3500.00 | 0.000 |
| 3 | 736.85 | 259.00 | 3500.00 | 0.000 |
| 4 | 741.85 | 259.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 6

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 682.31 | 261.00 | 0.00 | 0.000 |
| 2 | 687.31 | 261.00 | 3500.00 | 0.000 |
| 3 | 737.31 | 261.00 | 3500.00 | 0.000 |
| 4 | 742.31 | 261.00 | 0.00 | 0.000 |

1

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

5000 Trial Surfaces Have Been Generated.

500 Surface(s) Initiate(s) From Each Of 10 Points Equally Spaced
Along The Ground Surface Between X = 620.00(ft)
and X = 629.00(ft)

Each Surface Terminates Between X = 690.00(ft)
and X = 780.00(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 = 5000

Number of Trial Surfaces With Valid FS = 5000

Statistical Data On All Valid FS Values:
FS Max = 2.943 FS Min = 1.551 FS Ave = 2.195
Standard Deviation = 0.416 Coefficient of Variation = 18.97 %

Failure Surface Specified By 30 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.000 | 223.000 |
| 2 | 628.999 | 222.884 |
| 3 | 633.998 | 222.950 |
| 4 | 638.992 | 223.198 |
| 5 | 643.974 | 223.627 |
| 6 | 648.936 | 224.237 |
| 7 | 653.873 | 225.027 |
| 8 | 658.779 | 225.997 |
| 9 | 663.645 | 227.144 |
| 10 | 668.467 | 228.467 |
| 11 | 673.237 | 229.964 |
| 12 | 677.950 | 231.635 |
| 13 | 682.599 | 233.475 |
| 14 | 687.178 | 235.483 |
| 15 | 691.681 | 237.657 |
| 16 | 696.102 | 239.993 |
| 17 | 700.435 | 242.488 |
| 18 | 704.674 | 245.139 |
| 19 | 708.815 | 247.942 |
| 20 | 712.850 | 250.894 |
| 21 | 716.776 | 253.991 |
| 22 | 720.586 | 257.229 |
| 23 | 724.276 | 260.603 |
| 24 | 727.841 | 264.109 |
| 25 | 731.276 | 267.742 |
| 26 | 734.576 | 271.498 |
| 27 | 737.738 | 275.371 |
| 28 | 740.757 | 279.357 |
| 29 | 743.629 | 283.450 |
| 30 | 745.932 | 287.000 |

Circle Center At X = 629.693 ; Y = 360.304 ; and Radius = 137.422

Factor of Safety
*** 1.551 ***

Individual data on the 35 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 | 784.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 5.0 | 2299.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 5.0 | 3699.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 5.0 | 4978.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 5.0 | 6131.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 4.9 | 7151.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 4.9 | 8035.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 4.9 | 8781.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 4.8 | 9386.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 4.8 | 9852.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 4.7 | 10178.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 2.0 | 4537.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 2.6 | 7383.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 0.4 | 1422.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 3.0 | 10508.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 1.2 | 3954.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 1.8 | 6071.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 2.7 | 8886.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 4.4 | 14576.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 4.3 | 14102.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 4.2 | 13514.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 22 | 4.1 | 12823.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 23 | 4.0 | 12036.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 24 | 3.9 | 11166.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 25 | 3.8 | 10222.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 26 | 2.4 | 6112.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 27 | 1.3 | 3089.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 28 | 3.6 | 7964.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 29 | 3.4 | 6661.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 30 | 3.3 | 5362.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 31 | 3.2 | 4079.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 32 | 3.0 | 2827.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 33 | 2.9 | 1620.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 34 | 1.4 | 374.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 35 | 0.9 | 80.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 31 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.000 | 223.000 |
| 2 | 629.000 | 222.947 |
| 3 | 633.998 | 223.068 |
| 4 | 638.990 | 223.363 |
| 5 | 643.968 | 223.830 |
| 6 | 648.926 | 224.471 |
| 7 | 653.860 | 225.283 |
| 8 | 658.762 | 226.266 |
| 9 | 663.628 | 227.419 |

| | | |
|---|---|---|
| 10 | 668.450 | 228.741 |
| 11 | 673.223 | 230.229 |
| 12 | 677.942 | 231.882 |
| 13 | 682.601 | 233.698 |
| 14 | 687.193 | 235.675 |
| 15 | 691.714 | 237.810 |
| 16 | 696.158 | 240.102 |
| 17 | 700.520 | 242.546 |
| 18 | 704.795 | 245.140 |
| 19 | 708.976 | 247.881 |
| 20 | 713.060 | 250.766 |
| 21 | 717.041 | 253.791 |
| 22 | 720.915 | 256.952 |
| 23 | 724.677 | 260.246 |
| 24 | 728.321 | 263.669 |
| 25 | 731.845 | 267.217 |
| 26 | 735.243 | 270.885 |
| 27 | 738.512 | 274.668 |
| 28 | 741.647 | 278.563 |
| 29 | 744.645 | 282.565 |
| 30 | 747.502 | 286.668 |
| 31 | 747.717 | 287.000 |

Circle Center At X = 628.021 ; Y = 366.818 ; and Radius = 143.875

Factor of Safety
*** 1.552 ***

1

Failure Surface Specified By 29 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.000 | 223.000 |
| 2 | 629.000 | 222.995 |
| 3 | 633.997 | 223.175 |
| 4 | 638.984 | 223.539 |
| 5 | 643.953 | 224.087 |
| 6 | 648.900 | 224.818 |
| 7 | 653.816 | 225.731 |
| 8 | 658.694 | 226.825 |
| 9 | 663.530 | 228.098 |
| 10 | 668.314 | 229.549 |
| 11 | 673.042 | 231.176 |
| 12 | 677.707 | 232.976 |
| 13 | 682.302 | 234.947 |
| 14 | 686.822 | 237.086 |
| 15 | 691.259 | 239.391 |
| 16 | 695.608 | 241.858 |
| 17 | 699.863 | 244.483 |
| 18 | 704.018 | 247.265 |
| 19 | 708.068 | 250.197 |
| 20 | 712.006 | 253.277 |
| 21 | 715.828 | 256.501 |
| 22 | 719.529 | 259.863 |
| 23 | 723.103 | 263.360 |
| 24 | 726.545 | 266.986 |
| 25 | 729.852 | 270.737 |
| 26 | 733.017 | 274.607 |
| 27 | 736.038 | 278.592 |
| 28 | 738.909 | 282.685 |
| 29 | 740.848 | 285.679 |

Circle Center At X = 626.633 ; Y = 358.387 ; and Radius = 135.413

Factor of Safety
*** 1.553 ***

Failure Surface Specified By 29 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.000 | 223.000 |
| 2 | 628.988 | 222.649 |
| 3 | 633.986 | 222.513 |
| 4 | 638.985 | 222.592 |
| 5 | 643.977 | 222.886 |
| 6 | 648.951 | 223.395 |
| 7 | 653.898 | 224.117 |
| 8 | 658.810 | 225.051 |
| 9 | 663.677 | 226.195 |
| 10 | 668.491 | 227.548 |
| 11 | 673.242 | 229.107 |
| 12 | 677.921 | 230.869 |
| 13 | 682.520 | 232.830 |
| 14 | 687.031 | 234.987 |
| 15 | 691.445 | 237.337 |
| 16 | 695.753 | 239.874 |
| 17 | 699.949 | 242.594 |
| 18 | 704.023 | 245.492 |
| 19 | 707.969 | 248.562 |
| 20 | 711.779 | 251.800 |
| 21 | 715.447 | 255.198 |
| 22 | 718.965 | 258.751 |

| | | |
|---|---|---|
| 23 | 722.327 | 262.452 |
| 24 | 725.526 | 266.295 |
| 25 | 728.558 | 270.271 |
| 26 | 731.415 | 274.374 |
| 27 | 734.093 | 278.596 |
| 28 | 736.588 | 282.930 |
| 29 | 737.455 | 284.599 |

Circle Center At X = 634.648 ; Y = 338.718 ; and Radius = 116.207

Factor of Safety
*** 1.553 ***

1

Failure Surface Specified By 30 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 625.000 | 223.500 |
| 2 | 629.997 | 223.329 |
| 3 | 634.997 | 223.351 |
| 4 | 639.992 | 223.563 |
| 5 | 644.976 | 223.968 |
| 6 | 649.941 | 224.563 |
| 7 | 654.879 | 225.348 |
| 8 | 659.783 | 226.322 |
| 9 | 664.646 | 227.483 |
| 10 | 669.461 | 228.830 |
| 11 | 674.221 | 230.361 |
| 12 | 678.919 | 232.073 |
| 13 | 683.547 | 233.964 |
| 14 | 688.100 | 236.032 |
| 15 | 692.570 | 238.272 |
| 16 | 696.951 | 240.682 |
| 17 | 701.236 | 243.258 |
| 18 | 705.419 | 245.997 |
| 19 | 709.494 | 248.894 |
| 20 | 713.455 | 251.946 |
| 21 | 717.296 | 255.147 |
| 22 | 721.012 | 258.493 |
| 23 | 724.596 | 261.979 |
| 24 | 728.044 | 265.600 |
| 25 | 731.351 | 269.350 |
| 26 | 734.511 | 273.225 |
| 27 | 737.520 | 277.218 |
| 28 | 740.374 | 281.324 |
| 29 | 743.069 | 285.535 |
| 30 | 743.682 | 286.581 |

Circle Center At X = 631.960 ; Y = 353.593 ; and Radius = 130.279

Factor of Safety
*** 1.554 ***

Failure Surface Specified By 29 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 625.000 | 223.500 |
| 2 | 629.999 | 223.419 |
| 3 | 634.998 | 223.526 |
| 4 | 639.989 | 223.822 |
| 5 | 644.966 | 224.307 |
| 6 | 649.920 | 224.979 |
| 7 | 654.846 | 225.838 |
| 8 | 659.736 | 226.883 |
| 9 | 664.583 | 228.111 |
| 10 | 669.379 | 229.522 |
| 11 | 674.120 | 231.113 |
| 12 | 678.796 | 232.882 |
| 13 | 683.403 | 234.826 |
| 14 | 687.932 | 236.943 |
| 15 | 692.379 | 239.230 |
| 16 | 696.736 | 241.683 |
| 17 | 700.997 | 244.298 |
| 18 | 705.157 | 247.073 |
| 19 | 709.208 | 250.003 |
| 20 | 713.146 | 253.084 |
| 21 | 716.965 | 256.312 |
| 22 | 720.659 | 259.681 |
| 23 | 724.223 | 263.188 |
| 24 | 727.652 | 266.827 |
| 25 | 730.941 | 270.593 |
| 26 | 734.086 | 274.480 |
| 27 | 737.081 | 278.483 |
| 28 | 739.923 | 282.597 |
| 29 | 742.148 | 286.093 |

Circle Center At X = 629.654 ; Y = 355.742 ; and Radius = 132.324

Factor of Safety
*** 1.554 ***

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Failure Surface Specified By 31 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.000 | 223.000 |
| 2 | 628.988 | 222.655 |
| 3 | 633.986 | 222.504 |
| 4 | 638.986 | 222.549 |
| 5 | 643.980 | 222.788 |
| 6 | 648.961 | 223.221 |
| 7 | 653.922 | 223.848 |
| 8 | 658.854 | 224.668 |
| 9 | 663.751 | 225.679 |
| 10 | 668.604 | 226.881 |
| 11 | 673.407 | 228.270 |
| 12 | 678.152 | 229.846 |
| 13 | 682.833 | 231.605 |
| 14 | 687.441 | 233.545 |
| 15 | 691.970 | 235.664 |
| 16 | 696.413 | 237.957 |
| 17 | 700.764 | 240.421 |
| 18 | 705.015 | 243.053 |
| 19 | 709.160 | 245.849 |
| 20 | 713.194 | 248.804 |
| 21 | 717.109 | 251.914 |
| 22 | 720.900 | 255.174 |
| 23 | 724.561 | 258.579 |
| 24 | 728.087 | 262.125 |
| 25 | 731.471 | 265.805 |
| 26 | 734.710 | 269.614 |
| 27 | 737.799 | 273.546 |
| 28 | 740.731 | 277.596 |
| 29 | 743.504 | 281.757 |
| 30 | 746.112 | 286.022 |
| 31 | 746.659 | 287.000 |

Circle Center At X = 635.350 ; Y = 350.822 ; and Radius = 128.325

Factor of Safety
*** 1.555 ***

Failure Surface Specified By 29 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 625.000 | 223.500 |
| 2 | 629.992 | 223.214 |
| 3 | 634.991 | 223.136 |
| 4 | 639.990 | 223.266 |
| 5 | 644.978 | 223.605 |
| 6 | 649.948 | 224.152 |
| 7 | 654.891 | 224.906 |
| 8 | 659.798 | 225.865 |
| 9 | 664.661 | 227.028 |
| 10 | 669.471 | 228.392 |
| 11 | 674.220 | 229.957 |
| 12 | 678.900 | 231.717 |
| 13 | 683.502 | 233.672 |
| 14 | 688.019 | 235.817 |
| 15 | 692.442 | 238.148 |
| 16 | 696.764 | 240.662 |
| 17 | 700.978 | 243.353 |
| 18 | 705.075 | 246.219 |
| 19 | 709.050 | 249.252 |
| 20 | 712.894 | 252.449 |
| 21 | 716.602 | 255.803 |
| 22 | 720.167 | 259.309 |
| 23 | 723.582 | 262.961 |
| 24 | 726.843 | 266.752 |
| 25 | 729.942 | 270.676 |
| 26 | 732.875 | 274.725 |
| 27 | 735.636 | 278.893 |
| 28 | 738.221 | 283.173 |
| 29 | 739.331 | 285.196 |

Circle Center At X = 634.359 ; Y = 342.989 ; and Radius = 119.855

Factor of Safety
*** 1.555 ***

1

Failure Surface Specified By 28 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 625.000 | 223.500 |
| 2 | 629.993 | 223.243 |

| | | |
|---|---|---|
| 3 | 634.993 | 223.202 |
| 4 | 639.990 | 223.375 |
| 5 | 644.975 | 223.762 |
| 6 | 649.939 | 224.364 |
| 7 | 654.872 | 225.178 |
| 8 | 659.766 | 226.203 |
| 9 | 664.611 | 227.438 |
| 10 | 669.399 | 228.879 |
| 11 | 674.120 | 230.525 |
| 12 | 678.766 | 232.372 |
| 13 | 683.329 | 234.418 |
| 14 | 687.799 | 236.657 |
| 15 | 692.170 | 239.086 |
| 16 | 696.431 | 241.701 |
| 17 | 700.577 | 244.497 |
| 18 | 704.598 | 247.468 |
| 19 | 708.489 | 250.609 |
| 20 | 712.240 | 253.914 |
| 21 | 715.846 | 257.378 |
| 22 | 719.301 | 260.993 |
| 23 | 722.596 | 264.753 |
| 24 | 725.727 | 268.651 |
| 25 | 728.688 | 272.681 |
| 26 | 731.472 | 276.833 |
| 27 | 734.076 | 281.102 |
| 28 | 735.700 | 284.041 |

Circle Center At X = 633.482 ; Y = 339.470 ; and Radius = 116.280

Factor of Safety
*** 1.557 ***

Failure Surface Specified By 31 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.000 | 223.000 |
| 2 | 629.000 | 222.971 |
| 3 | 633.998 | 223.105 |
| 4 | 638.989 | 223.400 |
| 5 | 643.969 | 223.857 |
| 6 | 648.930 | 224.476 |
| 7 | 653.869 | 225.255 |
| 8 | 658.780 | 226.194 |
| 9 | 663.658 | 227.292 |
| 10 | 668.498 | 228.547 |
| 11 | 673.294 | 229.959 |
| 12 | 678.043 | 231.526 |
| 13 | 682.738 | 233.245 |
| 14 | 687.374 | 235.117 |
| 15 | 691.948 | 237.137 |
| 16 | 696.453 | 239.306 |
| 17 | 700.886 | 241.619 |
| 18 | 705.241 | 244.074 |
| 19 | 709.515 | 246.670 |
| 20 | 713.702 | 249.403 |
| 21 | 717.798 | 252.270 |
| 22 | 721.799 | 255.269 |
| 23 | 725.700 | 258.396 |
| 24 | 729.499 | 261.648 |
| 25 | 733.189 | 265.021 |
| 26 | 736.768 | 268.512 |
| 27 | 740.232 | 272.118 |
| 28 | 743.578 | 275.834 |
| 29 | 746.801 | 279.657 |
| 30 | 749.898 | 283.582 |
| 31 | 752.419 | 287.000 |

Circle Center At X = 627.389 ; Y = 377.064 ; and Radius = 154.102

Factor of Safety
*** 1.557 ***

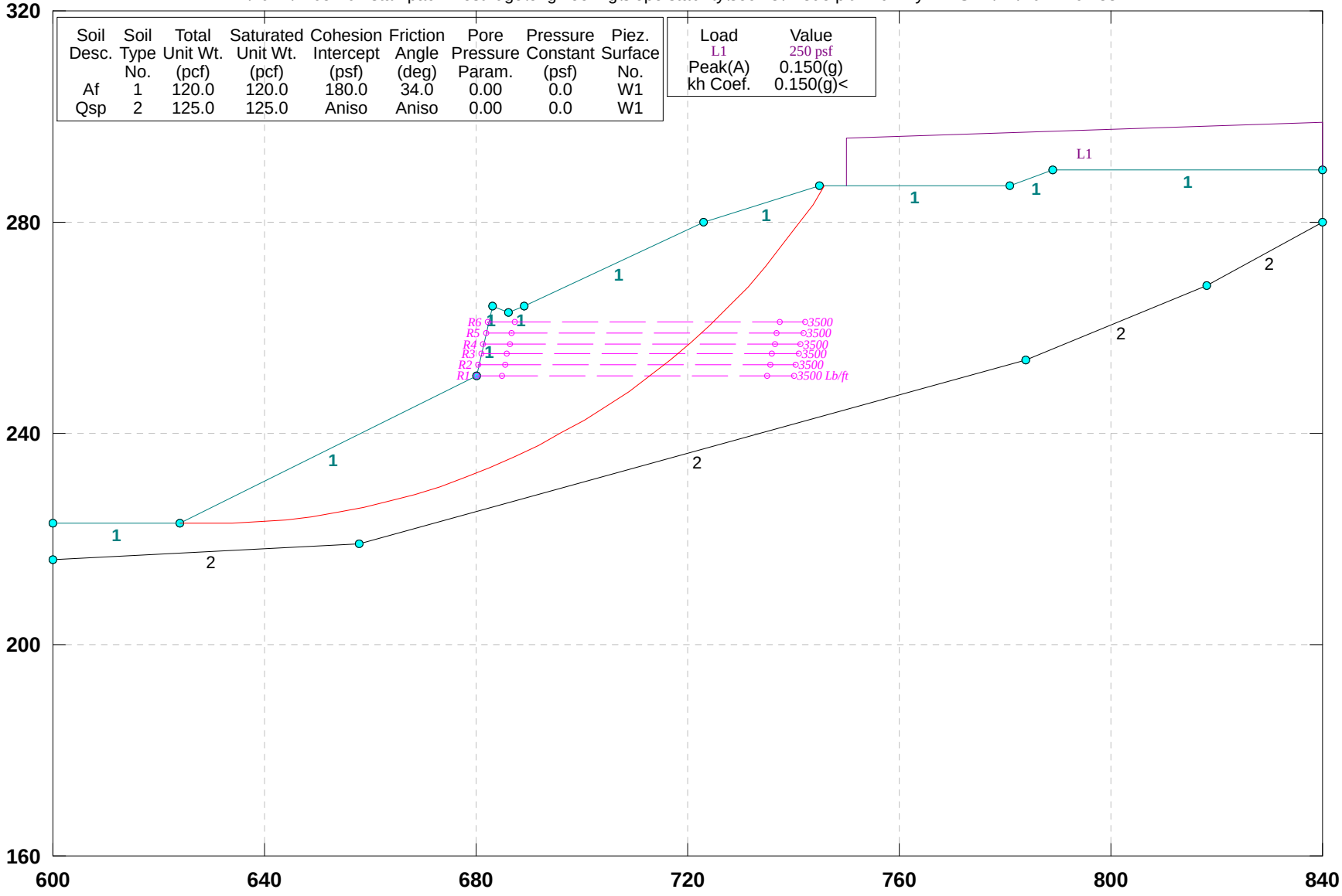
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 13-13'/ MSE Wall - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13de.plt Run By: KMS 4/14/2017 02:38PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=1.35**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:38PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13de.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13de.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13de.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 13-13'/
MSE Wall - Seismic

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 223.00 | 624.00 | 223.00 | 1 |
| 2 | 624.00 | 223.00 | 680.00 | 251.00 | 1 |
| 3 | 680.00 | 251.00 | 683.00 | 264.00 | 1 |
| 4 | 683.00 | 264.00 | 686.00 | 263.00 | 1 |
| 5 | 686.00 | 263.00 | 689.00 | 264.00 | 1 |
| 6 | 689.00 | 264.00 | 723.00 | 280.00 | 1 |
| 7 | 723.00 | 280.00 | 745.00 | 287.00 | 1 |
| 8 | 745.00 | 287.00 | 781.00 | 287.00 | 1 |
| 9 | 781.00 | 287.00 | 789.00 | 290.00 | 1 |
| 10 | 789.00 | 290.00 | 840.00 | 290.00 | 1 |
| 11 | 600.00 | 216.00 | 658.00 | 219.00 | 2 |
| 12 | 658.00 | 219.00 | 784.00 | 254.00 | 2 |
| 13 | 784.00 | 254.00 | 818.00 | 268.00 | 2 |
| 14 | 818.00 | 268.00 | 840.00 | 280.00 | 2 |

User Specified Y-Origin = 160.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 750.00 | 840.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

REINFORCING LAYER(S)

6 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO. 1

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.00 | 251.00 | 0.00 | 0.000 |
| 2 | 685.00 | 251.00 | 3500.00 | 0.000 |
| 3 | 735.00 | 251.00 | 3500.00 | 0.000 |
| 4 | 740.00 | 251.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 2

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.46 | 253.00 | 0.00 | 0.000 |
| 2 | 685.46 | 253.00 | 3500.00 | 0.000 |
| 3 | 735.46 | 253.00 | 3500.00 | 0.000 |
| 4 | 740.46 | 253.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 3

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.92 | 255.00 | 0.00 | 0.000 |
| 2 | 685.92 | 255.00 | 3500.00 | 0.000 |
| 3 | 735.92 | 255.00 | 3500.00 | 0.000 |
| 4 | 740.92 | 255.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 4

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.38 | 257.00 | 0.00 | 0.000 |
| 2 | 686.38 | 257.00 | 3500.00 | 0.000 |
| 3 | 736.38 | 257.00 | 3500.00 | 0.000 |
| 4 | 741.38 | 257.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 5

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.85 | 259.00 | 0.00 | 0.000 |
| 2 | 686.85 | 259.00 | 3500.00 | 0.000 |
| 3 | 736.85 | 259.00 | 3500.00 | 0.000 |
| 4 | 741.85 | 259.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 6

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 682.31 | 261.00 | 0.00 | 0.000 |
| 2 | 687.31 | 261.00 | 3500.00 | 0.000 |
| 3 | 737.31 | 261.00 | 3500.00 | 0.000 |
| 4 | 742.31 | 261.00 | 0.00 | 0.000 |



Trial Failure Surface Specified By 30 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 624.000 | 223.000 |
| 2 | 628.999 | 222.884 |
| 3 | 633.998 | 222.950 |
| 4 | 638.992 | 223.198 |
| 5 | 643.974 | 223.627 |
| 6 | 648.936 | 224.237 |
| 7 | 653.873 | 225.027 |
| 8 | 658.779 | 225.997 |
| 9 | 663.645 | 227.144 |
| 10 | 668.467 | 228.467 |
| 11 | 673.237 | 229.964 |
| 12 | 677.950 | 231.635 |
| 13 | 682.599 | 233.475 |
| 14 | 687.178 | 235.483 |
| 15 | 691.681 | 237.657 |
| 16 | 696.102 | 239.993 |
| 17 | 700.435 | 242.488 |
| 18 | 704.674 | 245.139 |
| 19 | 708.815 | 247.942 |
| 20 | 712.850 | 250.894 |
| 21 | 716.776 | 253.991 |
| 22 | 720.586 | 257.229 |
| 23 | 724.276 | 260.603 |
| 24 | 727.841 | 264.109 |
| 25 | 731.276 | 267.742 |
| 26 | 734.576 | 271.498 |
| 27 | 737.738 | 275.371 |
| 28 | 740.757 | 279.357 |
| 29 | 743.629 | 283.450 |
| 30 | 745.932 | 287.000 |

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

| Angle/Segment No. | Deflection(Deg) | Segment Length(ft) |
|---|---|---|
| 1 | 2.09 | 5.00 |
| 2 | 2.09 | 5.00 |
| 3 | 2.08 | 5.00 |
| 4 | 2.09 | 5.00 |
| 5 | 2.08 | 5.00 |
| 6 | 2.09 | 5.00 |
| 7 | 2.08 | 5.00 |
| 8 | 2.08 | 5.00 |
| 9 | 2.08 | 5.00 |
| 10 | 2.10 | 5.00 |
| 11 | 2.07 | 5.00 |
| 12 | 2.09 | 5.00 |
| 13 | 2.09 | 5.00 |
| 14 | 2.08 | 5.00 |
| 15 | 2.08 | 5.00 |
| 16 | 2.09 | 5.00 |
| 17 | 2.07 | 5.00 |
| 18 | 2.10 | 5.00 |

| | | |
|---|---|---|
| 19 | 2.08 | 5.00 |
| 20 | 2.09 | 5.00 |
| 21 | 2.08 | 5.00 |
| 22 | 2.08 | 5.00 |
| 23 | 2.08 | 5.00 |
| 24 | 2.09 | 5.00 |
| 25 | 2.07 | 5.00 |
| 26 | 2.09 | 5.00 |
| 27 | 2.08 | 5.00 |

Circle Center At X = 629.692(ft) ; Y = 360.307(ft); and Radius = 137.425(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Sum of Reinforcing Forces on Failure Surface = 15908.23 (lbs)

Factor Of Safety For The Preceding Specified Surface = 1.352

The calculated factor of safety for the specified surface without piers/piles,
reinforcement, soil nails, or applied forces = 1.206

***Table 1 - Individual Data on the 35 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 | 784.5 | 0.0 | 0.0 | 0.0 | 0.0 | 117.7 | 0.0 | 0.0 |
| 2 | 5.0 | 2298.9 | 0.0 | 0.0 | 0.0 | 0.0 | 344.8 | 0.0 | 0.0 |
| 3 | 5.0 | 3699.7 | 0.0 | 0.0 | 0.0 | 0.0 | 555.0 | 0.0 | 0.0 |
| 4 | 5.0 | 4979.4 | 0.0 | 0.0 | 0.0 | 0.0 | 746.9 | 0.0 | 0.0 |
| 5 | 5.0 | 6130.3 | 0.0 | 0.0 | 0.0 | 0.0 | 919.6 | 0.0 | 0.0 |
| 6 | 4.9 | 7150.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1072.6 | 0.0 | 0.0 |
| 7 | 4.9 | 8036.6 | 0.0 | 0.0 | 0.0 | 0.0 | 1205.5 | 0.0 | 0.0 |
| 8 | 4.9 | 8779.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1316.9 | 0.0 | 0.0 |
| 9 | 4.8 | 9387.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1408.1 | 0.0 | 0.0 |
| 10 | 4.8 | 9851.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1477.7 | 0.0 | 0.0 |
| 11 | 4.7 | 10178.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1526.8 | 0.0 | 0.0 |
| 12 | 2.0 | 4537.9 | 0.0 | 0.0 | 0.0 | 0.0 | 680.7 | 0.0 | 0.0 |
| 13 | 2.6 | 7382.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1107.4 | 0.0 | 0.0 |
| 14 | 0.4 | 1422.8 | 0.0 | 0.0 | 0.0 | 0.0 | 213.4 | 0.0 | 0.0 |
| 15 | 3.0 | 10508.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1576.3 | 0.0 | 0.0 |
| 16 | 1.2 | 3954.0 | 0.0 | 0.0 | 0.0 | 0.0 | 593.1 | 0.0 | 0.0 |
| 17 | 1.8 | 6072.5 | 0.0 | 0.0 | 0.0 | 0.0 | 910.9 | 0.0 | 0.0 |
| 18 | 2.7 | 8886.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1332.9 | 0.0 | 0.0 |
| 19 | 4.4 | 14577.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2186.6 | 0.0 | 0.0 |
| 20 | 4.3 | 14102.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2115.3 | 0.0 | 0.0 |
| 21 | 4.2 | 13513.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2026.9 | 0.0 | 0.0 |
| 22 | 4.1 | 12825.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1923.8 | 0.0 | 0.0 |
| 23 | 4.0 | 12035.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1805.3 | 0.0 | 0.0 |
| 24 | 3.9 | 11167.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1675.2 | 0.0 | 0.0 |
| 25 | 3.8 | 10221.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1533.3 | 0.0 | 0.0 |
| 26 | 2.4 | 6112.1 | 0.0 | 0.0 | 0.0 | 0.0 | 916.8 | 0.0 | 0.0 |
| 27 | 1.3 | 3090.5 | 0.0 | 0.0 | 0.0 | 0.0 | 463.6 | 0.0 | 0.0 |
| 28 | 3.6 | 7964.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1194.6 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 29 | 3.4 | 6661.8 | 0.0 | 0.0 | 0.0 | 0.0 | 999.3 | 0.0 | 0.0 |
| 30 | 3.3 | 5361.1 | 0.0 | 0.0 | 0.0 | 0.0 | 804.2 | 0.0 | 0.0 |
| 31 | 3.2 | 4079.7 | 0.0 | 0.0 | 0.0 | 0.0 | 612.0 | 0.0 | 0.0 |
| 32 | 3.0 | 2827.8 | 0.0 | 0.0 | 0.0 | 0.0 | 424.2 | 0.0 | 0.0 |
| 33 | 2.9 | 1621.0 | 0.0 | 0.0 | 0.0 | 0.0 | 243.1 | 0.0 | 0.0 |
| 34 | 1.4 | 374.3 | 0.0 | 0.0 | 0.0 | 0.0 | 56.2 | 0.0 | 0.0 |
| 35 | 0.9 | 80.3 | 0.0 | 0.0 | 0.0 | 0.0 | 12.1 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 35 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Shear Mobilized Stress * (psf) |
|---|---|---|---|---|---|
| 1 | -1.33 | 626.50 | 5.00 | 324.53 | 19.78 |
| 2 | 0.76 | 631.50 | 5.00 | 545.27 | 74.08 |
| 3 | 2.84 | 636.50 | 5.00 | 741.07 | 145.06 |
| 4 | 4.92 | 641.48 | 5.00 | 913.18 | 229.73 |
| 5 | 7.01 | 646.46 | 5.00 | 1062.48 | 325.29 |
| 6 | 9.09 | 651.40 | 5.00 | 1190.01 | 428.41 |
| 7 | 11.18 | 656.33 | 5.00 | 1296.53 | 536.20 |
| 8 | 13.26 | 661.21 | 5.00 | 1383.13 | 644.89 |
| 9 | 15.34 | 666.06 | 5.00 | 1450.57 | 751.65 |
| 10 | 17.42 | 670.85 | 5.00 | 1499.57 | 853.54 |
| 11 | 19.52 | 675.59 | 5.00 | 1530.62 | 948.00 |
| 12 | 21.59 | 678.97 | 2.20 | 1535.12 | 1023.81 |
| 13 | 21.59 | 681.30 | 2.80 | 1923.06 | 1306.20 |
| 14 | 23.68 | 682.80 | 0.44 | 2315.74 | 1698.96 |
| 15 | 23.68 | 684.50 | 3.28 | 2288.29 | 1677.96 |
| 16 | 23.68 | 686.59 | 1.29 | 2199.44 | 1609.90 |
| 17 | 25.77 | 688.09 | 2.02 | 2142.42 | 1664.83 |
| 18 | 25.77 | 690.34 | 2.98 | 2131.53 | 1655.94 |
| 19 | 27.85 | 693.89 | 5.00 | 2079.50 | 1704.87 |
| 20 | 29.93 | 698.27 | 5.00 | 2013.38 | 1732.24 |
| 21 | 32.02 | 702.55 | 5.00 | 1934.65 | 1737.67 |
| 22 | 34.09 | 706.74 | 5.00 | 1844.55 | 1720.19 |
| 23 | 36.19 | 710.83 | 5.00 | 1743.11 | 1680.16 |
| 24 | 38.27 | 714.81 | 5.00 | 1631.93 | 1617.32 |
| 25 | 40.36 | 718.68 | 5.00 | 1511.35 | 1532.61 |
| 26 | 42.44 | 721.79 | 3.27 | 1399.78 | 1446.24 |
| 27 | 42.44 | 723.64 | 1.73 | 1344.80 | 1384.35 |
| 28 | 44.52 | 726.06 | 5.00 | 1219.62 | 1271.04 |
| 29 | 46.60 | 729.56 | 5.00 | 1047.86 | 1093.71 |
| 30 | 48.70 | 732.93 | 5.00 | 873.64 | 903.78 |
| 31 | 50.77 | 736.16 | 5.00 | 698.51 | 704.69 |
| 32 | 52.86 | 739.25 | 5.00 | 523.33 | 499.63 |
| 33 | 54.94 | 742.19 | 5.00 | 349.66 | 292.47 |
| 34 | 57.03 | 744.31 | 2.52 | 219.17 | 136.61 |
| 35 | 57.03 | 745.47 | 1.71 | 143.32 | 43.17 |

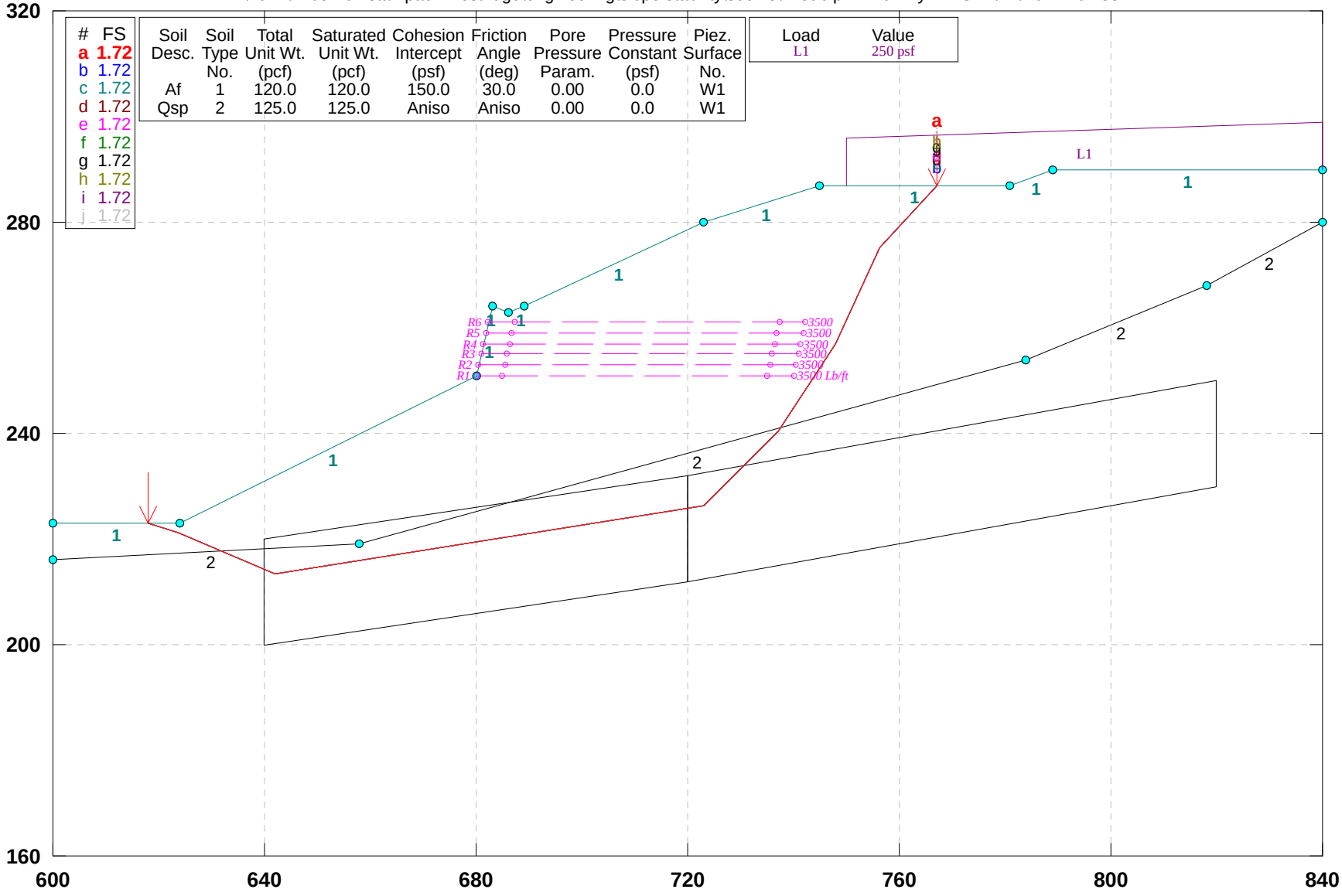
NOTE: Pier/Pile, reinforcement, soil nail, and applied forces (if applicable)
are included in the Available Shear values in Table 2 by uniform distribution on each slice base, based upon the converged factor of safety.

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 185590.98 (lbs)

```
     Average Available Shear Strength (including Tieback, Pier/Pile,
Reinforcing,
     Soil Nail, and Applied Forces if applicable) =   1286.75(psf)


     Sum of the Driving Forces =   137295.61 (lbs)


     Average Mobilized Shear Stress =     951.91(psf)


     Total length of the failure surface =     144.23(ft)


           CAUTION - Factor Of Safety Is Calculated By The Modified
Bishop
                     Method. This Method Is Valid Only If The Failure
Surface
                     Approximates A Circular Arc.

                   *** SEISMIC SLOPE DISPLACEMENT DATA ***
           (Note: kv is set = zero for displacement calculations)
           Seismic Yield Coefficient (ky) =  0.3451(g)
           Calculated Newmark Seismic Displacement =   0.003(ft)

           Non-Symmetrical Sliding Resistance Has Been Specified
           for Downhill Sliding.


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

# Westridge/14057-01/Sec 13-13'/ MSE Wall - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13db.pl2  Run By: KMS  4/14/2017  02:33PM

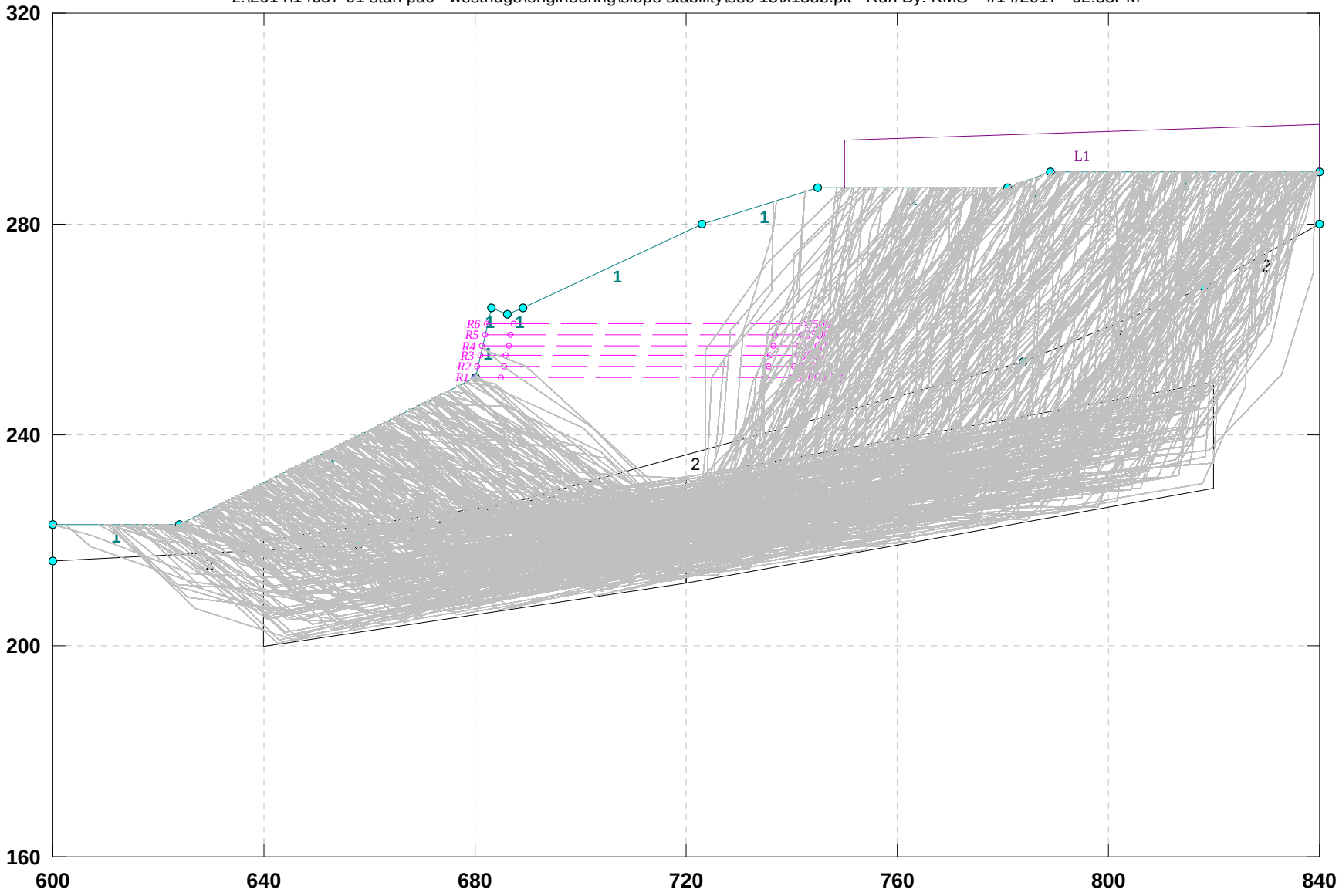



**GSTABL7 v.2  FSmin=1.72**

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

# Westridge/14057-01/Sec 13-13'/ MSE Wall - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13db.plt  Run By: KMS  4/14/2017  02:33PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:33PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13db.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13db.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13db.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 13-13'/
MSE Wall - Block - Static

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 223.00 | 624.00 | 223.00 | 1 |
| 2 | 624.00 | 223.00 | 680.00 | 251.00 | 1 |
| 3 | 680.00 | 251.00 | 683.00 | 264.00 | 1 |
| 4 | 683.00 | 264.00 | 686.00 | 263.00 | 1 |
| 5 | 686.00 | 263.00 | 689.00 | 264.00 | 1 |
| 6 | 689.00 | 264.00 | 723.00 | 280.00 | 1 |
| 7 | 723.00 | 280.00 | 745.00 | 287.00 | 1 |
| 8 | 745.00 | 287.00 | 781.00 | 287.00 | 1 |
| 9 | 781.00 | 287.00 | 789.00 | 290.00 | 1 |
| 10 | 789.00 | 290.00 | 840.00 | 290.00 | 1 |
| 11 | 600.00 | 216.00 | 658.00 | 219.00 | 2 |
| 12 | 658.00 | 219.00 | 784.00 | 254.00 | 2 |
| 13 | 784.00 | 254.00 | 818.00 | 268.00 | 2 |
| 14 | 818.00 | 268.00 | 840.00 | 280.00 | 2 |

User Specified Y-Origin = 160.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 0.0 | 0.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type  2 Is Anisotropic

Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 750.00 | 840.00 | 250.0 | 0.0 |

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

1

REINFORCING LAYER(S)

6 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO.  1

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.00 | 251.00 | 0.00 | 0.000 |
| 2 | 685.00 | 251.00 | 3500.00 | 0.000 |
| 3 | 735.00 | 251.00 | 3500.00 | 0.000 |
| 4 | 740.00 | 251.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  2

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.46 | 253.00 | 0.00 | 0.000 |
| 2 | 685.46 | 253.00 | 3500.00 | 0.000 |
| 3 | 735.46 | 253.00 | 3500.00 | 0.000 |
| 4 | 740.46 | 253.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  3

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.92 | 255.00 | 0.00 | 0.000 |
| 2 | 685.92 | 255.00 | 3500.00 | 0.000 |
| 3 | 735.92 | 255.00 | 3500.00 | 0.000 |
| 4 | 740.92 | 255.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  4

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.38 | 257.00 | 0.00 | 0.000 |
| 2 | 686.38 | 257.00 | 3500.00 | 0.000 |
| 3 | 736.38 | 257.00 | 3500.00 | 0.000 |
| 4 | 741.38 | 257.00 | 0.00 | 0.000 |

REINFORCING LAYER NO.  5

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.85 | 259.00 | 0.00 | 0.000 |
| 2 | 686.85 | 259.00 | 3500.00 | 0.000 |
| 3 | 736.85 | 259.00 | 3500.00 | 0.000 |
| 4 | 741.85 | 259.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 6

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 682.31 | 261.00 | 0.00 | 0.000 |
| 2 | 687.31 | 261.00 | 3500.00 | 0.000 |
| 3 | 737.31 | 261.00 | 3500.00 | 0.000 |
| 4 | 742.31 | 261.00 | 0.00 | 0.000 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 640.00 | 210.00 | 720.00 | 222.00 | 20.00 |
| 2 | 720.10 | 222.00 | 820.00 | 240.00 | 20.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

Factor of Safety
*** 1.723 ***

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 | 5.5 | 599.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 0.4 | 102.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 7.9 | 5343.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 10.1 | 17009.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 16.0 | 41401.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 22.0 | 74034.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.0 | 13727.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 3.0 | 15721.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 3.0 | 15556.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 33.9 | 198782.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 0.1 | 659.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 14.0 | 82884.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 0.5 | 2781.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 7.4 | 34833.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 3.0 | 11713.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 2.0 | 6604.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 6.4 | 14388.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1597.9 |
| 18 | 10.8 | 7627.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 2688.1 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

Factor of Safety
*** 1.723 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

Factor of Safety
*** 1.723 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |

| | | |
|---|---|---|
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

Factor of Safety
*** 1.723 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
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Factor of Safety
*** 1.723 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
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Factor of Safety
*** 1.723 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

Factor of Safety
*** 1.723 ***

1

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

Factor of Safety
*** 1.723 ***

Failure Surface Specified By 8 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

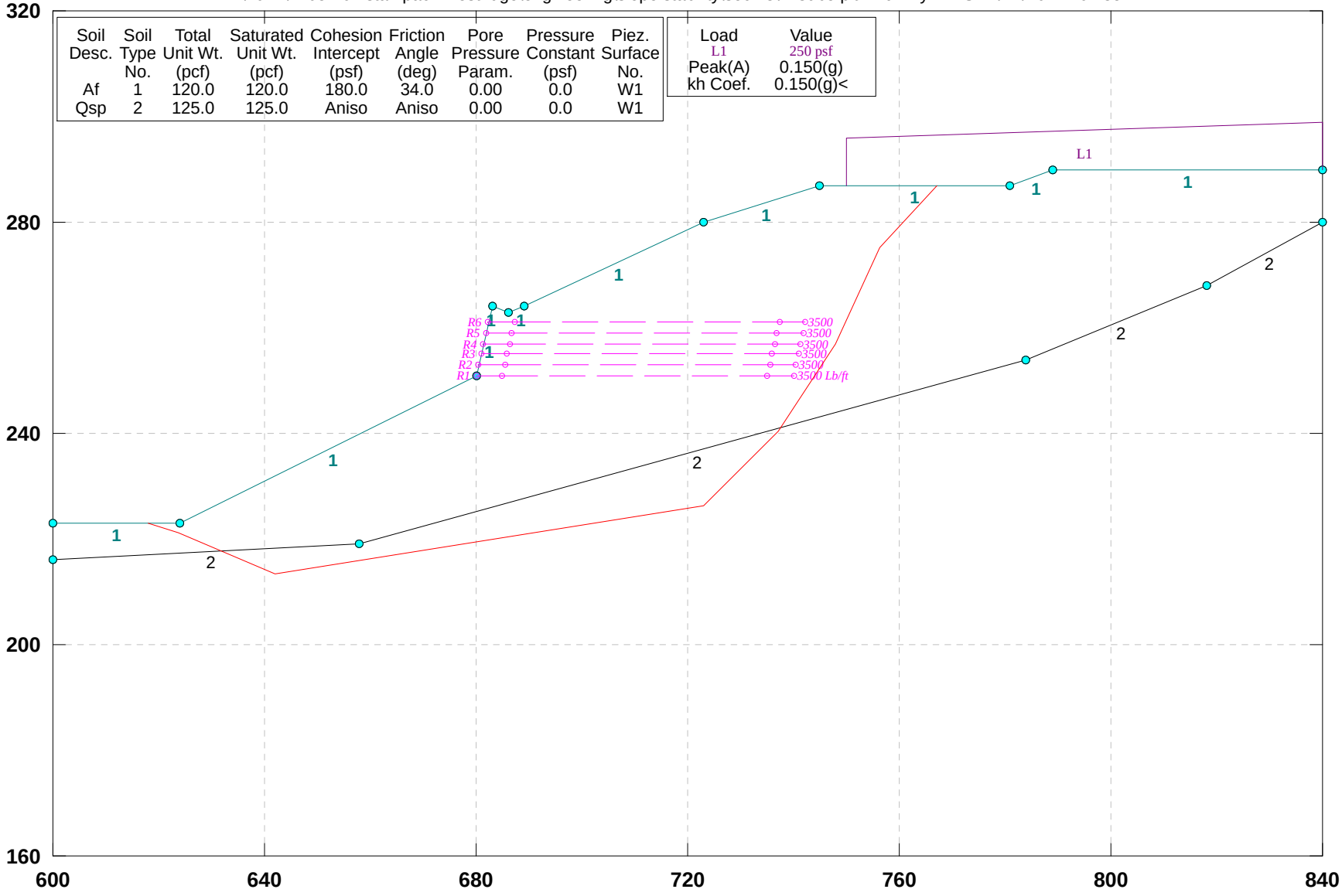
Factor of Safety

*** 1.723 ***

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

# Westridge/14057-01/Sec 13-13'/ MSE Wall - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13dbe.plt Run By: KMS 4/14/2017 02:35PM




**GSTABL7 v.2 FSmin=1.33**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:35PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13dbe.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13dbe.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13dbe.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 13-13'/
MSE Wall - Seismic

BOUNDARY COORDINATES

10 Top Boundaries

14 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 223.00 | 624.00 | 223.00 | 1 |
| 2 | 624.00 | 223.00 | 680.00 | 251.00 | 1 |
| 3 | 680.00 | 251.00 | 683.00 | 264.00 | 1 |
| 4 | 683.00 | 264.00 | 686.00 | 263.00 | 1 |
| 5 | 686.00 | 263.00 | 689.00 | 264.00 | 1 |
| 6 | 689.00 | 264.00 | 723.00 | 280.00 | 1 |
| 7 | 723.00 | 280.00 | 745.00 | 287.00 | 1 |
| 8 | 745.00 | 287.00 | 781.00 | 287.00 | 1 |
| 9 | 781.00 | 287.00 | 789.00 | 290.00 | 1 |
| 10 | 789.00 | 290.00 | 840.00 | 290.00 | 1 |
| 11 | 600.00 | 216.00 | 658.00 | 219.00 | 2 |
| 12 | 658.00 | 219.00 | 784.00 | 254.00 | 2 |
| 13 | 784.00 | 254.00 | 818.00 | 268.00 | 2 |
| 14 | 818.00 | 268.00 | 840.00 | 280.00 | 2 |

User Specified Y-Origin = 160.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 2 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 750.00 | 840.00 | 250.0 | 0.0 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

REINFORCING LAYER(S)

6 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO. 1

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.00 | 251.00 | 0.00 | 0.000 |
| 2 | 685.00 | 251.00 | 3500.00 | 0.000 |
| 3 | 735.00 | 251.00 | 3500.00 | 0.000 |
| 4 | 740.00 | 251.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 2

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.46 | 253.00 | 0.00 | 0.000 |
| 2 | 685.46 | 253.00 | 3500.00 | 0.000 |
| 3 | 735.46 | 253.00 | 3500.00 | 0.000 |
| 4 | 740.46 | 253.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 3

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 680.92 | 255.00 | 0.00 | 0.000 |
| 2 | 685.92 | 255.00 | 3500.00 | 0.000 |
| 3 | 735.92 | 255.00 | 3500.00 | 0.000 |
| 4 | 740.92 | 255.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 4

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.38 | 257.00 | 0.00 | 0.000 |
| 2 | 686.38 | 257.00 | 3500.00 | 0.000 |
| 3 | 736.38 | 257.00 | 3500.00 | 0.000 |
| 4 | 741.38 | 257.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 5

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 681.85 | 259.00 | 0.00 | 0.000 |
| 2 | 686.85 | 259.00 | 3500.00 | 0.000 |
| 3 | 736.85 | 259.00 | 3500.00 | 0.000 |
| 4 | 741.85 | 259.00 | 0.00 | 0.000 |

REINFORCING LAYER NO. 6

4 POINTS DEFINE THIS LAYER

| POINT NO. | X-COORD | Y-COORD | FORCE | INCLINATION FACTOR |
|---|---|---|---|---|
| 1 | 682.31 | 261.00 | 0.00 | 0.000 |
| 2 | 687.31 | 261.00 | 3500.00 | 0.000 |
| 3 | 737.31 | 261.00 | 3500.00 | 0.000 |
| 4 | 742.31 | 261.00 | 0.00 | 0.000 |

Janbu's Empirical Coef. is being used for the case of c & phi both > 0
1

Trial Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 618.062 | 223.000 |
| 2 | 623.556 | 221.181 |
| 3 | 641.968 | 213.370 |
| 4 | 722.899 | 226.155 |
| 5 | 737.040 | 240.298 |
| 6 | 748.023 | 257.013 |
| 7 | 756.391 | 275.178 |
| 8 | 767.144 | 287.000 |

Janbu's Empirical Coefficient (fo) = 1.079

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Sum of Reinforcing Forces on Failure Surface = 0.00 (lbs)

Factor Of Safety For The Preceding Specified Surface = 1.333

The calculated factor of safety for the specified surface without piers/piles,
reinforcement, soil nails, or applied forces = 1.333

***Table 1 - 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 | 5.5 | 599.6 | 0.0 | 0.0 | 0.0 | 0.0 | 89.9 | 0.0 | 0.0 |
| 2 | 0.4 | 101.9 | 0.0 | 0.0 | 0.0 | 0.0 | 15.3 | 0.0 | 0.0 |
| 3 | 7.9 | 5343.3 | 0.0 | 0.0 | 0.0 | 0.0 | 801.5 | 0.0 | 0.0 |
| 4 | 10.1 | 17009.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2551.4 | 0.0 | 0.0 |
| 5 | 16.0 | 41401.4 | 0.0 | 0.0 | 0.0 | 0.0 | 6210.2 | 0.0 | 0.0 |
| 6 | 22.0 | 74035.1 | 0.0 | 0.0 | 0.0 | 0.0 | 11105.3 | 0.0 | 0.0 |
| 7 | 3.0 | 13727.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2059.1 | 0.0 | 0.0 |
| 8 | 3.0 | 15722.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2358.3 | 0.0 | 0.0 |
| 9 | 3.0 | 15556.8 | 0.0 | 0.0 | 0.0 | 0.0 | 2333.5 | 0.0 | 0.0 |
| 10 | 33.9 | 198785.8 | 0.0 | 0.0 | 0.0 | 0.0 | 29817.9 | 0.0 | 0.0 |
| 11 | 0.1 | 657.3 | 0.0 | 0.0 | 0.0 | 0.0 | 98.6 | 0.0 | 0.0 |

```
  12     14.0   82884.1     0.0     0.0      0.0     0.0 12432.6     0.0
0.0
  13      0.5    2782.2     0.0     0.0      0.0     0.0   417.3     0.0
0.0
  14      7.4   34833.0     0.0     0.0      0.0     0.0  5225.0     0.0
0.0
  15      3.0   11712.6     0.0     0.0      0.0     0.0  1756.9     0.0
0.0
  16      2.0    6605.0     0.0     0.0      0.0     0.0   990.8     0.0
0.0
  17      6.4   14386.4     0.0     0.0      0.0     0.0  2158.0     0.0
1597.7
  18     10.8    7627.4     0.0     0.0      0.0     0.0  1144.1     0.0
2688.2
```

***Table 2 - Base Stress Data on the 18 Slices***

| Slice No. | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress * (psf) |
|---|---|---|---|---|---|
| 1 | -18.32 | 620.81 | 5.79 | 326.14 | -18.76 |
| 2 | -22.99 | 623.78 | 0.48 | 473.46 | -57.96 |
| 3 | -22.99 | 627.94 | 8.56 | 901.07 | -171.15 |
| 4 | -22.99 | 636.92 | 10.96 | 2315.24 | -425.73 |
| 5 | 8.98 | 649.98 | 16.23 | 1440.70 | 785.58 |
| 6 | 8.98 | 669.00 | 22.27 | 1819.79 | 1023.71 |
| 7 | 8.98 | 681.50 | 3.04 | 2406.02 | 1391.95 |
| 8 | 8.98 | 684.50 | 3.04 | 2728.03 | 1594.23 |
| 9 | 8.98 | 687.50 | 3.04 | 2701.36 | 1577.47 |
| 10 | 8.98 | 705.95 | 34.32 | 3029.92 | 1783.86 |
| 11 | 45.00 | 722.95 | 0.14 | 4471.44 | 5291.32 |
| 12 | 45.00 | 730.02 | 19.86 | 4099.29 | 4800.76 |
| 13 | 56.69 | 737.30 | 0.96 | 4027.70 | 4832.69 |
| 14 | 56.69 | 741.28 | 13.53 | 3322.80 | 4303.36 |
| 15 | 56.69 | 746.51 | 5.51 | 2777.67 | 3557.18 |
| 16 | 65.27 | 749.01 | 4.73 | 2660.91 | 3244.14 |
| 17 | 65.27 | 753.20 | 15.27 | 2041.44 | 2412.88 |
| 18 | 47.71 | 761.77 | 15.98 | 767.97 | 781.26 |

NOTE: Pier/Pile, reinforcement, soil nail, and applied forces (if applicable)
are included in the Available Shear values in Table 2 by uniform distribution on each slice base, based upon the converged factor of safety.

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 429209.00 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2336.43(psf)

Sum of the Driving Forces = 347592.00 (lbs)

Average Mobilized Shear Stress = 1892.14(psf)

Total length of the failure surface = 183.70(ft)

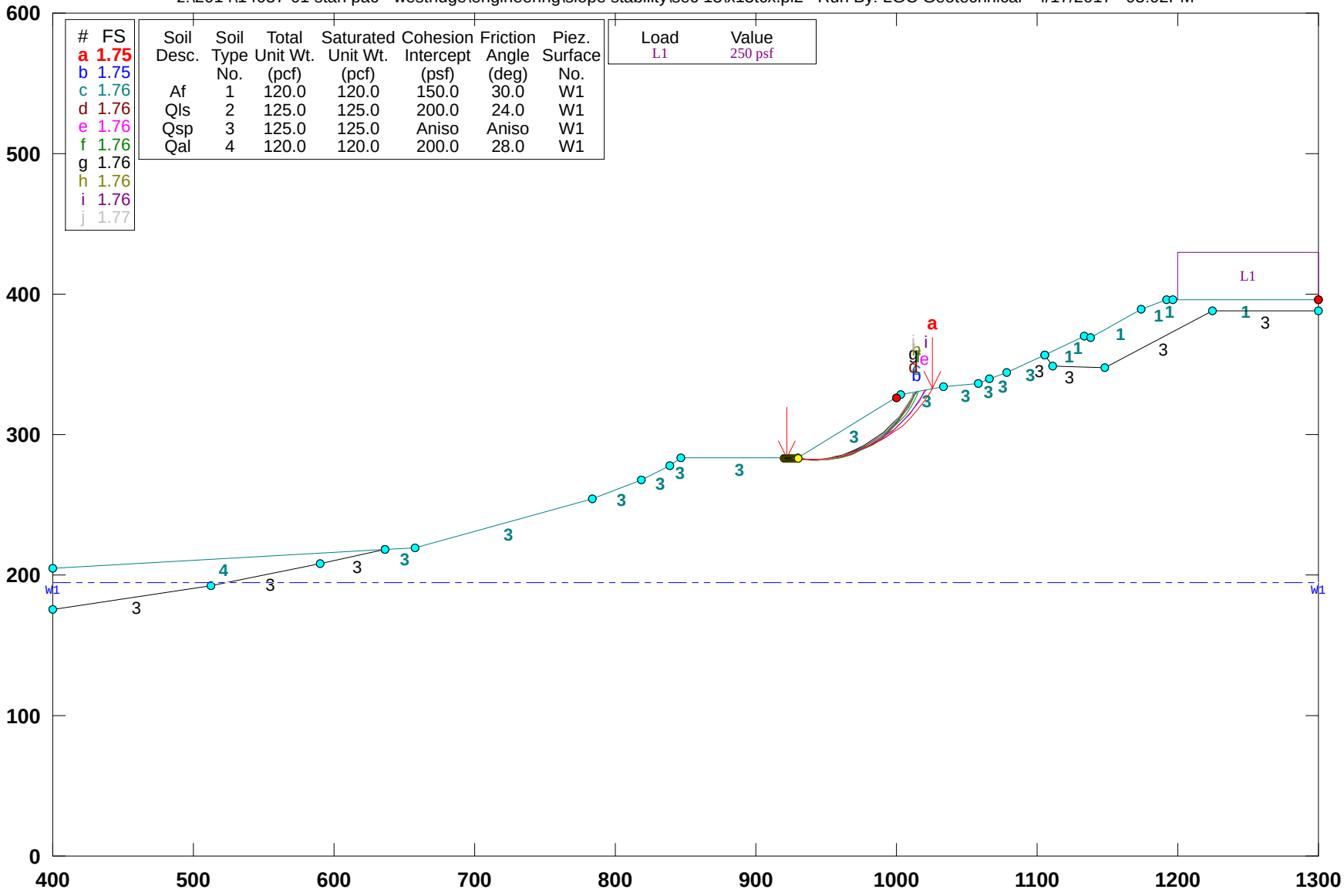
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3136(g)
Calculated Newmark Seismic Displacement = 0.003(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13tcx.pl2  Run By: LGC Geotechnical  4/17/2017  03:02PM




**GSTABL7 v.2  FSmin=1.75**

**Safety Factors Are Calculated By The Modified Bishop Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:  4/17/2017
Time of Run:  03:02PM
Run By:  LGC Geotechnical
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tcx.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tcx.OUT
Unit System:  English
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tcx.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 13-13'/
Temp Backcut Analysis

BOUNDARY COORDINATES
Note: User origin value specified.
Add 400.00 to X-values and 0.00 to Y-values listed.

19 Top Boundaries
26 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 400.00 | 205.00 | 636.00 | 218.00 | 4 |
| 2 | 636.00 | 218.00 | 658.00 | 219.00 | 3 |
| 3 | 658.00 | 219.00 | 784.00 | 254.00 | 3 |
| 4 | 784.00 | 254.00 | 818.00 | 268.00 | 3 |
| 5 | 818.00 | 268.00 | 839.00 | 278.00 | 3 |
| 6 | 839.00 | 278.00 | 847.00 | 284.00 | 3 |
| 7 | 847.00 | 284.00 | 930.00 | 283.00 | 3 |
| 8 | 930.00 | 283.00 | 1003.00 | 328.00 | 3 |
| 9 | 1003.00 | 328.00 | 1033.00 | 334.00 | 3 |
| 10 | 1033.00 | 334.00 | 1058.00 | 336.00 | 3 |
| 11 | 1058.00 | 336.00 | 1066.00 | 340.00 | 3 |
| 12 | 1066.00 | 340.00 | 1078.00 | 344.00 | 3 |
| 13 | 1078.00 | 344.00 | 1105.00 | 357.00 | 3 |
| 14 | 1105.00 | 357.00 | 1134.00 | 370.00 | 1 |
| 15 | 1134.00 | 370.00 | 1138.00 | 369.00 | 1 |
| 16 | 1138.00 | 369.00 | 1174.00 | 389.00 | 1 |
| 17 | 1174.00 | 389.00 | 1192.00 | 396.00 | 1 |
| 18 | 1192.00 | 396.00 | 1196.00 | 396.00 | 1 |
| 19 | 1196.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 20 | 400.00 | 176.00 | 513.00 | 192.00 | 3 |
| 21 | 513.00 | 192.00 | 590.00 | 208.00 | 3 |
| 22 | 590.00 | 208.00 | 636.00 | 218.00 | 3 |
| 23 | 1105.00 | 357.00 | 1111.00 | 349.00 | 3 |
| 24 | 1111.00 | 349.00 | 1148.00 | 348.00 | 3 |
| 25 | 1148.00 | 348.00 | 1225.00 | 388.00 | 3 |
| 26 | 1225.00 | 388.00 | 1300.00 | 388.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 400.00 | 195.00 |
| 2 | 1300.00 | 195.00 |

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1200.00 | 1300.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
EARTHQUAKE DATA HAS BEEN SUPPRESSED
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
250 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 920.00(ft)
and X = 930.00(ft)
Each Surface Terminates Between X =1000.00(ft)
and X =1300.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
8.00(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 = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 3.653 FS Min = 1.751 FS Ave = 2.779
Standard Deviation = 0.507 Coefficient of Variation = 18.26 %
Failure Surface Specified By 17 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.579 | 283.101 |
| 2 | 929.530 | 282.220 |
| 3 | 937.526 | 281.959 |
| 4 | 945.518 | 282.319 |
| 5 | 953.458 | 283.298 |
| 6 | 961.297 | 284.891 |
| 7 | 968.990 | 287.088 |
| 8 | 976.489 | 289.876 |
| 9 | 983.748 | 293.237 |

| | | | |
|---|---|---|---|
| 10 | 990.725 | 297.152 | |
| 11 | 997.377 | 301.596 | |
| 12 | 1003.663 | 306.544 | |
| 13 | 1009.547 | 311.965 | |
| 14 | 1014.991 | 317.826 | |
| 15 | 1019.965 | 324.092 | |
| 16 | 1024.437 | 330.726 | |
| 17 | 1025.434 | 332.487 | |

Circle Center At X = 936.891 ; Y = 384.918 ; and Radius = 102.962

Factor of Safety

*** 1.751 ***

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 | 8.0 | 390.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 0.5 | 46.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 7.5 | 3046.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 8.0 | 7955.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 7.9 | 12112.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 7.8 | 15465.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 7.7 | 17956.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 7.5 | 19556.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 7.3 | 20271.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 7.0 | 20135.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 6.7 | 19214.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 5.6 | 15786.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 0.7 | 1805.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 5.9 | 14316.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 5.4 | 10180.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 5.0 | 6177.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 4.5 | 2477.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 1.0 | 97.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.421 | 283.019 |
| 2 | 936.372 | 282.140 |
| 3 | 944.372 | 282.068 |
| 4 | 952.338 | 282.803 |
| 5 | 960.190 | 284.338 |
| 6 | 967.846 | 286.657 |
| 7 | 975.230 | 289.736 |
| 8 | 982.265 | 293.544 |
| 9 | 988.881 | 298.043 |
| 10 | 995.008 | 303.186 |
| 11 | 1000.586 | 308.921 |
| 12 | 1005.557 | 315.189 |
| 13 | 1009.871 | 321.926 |
| 14 | 1013.482 | 329.065 |
| 15 | 1013.913 | 330.182 |

Circle Center At X = 941.087 ; Y = 361.211 ; and Radius = 79.212

Factor of Safety

*** 1.754 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 924.737 | 283.063 |
| 2 | 932.688 | 282.185 |
| 3 | 940.687 | 282.060 |
| 4 | 948.662 | 282.692 |
| 5 | 956.542 | 284.073 |
| 6 | 964.257 | 286.192 |
| 7 | 971.736 | 289.030 |
| 8 | 978.915 | 292.561 |
| 9 | 985.728 | 296.754 |
| 10 | 992.115 | 301.571 |
| 11 | 998.019 | 306.970 |
| 12 | 1003.386 | 312.902 |



| | | |
|---|---|---|
| 13 | 1008.170 | 319.314 |
| 14 | 1012.327 | 326.149 |
| 15 | 1014.325 | 330.265 |

Circle Center At X = 938.002 ; Y = 366.672 ; and Radius = 84.655

Factor of Safety

*** 1.755 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 926.842 | 283.038 |
| 2 | 934.785 | 282.088 |
| 3 | 942.784 | 281.955 |
| 4 | 950.755 | 282.639 |
| 5 | 958.614 | 284.134 |
| 6 | 966.279 | 286.424 |
| 7 | 973.671 | 289.485 |
| 8 | 980.711 | 293.285 |
| 9 | 987.325 | 297.784 |
| 10 | 993.446 | 302.935 |
| 11 | 999.009 | 308.685 |
| 12 | 1003.955 | 314.973 |
| 13 | 1008.232 | 321.733 |
| 14 | 1011.797 | 328.895 |
| 15 | 1012.149 | 329.830 |

Circle Center At X = 940.088 ; Y = 360.121 ; and Radius = 78.213

Factor of Safety

*** 1.758 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 927.368 | 283.032 |
| 2 | 935.324 | 282.187 |
| 3 | 943.323 | 282.065 |
| 4 | 951.300 | 282.665 |
| 5 | 959.191 | 283.983 |
| 6 | 966.930 | 286.008 |
| 7 | 974.455 | 288.724 |
| 8 | 981.704 | 292.108 |
| 9 | 988.618 | 296.133 |
| 10 | 995.140 | 300.766 |
| 11 | 1001.217 | 305.969 |
| 12 | 1006.799 | 311.699 |
| 13 | 1011.842 | 317.910 |
| 14 | 1016.302 | 324.551 |
| 15 | 1020.060 | 331.412 |

Circle Center At X = 940.678 ; Y = 370.530 ; and Radius = 88.505

Factor of Safety

*** 1.760 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.421 | 283.019 |
| 2 | 936.360 | 282.032 |
| 3 | 944.358 | 281.846 |
| 4 | 952.334 | 282.461 |
| 5 | 960.209 | 283.871 |
| 6 | 967.903 | 286.062 |
| 7 | 975.339 | 289.013 |
| 8 | 982.442 | 292.694 |
| 9 | 989.141 | 297.067 |
| 10 | 995.368 | 302.089 |
| 11 | 1001.062 | 307.709 |
| 12 | 1006.164 | 313.870 |
| 13 | 1010.624 | 320.512 |
| 14 | 1014.396 | 327.567 |
| 15 | 1015.614 | 330.523 |

Circle Center At X = 942.220 ; Y = 361.625 ; and Radius = 79.808

Factor of Safety

*** 1.762 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 923.158 | 283.082 |
| 2 | 931.101 | 282.133 |
| 3 | 939.099 | 281.947 |
| 4 | 947.078 | 282.528 |
| 5 | 954.965 | 283.870 |
| 6 | 962.687 | 285.960 |
| 7 | 970.173 | 288.779 |
| 8 | 977.356 | 292.302 |
| 9 | 984.168 | 296.497 |
| 10 | 990.548 | 301.323 |
| 11 | 996.437 | 306.739 |
| 12 | 1001.780 | 312.693 |
| 13 | 1006.529 | 319.130 |
| 14 | 1010.640 | 325.993 |
| 15 | 1012.498 | 329.900 |

Circle Center At X = 937.033 ; Y = 365.425 ; and Radius = 83.504

Factor of Safety

*** 1.763 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 926.316 | 283.044 |
| 2 | 934.246 | 281.988 |
| 3 | 942.242 | 281.733 |
| 4 | 950.223 | 282.283 |
| 5 | 958.108 | 283.632 |
| 6 | 965.818 | 285.767 |
| 7 | 973.274 | 288.666 |
| 8 | 980.402 | 292.299 |
| 9 | 987.128 | 296.630 |
| 10 | 993.385 | 301.615 |
| 11 | 999.109 | 307.204 |
| 12 | 1004.243 | 313.339 |
| 13 | 1008.734 | 319.959 |
| 14 | 1012.538 | 326.997 |
| 15 | 1013.861 | 330.172 |

Circle Center At X = 940.771 ; Y = 361.234 ; and Radius = 79.515

Factor of Safety

*** 1.763 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 923.684 | 283.076 |
| 2 | 931.639 | 282.232 |
| 3 | 939.638 | 282.063 |
| 4 | 947.622 | 282.572 |
| 5 | 955.534 | 283.755 |
| 6 | 963.317 | 285.602 |
| 7 | 970.917 | 288.101 |
| 8 | 978.278 | 291.235 |
| 9 | 985.347 | 294.979 |
| 10 | 992.075 | 299.309 |
| 11 | 998.411 | 304.192 |
| 12 | 1004.313 | 309.593 |
| 13 | 1009.736 | 315.475 |
| 14 | 1014.642 | 321.794 |
| 15 | 1018.996 | 328.505 |
| 16 | 1020.607 | 331.521 |

Circle Center At X = 937.660 ; Y = 376.294 ; and Radius = 94.259

Factor of Safety

*** 1.764 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 924.210 | 283.070 |
| 2 | 932.131 | 281.943 |
| 3 | 940.124 | 281.621 |
| 4 | 948.109 | 282.107 |



| | | |
|---|---|---|
| 5 | 956.005 | 283.396 |
| 6 | 963.730 | 285.475 |
| 7 | 971.206 | 288.322 |
| 8 | 978.357 | 291.909 |
| 9 | 985.110 | 296.198 |
| 10 | 991.396 | 301.147 |
| 11 | 997.150 | 306.705 |
| 12 | 1002.314 | 312.815 |
| 13 | 1006.836 | 319.414 |
| 14 | 1010.670 | 326.436 |
| 15 | 1012.095 | 329.819 |

Circle Center At X = 939.311 ; Y = 360.834 ; and Radius = 79.217

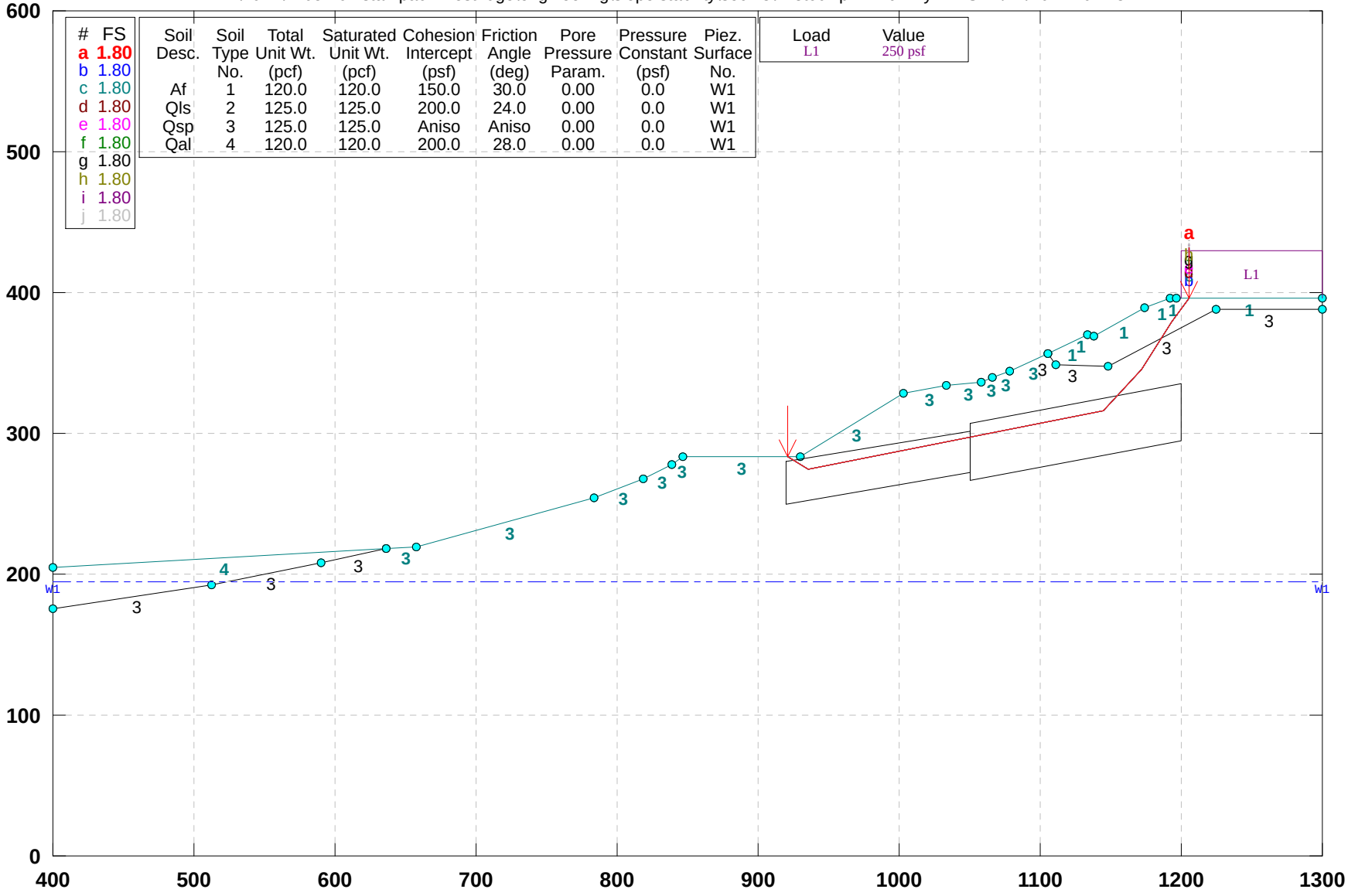
Factor of Safety

*** 1.769 ***

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

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis - Search

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13tcbx.pl2 Run By: KMS 4/14/2017 02:43PM

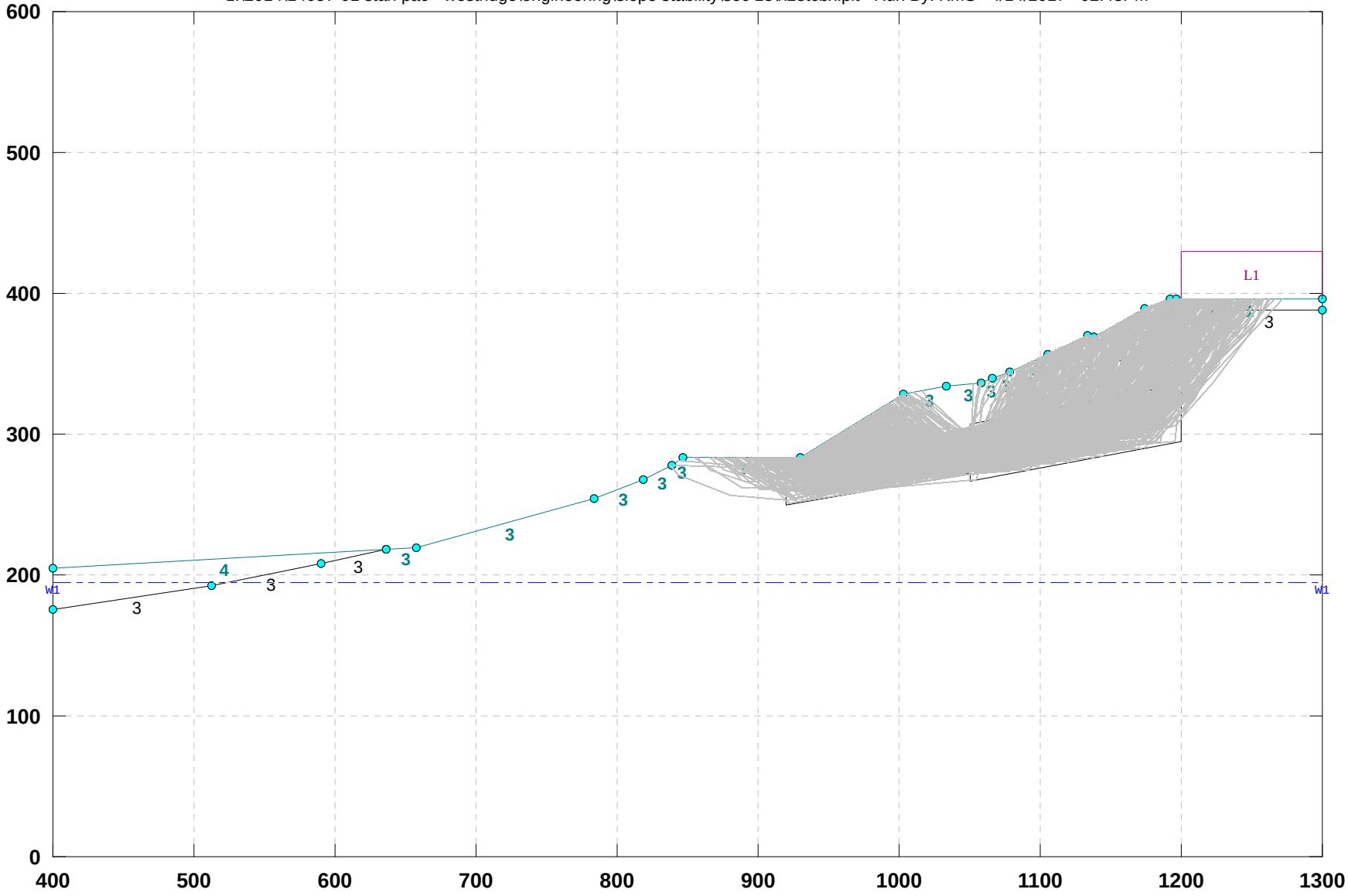



**GSTABL7 v.2 FSmin=1.80**

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

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis - Search

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13tcbx.plt Run By: KMS 4/14/2017 02:43PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:43PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tcbx.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tcbx.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tcbx.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 13-13'/
Temp Backcut Analysis - Search

BOUNDARY COORDINATES

19 Top Boundaries

26 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 400.00 | 205.00 | 636.00 | 218.00 | 4 |
| 2 | 636.00 | 218.00 | 658.00 | 219.00 | 3 |
| 3 | 658.00 | 219.00 | 784.00 | 254.00 | 3 |
| 4 | 784.00 | 254.00 | 818.00 | 268.00 | 3 |
| 5 | 818.00 | 268.00 | 839.00 | 278.00 | 3 |
| 6 | 839.00 | 278.00 | 847.00 | 284.00 | 3 |
| 7 | 847.00 | 284.00 | 930.00 | 283.00 | 3 |
| 8 | 930.00 | 283.00 | 1003.00 | 328.00 | 3 |
| 9 | 1003.00 | 328.00 | 1033.00 | 334.00 | 3 |
| 10 | 1033.00 | 334.00 | 1058.00 | 336.00 | 3 |
| 11 | 1058.00 | 336.00 | 1066.00 | 340.00 | 3 |
| 12 | 1066.00 | 340.00 | 1078.00 | 344.00 | 3 |
| 13 | 1078.00 | 344.00 | 1105.00 | 357.00 | 3 |
| 14 | 1105.00 | 357.00 | 1134.00 | 370.00 | 1 |
| 15 | 1134.00 | 370.00 | 1138.00 | 369.00 | 1 |
| 16 | 1138.00 | 369.00 | 1174.00 | 389.00 | 1 |
| 17 | 1174.00 | 389.00 | 1192.00 | 396.00 | 1 |
| 18 | 1192.00 | 396.00 | 1196.00 | 396.00 | 1 |
| 19 | 1196.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 20 | 400.00 | 176.00 | 513.00 | 192.00 | 3 |
| 21 | 513.00 | 192.00 | 590.00 | 208.00 | 3 |
| 22 | 590.00 | 208.00 | 636.00 | 218.00 | 3 |
| 23 | 1105.00 | 357.00 | 1111.00 | 349.00 | 3 |
| 24 | 1111.00 | 349.00 | 1148.00 | 348.00 | 3 |
| 25 | 1148.00 | 348.00 | 1225.00 | 388.00 | 3 |
| 26 | 1225.00 | 388.00 | 1300.00 | 388.00 | 3 |

Default Y-Origin = 0.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

| Soil Type | Total Unit Wt. | Saturated Unit Wt. | Cohesion Intercept | Friction Angle | Pore Pressure | Pressure Constant | Piez. Surface |
|---|---|---|---|---|---|---|---|

| No. | (pcf) | (pcf) | (psf) | (deg) | Param. | (psf) | No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 400.00 | 195.00 |
| 2 | 1300.00 | 195.00 |

1

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1200.00 | 1300.00 | 250.0 | 0.0 |

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

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 920.00 | 265.00 | 1050.00 | 287.00 | 30.00 |
| 2 | 1050.10 | 287.00 | 1200.00 | 315.00 | 40.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Individual data on the 21 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.6 | 2850.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 5.3 | 5727.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 67.7 | 220481.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 30.0 | 150840.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 25.0 | 121136.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 8.0 | 38487.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 12.0 | 60752.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 27.0 | 152312.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 6.0 | 37113.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 23.0 | 151433.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 4.0 | 27223.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 7.0 | 47795.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 3.0 | 20739.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 24.0 | 142930.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 2.0 | 10239.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 11.6 | 46352.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 6.4 | 16975.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 1.0 | 2120.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 3.0 | 5154.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 4.0 | 4627.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 5.0 | 2081.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1257.3 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |

6 1205.029 396.000

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point | X-Surf | Y-Surf |
|---|---|---|

| No. | (ft) | (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

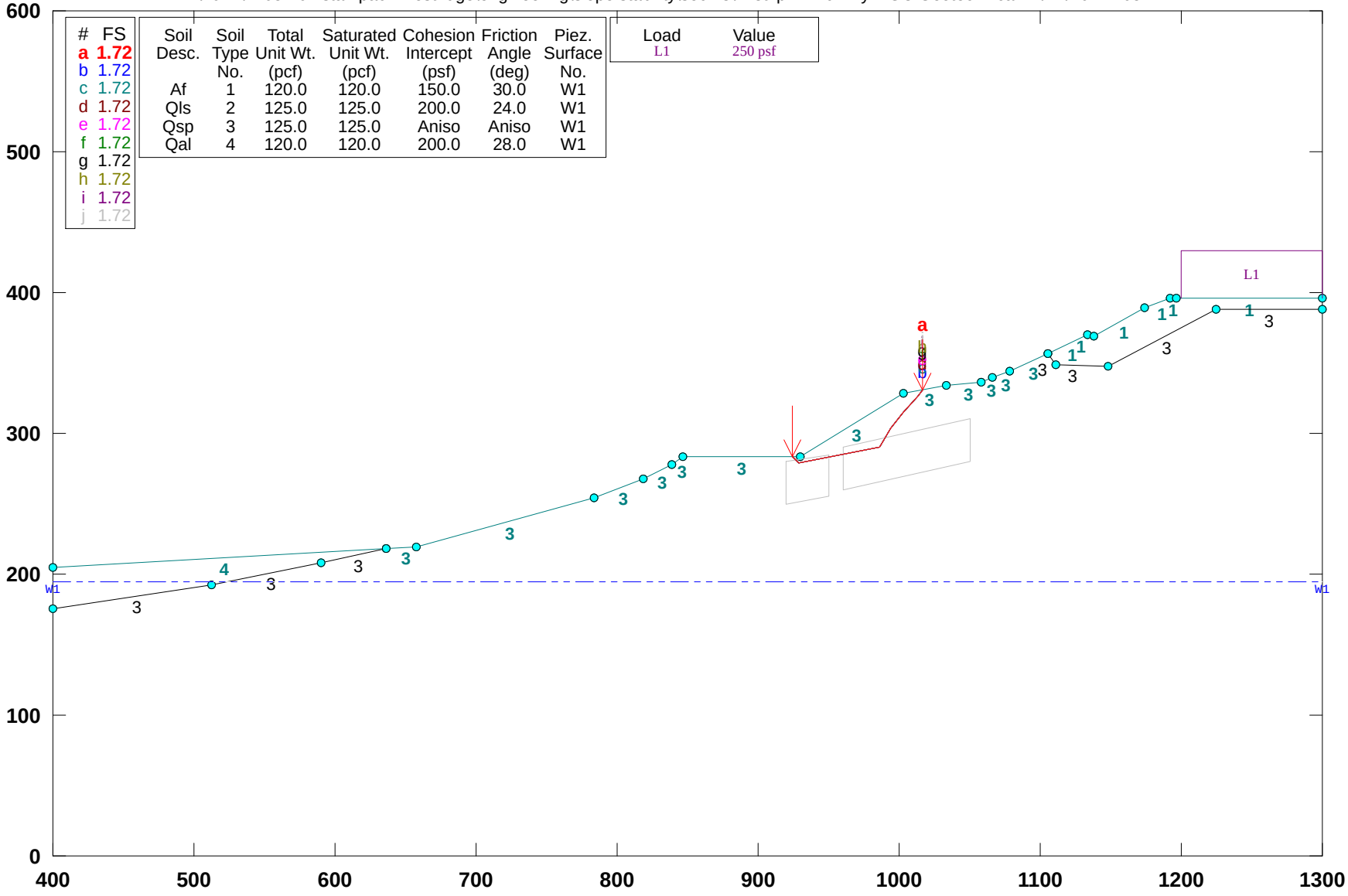
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

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

# Westridge/14057-01/Sec 13-13'/ Temp Backcut  Lower Slope

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13tl.pl2  Run By: LGC Geotechnical  4/17/2017  05:12PM




| # | FS |
|---|---|
| a | 1.72 |
| b | 1.72 |
| c | 1.72 |
| d | 1.72 |
| e | 1.72 |
| f | 1.72 |
| g | 1.72 |
| h | 1.72 |
| i | 1.72 |
| j | 1.72 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

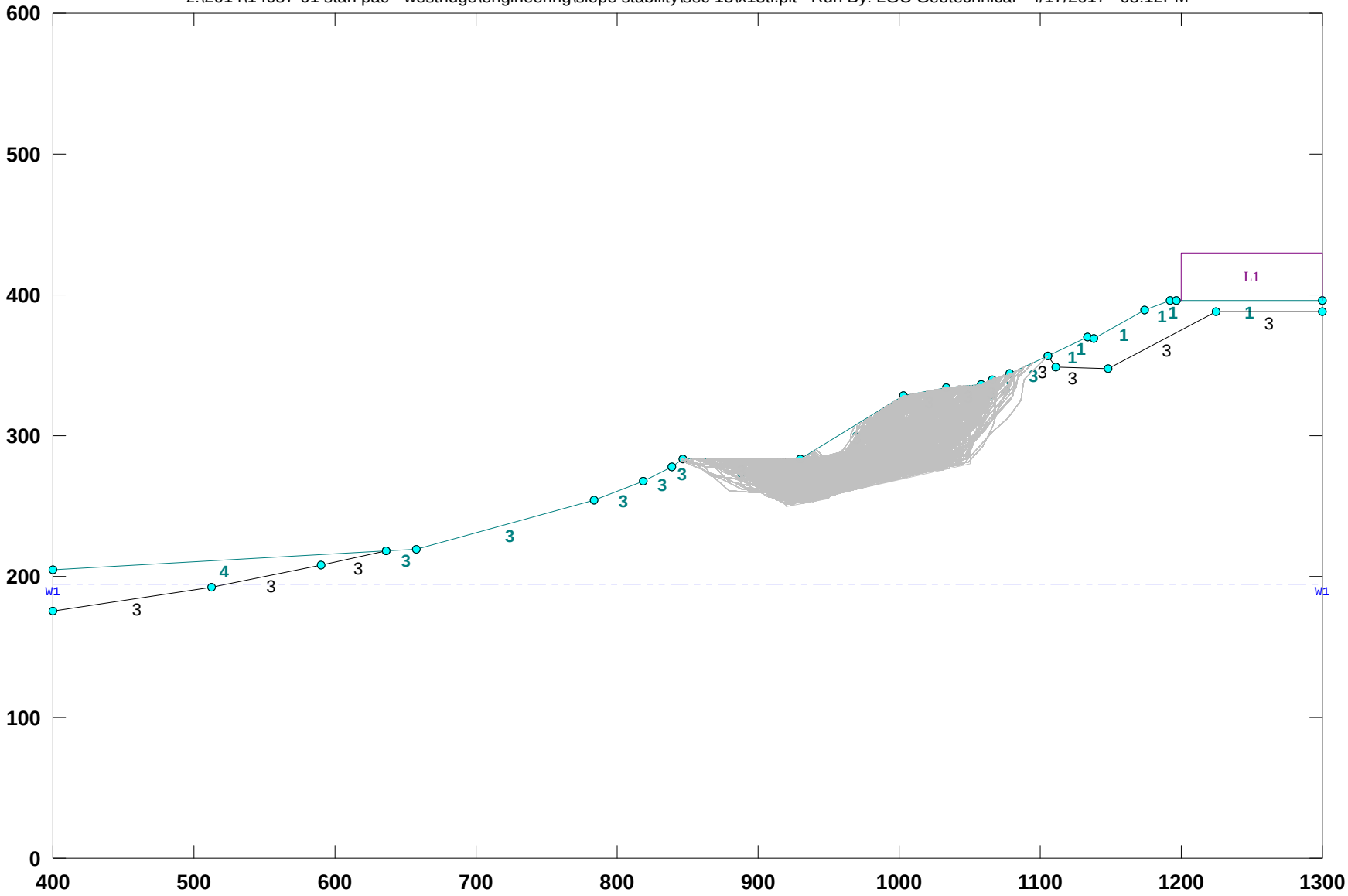
| Load | Value |
|---|---|
| L1 | 250 psf |

**GSTABL7 v.2  FSmin=1.72**

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

# Westridge/14057-01/Sec 13-13'/ Temp Backcut  Lower Slope

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 13\x13tl.plt  Run By: LGC Geotechnical  4/17/2017  05:12PM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 4/17/2017
Time of Run: 05:12PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tl.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tl.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 13\x13tl.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 13-13'/
Temp Backcut Lower Slope

BOUNDARY COORDINATES
Note: User origin value specified.
Add 400.00 to X-values and 0.00 to Y-values listed.

19 Top Boundaries
26 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 400.00 | 205.00 | 636.00 | 218.00 | 4 |
| 2 | 636.00 | 218.00 | 658.00 | 219.00 | 3 |
| 3 | 658.00 | 219.00 | 784.00 | 254.00 | 3 |
| 4 | 784.00 | 254.00 | 818.00 | 268.00 | 3 |
| 5 | 818.00 | 268.00 | 839.00 | 278.00 | 3 |
| 6 | 839.00 | 278.00 | 847.00 | 284.00 | 3 |
| 7 | 847.00 | 284.00 | 930.00 | 283.00 | 3 |
| 8 | 930.00 | 283.00 | 1003.00 | 328.00 | 3 |
| 9 | 1003.00 | 328.00 | 1033.00 | 334.00 | 3 |
| 10 | 1033.00 | 334.00 | 1058.00 | 336.00 | 3 |
| 11 | 1058.00 | 336.00 | 1066.00 | 340.00 | 3 |
| 12 | 1066.00 | 340.00 | 1078.00 | 344.00 | 3 |
| 13 | 1078.00 | 344.00 | 1105.00 | 357.00 | 3 |
| 14 | 1105.00 | 357.00 | 1134.00 | 370.00 | 1 |
| 15 | 1134.00 | 370.00 | 1138.00 | 369.00 | 1 |
| 16 | 1138.00 | 369.00 | 1174.00 | 389.00 | 1 |
| 17 | 1174.00 | 389.00 | 1192.00 | 396.00 | 1 |
| 18 | 1192.00 | 396.00 | 1196.00 | 396.00 | 1 |
| 19 | 1196.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 20 | 400.00 | 176.00 | 513.00 | 192.00 | 3 |
| 21 | 513.00 | 192.00 | 590.00 | 208.00 | 3 |
| 22 | 590.00 | 208.00 | 636.00 | 218.00 | 3 |
| 23 | 1105.00 | 357.00 | 1111.00 | 349.00 | 3 |
| 24 | 1111.00 | 349.00 | 1148.00 | 348.00 | 3 |
| 25 | 1148.00 | 348.00 | 1225.00 | 388.00 | 3 |
| 26 | 1225.00 | 388.00 | 1300.00 | 388.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 400.00 | 195.00 |
| 2 | 1300.00 | 195.00 |

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1200.00 | 1300.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 15.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 920.00 | 265.00 | 950.00 | 270.00 | 30.00 |
| 2 | 960.00 | 275.00 | 1050.00 | 295.00 | 30.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 7.424 FS Min = 1.721 FS Ave = 2.745
Standard Deviation = 0.687 Coefficient of Variation = 25.03 %
Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 924.355 | 283.068 |
| 2 | 929.036 | 278.919 |
| 3 | 986.186 | 290.639 |
| 4 | 993.828 | 303.546 |
| 5 | 1003.351 | 315.136 |
| 6 | 1012.915 | 326.691 |
| 7 | 1016.112 | 330.622 |

Factor of Safety
*** 1.721 ***
Individual data on the 8 slices

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

| No. | (ft) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) | (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.7 | 1197.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 1.0 | 480.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 56.2 | 108437.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 7.6 | 21873.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 9.2 | 18396.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 0.4 | 574.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 9.6 | 9700.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 3.2 | 657.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 924.355 | 283.068 |
| 2 | 929.036 | 278.919 |
| 3 | 986.186 | 290.639 |
| 4 | 993.828 | 303.546 |
| 5 | 1003.351 | 315.136 |
| 6 | 1012.915 | 326.691 |
| 7 | 1016.112 | 330.622 |

Factor of Safety
*** 1.721 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 924.355 | 283.068 |
| 2 | 929.036 | 278.919 |
| 3 | 986.186 | 290.639 |
| 4 | 993.828 | 303.546 |
| 5 | 1003.351 | 315.136 |
| 6 | 1012.915 | 326.691 |
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Factor of Safety
*** 1.721 ***

Failure Surface Specified By 7 Coordinate Points

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Factor of Safety
*** 1.721 ***

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Factor of Safety
*** 1.721 ***

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Factor of Safety
*** 1.721 ***

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Factor of Safety
*** 1.721 ***

Failure Surface Specified By 7 Coordinate Points



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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Factor of Safety
*** 1.721 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 924.355 | 283.068 |
| 2 | 929.036 | 278.919 |
| 3 | 986.186 | 290.639 |
| 4 | 993.828 | 303.546 |
| 5 | 1003.351 | 315.136 |
| 6 | 1012.915 | 326.691 |
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Factor of Safety
*** 1.721 ***

Failure Surface Specified By 7 Coordinate Points

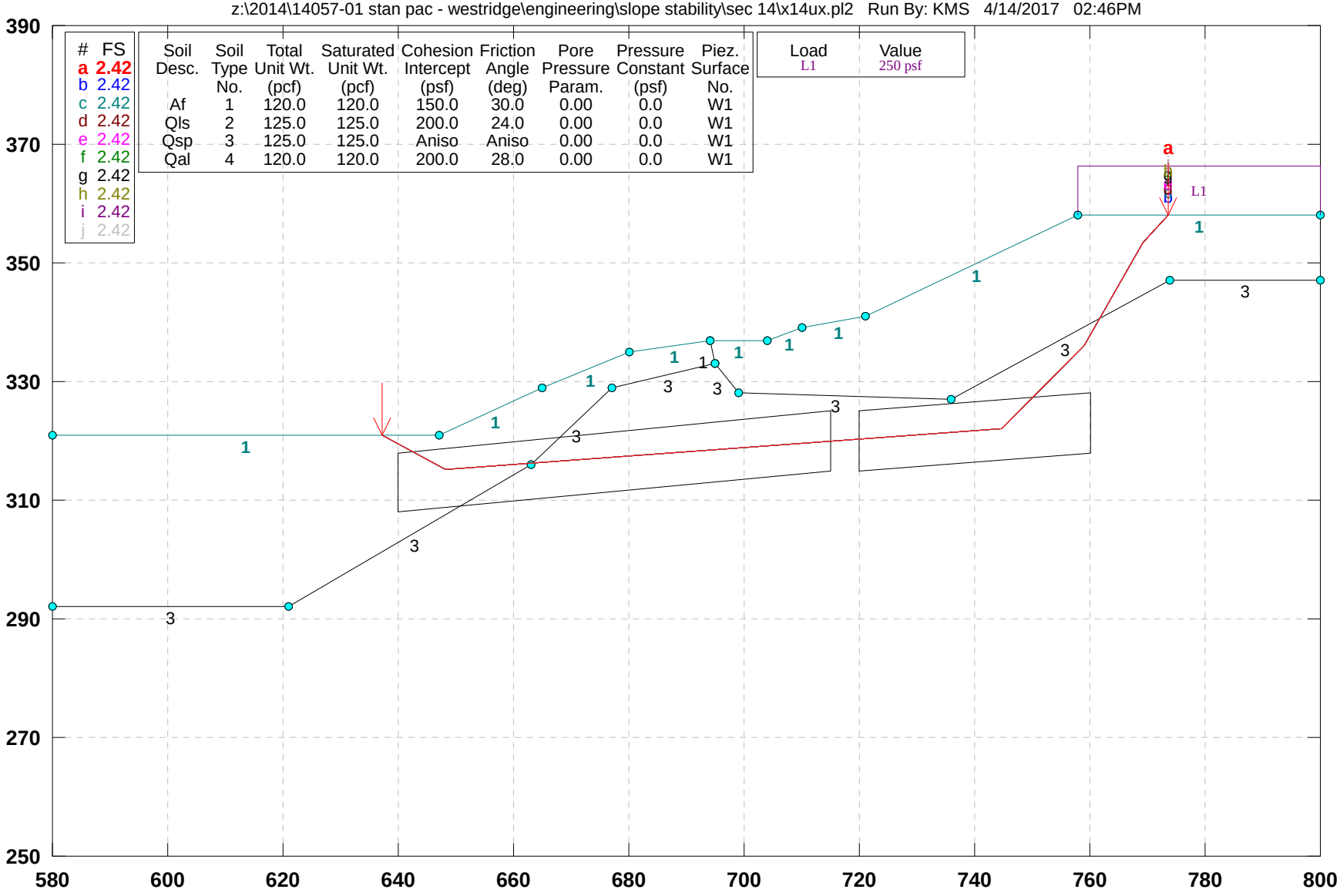
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 924.355 | 283.068 |
| 2 | 929.036 | 278.919 |
| 3 | 986.186 | 290.639 |
| 4 | 993.828 | 303.546 |
| 5 | 1003.351 | 315.136 |
| 6 | 1012.915 | 326.691 |
| 7 | 1016.112 | 330.622 |

Factor of Safety
*** 1.721 ***

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

# Westridge/14057-01/Sec 14-14'/Upper Slope/Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 14\x14ux.pl2  Run By: KMS  4/14/2017  02:46PM

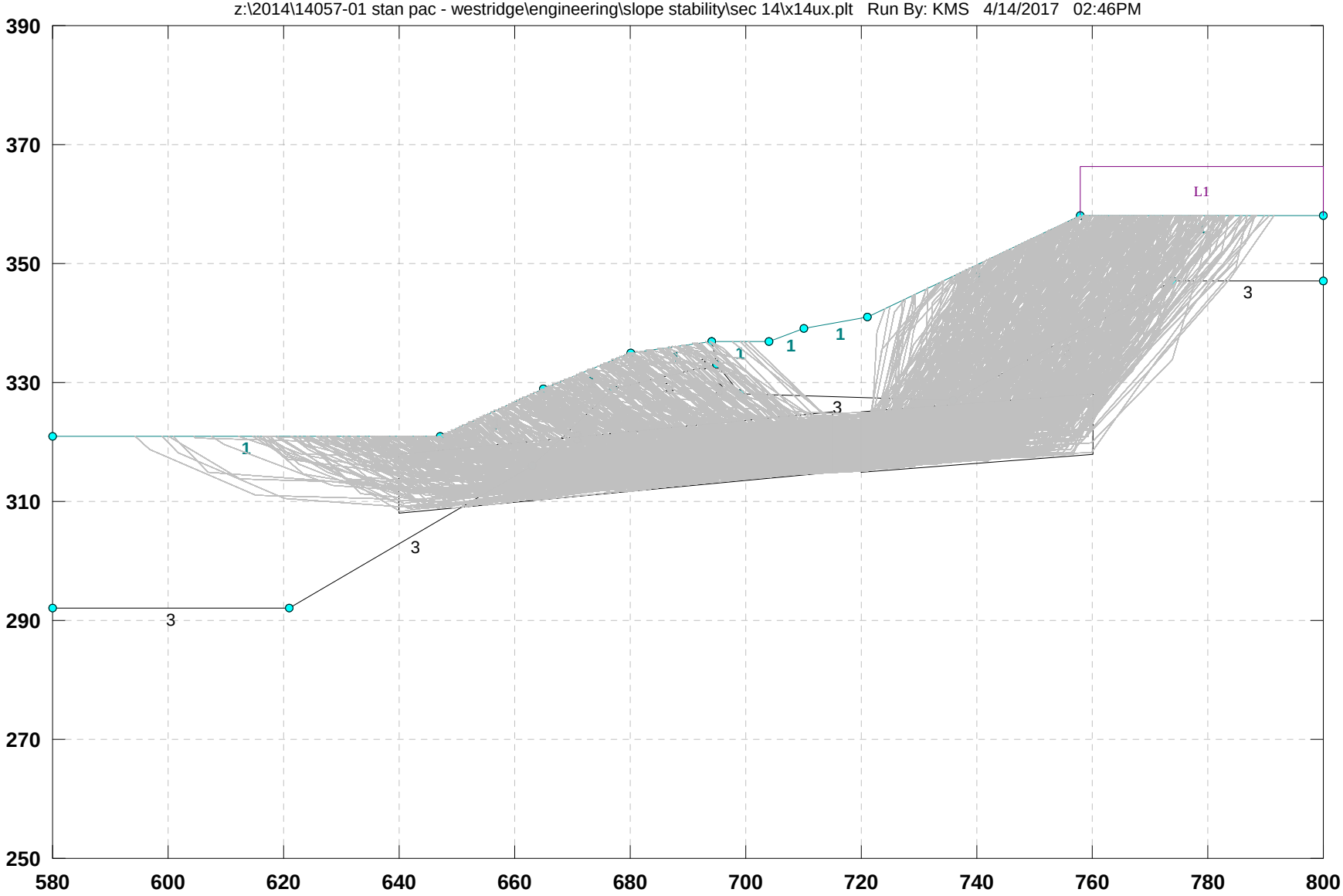



**GSTABL7 v.2  FSmin=2.42**

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

# Westridge/14057-01/Sec 14-14'/Upper Slope/Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 14\x14ux.plt Run By: KMS 4/14/2017 02:46PM



*** GSTABL7 ***

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

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

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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: 4/14/2017
Time of Run: 02:46PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 14\x14ux.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 14\x14ux.OUT
Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 14\x14ux.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 14-14'/Upper Slope/Static

BOUNDARY COORDINATES

9 Top Boundaries

23 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 580.00 | 321.00 | 647.00 | 321.00 | 1 |
| 2 | 647.00 | 321.00 | 665.00 | 329.00 | 1 |
| 3 | 665.00 | 329.00 | 680.00 | 335.00 | 1 |
| 4 | 680.00 | 335.00 | 694.00 | 337.00 | 1 |
| 5 | 694.00 | 337.00 | 704.00 | 337.00 | 1 |
| 6 | 704.00 | 337.00 | 710.00 | 339.00 | 1 |
| 7 | 710.00 | 339.00 | 721.00 | 341.00 | 1 |
| 8 | 721.00 | 341.00 | 758.00 | 358.00 | 1 |
| 9 | 758.00 | 358.00 | 800.00 | 358.00 | 1 |
| 10 | 694.00 | 337.00 | 695.00 | 333.00 | 1 |
| 11 | 695.00 | 333.00 | 699.00 | 328.00 | 3 |
| 12 | 699.00 | 328.00 | 736.00 | 327.00 | 3 |
| 13 | 736.00 | 327.00 | 774.00 | 347.00 | 3 |
| 14 | 774.00 | 347.00 | 800.00 | 347.00 | 3 |
| 15 | 60.00 | 300.00 | 73.00 | 299.00 | 1 |
| 16 | 73.00 | 299.00 | 86.00 | 300.00 | 1 |
| 17 | 86.00 | 300.00 | 90.00 | 296.00 | 1 |
| 18 | 580.00 | 292.00 | 621.00 | 292.00 | 3 |
| 19 | 621.00 | 292.00 | 663.00 | 316.00 | 3 |
| 20 | 663.00 | 316.00 | 677.00 | 329.00 | 3 |
| 21 | 677.00 | 329.00 | 695.00 | 333.00 | 3 |
| 22 | 0.00 | 279.00 | 67.00 | 279.00 | 3 |
| 23 | 67.00 | 279.00 | 88.00 | 297.00 | 3 |

User Specified Y-Origin = 250.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |
| 3 | 125.0 | 125.0 | 30.0 | 32.0 | 0.00 | 0.0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 3.0 | 300.00 | 32.00 |
| 2 | 6.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

BOUNDARY LOAD(S)

1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 758.00 | 800.00 | 250.0 | 0.0 |

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

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

9999 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 640.00 | 313.00 | 715.00 | 320.00 | 10.00 |
| 2 | 720.00 | 320.00 | 760.00 | 323.00 | 10.00 |

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

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

Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |

6 773.602 358.000

Factor of Safety
*** 2.423 ***

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 | 9.8 | 3117.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 1.1 | 745.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 15.2 | 16684.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 1.8 | 2599.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 12.0 | 21448.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 3.0 | 6329.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 14.0 | 31296.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 1.0 | 2296.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 4.0 | 9050.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 5.0 | 11047.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 6.0 | 13677.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 11.0 | 26868.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 15.0 | 42874.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 8.8 | 29915.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 13.2 | 42195.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 0.9 | 2391.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 222.7 |
| 17 | 2.6 | 6048.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 637.5 |
| 18 | 7.8 | 10508.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1961.2 |
| 19 | 4.3 | 1221.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1079.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

1

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
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Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |

| | | |
|---|---|---|
| 3 | 744.753 | 322.051 |
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Factor of Safety
*** 2.423 ***

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Factor of Safety
*** 2.423 ***

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Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
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Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 2 | 648.070 | 315.144 |
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Factor of Safety
*** 2.423 ***

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Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
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Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

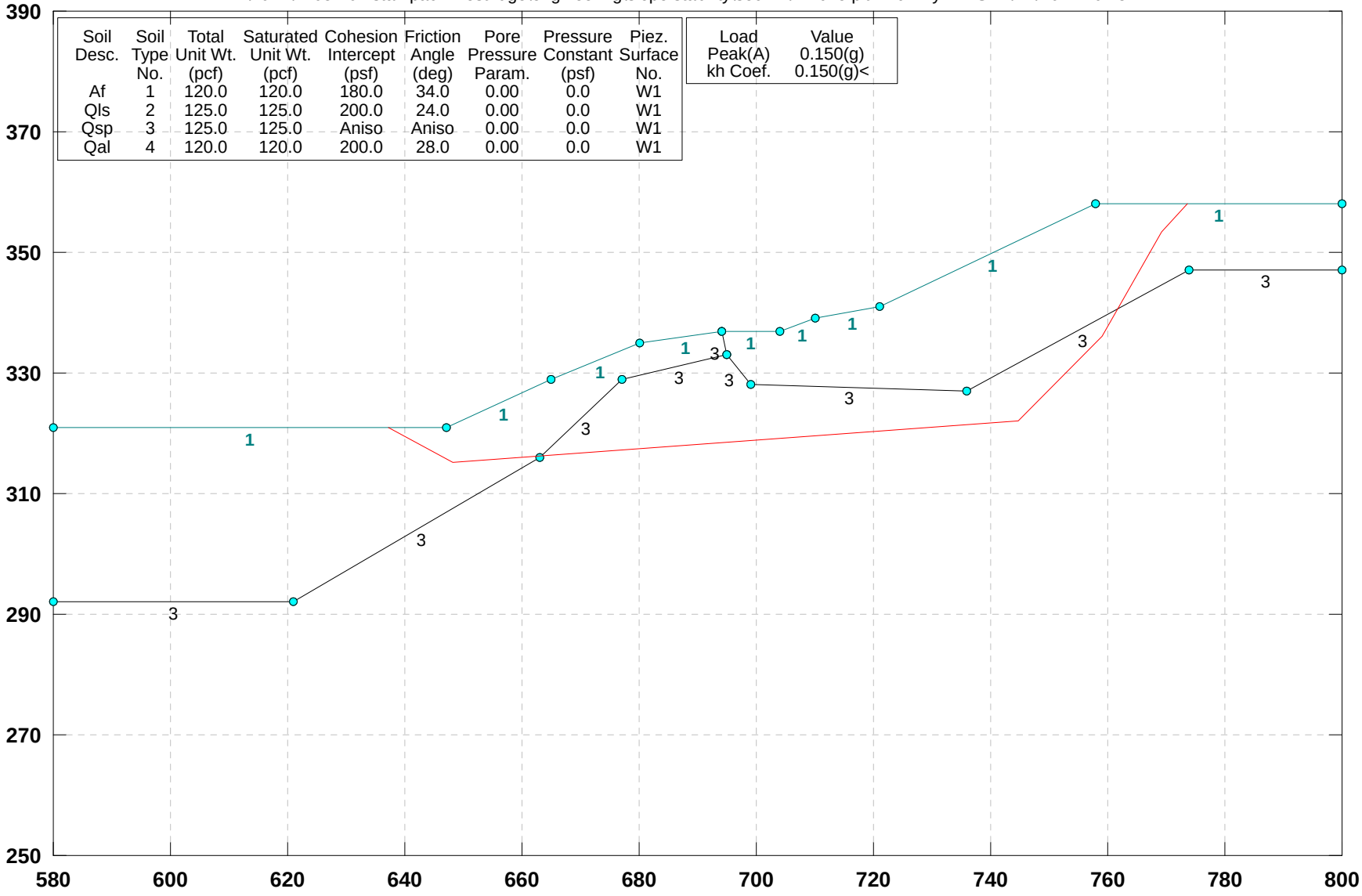
**** END OF GSTABL7 OUTPUT ****

# Westridge/14057-01/Sec 14-14'/Upper Slope/ Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 14\x14uxe.plt Run By: KMS 4/14/2017 02:51PM

| 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. |
|---|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.00 | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.86**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*** GSTABL7 ***

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

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

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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: 4/14/2017

Time of Run: 02:51PM

Run By: KMS

Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 14\x14uxe.in

Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 14\x14uxe.OUT

Unit System: English

Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Sec 14\x14uxe.PLT

PROBLEM DESCRIPTION: Westridge/14057-01/Sec 14-14'/Upper Slope/ Seismic

BOUNDARY COORDINATES

9 Top Boundaries

23 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 580.00 | 321.00 | 647.00 | 321.00 | 1 |
| 2 | 647.00 | 321.00 | 665.00 | 329.00 | 1 |
| 3 | 665.00 | 329.00 | 680.00 | 335.00 | 1 |
| 4 | 680.00 | 335.00 | 694.00 | 337.00 | 1 |
| 5 | 694.00 | 337.00 | 704.00 | 337.00 | 1 |
| 6 | 704.00 | 337.00 | 710.00 | 339.00 | 1 |
| 7 | 710.00 | 339.00 | 721.00 | 341.00 | 1 |
| 8 | 721.00 | 341.00 | 758.00 | 358.00 | 1 |
| 9 | 758.00 | 358.00 | 800.00 | 358.00 | 1 |
| 10 | 694.00 | 337.00 | 695.00 | 333.00 | 3 |
| 11 | 695.00 | 333.00 | 699.00 | 328.00 | 3 |
| 12 | 699.00 | 328.00 | 736.00 | 327.00 | 3 |
| 13 | 736.00 | 327.00 | 774.00 | 347.00 | 3 |
| 14 | 774.00 | 347.00 | 800.00 | 347.00 | 3 |
| 15 | 60.00 | 300.00 | 73.00 | 299.00 | 1 |
| 16 | 73.00 | 299.00 | 86.00 | 300.00 | 1 |
| 17 | 86.00 | 300.00 | 90.00 | 296.00 | 1 |
| 18 | 580.00 | 292.00 | 621.00 | 292.00 | 3 |
| 19 | 621.00 | 292.00 | 663.00 | 316.00 | 3 |
| 20 | 663.00 | 316.00 | 677.00 | 329.00 | 3 |
| 21 | 677.00 | 329.00 | 695.00 | 333.00 | 3 |
| 22 | 0.00 | 279.00 | 67.00 | 279.00 | 3 |
| 23 | 67.00 | 279.00 | 88.00 | 297.00 | 3 |

User Specified Y-Origin = 250.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

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 Piez. Constant (psf) | Surface No. |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 3.0 | 500.00 | 34.00 |
| 2 | 6.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

Janbu's Empirical Coef. is being used for the case of c & phi both > 0

Trial Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Janbu's Empirical Coefficient (fo) = 1.070

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.862

***Table 1 - 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 | 9.8 | 3117.9 | 0.0 | 0.0 | 0.0 | 0.0 | 467.7 | 0.0 | 0.0 |
| 2 | 1.1 | 745.6 | 0.0 | 0.0 | 0.0 | 0.0 | 111.8 | 0.0 | 0.0 |
| 3 | 15.2 | 16684.5 | 0.0 | 0.0 | 0.0 | 0.0 | 2502.7 | 0.0 | 0.0 |
| 4 | 1.8 | 2600.0 | 0.0 | 0.0 | 0.0 | 0.0 | 390.0 | 0.0 | 0.0 |
| 5 | 12.0 | 21448.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3217.3 | 0.0 | 0.0 |
| 6 | 3.0 | 6329.8 | 0.0 | 0.0 | 0.0 | 0.0 | 949.5 | 0.0 | 0.0 |
| 7 | 14.0 | 31296.6 | 0.0 | 0.0 | 0.0 | 0.0 | 4694.5 | 0.0 | 0.0 |
| 8 | 1.0 | 2307.4 | 0.0 | 0.0 | 0.0 | 0.0 | 346.1 | 0.0 | 0.0 |
| 9 | 4.0 | 9050.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1357.5 | 0.0 | 0.0 |
| 10 | 5.0 | 11047.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1657.2 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 6.0 | 13678.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2051.7 | 0.0 | 0.0 |
| 12 | 11.0 | 26868.8 | 0.0 | 0.0 | 0.0 | 0.0 | 4030.3 | 0.0 | 0.0 |
| 13 | 15.0 | 42874.4 | 0.0 | 0.0 | 0.0 | 0.0 | 6431.2 | 0.0 | 0.0 |
| 14 | 8.8 | 29913.8 | 0.0 | 0.0 | 0.0 | 0.0 | 4487.1 | 0.0 | 0.0 |
| 15 | 13.2 | 42197.6 | 0.0 | 0.0 | 0.0 | 0.0 | 6329.6 | 0.0 | 0.0 |
| 16 | 0.9 | 2392.3 | 0.0 | 0.0 | 0.0 | 0.0 | 358.9 | 0.0 | 0.0 |
| 17 | 2.6 | 6049.0 | 0.0 | 0.0 | 0.0 | 0.0 | 907.4 | 0.0 | 0.0 |
| 18 | 7.8 | 10507.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1576.2 | 0.0 | 0.0 |
| 19 | 4.3 | 1221.0 | 0.0 | 0.0 | 0.0 | 0.0 | 183.2 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 19 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -28.23 | 642.08 | 11.17 | 554.76 | -108.00 |
| 2 | -28.23 | 647.54 | 1.21 | 915.79 | -237.47 |
| 3 | 4.09 | 655.66 | 15.21 | 900.61 | 242.84 |
| 4 | 4.09 | 664.12 | 1.76 | 939.23 | 327.36 |
| 5 | 4.09 | 671.00 | 12.03 | 1092.20 | 394.79 |
| 6 | 4.09 | 678.50 | 3.01 | 1253.80 | 466.03 |
| 7 | 4.09 | 687.00 | 14.04 | 1316.70 | 493.76 |
| 8 | 4.09 | 694.50 | 1.00 | 1352.73 | 509.65 |
| 9 | 4.09 | 697.00 | 4.01 | 1330.27 | 499.75 |
| 10 | 4.09 | 701.50 | 5.01 | 1303.71 | 488.03 |
| 11 | 4.09 | 707.00 | 6.02 | 1338.85 | 503.53 |
| 12 | 4.09 | 715.50 | 11.03 | 1420.49 | 539.52 |
| 13 | 4.09 | 728.50 | 15.04 | 1628.76 | 631.33 |
| 14 | 4.09 | 740.38 | 8.78 | 1908.96 | 754.86 |
| 15 | 45.02 | 751.38 | 18.74 | 2750.10 | 2590.92 |
| 16 | 45.02 | 758.45 | 1.26 | 2399.64 | 2183.91 |
| 17 | 58.69 | 760.17 | 4.91 | 2532.37 | 2211.24 |
| 18 | 58.69 | 765.36 | 15.09 | 1306.69 | 1248.79 |
| 19 | 47.53 | 771.44 | 6.39 | 393.49 | 237.33 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 223482.25 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1435.30(psf)

Sum of the Driving Forces = 128438.80 (lbs)

Average Mobilized Shear Stress = 824.89(psf)

Total length of the failure surface = 155.70(ft)

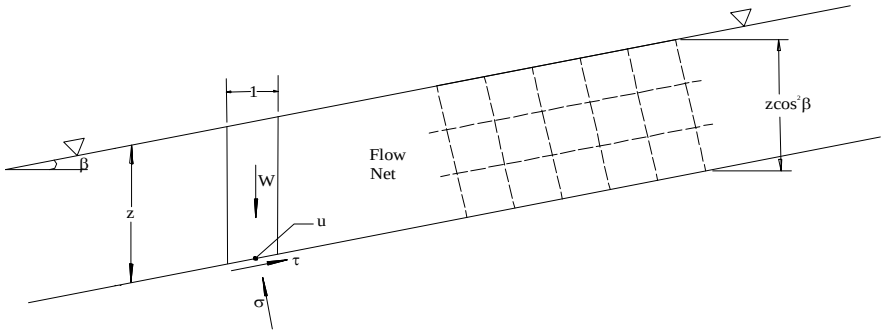
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.4736(g)
Calculated Newmark Seismic Displacement = 0.001(ft)

Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

## MANUFACTURED 2H:1V FILL SLOPE

### INFINITE SLOPE CONDITION




### ASSUMPTION

| | |
|---|---|
| Depth of Saturation (ft), z<br>(and steady seepage parallel to slope face) | 4 |

### SOIL PARAMETERS

| | |
|---|---|
| Angle of Internal Friction, $\phi$ | 26 |
| Cohesion (psf), c | 300 |
| Saturated Unit Weight of Soil (pcf), $\gamma_{sat}$ | 125 |
| Unit Weight of Water (pcf), $\gamma_w$ | 62.4 |
| Slope Angle (2H:1V), $\beta$ | 26.6 |

### CALCULATIONS

Normal Stress Along Failure Plane

$$\sigma = \gamma_{sat} * z * \cos^2 \beta \qquad \sigma = 399.756 \text{ lb/ft}^2$$

Shear Stress Along Failure Plane

$$\tau_d = \gamma_{sat} * z * \sin \beta * \cos \beta \qquad \tau_d = 200.183 \text{ lb/ft}^2$$

Pore Pressure Along Failure Plane

$$u = \gamma_w * z * \cos^2 \beta \qquad u = 199.558 \text{ lb/ft}^2$$

Resisting Shear Stress Along Failure Plane

$$\tau_r = c + (\sigma - u) \tan \phi \qquad \tau_r = 397.643 \text{ lb/ft}^2$$

### FACTOR OF SAFETY

$$\mathbf{FS} = \frac{\tau_r}{\tau_d}$$

**FS = 1.99**

| | | | |
|---|---|---|---|
| LGC Geotechnical, Inc. | SURFICIAL STABILITY | Project Name :<br>Project Number :<br>Designed/Checked :<br>Date: | Rancho La Habra<br>14057-01<br>BTZ<br>April, 2017 |

# *Appendix F*
# *Engineering Calculations*

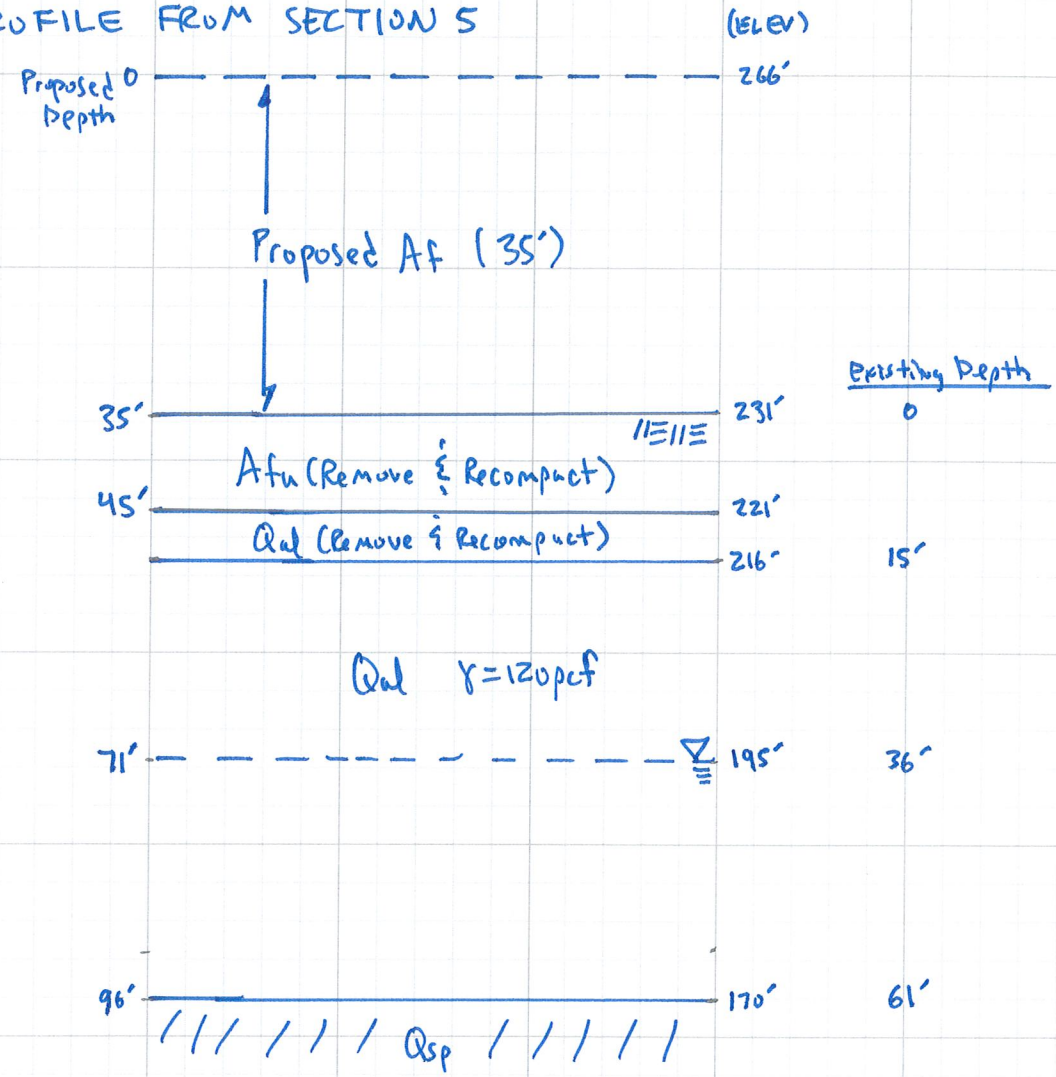
**SUMMARY OF LABORATORY CONSOLIDATION DATA**

| Boring | Depth (ft) | (ksf) po | (ksf) Pc | Cc$\varepsilon$ | Cr$\varepsilon$ | USCS Soil Type | Field Moisture | PI | LL | PL | Liquidity Index | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HS-3 | 10 | 1.25 | 5.0 | 0.04 | 0.009 | CL | 11.6 | 13 | 27 | 14 | -0.18 | Qal |
| HS-3 | 15 | 1.88 | 4.5 | 0.03 | 0.005 | CL | 9.7 | 10 | 25 | 15 | -0.53 | Qal |
| HS-3 | 25 | 3.13 | 5.0 | 0.10 | 0.02 | CL | 21.3 | 23 | 39 | 16 | 0.23 | Qal |
| HS-12 | 40 | 5.00 | 5.0 | 0.04 | 0.015 | CL | 14.8 | 23 | 37 | 14 | 0.03 | Qal |
| HS-12 | 50 | 6.25 | 9.0 | 0.12 | 0.018 | CL | 25.7 | 22 | 42 | 20 | 0.26 | Qal |
| HS-14 | 20 | 2.50 | 6.0 | 0.04 | 0.005 | SC | 9.1 | 10 | 25 | 15 | -0.59 | Qal |
| HS-15 | 25 | 3.13 | 7.0 | 0.06 | 0.009 | SC | 13.4 | 21 | 42 | 21 | -0.36 | Qal |
| HS-16 | 20 | 2.50 | 8.0 | 0.095 | 0.008 | CL | 16.4 | 17 | 36 | 19 | -0.15 | Qal |
| HS-17 | 20 | 2.50 | 3.5 | 0.095 | 0.017 | CL | 26.3 | 22 | 42 | 20 | 0.29 | Qal |
| HS-17 | 25 | 3.13 | 6.0 | 0.06 | 0.006 | CL | 18.2 | 15 | 32 | 17 | 0.08 | Qal |
| | | Average | 5.9 | 0.068 | 0.011 | | | 17.6 | 34.7 | 17.1 | -0.09 | |

LGC Geotechnical, Inc.

# SETTLEMENT OF Qal

IDEALIZED PROFILE FROM SECTION 5




$\Delta q = 120pcf\ (35') = 4.20\ ksf$

Project Name: Rancho La Habra
Project Number: 14057-01
Drawn By: BTZ
Date: 2/14/2017
Checked By:
Scale: N/A
Page: 1 of

## SETTLEMENT OF Qal (CONT.)

Using $P_c = 5.9$ ksf $C_{c\varepsilon} = 0.068$ $C_{r\varepsilon} = 0.011$ $\Delta q = 4.20$ ksf

Layer ① 10' thick layer (15' to 25' below EG)

$\sigma_{v_i\,Avg}' = 120\,pcf(20') = 2{,}400\,psf = 2.40\,ksf$

$$\Delta S = H\left[C_{r\varepsilon}\log\left(\frac{P_c}{\sigma_{v_i}'}\right) + C_{c\varepsilon}\log\left(\frac{\sigma_{v_i}' + \Delta q}{P_c}\right)\right]$$

$$\Delta S = 10'(12''/ft)\left[0.011\log\left(\frac{5.9}{2.40}\right) + 0.068\log\left(\frac{2.4+4.20}{5.9}\right)\right] = 0.913''$$

Layer ② 11' thick layer (25' to 36' below EG)

$\sigma_{v\,Avg}' = 120\,pcf(30.5') = 3.66\,ksf$

$$\Delta S = 11'(12''/ft)\left[0.011\log\left(\frac{5.9}{3.66}\right) + 0.068\log\left(\frac{3.66+4.20}{5.9}\right)\right] = 1.419''$$

Layer ③ 12' thick layer (36' to 48' below EG)

$\sigma_{v\,Avg}' = 120\,pcf(36') + (120-62.4\,pcf)(6') = 4{,}666\,psf = 4.67\,ksf$

$$\Delta S = 12'(12''/ft)\left[0.011\log\left(\frac{5.9}{4.67}\right) + 0.068\log\left(\frac{4.67+4.2}{5.9}\right)\right] = 1.895''$$

Layer ④ 13' thick layer (48' to 61' below EG)

$\sigma_{v\,Avg}' = 120\,pcf(36') + (120-62.4\,psf)(18.5') = 5{,}386\,psf = 5.39\,ksf$

$$\Delta S = 13'(12''/ft)\left[0.011\log\left(\frac{5.9}{5.39}\right) + 0.068\log\left(\frac{5.39+4.2}{5.9}\right)\right] = 2.305''$$

$\delta_T = 0.913'' + 1.419'' + 1.895'' + 2.305'' = \underline{6.53''}$



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**SETTLEMENT CALCULATION**
**FOR FILL SURCHARGE**

| | | | |
|---|---|---|---|
| Soil Unit Weight | 120.0 pcf | Surcharge | 4,200 psf |
| Water Unit Weight | 62.4 pcf | Af Unit Wt | 120.0 pcf |
| Buoyant Unit Weight | 57.6 pcf | Fill Depth | 35.0 ft |
| Groundwater Depth | 36 feet | | |
| Pc' | 5,900.0 psf | | |

Description: Idealized Profile from Section 5

| | | Stress at Layer Bottom | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Unit Weight γ (pcf) | Total Stress (psf) | Pore Water (psf) | Effective Stress, po (psf) | Δp | Ccε | Crε | po + Δp | Δ s (feet) | Δ s (inch) | Depth (ft) |
| 0 | 120.0 | 0.0 | 0.0 | 0.0 | 4200.0 | 0 | 0 | 4200.0 | 0.000 | 0 | 0.0 |
| 1 | 120.0 | 120.0 | 0.0 | 120.0 | 4200.0 | 0 | 0 | 4320.0 | 0.000 | 0.000 | 1.0 |
| 2 | 120.0 | 240.0 | 0.0 | 240.0 | 4200.0 | 0 | 0 | 4440.0 | 0.000 | 0.000 | 2.0 |
| 3 | 120.0 | 360.0 | 0.0 | 360.0 | 4200.0 | 0 | 0 | 4560.0 | 0.000 | 0.000 | 3.0 |
| 4 | 120.0 | 480.0 | 0.0 | 480.0 | 4200.0 | 0 | 0 | 4680.0 | 0.000 | 0.000 | 4.0 |
| 5 | 120.0 | 600.0 | 0.0 | 600.0 | 4200.0 | 0 | 0 | 4800.0 | 0.000 | 0.000 | 5.0 |
| 6 | 120.0 | 720.0 | 0.0 | 720.0 | 4200.0 | 0 | 0 | 4920.0 | 0.000 | 0.000 | 6.0 |
| **7** | 120.0 | 840.0 | 0.0 | 840.0 | 4200.0 | 0 | 0 | 5040.0 | 0.000 | 0.000 | 7.0 |
| 8 | 120.0 | 960.0 | 0.0 | 960.0 | 4200.0 | 0 | 0 | 5160.0 | 0.000 | 0.000 | 8.0 |
| 9 | 120.0 | 1080.0 | 0.0 | 1080.0 | 4200.0 | 0 | 0 | 5280.0 | 0.000 | 0.000 | 9.0 |
| 10 | 120.0 | 1200.0 | 0.0 | 1200.0 | 4200.0 | 0 | 0 | 5400.0 | 0.000 | 0.000 | 10.0 |
| 11 | 120.0 | 1320.0 | 0.0 | 1320.0 | 4200.0 | 0 | 0 | 5520.0 | 0.000 | 0.000 | 11.0 |
| 12 | 120.0 | 1440.0 | 0.0 | 1440.0 | 4200.0 | 0 | 0 | 5640.0 | 0.000 | 0.000 | 12.0 |
| 13 | 120.0 | 1560.0 | 0.0 | 1560.0 | 4200.0 | 0 | 0 | 5760.0 | 0.000 | 0.000 | 13.0 |
| 14 | 120.0 | 1680.0 | 0.0 | 1680.0 | 4200.0 | 0 | 0 | 5880.0 | 0.000 | 0.000 | 14.0 |
| 15 | 120.0 | 1800.0 | 0.0 | 1800.0 | 4200.0 | 0 | 0 | 6000.0 | 0.000 | 0.000 | 15.0 |
| 16 | 120.0 | 1920.0 | 0.0 | 1920.0 | 4200.0 | 0.068 | 0.011 | 6120.0 | 0.006 | 0.077 | 16.0 |
| 17 | 120.0 | 2040.0 | 0.0 | 2040.0 | 4200.0 | 0.068 | 0.011 | 6240.0 | 0.007 | 0.081 | 17.0 |
| 18 | 120.0 | 2160.0 | 0.0 | 2160.0 | 4200.0 | 0.068 | 0.011 | 6360.0 | 0.007 | 0.084 | 18.0 |
| 19 | 120.0 | 2280.0 | 0.0 | 2280.0 | 4200.0 | 0.068 | 0.011 | 6480.0 | 0.007 | 0.088 | 19.0 |
| 20 | 120.0 | 2400.0 | 0.0 | 2400.0 | 4200.0 | 0.068 | 0.011 | 6600.0 | 0.008 | 0.091 | 20.0 |
| 21 | 120.0 | 2520.0 | 0.0 | 2520.0 | 4200.0 | 0.068 | 0.011 | 6720.0 | 0.008 | 0.095 | 21.0 |
| 22 | 120.0 | 2640.0 | 0.0 | 2640.0 | 4200.0 | 0.068 | 0.011 | 6840.0 | 0.008 | 0.098 | 22.0 |
| 23 | 120.0 | 2760.0 | 0.0 | 2760.0 | 4200.0 | 0.068 | 0.011 | 6960.0 | 0.009 | 0.102 | 23.0 |
| 24 | 120.0 | 2880.0 | 0.0 | 2880.0 | 4200.0 | 0.068 | 0.011 | 7080.0 | 0.009 | 0.106 | 24.0 |
| 25 | 120.0 | 3000.0 | 0.0 | 3000.0 | 4200.0 | 0.068 | 0.011 | 7200.0 | 0.009 | 0.109 | 25.0 |
| 26 | 120.0 | 3120.0 | 0.0 | 3120.0 | 4200.0 | 0.068 | 0.011 | 7320.0 | 0.009 | 0.113 | 26.0 |
| 27 | 120.0 | 3240.0 | 0.0 | 3240.0 | 4200.0 | 0.068 | 0.011 | 7440.0 | 0.010 | 0.117 | 27.0 |
| 28 | 120.0 | 3360.0 | 0.0 | 3360.0 | 4200.0 | 0.068 | 0.011 | 7560.0 | 0.010 | 0.120 | 28.0 |
| 29 | 120.0 | 3480.0 | 0.0 | 3480.0 | 4200.0 | 0.068 | 0.011 | 7680.0 | 0.010 | 0.124 | 29.0 |
| 30 | 120.0 | 3600.0 | 0.0 | 3600.0 | 4200.0 | 0.068 | 0.011 | 7800.0 | 0.011 | 0.127 | 30.0 |
| 31 | 120.0 | 3720.0 | 0.0 | 3720.0 | 4200.0 | 0.068 | 0.011 | 7920.0 | 0.011 | 0.131 | 31.0 |
| 32 | 120.0 | 3840.0 | 0.0 | 3840.0 | 4200.0 | 0.068 | 0.011 | 8040.0 | 0.011 | 0.134 | 32.0 |
| 33 | 120.0 | 3960.0 | 0.0 | 3960.0 | 4200.0 | 0.068 | 0.011 | 8160.0 | 0.011 | 0.138 | 33.0 |
| 34 | 120.0 | 4080.0 | 0.0 | 4080.0 | 4200.0 | 0.068 | 0.011 | 8280.0 | 0.012 | 0.141 | 34.0 |
| 35 | 120.0 | 4200.0 | 0.0 | 4200.0 | 4200.0 | 0.068 | 0.011 | 8400.0 | 0.012 | 0.145 | 35.0 |
| 36 | 120.0 | 4320.0 | 0.0 | 4320.0 | 4200.0 | 0.068 | 0.011 | 8520.0 | 0.012 | 0.148 | 36.0 |
| 37 | 120.0 | 4440.0 | 62.4 | 4377.6 | 4200.0 | 0.068 | 0.011 | 8577.6 | 0.012 | 0.150 | 37.0 |
| 38 | 120.0 | 4560.0 | 124.8 | 4435.2 | 4200.0 | 0.068 | 0.011 | 8635.2 | 0.013 | 0.151 | 38.0 |
| 39 | 120.0 | 4680.0 | 187.2 | 4492.8 | 4200.0 | 0.068 | 0.011 | 8692.8 | 0.013 | 0.153 | 39.0 |
| 40 | 120.0 | 4800.0 | 249.6 | 4550.4 | 4200.0 | 0.068 | 0.011 | 8750.4 | 0.013 | 0.155 | 40.0 |
| 41 | 120.0 | 4920.0 | 312.0 | 4608.0 | 4200.0 | 0.068 | 0.011 | 8808.0 | 0.013 | 0.156 | 41.0 |
| 42 | 120.0 | 5040.0 | 374.4 | 4665.6 | 4200.0 | 0.068 | 0.011 | 8865.6 | 0.013 | 0.158 | 42.0 |
| 43 | 120.0 | 5160.0 | 436.8 | 4723.2 | 4200.0 | 0.068 | 0.011 | 8923.2 | 0.013 | 0.159 | 43.0 |
| 44 | 120.0 | 5280.0 | 499.2 | 4780.8 | 4200.0 | 0.068 | 0.011 | 8980.8 | 0.013 | 0.161 | 44.0 |
| 45 | 120.0 | 5400.0 | 561.6 | 4838.4 | 4200.0 | 0.068 | 0.011 | 9038.4 | 0.014 | 0.163 | 45.0 |
| 46 | 120.0 | 5520.0 | 624.0 | 4896.0 | 4200.0 | 0.068 | 0.011 | 9096.0 | 0.014 | 0.164 | 46.0 |
| 47 | 120.0 | 5640.0 | 686.4 | 4953.6 | 4200.0 | 0.068 | 0.011 | 9153.6 | 0.014 | 0.166 | 47.0 |
| 48 | 120.0 | 5760.0 | 748.8 | 5011.2 | 4200.0 | 0.068 | 0.011 | 9211.2 | 0.014 | 0.167 | 48.0 |
| 49 | 120.0 | 5880.0 | 811.2 | 5068.8 | 4200.0 | 0.068 | 0.011 | 9268.8 | 0.014 | 0.169 | 49.0 |
| 50 | 120.0 | 6000.0 | 873.6 | 5126.4 | 4200.0 | 0.068 | 0.011 | 9326.4 | 0.014 | 0.170 | 50.0 |
| 51 | 120.0 | 6120.0 | 936.0 | 5184.0 | 4200.0 | 0.068 | 0.011 | 9384.0 | 0.014 | 0.172 | 51.0 |
| 52 | 120.0 | 6240.0 | 998.4 | 5241.6 | 4200.0 | 0.068 | 0.011 | 9441.6 | 0.014 | 0.173 | 52.0 |
| 53 | 120.0 | 6360.0 | 1060.8 | 5299.2 | 4200.0 | 0.068 | 0.011 | 9499.2 | 0.015 | 0.175 | 53.0 |
| 54 | 120.0 | 6480.0 | 1123.2 | 5356.8 | 4200.0 | 0.068 | 0.011 | 9556.8 | 0.015 | 0.176 | 54.0 |
| 55 | 120.0 | 6600.0 | 1185.6 | 5414.4 | 4200.0 | 0.068 | 0.011 | 9614.4 | 0.015 | 0.178 | 55.0 |
| 56 | 120.0 | 6720.0 | 1248.0 | 5472.0 | 4200.0 | 0.068 | 0.011 | 9672.0 | 0.015 | 0.179 | 56.0 |
| 57 | 120.0 | 6840.0 | 1310.4 | 5529.6 | 4200.0 | 0.068 | 0.011 | 9729.6 | 0.015 | 0.181 | 57.0 |
| 58 | 120.0 | 6960.0 | 1372.8 | 5587.2 | 4200.0 | 0.068 | 0.011 | 9787.2 | 0.015 | 0.182 | 58.0 |
| 59 | 120.0 | 7080.0 | 1435.2 | 5644.8 | 4200.0 | 0.068 | 0.011 | 9844.8 | 0.015 | 0.184 | 59.0 |
| 60 | 120.0 | 7200.0 | 1497.6 | 5702.4 | 4200.0 | 0.068 | 0.011 | 9902.4 | 0.015 | 0.185 | 60.0 |
| 61 | 120.0 | 7320.0 | 1560.0 | 5760.0 | 4200.0 | 0.068 | 0.011 | 9960.0 | 0.016 | 0.187 | 61.0 |
| | | | | | | | | | **Total:** | **6.58** | **inches** |

**SETTLEMENT CALCULATION**
**FOR FILL SURCHARGE**

| | | | |
|---|---|---|---|
| Soil Unit Weight | 120.0 pcf | Surcharge | 4,200 psf |
| Water Unit Weight | 62.4 pcf | Af Unit Wt | 120.0 pcf |
| Buoyant Unit Weight | 57.6 pcf | Fill Depth | 35.0 ft |
| Groundwater Depth | 36 feet | | |

Description: Idealized Profile from Section 5

| | | Stress at Layer Bottom | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Unit Weight γ (pcf) | Total Stress (psf) | Pore Water (psf) | Effective Stress, po (psf) | Δp | Crε | po + Δp | Δ s (feet) | Δ s (inch) | Depth (ft) | Comments |
| 0 | 120.0 | 0.0 | 0.0 | 0.0 | 4200.0 | 0 | 4200.0 | 0.000 | 0.000 | 0 | |
| 1 | 120.0 | 120.0 | 0.0 | 120.0 | 4200.0 | 0 | 4320.0 | 0.000 | 0.000 | 1 | |
| 2 | 120.0 | 240.0 | 0.0 | 240.0 | 4200.0 | 0 | 4440.0 | 0.000 | 0.000 | 2 | |
| 3 | 120.0 | 360.0 | 0.0 | 360.0 | 4200.0 | 0 | 4560.0 | 0.000 | 0.000 | 3 | |
| 4 | 120.0 | 480.0 | 0.0 | 480.0 | 4200.0 | 0 | 4680.0 | 0.000 | 0.000 | 4 | |
| 5 | 120.0 | 600.0 | 0.0 | 600.0 | 4200.0 | 0 | 4800.0 | 0.000 | 0.000 | 5 | |
| 6 | 120.0 | 720.0 | 0.0 | 720.0 | 4200.0 | 0 | 4920.0 | 0.000 | 0.000 | 6 | |
| 7 | 120.0 | 840.0 | 0.0 | 840.0 | 4200.0 | 0 | 5040.0 | 0.000 | 0.000 | 7 | |
| 8 | 120.0 | 960.0 | 0.0 | 960.0 | 4200.0 | 0 | 5160.0 | 0.000 | 0.000 | 8 | |
| 9 | 120.0 | 1080.0 | 0.0 | 1080.0 | 4200.0 | 0 | 5280.0 | 0.000 | 0.000 | 9 | |
| 10 | 120.0 | 1200.0 | 0.0 | 1200.0 | 4200.0 | 0 | 5400.0 | 0.000 | 0.000 | 10 | |
| 11 | 120.0 | 1320.0 | 0.0 | 1320.0 | 4200.0 | 0 | 5520.0 | 0.000 | 0.000 | 11 | |
| 12 | 120.0 | 1440.0 | 0.0 | 1440.0 | 4200.0 | 0 | 5640.0 | 0.000 | 0.000 | 12 | |
| 13 | 120.0 | 1560.0 | 0.0 | 1560.0 | 4200.0 | 0 | 5760.0 | 0.000 | 0.000 | 13 | |
| 14 | 120.0 | 1680.0 | 0.0 | 1680.0 | 4200.0 | 0 | 5880.0 | 0.000 | 0.000 | 14 | |
| 15 | 120.0 | 1800.0 | 0.0 | 1800.0 | 4200.0 | 0 | 6000.0 | 0.000 | 0.000 | 15 | |
| 16 | 120.0 | 1920.0 | 0.0 | 1920.0 | 4200.0 | 0.012 | 6120.0 | 0.006 | 0.072 | 16 | |
| 17 | 120.0 | 2040.0 | 0.0 | 2040.0 | 4200.0 | 0.012 | 6240.0 | 0.006 | 0.070 | 17 | |
| 18 | 120.0 | 2160.0 | 0.0 | 2160.0 | 4200.0 | 0.012 | 6360.0 | 0.006 | 0.068 | 18 | |
| 19 | 120.0 | 2280.0 | 0.0 | 2280.0 | 4200.0 | 0.012 | 6480.0 | 0.005 | 0.065 | 19 | |
| 20 | 120.0 | 2400.0 | 0.0 | 2400.0 | 4200.0 | 0.012 | 6600.0 | 0.005 | 0.063 | 20 | |
| 21 | 120.0 | 2520.0 | 0.0 | 2520.0 | 4200.0 | 0.012 | 6720.0 | 0.005 | 0.061 | 21 | |
| 22 | 120.0 | 2640.0 | 0.0 | 2640.0 | 4200.0 | 0.012 | 6840.0 | 0.005 | 0.060 | 22 | |
| 23 | 120.0 | 2760.0 | 0.0 | 2760.0 | 4200.0 | 0.012 | 6960.0 | 0.005 | 0.058 | 23 | |
| 24 | 120.0 | 2880.0 | 0.0 | 2880.0 | 4200.0 | 0.012 | 7080.0 | 0.005 | 0.056 | 24 | |
| 25 | 120.0 | 3000.0 | 0.0 | 3000.0 | 4200.0 | 0.012 | 7200.0 | 0.005 | 0.055 | 25 | |
| 26 | 120.0 | 3120.0 | 0.0 | 3120.0 | 4200.0 | 0.012 | 7320.0 | 0.004 | 0.053 | 26 | |
| 27 | 120.0 | 3240.0 | 0.0 | 3240.0 | 4200.0 | 0.012 | 7440.0 | 0.004 | 0.052 | 27 | |
| 28 | 120.0 | 3360.0 | 0.0 | 3360.0 | 4200.0 | 0.012 | 7560.0 | 0.004 | 0.051 | 28 | |
| 29 | 120.0 | 3480.0 | 0.0 | 3480.0 | 4200.0 | 0.012 | 7680.0 | 0.004 | 0.050 | 29 | |
| 30 | 120.0 | 3600.0 | 0.0 | 3600.0 | 4200.0 | 0.012 | 7800.0 | 0.004 | 0.048 | 30 | |
| 31 | 120.0 | 3720.0 | 0.0 | 3720.0 | 4200.0 | 0.012 | 7920.0 | 0.004 | 0.047 | 31 | |
| 32 | 120.0 | 3840.0 | 0.0 | 3840.0 | 4200.0 | 0.012 | 8040.0 | 0.004 | 0.046 | 32 | |
| 33 | 120.0 | 3960.0 | 0.0 | 3960.0 | 4200.0 | 0.012 | 8160.0 | 0.004 | 0.045 | 33 | |
| 34 | 120.0 | 4080.0 | 0.0 | 4080.0 | 4200.0 | 0.012 | 8280.0 | 0.004 | 0.044 | 34 | |
| 35 | 120.0 | 4200.0 | 0.0 | 4200.0 | 4200.0 | 0.012 | 8400.0 | 0.004 | 0.043 | 35 | |
| 36 | 120.0 | 4320.0 | 0.0 | 4320.0 | 4200.0 | 0.012 | 8520.0 | 0.004 | 0.042 | 36 | |
| 37 | 120.0 | 4440.0 | 62.4 | 4377.6 | 4200.0 | 0.012 | 8577.6 | 0.004 | 0.042 | 37 | |
| 38 | 120.0 | 4560.0 | 124.8 | 4435.2 | 4200.0 | 0.012 | 8635.2 | 0.003 | 0.042 | 38 | |
| 39 | 120.0 | 4680.0 | 187.2 | 4492.8 | 4200.0 | 0.012 | 8692.8 | 0.003 | 0.041 | 39 | |
| 40 | 120.0 | 4800.0 | 249.6 | 4550.4 | 4200.0 | 0.012 | 8750.4 | 0.003 | 0.041 | 40 | |
| 41 | 120.0 | 4920.0 | 312.0 | 4608.0 | 4200.0 | 0.012 | 8808.0 | 0.003 | 0.041 | 41 | |
| 42 | 120.0 | 5040.0 | 374.4 | 4665.6 | 4200.0 | 0.012 | 8865.6 | 0.003 | 0.040 | 42 | |
| 43 | 120.0 | 5160.0 | 436.8 | 4723.2 | 4200.0 | 0.012 | 8923.2 | 0.003 | 0.040 | 43 | |
| 44 | 120.0 | 5280.0 | 499.2 | 4780.8 | 4200.0 | 0.012 | 8980.8 | 0.003 | 0.039 | 44 | |
| 45 | 120.0 | 5400.0 | 561.6 | 4838.4 | 4200.0 | 0.012 | 9038.4 | 0.003 | 0.039 | 45 | |
| 46 | 120.0 | 5520.0 | 624.0 | 4896.0 | 4200.0 | 0.012 | 9096.0 | 0.003 | 0.039 | 46 | |
| 47 | 120.0 | 5640.0 | 686.4 | 4953.6 | 4200.0 | 0.012 | 9153.6 | 0.003 | 0.038 | 47 | |
| 48 | 120.0 | 5760.0 | 748.8 | 5011.2 | 4200.0 | 0.012 | 9211.2 | 0.003 | 0.038 | 48 | |
| 49 | 120.0 | 5880.0 | 811.2 | 5068.8 | 4200.0 | 0.012 | 9268.8 | 0.003 | 0.038 | 49 | |
| 50 | 120.0 | 6000.0 | 873.6 | 5126.4 | 4200.0 | 0.012 | 9326.4 | 0.003 | 0.037 | 50 | |
| 51 | 120.0 | 6120.0 | 936.0 | 5184.0 | 4200.0 | 0.012 | 9384.0 | 0.003 | 0.037 | 51 | |
| 52 | 120.0 | 6240.0 | 998.4 | 5241.6 | 4200.0 | 0.012 | 9441.6 | 0.003 | 0.037 | 52 | |
| 53 | 120.0 | 6360.0 | 1060.8 | 5299.2 | 4200.0 | 0.012 | 9499.2 | 0.003 | 0.037 | 53 | |
| 54 | 120.0 | 6480.0 | 1123.2 | 5356.8 | 4200.0 | 0.012 | 9556.8 | 0.003 | 0.036 | 54 | |
| 55 | 120.0 | 6600.0 | 1185.6 | 5414.4 | 4200.0 | 0.012 | 9614.4 | 0.003 | 0.036 | 55 | |
| 56 | 120.0 | 6720.0 | 1248.0 | 5472.0 | 4200.0 | 0.012 | 9672.0 | 0.003 | 0.036 | 56 | |
| 57 | 120.0 | 6840.0 | 1310.4 | 5529.6 | 4200.0 | 0.012 | 9729.6 | 0.003 | 0.035 | 57 | |
| 58 | 120.0 | 6960.0 | 1372.8 | 5587.2 | 4200.0 | 0.012 | 9787.2 | 0.003 | 0.035 | 58 | |
| 59 | 120.0 | 7080.0 | 1435.2 | 5644.8 | 4200.0 | 0.012 | 9844.8 | 0.003 | 0.035 | 59 | |
| 60 | 120.0 | 7200.0 | 1497.6 | 5702.4 | 4200.0 | 0.012 | 9902.4 | 0.003 | 0.035 | 60 | |
| 61 | 120.0 | 7320.0 | 1560.0 | 5760.0 | 4200.0 | 0.012 | 9960.0 | 0.003 | 0.034 | 61 | |

**Total:** **2.10** **inches**

LGC Geotechnical, Inc.

# TIME-RATE CONSOLIDATION ESTIMATE

$C_v = 0.004\ cm^2/sec = 0.37\ ft^2/day$ (Lower Bound)

$= 0.009\ cm^2/sec = 0.84\ ft^2/day$

} From Figure 4 of NAVFAC 7.1 (7.1-144)

Assume 20' layer with double drainage

$$t = \frac{T_v H^2}{C_v} = \frac{(0.848)(20'/2)^2}{0.37\ ft^2/day} = 229.19\ days = \underline{7.64\ months}$$

$$t = \frac{(0.848)(20'/2)^2}{0.84\ ft^2/day} = 100.95\ days = \underline{3.37\ months}$$

Project Name: Rancho La Habra | Drawn By: | Checked By:

Project Number: 14057-01 | Date: 2/10/17 | Scale: N/A | Page: 1 of 1

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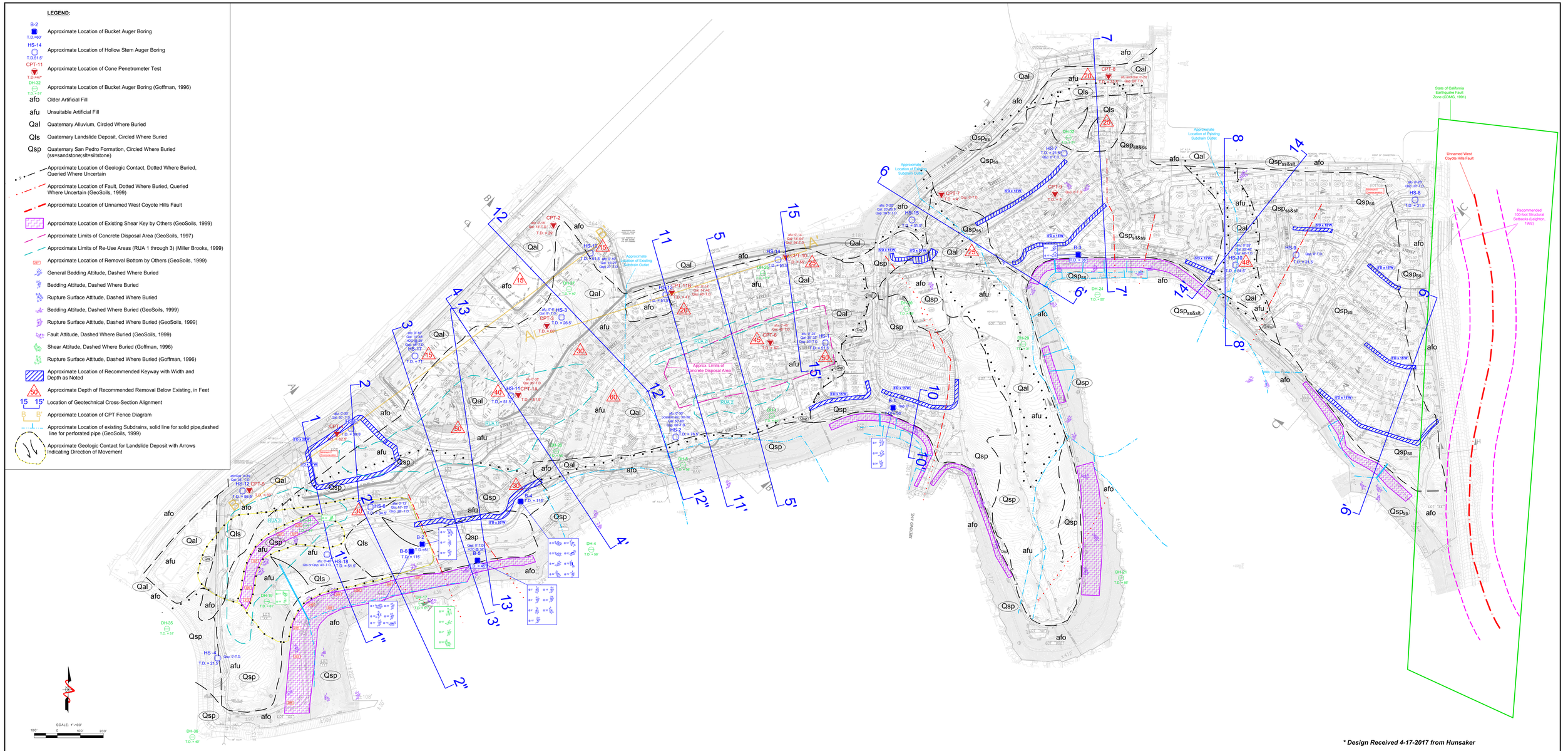


* Design Received 4-17-2017 from Hunsaker

LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

# Geotechnical Map

CLIENT:
CalAtlantic Homes
15360 Barranca Parkway
Irvine, CA 92618

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | 1" = 100' |
| DATE | April 2017 |

Sheet 1 of 3

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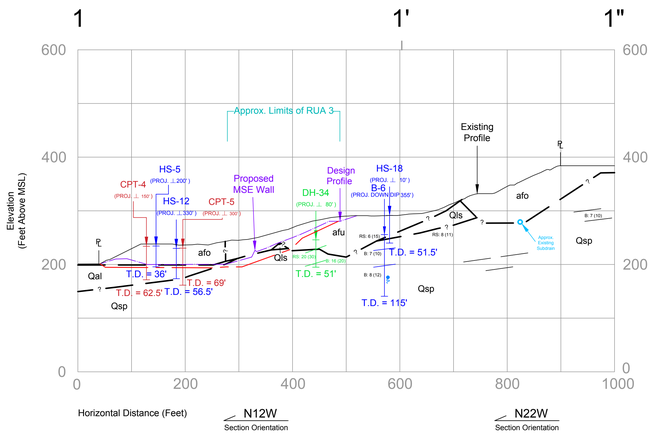


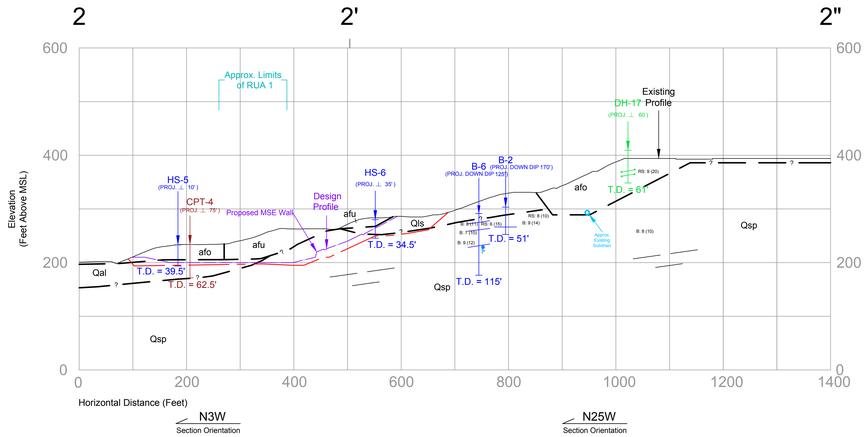


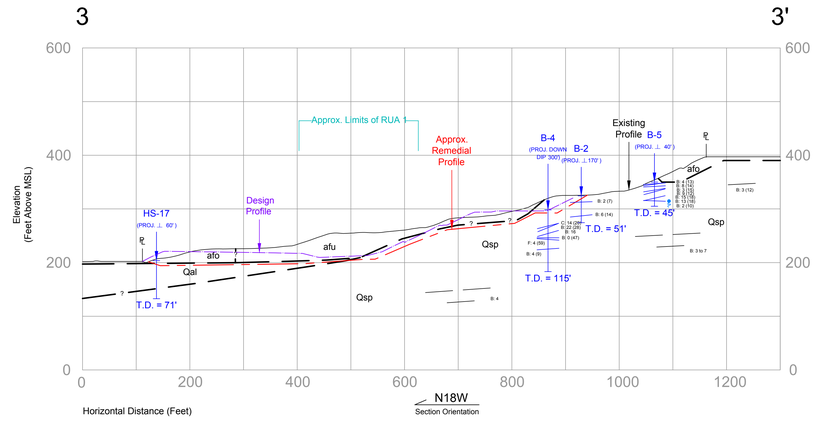


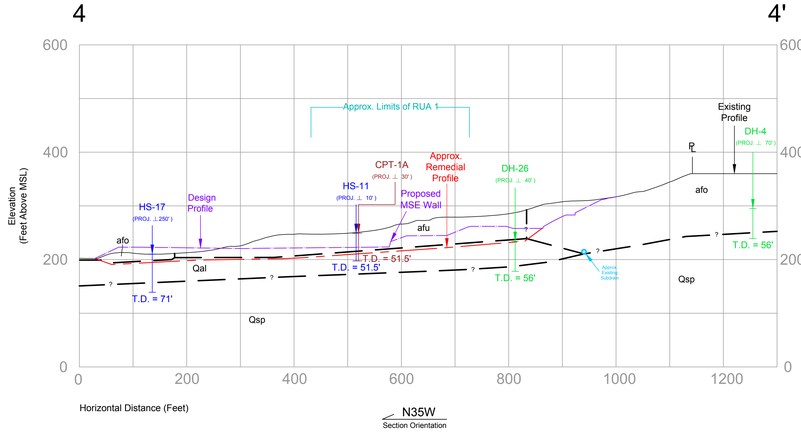


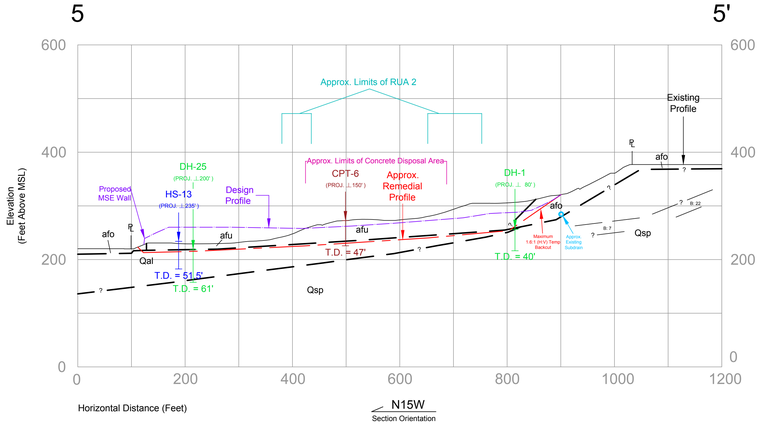


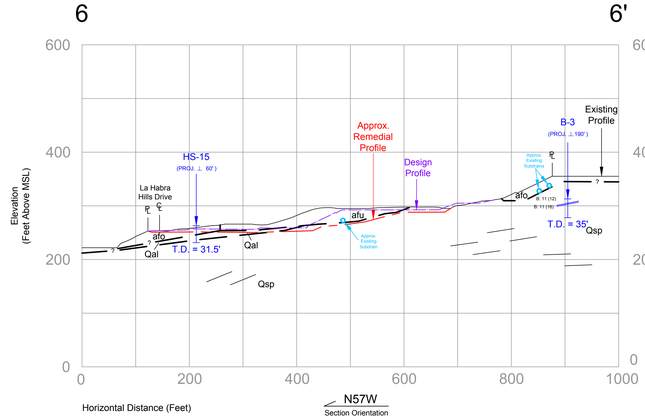


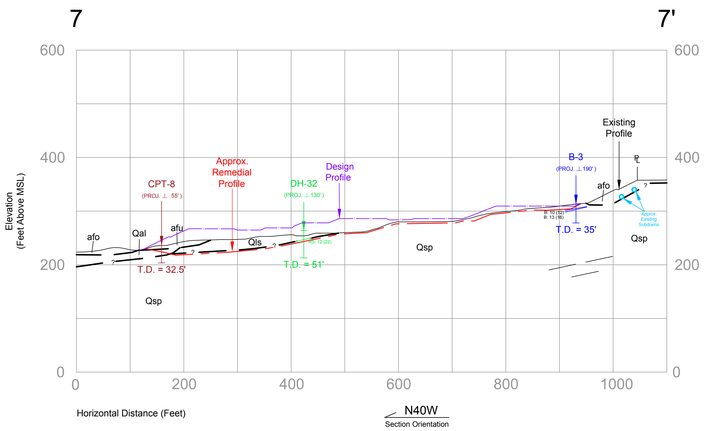


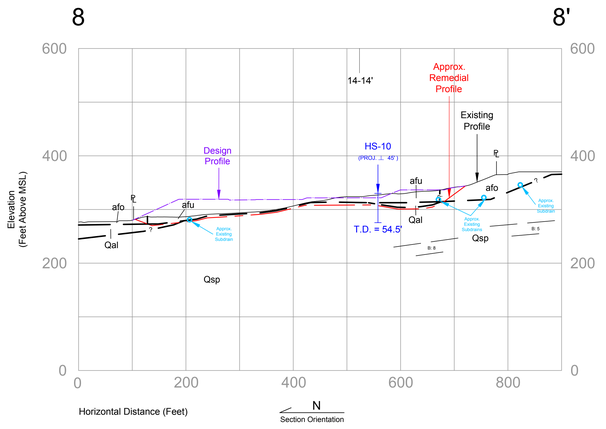


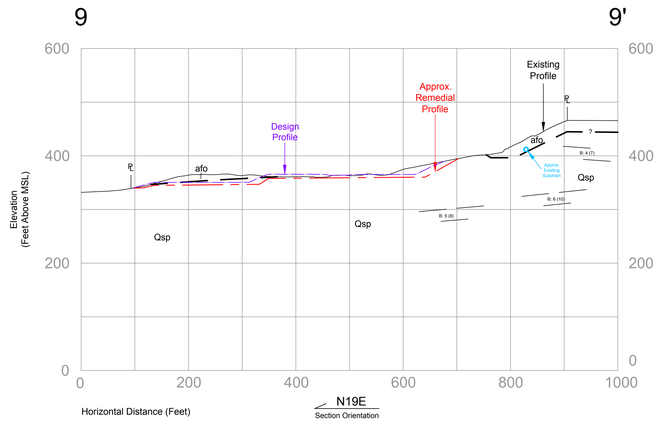


LGC Geotechnical, Inc.
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# Geotechnical Cross-Sections 1-1' through 9-9'

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | 1" = 100' |
| DATE | April 2017 |

SHEET 2 of 3

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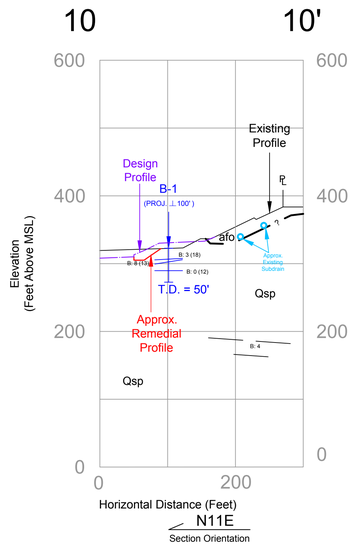


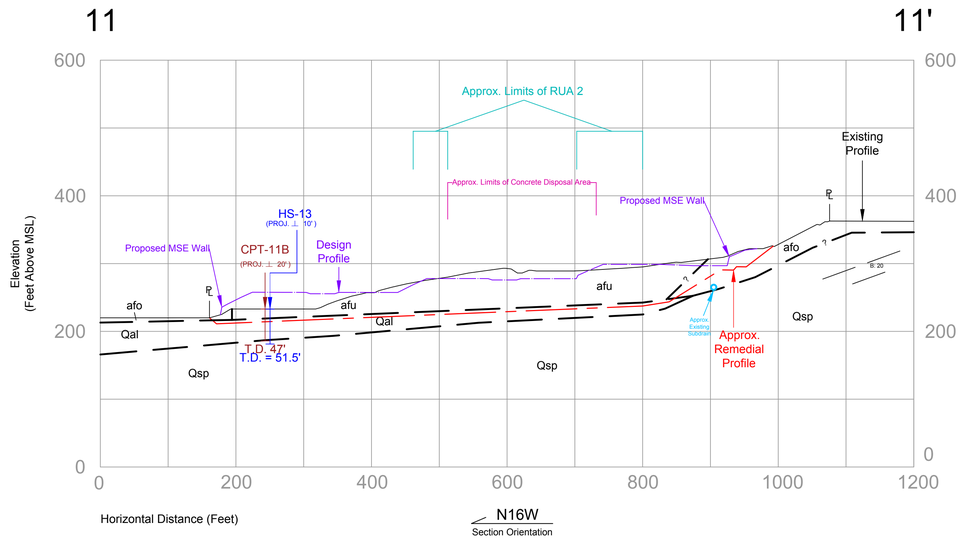


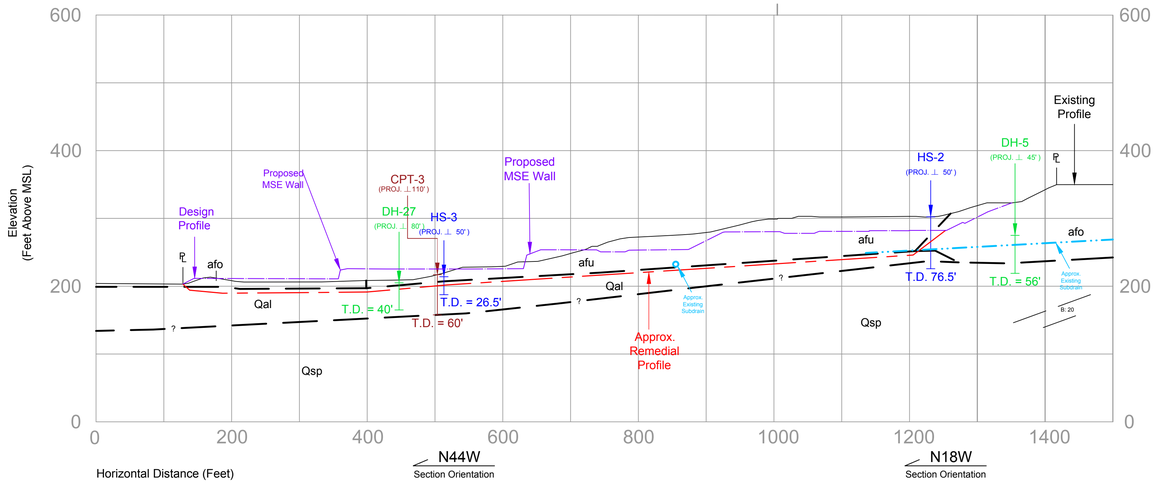


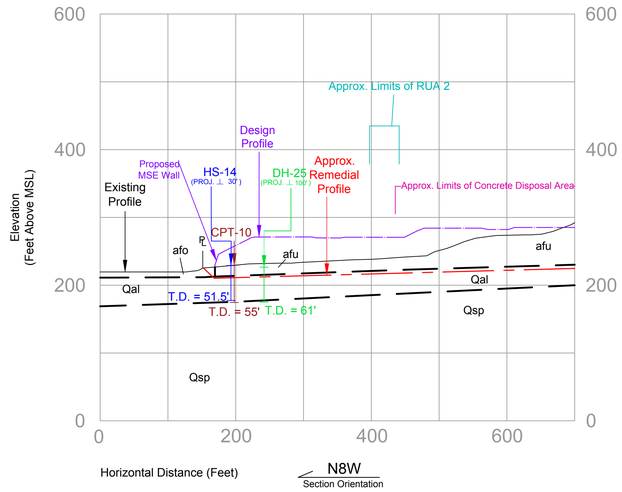


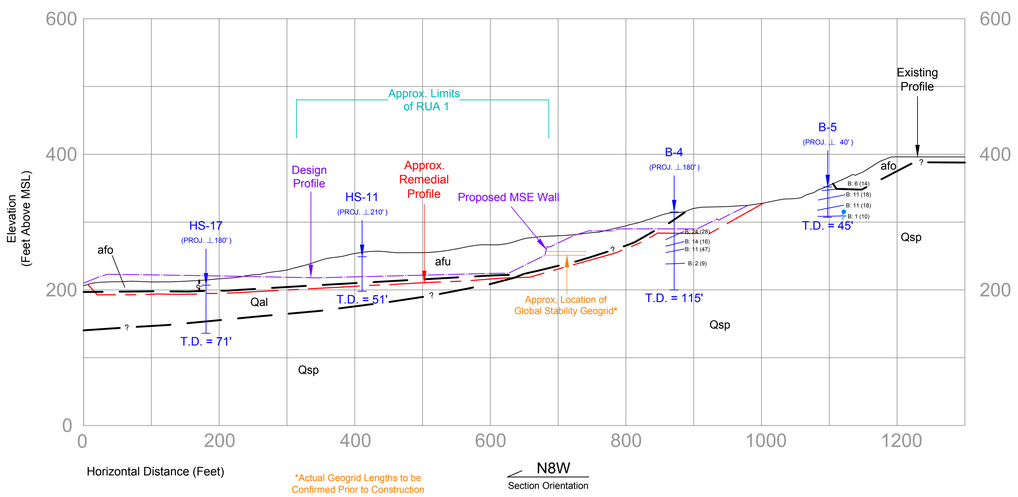


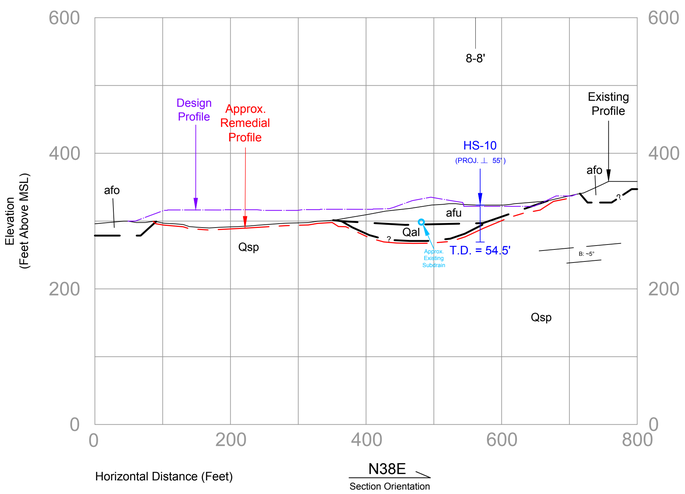



LGC Geotechnical, Inc.
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# Geotechnical Cross-Sections 10-10' through 15-15'

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | 1" = 100' |
| DATE | April 2017 |

**SHEET 3 of 3**

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Revised February 24, 2017 Project No. 14057-01

Mr. Michael Battaglia
***CalAtlantic Homes***
15360 Barranca Parkway
Irvine, California 92618

***Subject:*** ***Response to Peer Review of Preliminary Geotechnical Report, dated September 15, 2016, Proposed Rancho La Habra Residential Development, VTTM 17845, City of La Habra, California***

## ***Introduction***

In accordance with your request, LGC Geotechnical, Inc. (LGC Geotechnical) has prepared this response-report to the geotechnical comments within the peer review sheet by Albus Keefe & Associates (AKA, 2016), for the preliminary geotechnical report for the proposed Rancho La Habra Residential Development, VTTM 17845, City of La Habra, California.

## ***Additional Geotechnical Subsurface Evaluation & Laboratory Testing***

An additional bucket auger boring (B-6) in the southwestern portion of the site was drilled by Al-Roy Drilling under subcontract to LGC Geotechnical. The depth of the boring was approximately 115 feet below existing grade. The bucket auger boring was excavated to evaluate the geologic structure of the bedrock materials and to obtain samples for laboratory testing. The large-diameter borehole was surface logged during excavation and downhole logged by an engineering geologist. The boring was subsequently backfilled with cuttings and tamped. The boring log is provided in Appendix B.

Representative grab samples were obtained for laboratory testing during our recent field evaluation. Laboratory testing from Boring B-6 included Atterberg Limits and torsional ring shear. In addition, fines content testing was performed on select samples obtained from our previous field evaluation for comparison with CPT soil behavior type (SBT).

The following is a summary of the laboratory test results.

- Three Atterberg Limit (liquid limit and plastic limit) test were performed on grab samples obtained from Boring B-6. Results indicated Liquid Limit values ranging from 47 to 64.
- Two torsional ring shear tests were performed on respective grab samples of site clayey materials; one landslide rupture surface clay and one clayey bedrock sample. The plots are provided in Appendix C.

- Six fines content tests indicated a fines content (percent passing No. 200 sieve) ranging from approximately 29 percent to 62 percent. Based on the Unified Soils Classification System (USCS), four of the six tested samples would be classified as "coarse-grained."

Laboratory test results are provided in Appendix C.

***Soil Shear Strength Parameters***

The soil shear strength for the landslide rupture surface is based on results of a residual torsional ring shear test from rupture surface clay materials obtained during downhole logging of B-6. Laboratory test results are provided in Appendix C.

***Soil Shear Strength Parameters for Static Slope Stability Analysis***

| Soil Type | $\phi$ (Degrees) | Cohesion (psf) |
|---|---|---|
| Landslide Rupture Surface | 13 | 0 |

***Geotechnical Review Comments dated September 15, 2016***

For your convenience, the geotechnical peer review comments have been repeated below along with our responses. A copy of the review sheet is provided in Appendix H.

***Comment No. 1***

"Consultant should provide supporting data for the location and recommended set-back criteria for the Un-named West Coyote Hills fault. Consultant should confirm that sufficient continuous or overlapping exploratory trench excavations were completed and satisfactorily evaluated by others across the entire width of the Earthquake Fault Zone."

***Response to Comment No. 1***

As detailed in "Background", Section 1.4 and "Faulting and Seismic Hazards", Section 2.5 of LGC Geotechnical, 2016, location of the fault and setback criteria for the Unnamed West Coyote Hills Fault were originally presented in Leighton, 1992. As presented within the available documents, a series of relatively short exploratory trenches were excavated across the observed ground surface rupture. The recommended setback is relative to the observed ground surface rupture that was reportedly confirmed by the trenching. No full continuous overlapping trenches were excavated across the Earthquake Fault Zone. Since that time, the entire Earthquake Fault Zone has been improved or developed for the current residential uses, roadways, park, golf course, etc.

***Comment No. 2***

"Consultant should address the potential for renewed fault activity and/or ground deformation associated with inactive faults and oil production operations in the future."

***Response to Comment No. 2***

Due to the distance from the proposed structures to the surface trace of the Unnamed West Coyote Hills Fault (more than approximately 200 feet apart at the closest location) and the fact that oil production has ceased in the immediate vicinity, the potential for renewed fault activity to impact the proposed development is considered low. The Unnamed West Coyote Hills Fault was hypothesized to be active due to the oil production operations and it is not believed to be linked to the major active fault systems that currently interact with the plate tectonics of Southern California. It is highly unlikely that future oil production will occur immediately adjacent to the project, due to the presence of residential and commercial development on all sides. In the event there is unexplained new activity on the Unnamed West Coyote Hills Fault, it is our opinion it will cause less ground shaking at the site than would from one of the major tectonic faults in the region. Refer to Table 2 of Section 2.5, "Faulting and Seismic Hazards" for details (LGC Geotechnical, 2016).

Ground deformation from inactive faults is generally anticipated to be limited to a minor amount of differential settlement due to the variable materials on either side of the faults, that will be addressed with overexcavation of design cut or transition pads to ensure a minimum of 5 feet thick, uniform compacted fill over bedrock.

***Comment No. 3***

"In Sections 2.5 and 4.0, the consultant recommends further geologic evaluation be conducted during grading and prior to construction of habitable structures for Lots 12, 28 and 29 to verify the lack of active faults. The consultant then states that due to previous grading that has occurred within the limits of the Earthquake Fault Zone, it's likely that soil horizons typically utilized for dating faults (to determine whether it's active or not) have already been removed. Please clarify how an assessment of fault activity would be conducted if a fault is encountered and Holocene-age materials are no longer present."

***Response to Comment No. 3***

An assessment of fault activity will be conducted on Lots 12, 28, and 29 at the appropriate time, that will consist of both removals to expose the surrounding bedrock and the excavation of one backhoe trench per lot, generally perpendicular to the length of the Earthquake Fault Zone. Each trench should be excavated to a minimum of 5 feet deep in to ensure a vertical observation surface for detailed mapping. If a fault is observed, it will be evaluated for potential age of movement; in the event that no supporting age dating information is available, then structural fault setbacks shall apply to the three lots as appropriate.

***Comment No. 4***

"Consultant should provide supporting data for the landside limit within the western portion of the site in the vicinity of the future basin. The buried landslide limit shown in Geologic Cross-Section 1-1' is not consistent with the Geotechnical Map. Exploratory boring HS-18 also does not identify the basal surface of the reported

buried landslide. Please clarify how the geologic interpretation of the buried landslide shown in Cross-Section and plan view was determined. In addition, please discuss rupture surface characteristics and rational for previous landslide movement."

***Response to Comment No. 4***

As discussed during the meeting held at AKA offices on October 20, 2016, the buried landslide limits were difficult to see and have been highlighted for clarity on Sheet 1, Geotechnical Map. Additionally, the cross-section profile is based on several layers of information including the published grading plan review report (early borings), the as-graded report for the golf course, the environmental remediation data (elevations of oil-affected soil placement), and the recently excavated, sampled and logged small diameter and large diameter borings by LGC Geotechnical. The majority of information was collected from the as graded report (Geosoils, 1999); please note all available attitudes pertaining to the landslide are presented on the Geotechnical Map. Refer to the edges of the upper slope keyway at the head of the slide and the shear keyway in the middle/toe of the slide. Boring HS-18 was a small diameter hollow stem boring; no basal rupture surface was identified in the samples retrieved from HS-18.

An additional large diameter bucket auger boring (Boring B-6) was recently excavated in order to confirm the geometry of the landslide and bedrock below the landslide, and collect representative samples for supplemental soil shear strength testing. Samples were collected by hand during downhole logging including rupture surface clay and the most "clayey" bedrock material based on visual observation. The additional boring log, laboratory testing information, and updated Geotechnical Map are provided with this response to comments.

The landslide complex at the western portion of the site likely occurred as the result of a weak bedding layer, or "clay seam" becoming exposed over time as erosion of the north facing hillside eventually daylighted the weak feature. The geometry of the hillside, several ancient faults and the inclination of the weak bedding surface (out of slope) were likely triggers for the landslide. The landslide is likely very old based on the muted geomorphology and lack of topographic expression. Landslide rupture surface clay collected in Boring B-6 was observed to be an along-bedding clay seam that sheared with movement of the material above. The clay was observed to be moist, plastic, and less than ¼-inch thick. Laboratory testing of the material is presented in Appendix C.

***Comment No. 5***

"There is no mention of existing subdrains placed beneath the site during previous site development. If there are subdrains currently present, the consultant should show them on Geotechnical Map and provide recommendations for how they should be extended to daylight, if necessary."

***Response to Comment No. 5***

Approximate subdrain locations observed by Geosoils and presented in their as graded report for the golf course and adjacent residential tracts to the south (Geosoils, 1999), are presented on the Geotechnical Map, Sheet 1. The subdrains that are anticipated to be encountered during the proposed rough grading operation will be protected in place or extended to proper gravity flow outlets as necessary. Each subdrain will be handled on a case-by-case basis in order to maintain and/or improve the existing drainage system that serves both the subject site and the adjacent residential tracts to the south.

***Comment No. 6***

"The depths shown on the bedding attitudes for B-1 on the Geotechnical Map are not consistent with the boring log. The consultant should address this."

***Response to Comment No. 6***

The depths of bedding attitudes for B-1 are presented on Sheet 1.

***Comment No. 7***

"In Section 2.4, the consultant should discuss the potential for perched groundwater to form within the more permeable sandstone interbeds of the San Pedro Formation after site development. Such conditions could create pore pressure stresses on potential failure planes along the finer-grained bedding in the formation. The consultant should evaluate the potential for such conditions to form following site development and consider this effect in appropriate slope stability analyses."

***Response to Comment No. 7***

Based on the onsite geologic conditions, including the presence of existing and proposed subdrains, reduced water demand when the site is converted from a golf course to residential community, improved surface drainage characteristics (more concrete, asphalt and area drains and less grass) and site soils possessing relatively high fines content and relatively high CPT tip resistance of the "sandy" soils, it is our opinion that the potential for any significant perched groundwater in inter-beds is low.

***Comment No. 8***

"In Section 2.4, the consultant indicates that perched groundwater conditions could develop following site development and that surface seepage may develop due to this condition. The consultant should provide appropriate methods of mitigation to address potential adverse effects from this condition."

***Response to Comment No. 8***

Localized perched groundwater conditions are a possibility at any development following site development and irrigation. Generally, such conditions are unpredictable and have various causes. The general rough grading practices proposed at the site including overexcavation of transition and design cut pads, installation of new subdrains and extension of existing canyon subdrains, and construction of replacement fill keyways with backdrain/subdrains for design cut slopes, are anticipated to mitigate much of the potential for nuisance water to develop. If localized nuisance water issues develop after grading, they should be addressed on a case-by-case basis.

***Comment No. 9***

"In Section 2.5.1, the consultant has discussed results of liquefaction analyses. The consultant should provide supporting calculations of such analyses for review."

***Response to Comment No. 9***

As previously discussed, the majority of the developed site will consist of compacted fill over dense/hard bedrock and is not considered susceptible to liquefaction. However, the west portion of the site contains alluvial soils within a mapped liquefaction hazard zone that may be susceptible to liquefaction depending primarily on their apparent density (e.g., loose to dense) and plasticity. Laboratory test results indicate that fine-grained alluvial soils are generally not considered to be susceptible to liquefaction based on Plasticity Index and/or in-situ moisture content compared to their Liquid Limit (Bray & Sancio, 2006); refer to Table 1 provided in Appendix D. Dense to very dense sandy soils are also present that are not considered susceptible to liquefaction. However, the data obtained from our field evaluation indicates that the site contains isolated sandy layers susceptible to liquefaction in the upper 50 feet. Liquefaction analysis is based on a conservative groundwater elevation of 195 feet using the program CLiq. Refer to output files provided in Appendix D. The soil type interpretations of CPT soundings show good agreement to laboratory testing of fines content and Plasticity Index from samples obtained from adjacent borings, refer to Figure 1 and 2. Changes in design grade (either cut or fill) are incorporated into the calculations by adjustment of the total and effective stress for the induced cyclic stress ratio. Results indicate seismic settlement on the order of 1½ inches or less. Liquefaction calculations are provided in Appendix D.

***Comment No. 10***

"In Section 2.5.2, the consultant has indicated the potential for lateral spreading is considered very low due to the lack of a "free face" condition. However, development of the site will entail the creation of significant slopes supported by alluvial soils that are prone to liquefaction as well as large pad areas with overall sloping ground surface conditions. Both of these conditions could lead to lateral spreading. The consultant should provide appropriate analyses of lateral spreading that evaluate the effects of undrained, residual shear strengths during the design ground motion event under these conditions."

***Response to Comment No. 10***

Site sandy soils generally have a normalized clean sand tip resistance well above 70. A normalized clean sand tip resistance of 70 corresponds to a blow count $(N_1)_{60}$ of at least 15. Soils with a corrected SPT $(N_1)_{60}$ blow count of 15 or greater are generally not considered susceptible to lateral spreading (Youd, Hansen, Bartlett, 2002). Evaluation of lateral spreading potential were performed on Cross Sections 11-11', 12-12' and 15-15'. In our analysis, we modeled alluvium using the lower of the liquefied residual strength from the CPT's or the static shear strength based on the stress range. Liquefied shear strength values are based on Robertson, 2010. Plots of liquefied Su/S'v ratios are provided in Appendix D. The seismic coefficient (Kh) is based on the scaled design earthquake peak ground acceleration using a 5-cm displacement threshold per Special Publication 117A. Lateral spreading analysis indicates adequate factors of safety. Refer to Appendix D.

***Comment No. 11***

"In Section 2.7, landslide slip surfaces have been assigned the friction strength of 24 degrees. Due to shearing from movement, these surfaces would be expected to exhibit lower shear strengths than those assumed. The consultant should re-evaluate the selection of the strength associated with slip surfaces in Qls. The consultant may look to the work of Stark, T., Choi, H., and McCone, S., "Drained Shear Strength Parameters for Analysis of Landslides", ASCE Journal of Geotechnical and Geoenvironmental Engineering,

Vol. 131, No.5, May 1, 2005. Using this method, Atterberg testing would suggest a frictional value of 17 to 18 degrees is more appropriate."

***Response to Comment No. 11***

Torsional ring shear testing of the rupture surface indicated a friction angle of 13 degrees (zero cohesion). The results are provided in Appendix C. The friction angle of 24 degrees was used for landslide material, not the actual rupture surface. Slope stability analysis for Cross Section 2-2' indicates an adequate static factor of safety. Since the landslide rupture plane is less than 12 degrees from the horizontal, pseudostatic (seismic) slope stability was not performed in accordance with County of Orange Grading Manual. Slope stability analysis is provided in Appendix E.

***Comment No. 12***

"In Section 2.7, along bedding strength indicated for Qsp is appropriate for most siltstone units in the Qsp across the site. However, localized claystone units warrant consideration of lower along bedding strength parameters where present, such as in Cross Section 3. Please re-evaluate the selection of along bedding strength parameters to account for claystone units where potentially present and provide updated stability analyses accordingly."

***Response to Comment No. 12***

Torsional shear testing for fully-softened strength of site clayey bedrock indicated a soil friction angle of 28 degrees which correlates well with the shear strength used for along-bedding. Refer to Appendix C.

***Comment No. 13***

"In Section 2.7, the consultant indicates strengths were increased for seismic loading conditions. An increase in the apparent cohesion can be justified due to the dynamic loading that occurs during a strong ground motion event caused by increases in negative pore pressure. However, an increase in the friction angle cannot be equally justified. The consultant should provide a rationale for the use of increased friction capacity under seismic forces or revised the analyses to neglect the increase in friction angle."

***Response to Comment No. 13***

Seismic soil strengths are based on composite plots of shear test results. The design values for seismic loading are below the peak composite trend line (Refer to Appendix F). Direct shear testing is performed at a much slower shear rate than during seismic loading. Special Publication 117A also allows increase of soil shear strength parameters for seismic loading. In general, seismic factors of safety are generally well above the minimum required value of 1.1. However, we have evaluated the cross section (1-1') that has the lowest current seismic factor of safety and not increased the friction angle as requested. Resulting seismic factor of safety remains above 1.1. Refer to the plots and slope stability analysis provided in Appendix F.

***Comment No. 14***

"In Section 2.8, the consultant discusses the analysis for a rapid draw down in the detention basin. However, the setup of the problem does not correctly model the pore pressures in the embankment in a rapid draw down condition. In a rapid draw down scenario, the soil pore pressures are assumed to have the same conditions after the basin empties as existed when the basin is full. The models have been set up to have a phreatic surface along the bottom of the basin which will under-estimate the pore pressure distribution of a rapid draw down condition and therefore, result in a higher factor of safety. Please revise all calculations of rapid drawdown to properly model pore pressure conditions."

***Response to Comment No. 14***

We have updated the slope stability analysis and it is provided in Appendix E.

***Comment No. 15***

"In Section 2.8, please provide evaluation of temporary backcuts to confirm adequate temporary stability where offsite features or properties may be at risk to loss of support."

***Response to Comment No. 15***

The requested slope stability (Cross Section 5, 8, 12 and 13) is provided in Appendix E. Temporary backcuts are a maximum of 1.6:1 (horizontal: vertical). Slope stability analysis indicated factors of safety of at least 1.25 for temporary conditions.

***Comment No. 16***

"In Section 2.8, a new section should be drawn and evaluated for stability for the cut proposed below the existing shear key near current Cross Section 8. The new section should strike NW/SE to evaluate the highest portion of the proposed cut slope."

***Response to Comment No. 16***

The requested cross section (14-14') is shown on Sheet 1 (plan view) and Sheet 2 (cross-sectional view). The requested slope stability analysis is provided in Appendix E.

***Comment No. 17***

"In Section 2.8, please explain the purpose of entering an acceleration value in the program as well as a horizontal coefficient. Which of the two parameters is controlling the horizontal seismic force and if the acceleration is controlling, what is the effective horizontal factor. Also, a peak value of 0.15g has been used in all seismic analyses, which is equal to the entered horizontal coefficient, but smaller than the peak ground acceleration (0.76g; Table 3 of the reviewed report). Please explain the reason for using this peak value."

***Response to Comment No. 17***

The slope stability software requires the input of the Peak Ground Acceleration (PGA) along with the horizontal coefficient. However, the PGA input value is only applicable when using the program Newmark sliding block option of calculating a displacement of a specified surface. Therefore, for pseudo-static slope stability analysis the PGA input is irrelevant and not used in the calculations.

***Comment No. 18***

"In Section 2.11, the consultant has concluded that infiltration of storm water is not feasible at the site. While such a conclusion is reasonable in areas underlain by bedrock for the stated reasons, the consultant has not demonstrated that infiltration is not feasible in all portions of the site underlain by thick sections of granular alluvium. Data from CPT-1A, CPT-3, and HS-11 suggest that infiltration may be feasible by dry wells in the associated area. The conclusion that infiltration is not feasible in this area should be substantiated by a more compelling rationale or the conclusions regarding infiltration feasibility should be modified accordingly."

***Response to Comment No. 18***

Based on our review of the CPT and boring logs, the sandy layers are not continuous and thereby infiltration is not recommended. In addition, recent laboratory testing indicated fines content ranging approximately 29 percent to 62 percent. Correlation of CPT sounding soil behavior type and fines content is provided on fence diagrams (Figure 1 and 2). Soils with a combination of high fines content and high CPT tip resistances are considered to have low permeability. Refer to Figures 1 and 2.

***Comment No. 19***

"In Section 3.0, the consultant has indicated that raising of grades in areas underlain by alluvium is estimated to induce up to 2.5 inches of settlement. They further indicate that this settlement will require 6 to 12 months to occur. Some portions of the site will require the addition of about 30 feet over existing grades and are underlain by about 60 feet of alluvium. Such conditions would be expected to undergo more than 2.5 inches of primary settlement. This condition will also lead to long-term secondary settlement. The consultant should provide calculations to support the estimate of primary settlement and the time-frame to complete primary settlement. The consultant should also provide calculations for estimating secondary, long-term settlement and the associated time-rate. Conclusions and methods of mitigation should be provided regarding primary and secondary settlement of alluvial soils."

***Response to Comment No. 19***

Site alluvial soils are generally very stiff sandy clays and dense clayey sands. Based on laboratory test data consisting of in-situ moisture content and Atterberg Limits (Liquidity Index) and CPT data (tip resistance and interpreted OCR ratio), clayey soils are considered over-consolidated. Significant increase in grades are proposed overlying left in place alluvium along Cross Section 5-5', near CPT-10. Based on interpretation of CPT-10 the minimum over-consolidation ratio of the left in place alluvium is approximately 5. Our calculations indicate that increase of grades may induce settlement ranging from approximately 2½ inches to approximately 6¾ inches. The higher estimate is based on using Pc values estimated from consolidation curves. However, it is our opinion that site clays are more over consolidated and the actual settlement will be

closer to approximately 2½ inches and long-term secondary settlement is negligible. The lower estimate is based on over-consolidated clays with an approximate average Crε value. It is our opinion that over-consolidation ratio of applicable site clays is better estimated from CPT data instead of maximum past pressure values (Pc) estimated from laboratory consolidation tests. Please note that settlement monitoring will be performed starting at the end of grading and construction of proposed structures will not commence until monitoring data indicates that future projected settlement (both primary and secondary) is within tolerable limits. Settlement calculations are provided in Appendix G. Plots of the over-consolidated ratio (OCR) based on CPT data is provided in Appendix D.

Settlement of alluvial soils is estimated to take approximately 6 to 12 months after the completion of rough grading, it is our opinion it will be closer to 6 months to complete. Consolidation time is estimated from correlations from Liquid Limit. It should be noted that left in place alluvial soils that will experience significant grade increases are generally inter-bedded with sandy layers which will increase the rate of consolidation and decreasing total settlement duration. Refer to CPT-10 and 11B located near Cross Section 5-5'. Refer to calculations provided in Appendix G.

***Comment No. 20***

"In Section 3.0, the consultant indicates that native and cut slopes surrounding the development may be subject to surficial failures. The consultant should provide a discussion of potential adverse impacts from this condition and methods of mitigation to address potential adverse effects of this condition."

***Response to Comment No. 20***

Paramount in reducing the potential for either erosion or localized instability is to properly maintain native and graded slopes. We recommend that the slopes be properly landscaped with deep-rooted drought-tolerant, slope stabilizing vegetation as soon as possible to minimize the potential for erosion and/or other instabilities. Slopes should not be allowed to be bare of vegetation. Landscape vegetation should not be "trimmed" to root structures leaving no protection of the slopes

Irrigation at the site should be kept at the minimum level to support plant growth, overwatering must be avoided. Future landowners/property managers should be made aware that even though the site has been developed in accordance with the local standard of practice that includes a subdrain system, improper maintenance and particularly significant overwatering or poor surface drainage could possibly lead to a buildup in localized groundwater levels. This may result in nuisance type water-related issues to foundations, flatwork, walls, landscaping improvements, etc., and in extreme cases a decrease in the stability of slopes. To help reduce the potential for excessive erosion of graded slopes we recommend that protective measures be implemented in accordance with the latest city grading ordinances and other governing codes. Design of surface drainage provisions are within the purview of the project civil engineer.

Subdrains and v-ditches must be properly maintained and their outlets kept free draining and clear of any potential obstructions. Routine maintenance should be performed, especially prior to and during the rainy season. Failure to properly maintain these elements may result in slope failures, slumps, excessive erosion, localized saturated zones, nuisance type water issues, etc.

Any future trenches excavated on a slope face for utility or irrigation lines and/or for any purpose should be properly backfilled and compacted to the slope face. Observation and acceptance by the geotechnical consultant during trench backfill are recommended.

A program for the elimination of burrowing animals in both native and graded slope areas must be established and properly maintained to protect slope stability by reducing the potential for surface water to penetrate into the soil. Continuous erosion control, rodent control, and maintenance are essential to the long-term stability of all slopes.

These will be addressed in the 40-scale geotechnical grading plan review report.

***Comment No. 21***

"In Section 3.0, the consultant indicates improvements adjacent to slopes will be impacted by slope creep. The consultant should provide general methods of mitigation to address adverse effects of slope creep on improvements likely to be impacted by creep."

***Response to Comment No. 21***

Typical methods to reduce the impacts of slope creep for top of slope improvements include placing improvements such as retaining and free-standing walls on a deep foundation system. Decorative walkways, patios, swimming pools and spas, and other landscaping features are recommended to be constructed with flexibility to accommodate the effects of slope creep. Typical remediation methods include frequent control joints, flexible pavers, flexible structures, or additional reinforcement to limit (not eliminate) cracking and rotation. More specific recommendations will be provided in the future based on the 40-scale grading plan.

***Comment No. 22***

"In Section 4.0, the consultant recommends that settlement monuments should be installed within fill areas greater than approximately 40 feet below finished grade where alluvium is left in place. The statement is confusing but appears to recommend the placement of monuments where more than 40 feet of fill will be placed over existing grade. Please clarify this recommendation and amend if necessary based on the response to Item #19."

***Response to Comment No. 22***

Where removals are performed to bedrock (i.e., no alluvium left in place), settlement monuments should be placed where fill depths are greater than approximately 40 feet. Fill depth is measured from removal bottom to finish grade. In addition, in areas where design grades increase 10 feet or more from existing grades and left in-place alluvium is approximately 20 feet or greater settlement monuments should be installed.

Settlement monuments should be read by a licensed surveyor with an off-site benchmark. The survey readings should be obtained four times in the first two months, twice in the third month, and then once a month unless otherwise requested by the geotechnical consultant. Shallow footings and slab-on-grade foundations should be constructed after settlement monitoring data indicates future total settlements are within tolerable limits. Temporary surcharge loading may be used to decrease the settlement waiting period.

***Comment No. 23***

"Appendix D, Section 1- Please extend the geometry of the analysis and adjust search limits for the remainder of the section."

***Response to Comment No. 23***

The requested slope stability analysis is provided in Appendix E.

***Comment No. 24***

"Appendix D, Section 2- Please evaluate stability of overall composite slopes by extending the section to include Cross Sections 2-2' and 2'-2''."

***Response to Comment No. 24***

The requested slope stability analysis is provided in Appendix E.

***Comment No. 25***

"Appendix D, Section 4- Please revise the model to search before and beyond the toe, not just the toe."

***Response to Comment No. 25***

The requested slope stability analysis is provided in Appendix E.

***Comment No. 26***

"Appendix D, Section 7- Please provide analysis of lower slope in consideration of the Qls."

***Response to Comment No. 26***

Please note that the landslide (Qls) will be removed during grading. Refer to Cross Section 7-7' shown on Sheet 2.

***Comment No. 27***

"Appendix D, Section 8- Please provide block analysis for lower slope to evaluate failures through Qsp."

***Response to Comment No. 27***

The requested slope stability analysis is provided in Appendix E.

***Comment No. 28***

"Appendix D, Section 10- Please revise location of exit box to evaluate failures below key and out at toe. The key with material type Af has not been included in the model."

***Response to Comment No. 28***

The requested slope stability analysis is provided in Appendix E.

***Comment No. 29***

"Appendix D, Section 11- Please apply the seismic load for the seismic case."

***Response to Comment No. 29***

The requested slope stability analysis is provided in Appendix E.

***Comment No. 30***

"Appendix D, Section 12- Please evaluate stability of overall composite slopes by extending the section to include Cross Sections 12-12' and 12'-12''."

***Response to Comment No. 30***

The requested slope stability analysis is provided in Appendix E.

Should you have any questions, please do not hesitate to contact our office. We appreciate the opportunity to be of service.

Sincerely,

***LGC Geotechnical, Inc.***

Dennis Boratynec, GE 2770
Vice President

Katie Maes, CEG 2216
Project Geologist

Brad Zellmer, GE 2618
Project Engineer

KTM/BTZ/DJB/aca

Attachments: **Volume** 1

Figure 1 – CPT Fence Diagram A-A' (Rear of Text)
Figure 2 – CPT Fence Diagram B-B' (Rear of Text)

Appendix A: References
Appendix B: Boring Log B-6
Appendix C: Laboratory Test Results
Appendix D: Liquefaction & Lateral Spreading Analysis
Appendix E: Slope Stability Analysis
Appendix F: Seismic Soil Shear Strengths
Appendix G: Settlement Calculations
Appendix H: Albus-Keefe & Associates Peer Review dated September 15, 2016

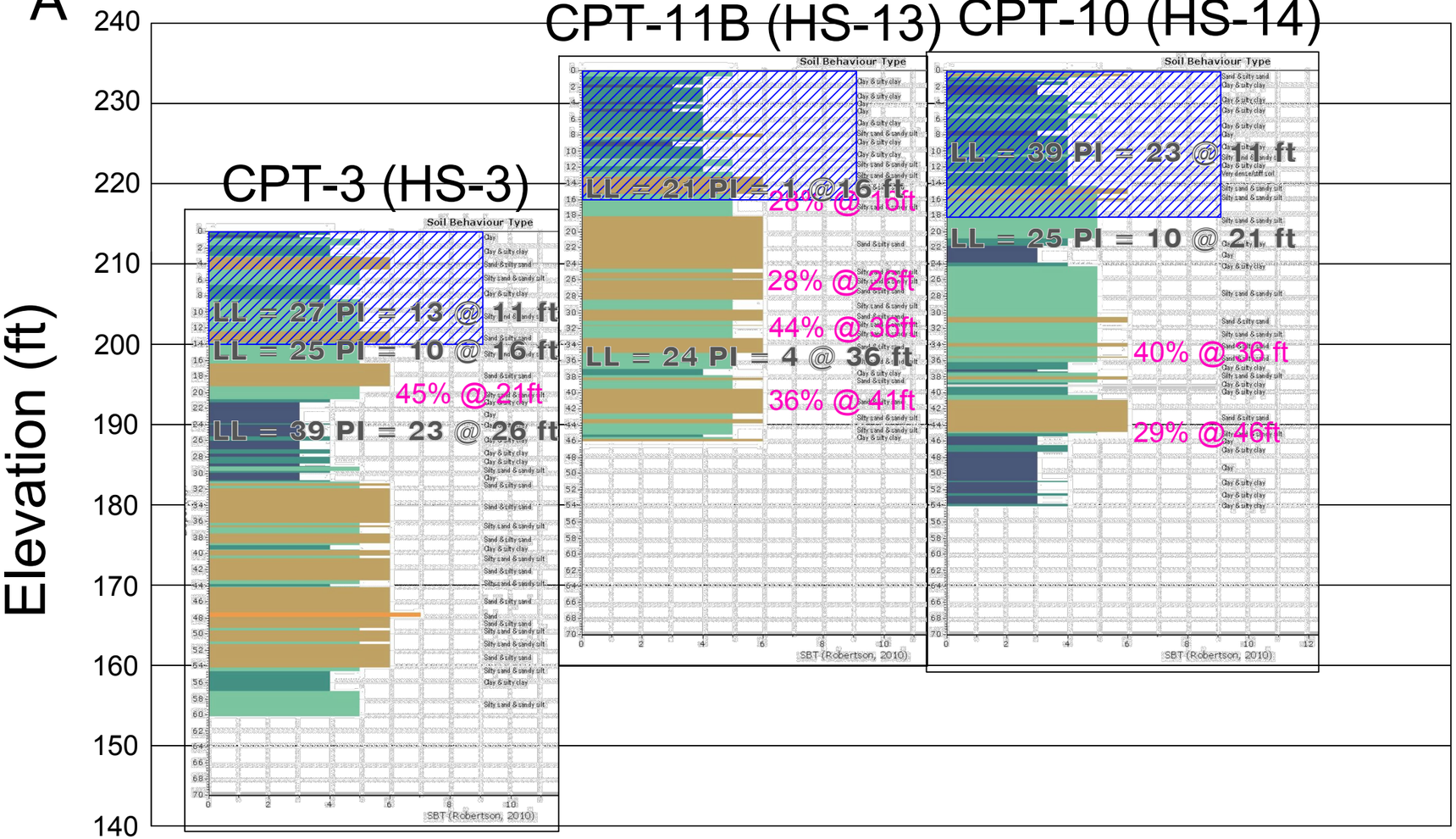
**Volume 2**

Sheet 1 – Geotechnical Map (In Pocket)
Sheet 2 – Geotechnical Cross-Sections 1-1' through 9-9' (In Pocket)
Sheet 3 – Geotechnical Cross-Sections 10-10' through 15-15' (In Pocket)

Distribution: (1) Addressee (1 electronic copy)
(2) Carlson Strategic Land Solutions (1 wet-signed copy, 1 electronic copy)
Attn: Mr. Peter Carlson
(2) Albus Keefe & Associates (1 wet-signed copy, 1 electronic copy)
Attn: Messrs. Dave Albus and Patrick Keefe

A

A'




***Horizontal Not to Scale***

## LEGEND

Soil to be Removed

Soil to be Removed and Recompacted

LL = 39 PI = 23 @ 36 ft — Atterberg Limits and Approximate Depth from Laboratory Testing

45% @ 21ft — Fines Content and Approximate Depth From Laboratory Testing

SCALE: 1”=16’ ***(Vertical Only)***

16’ 0 16’ 32’


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***Figure 1***
***CPT Fence Diagram A-A'***

| | |
|---|---|
| *PROJECT NAME* | *Rancho La Habra - VTTM 17845* |
| *PROJECT NO.* | *14057-01* |
| *ENG. / GEOL.* | *DJB / KTM* |
| *SCALE* | *1" = 16'* |
| *DATE* | *February 2017* |

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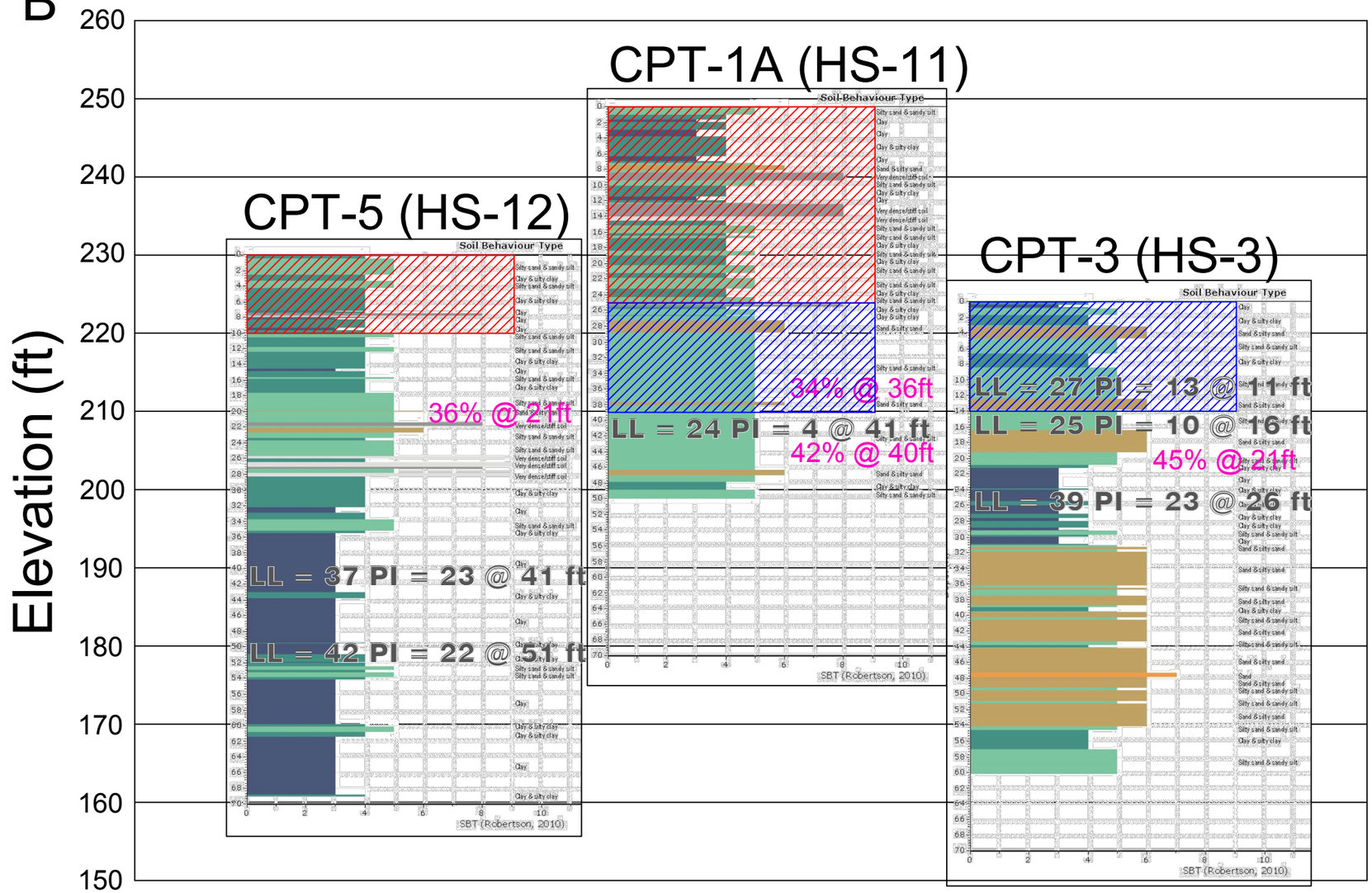
B

B'




***Horizontal Not to Scale***

## LEGEND

Soil to be Removed

Soil to be Removed and Recompacted

LL = 42 PI = 22 @ 51 ft — Atterberg Limits and Approximate Depth from Laboratory Testing

45% @ 21ft — Fines Content and Approximate Depth From Laboratory Testing

SCALE: 1"=16' ***(Vertical Only)***

16' 0 16' 32'


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***Figure 2***
***CPT Fence Diagram B-B'***

| | |
|---|---|
| *PROJECT NAME* | *Rancho La Habra - VTTM 17845* |
| *PROJECT NO.* | *14057-01* |
| *ENG. / GEOL.* | *DJB / KTM* |
| *SCALE* | *1" = 16'* |
| *DATE* | *February 2017* |

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# *Appendix A*
# *References*

## ***References***


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# *Appendix B*
# *Boring Log B-6*

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 1 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 325 | 0 | | | | | | | | **@ 0' to 10' Quaternary Landslide Deposit (Qls):** @0' Fine SANDSTONE and fine Silty SANDSTONE: light brown, yellowish brown, and gray mottled, few shells | |
| | | | SH: N80W, 60N | GB-3 | | | | | @ 3' Shear plane attitude, internal rupture surface. Rootlets, slightly sheared clay: olive gray, slightly moist, slightly stiff to stiff; iron oxide; 1/8" thick, soft moist, clay lined shear with fine sand lenses, highly weathered, fractured, iron oxide, manganese oxide. Grab Sample GB-3. | |
| 320 | 5 | | | | | | | | | |
| | | | | | | | | | @ 10' Rupture surface attitude at base of fractured/oxidized/offset material. CLAY: gray, soft to stiff, moist 1/4" thick, overlies 5" thick light yellowish sandstone bed with soft sediment deformation and siltstone lenses. Grab Sample GB-4; rupture surface clay. | |
| | 10 | | RS: NS, 15W | GB-4 | | | | CH | **@10' to T.D. Quaternary San Pedro Formation (Qsp):** | AL TS |
| 315 | | | B: N22E, 11W | | | | | | @10' Interbedded gray siltstone and yellow sandstone, very thin to moderately thick, moist, very stiff/dense; intact; slightly weathered; tight; faint soft sediment deformation. @ 11' Bedding attitude. | |
| | 15 | | | | | | | | | |
| 310 | | | | | | | | | @ 16' Thin concretion with shells within yellow SANDSTONE with laminations, slightly friable | |
| | | | | | | | | | @ 18' Fine Sandy SILTSTONE with sand lenses: light brown and light yellow, moist, dense to very dense. Minor gypsum lenses, soft sediment deformation, tight. | |
| | 20 | | B: N28E, 11W | | | | | | @ 20' Bedding attitude, fine sand lenses, gypsum. | |
| 305 | | | | | | | | | | |
| | 25 | | B: N15E, 10W | | | | | | @ 25' Bedding attitude on sand lens, 1" thick with gypsum/ manganese oxide, tight, flame structures in fine sandy siltstone, overall affected by soft sediment deformation, moderately weathered, jointed. | |
| 300 | | | J: N55W, 53N | | | | | | @ 29' Joint attitude with gypsum up to 1/2" wide. Decrease in gypsum, below is gray sandy siltstone with iron oxide staining | |

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

Last Edited: 11/28/2016

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 2 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 295 | 30 | | | | | | | | | |
| | 35 | | | GB-5 | | | | | @ 35' Zone of faint spider web jointing with manganese oxide, non-continuous, sub vertical, tight<br>@ 36' SILTSTONE with Clay: moist, very stiff; Grab Sample GB-5; siltstone with clay. Below is Sandy SILTSTONE with fine SAND lenses: gray with orange, moist, dense, very stiff to slightly hard; iron oxide; shells to 2" in diameter | |
| 290 | 40 | | B: N5W, 8W | | | | | | @ 41' Bedding attitude. Continuous SANDSTONE lenses; thinly bedded | |
| 285 | 45 | | | | | | | | @ 45.5' Top of SANDSTONE: light brown, very moist to wet, dense; fine to medium sand; very weakly cemented | |
| 280 | | | | | | | | | @ 48' Base of sandstone, undulatory contact with iron oxide at base | |
| | 50 | | GB: N20E, 10N | GB-1 | | | | CL | @ 50' General bedding attitude, SILTSTONE with Sandstone lenses: mottled light brown and orange, very moist, very stiff<br>@ 51' SILTSTONE with Clay interbedded with Sandstone lenses: orange brown, very moist, very stiff; scattered shell fragments; soft sediment deformation. Grab Sample GB-1; siltstone with clay. | AL |
| 275 | | | | | | | | | | |
| | 55 | | | | | | | | | |
| 270 | | | B:N20E, 12W | | | | | | @ 58' Bedding attitude. SANDSTONE bed, 4" thick: reddish brown, wet, very dense<br>@ 59' SILTSTONE with trace fine Sand: dark gray, very moist to wet, very stiff to hard; zones of iron oxide staining; scattered shells; soft sediment deformation | |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 3 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 265 | 60 | | | | | | | | @ 60' SILTSTONE with trace fine Sand: dark gray, very moist to wet, very stiff to hard; zones of iron oxide staining; scattered shells; soft sediment deformation; minor seepage on one wall | |
| 260 | 65 | | | | | | | | | |
| 255 | 70 | | | | | | | | | |
| 250 | 75 | | J: N85W, 82N | | | | | | @ 75' Attitude on iron oxide lined joint; rough; tight; small seepage | |
| | | | GB: N20E, 15W | | | | | | @ 78' General bedding attitude; not representative; 1/3 of boring is sharply defined iron oxide zone around joint; prevalent soft sediment deformation | |
| 245 | 80 | | | | | | | | @ 81' Active seepage from joints. SILTSTONE with fine Sand and Sand lenses: dark gray, wet, very stiff; tight | |
| 240 | 85 | | J: N85W, 72N | | | | | | @ 85' Joint attitudes on iron oxide lined joints | |
| | | | J: N65W, 58S | GB-2 | | | | CL/ML | @ 86' SILTSTONE with Clay: dark gray, very moist, few sub planar tight joints. Grab Sample GB-2. | AL TS |

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**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
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| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

# Geotechnical Boring Log B-6

| | | | |
|---|---|---|---|
| **Date :** | 11/18/2016 Page 4 of 4 | **Drilling Company :** | Alroy Drilling |
| **Project Name :** | Rancho La Habra | **Type of Rig :** | EZ Bore Bucket Auger |
| **Project Number :** | 14057-01 | **Drop :** 12 " | **Hole Diameter :** 26" |
| **Elevation of Top of Hole :** | ~ 327 ' MSL | **Drive Weight :** | 0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200 |
| **Hole Location :** | See Geotechnical Map | | |

Logged by KTM

Sampled by KTM

| Elevation (ft) | Depth (ft) | Graphic Log | Attitudes | Sample Number | Blow Count | Dry Density(pcf) | Moisture (%) | USCS Symbol | DESCRIPTION | Type of Test |
|---|---|---|---|---|---|---|---|---|---|---|
| 235 | 90 | | | | | | | | @ 90' Fresh, unoxidized bedrock. Increase hardness from slightly hard to hard. SILTSTONE with variable fine Sand content: dark gray, wet, hard; shells up to 1/2" diameter. Below is massive, generally lacks defects, water from seepage at 81' running down boring walls. | |
| 230 | 95 | | | | | | | | | |
| 225 | 100 | | | | | | | | | |
| 220 | 105 | | | | | | | | | |
| 215 | 110 | | | | | | | | @ 111' End visual log. | |
| 210 | 115 | | | | | | | | @ 114' Standing water. | |
| | | | | | | | | | **Total Depth = 115'** | |
| | | | | | | | | | **Ground Water Encountered; Active Seepage at 81'** | |
| | | | | | | | | | **Backfilled with Cuttings on 11/18/2016** | |

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

**SAMPLE TYPES:**

| | |
|---|---|
| B | BULK SAMPLE |
| R | RING SAMPLE |
| G | GRAB SAMPLE |

**TEST TYPES:**

| | |
|---|---|
| DS | DIRECT SHEAR |
| MD | MAXIMUM DENSITY |
| SA | SIEVE ANALYSIS |
| S&H | SIEVE AND HYDROMETER |
| EI | EXPANSION INDEX |
| CN | CONSOLIDATION |
| CR | CORROSION |
| AL | ATTERBERG LIMITS |
| CO | COLLAPSE/SWELL |
| RV | R-VALUE |
| TS | TORSIONAL SHEAR |

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# *Appendix C*
# *Laboratory Test Results*

## *APPENDIX C*

### ***Laboratory Test Results***

The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Fines Content: Representative samples were dried, weighed, and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve was dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve) or ASTM D422 (sieve and hydrometer).

| Sample Location | Description | % Passing # 200 Sieve |
|---|---|---|
| HS-3 @ 20 ft | Clayey Sand with Gravel | 45 |
| HS-5 @ 10 ft | Sandy Clay | 62 |
| HS-5 @ 38 ft | Sandy Clay | 54 |
| HS-12 @ 20 ft | Silty Sand | 36 |
| HS-14 @ 35 ft | Clayey Sand | 40 |
| HS-14 @ 45 ft | Clayey Sand | 29 |

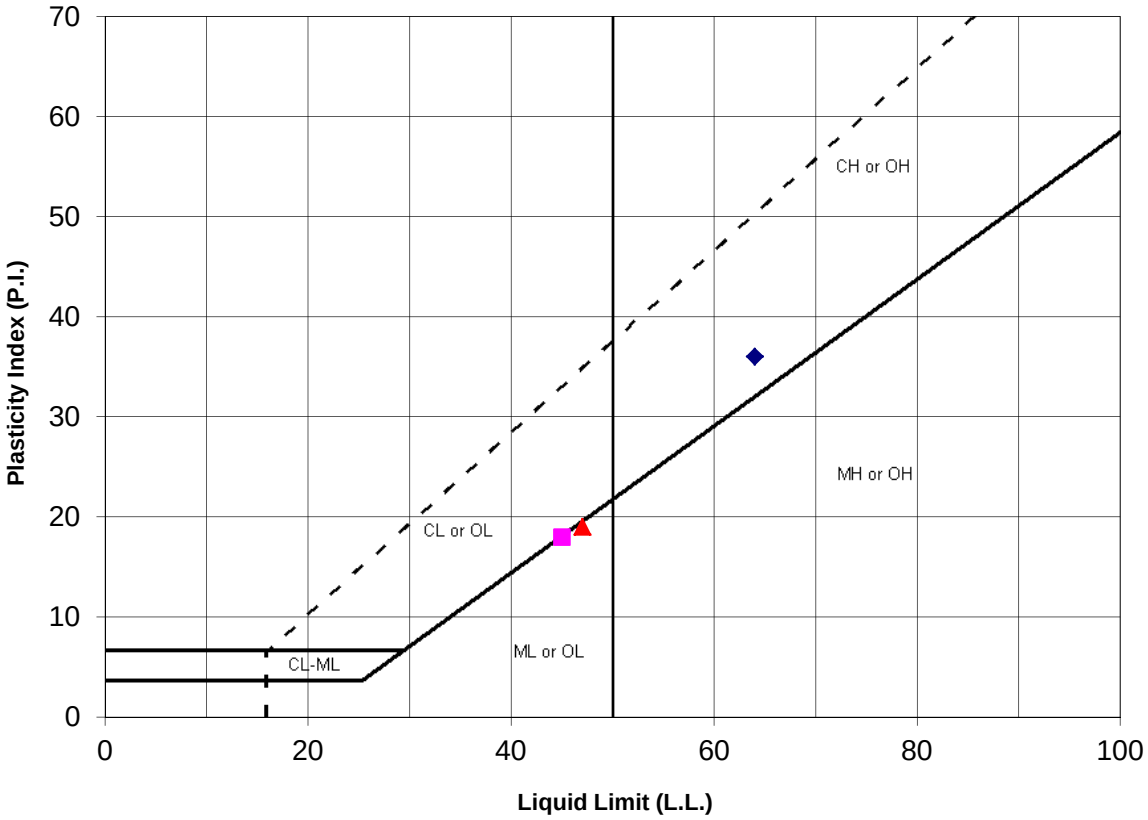
Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined per ASTM D4318 for engineering classification of fine-grained material and presented in the table below. The plots are provided in this Appendix.

| Sample Location | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | USCS Soil Classification |
|---|---|---|---|---|
| B-6 @ 10 feet | 64 | 28 | 36 | CH |
| B-6 @ 51 feet | 45 | 27 | 18 | CL |
| B-6 @ 86 feet | 47 | 28 | 19 | CL/ML |

Torsional Ring Shear for Residual Shear Strength: A drained, residual torsional ring shear test was performed on site clay grab sample (B-6 @ 10 ft). The sample was tested under various normal loads (1, 2.5 and 5 ksf) using a torsional ring-shear testing apparatus (ASTM D6467). The plot is presented in this Appendix.

Torsional Ring Shear for Fully Softened Shear Strength: A drained, fully softened torsional ring shear test was performed on site clay grab samples (B-6 @ 86 ft). The sample was tested under various normal loads (4, 8 and 12 ksf) using a torsional ring-shear testing apparatus (ASTM D7608). The plot is presented in this Appendix.

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS




| Symbol | Location.: | Sample No.: | Depth (ft) | Passing No. 200 Sieve (%) | Liquid Limit (%) LL | Plastic Limit (%) PL | Plasticity Index (%) PI | USCS |
|---|---|---|---|---|---|---|---|---|
| ◆ | B-6 | GB-4 | 10 | - | 64 | 28 | 36 | CH |
| ■ | B-6 | GB-1 | 51 | - | 45 | 27 | 18 | CL |
| ▲ | B-6 | GB-2 | 86 | - | 47 | 28 | 19 | CL/ML |
| | | | | | | | | |
| | | | | | | | | |

LGC Geotechnical, Inc.

**ATTERBERG LIMITS**
(ASTM D 4318)

**Project Number:** 14057-01
**Date:** Dec-16

**Rancho La Habra**

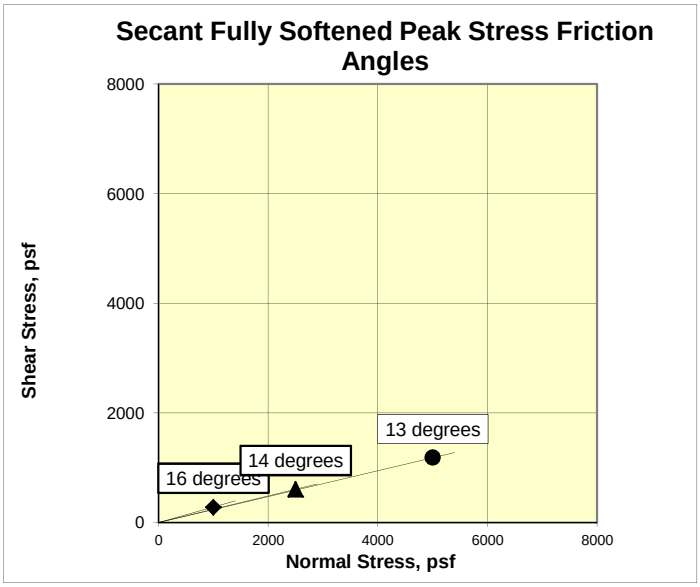
# Drained Residual Torsional Shear Strength (ASTM D6467)

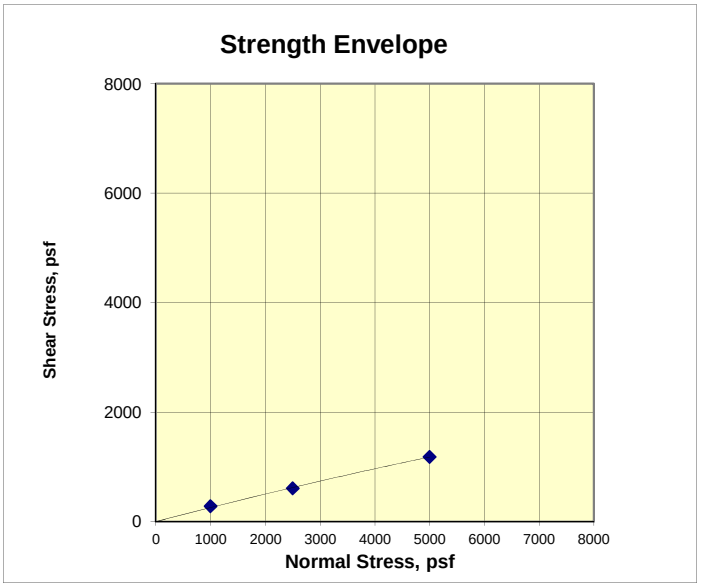
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CTL Job No.:** | 749-009 | **Boring:** | B-6 | **Date:** | 12/15/2016 | **Clay, %:** | |
| **Client:** | LGC Geotechnical | **Sample:** | | **By:** | PJ | **LL:** | 64 |
| **Project Name:** | Rancho LaHabra | **Depth (ft):** | 10 | **Checked:** | DC | **PL:** | 28 |
| **Project Number:** | 14057-01 | **Test Type:** | Fully Softened Residual | | | | |

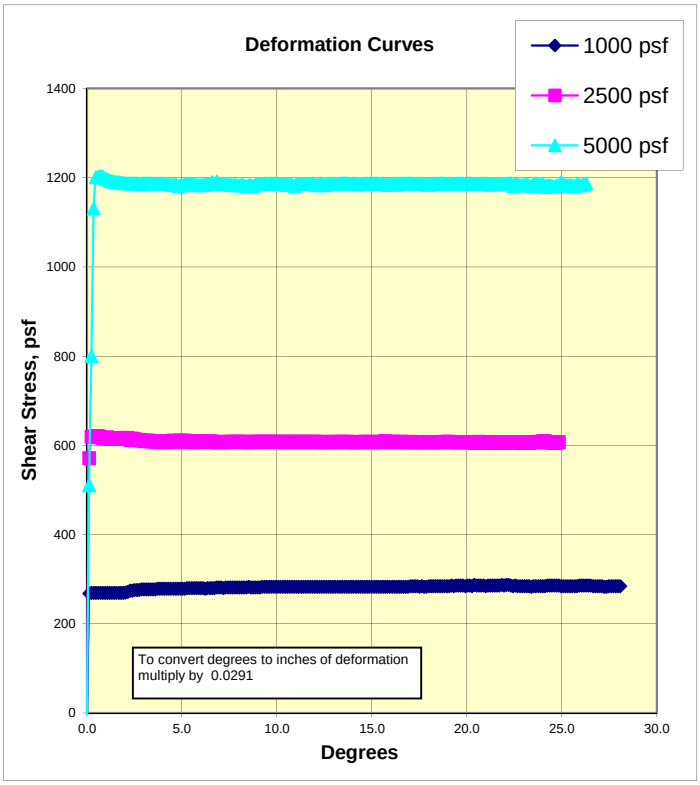
**Soil Type:** Gray Fat CLAY w/ Sand

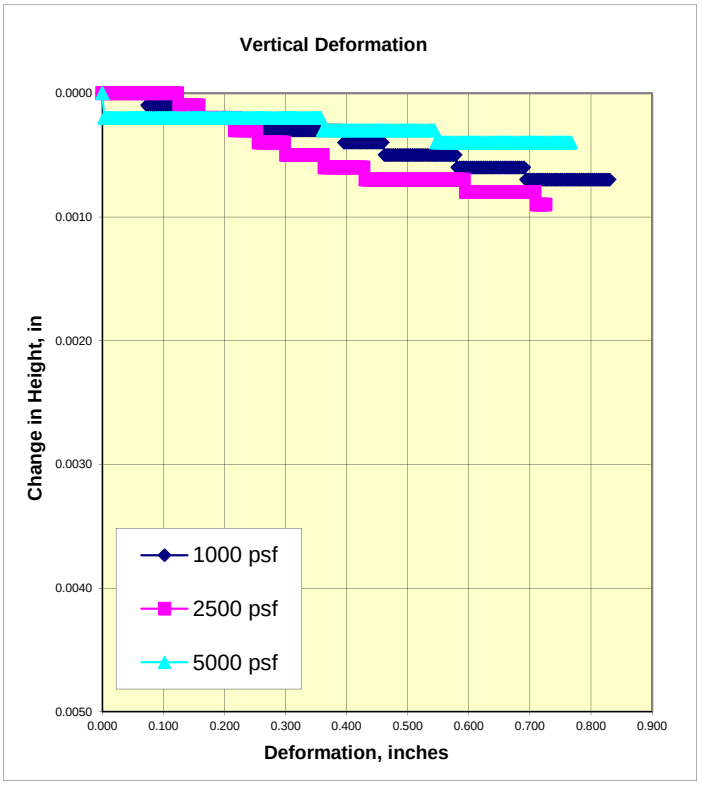
| **Normal Stress, psf:** | 1000 | 2500 | 5000 |
|---|---|---|---|
| **Secant Phi, deg.:** | 16 | 14 | 13 |

Remarks: A small friction correction was applied to each point.



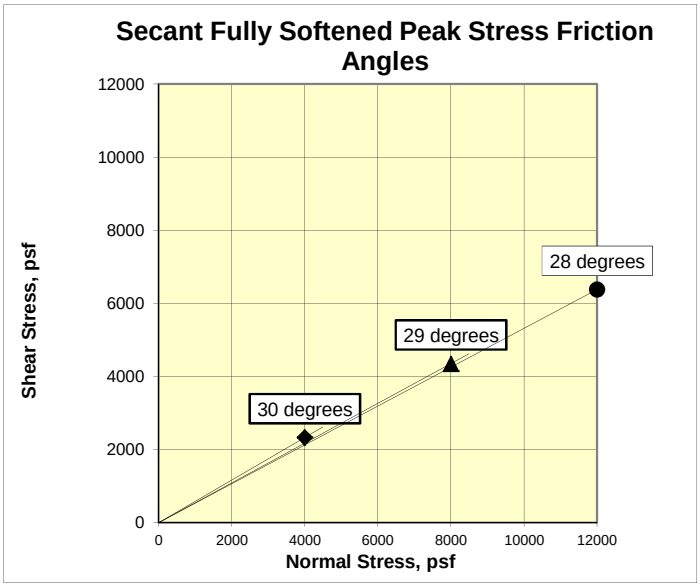



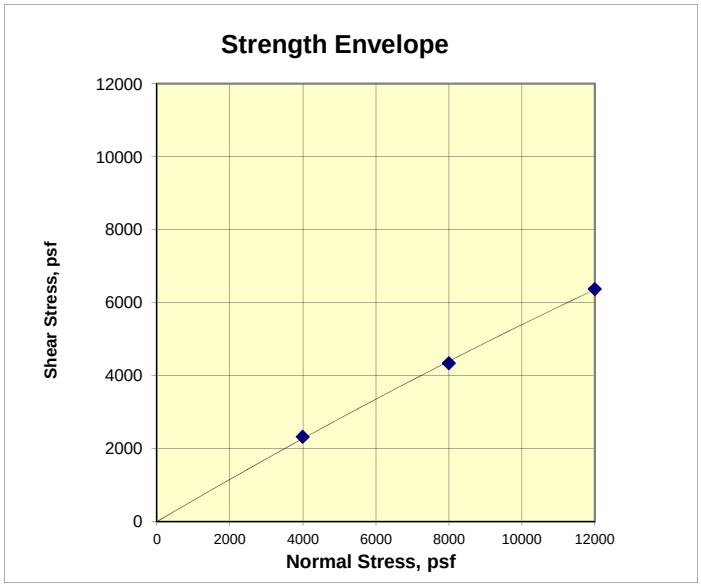



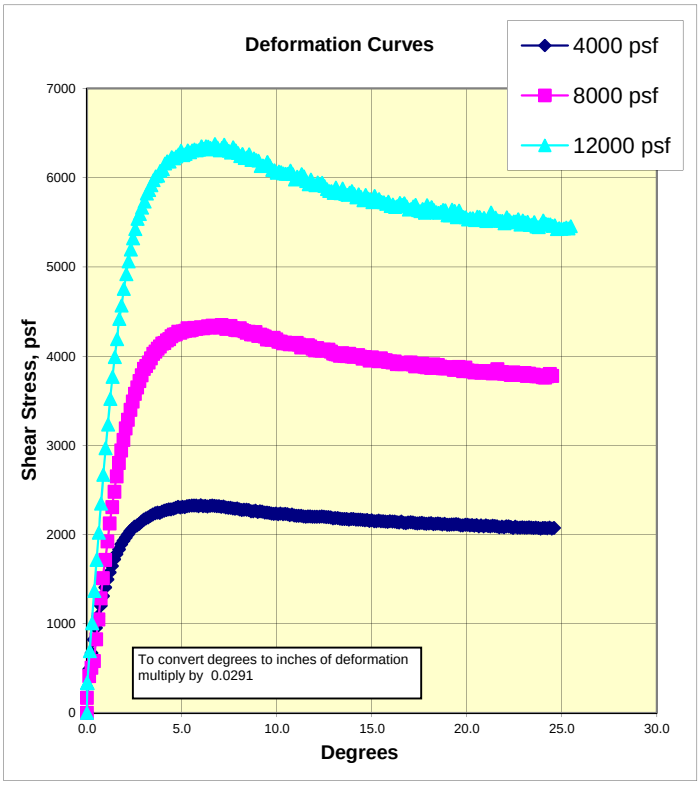
# Drained Fully Softened Peak Torsional Shear Strength (ASTM D7608)

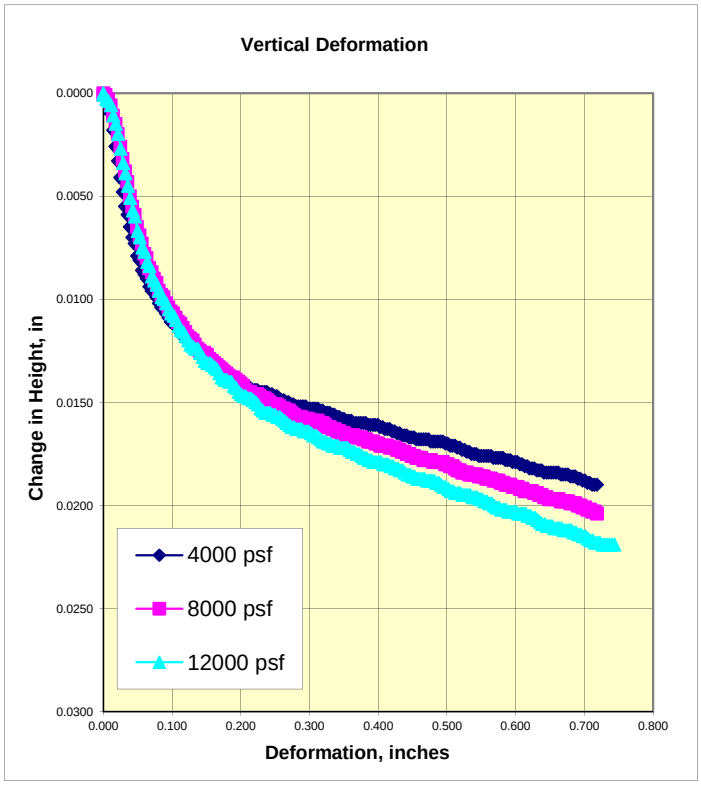
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CTL Job No.:** | 749-009 | **Boring:** | B-6 | **Date:** | 12/12/2016 | **Clay, %:** | |
| **Client:** | LGC Geotechnical | **Sample:** | | **By:** | PJ | **LL:** | 47 |
| **Project Name:** | Rancho LaHabra | **Depth (ft):** | 86 | **Checked:** | DC | **PL:** | 28 |
| **Project Number:** | 14057-01 | **Test Type:** | Fully Softened Peak | | | | |
| **Soil Type:** | Bluish Gray SILT w/ Sand | | | Remarks: | | | |

| | | | |
|---|---|---|---|
| **Normal Stress, psf:** | 4000 | 8000 | 12000 |
| **Secant Phi, deg.:** | 30 | 29 | 28 |



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# *Appendix D*
# *Liquefaction & Lateral Spreading Analysis*

**TABLE 1**
**BRAY'S CRITERIA FOR LIQUEFIABLE FINE-GRAINED SOILS**

| | | Dry Unit Weight (pcf) | in-situ wc (%) | Total Unit Weight (pcf) | Satur (Gs=2.7) (%) | Atterberg Limits LL | PL | PI | Liquidty Index | Bray's Criteria (80% of LL) | Bray's Criteria for LL In Situ | Sat wc (%) | Bray's Criteria for LL Saturated | Fines (%) | Entire USCS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HS-3 | 10 | 118.1 | 11.6 | 131.8 | 73 | 27 | 14 | 13 | -0.2 | 21.6 | Not Susceptible | 15.8 | Not Susceptible | - | CL | |
| HS-3 | 15 | 115.1 | 9.7 | 126.3 | 56 | 25 | 15 | 10 | -0.5 | 20.0 | Not Susceptible | 17.2 | Not Susceptible | - | CL | |
| HS-3 | 25 | 103.2 | 21.3 | 125.2 | 91 | 39 | 16 | 23 | 0.2 | 31.2 | Not Susceptible | 23.4 | Not Susceptible | - | CL | |
| HS-11 | 40 | 119.2 | 4.6 | 124.7 | 30 | 24 | 20 | 4 | -3.9 | 19.2 | Not Susceptible | 15.3 | Not Susceptible | 42 | SC-SM | |
| HS-12 | 40 | 115.7 | 14.8 | 132.8 | 88 | 37 | 14 | 23 | 0.0 | 29.6 | Not Susceptible | 16.9 | Not Susceptible | - | CL | |
| HS-12 | 50 | 97.5 | 25.7 | 122.6 | 95 | 42 | 20 | 22 | 0.3 | 33.6 | Not Susceptible | 27.0 | Not Susceptible | - | CL | |
| HS-13 | 15 | 105.3 | 6.7 | 112.4 | 30 | 21 | 20 | 1 | -13.3 | 16.8 | Not Susceptible | 22.2 | Susceptible | 28 | SM | |
| HS-13 | 35 | 106.9 | 9.8 | 117.4 | 46 | 24 | 20 | 4 | -2.6 | 19.2 | Not Susceptible | 21.3 | Susceptible | 44 | SC-SM | |
| HS-14 | 10 | 107.5 | 21.4 | 130.5 | 100 | 39 | 16 | 23 | 0.2 | 31.2 | Not Susceptible | 21.0 | Not Susceptible | - | CL | |
| HS-14 | 20 | 115.3 | 9.1 | 125.8 | 53 | 25 | 15 | 10 | -0.6 | 20.0 | Not Susceptible | 17.1 | Not Susceptible | - | SC | |
| HS-15 | 20 | 124.2 | 7.6 | 133.6 | 58 | 67 | 19 | 48 | -0.2 | 53.6 | Not Susceptible | 13.2 | Not Susceptible | 15 | SC | |
| HS-15 | 25 | 119.2 | 13.4 | 135.2 | 88 | 42 | 21 | 21 | -0.4 | 33.6 | Not Susceptible | 15.3 | Not Susceptible | - | SC | |
| HS-16 | 20 | 111.7 | 16.4 | 130.0 | 87 | 36 | 19 | 17 | -0.2 | 28.8 | Not Susceptible | 18.8 | Not Susceptible | - | CL | |
| HS-16 | 35 | 104.1 | 21.7 | 126.7 | 95 | 38 | 27 | 11 | -0.5 | 30.4 | Not Susceptible | 22.9 | Not Susceptible | 84 | ML | |
| HS-17 | 20 | 99.0 | 26.3 | 125.0 | 100 | 42 | 20 | 22 | 0.3 | 33.6 | Not Susceptible | 26.0 | Not Susceptible | - | CL | |
| HS-17 | 25 | 110.4 | 18.2 | 130.5 | 93 | 32 | 17 | 15 | 0.1 | 25.6 | Not Susceptible | 19.5 | Not Susceptible | - | CL | |
| HS-11 | 45 | 119.9 | 6.5 | 127.7 | 43 | 24 | 20 | 4 | -3.4 | 19.2 | Not Susceptible | 15.0 | Not Susceptible | - | SC | PI From HS-11 @ 40 ft |
| HS-11 | 50 | 124.9 | 3.9 | 129.8 | 30 | 24 | 20 | 4 | -4.0 | 19.2 | Not Susceptible | 12.9 | Not Susceptible | - | SC | PI From HS-11 @ 40 ft |
| HS-14 | 25 | 116.8 | 8.6 | 126.8 | 52 | 25 | 15 | 10 | -0.6 | 20.0 | Not Susceptible | 16.4 | Not Susceptible | - | SC | PI From HS-14 @ 20 ft |
| HS-14 | 30 | 122.7 | 8.5 | 133.1 | 62 | 25 | 15 | 10 | -0.7 | 20.0 | Not Susceptible | 13.8 | Not Susceptible | - | SC | PI From HS-14 @ 20 ft |
| HS-14 | 35 | 116.1 | 8.7 | 126.2 | 52 | 25 | 15 | 10 | -0.6 | 20.0 | Not Susceptible | 16.7 | Not Susceptible | - | SC | PI From HS-14 @ 20 ft |

Reference:
Bray & Sancio, 2006, Assessment of the liquefaction susceptibilty of fine-grained soils, ASCE Journal of Geotechnical and Geoenvironmental Engineering, 1165-1177,September 2006

***TABLE 2***

***Summary of Over Consolidation Ratio (OCR)***

| **CPT** | **Average OCR** |
|---|---|
| CPT-1A | >10 |
| CPT-2 | >10 |
| CPT-3 | 8 |
| CPT-4 | 6 |
| CPT-5 | 7 |
| CPT-6 | >10 |
| CPT-10 | 8 |
| CPT-11B | 9 |

***TABLE 3***

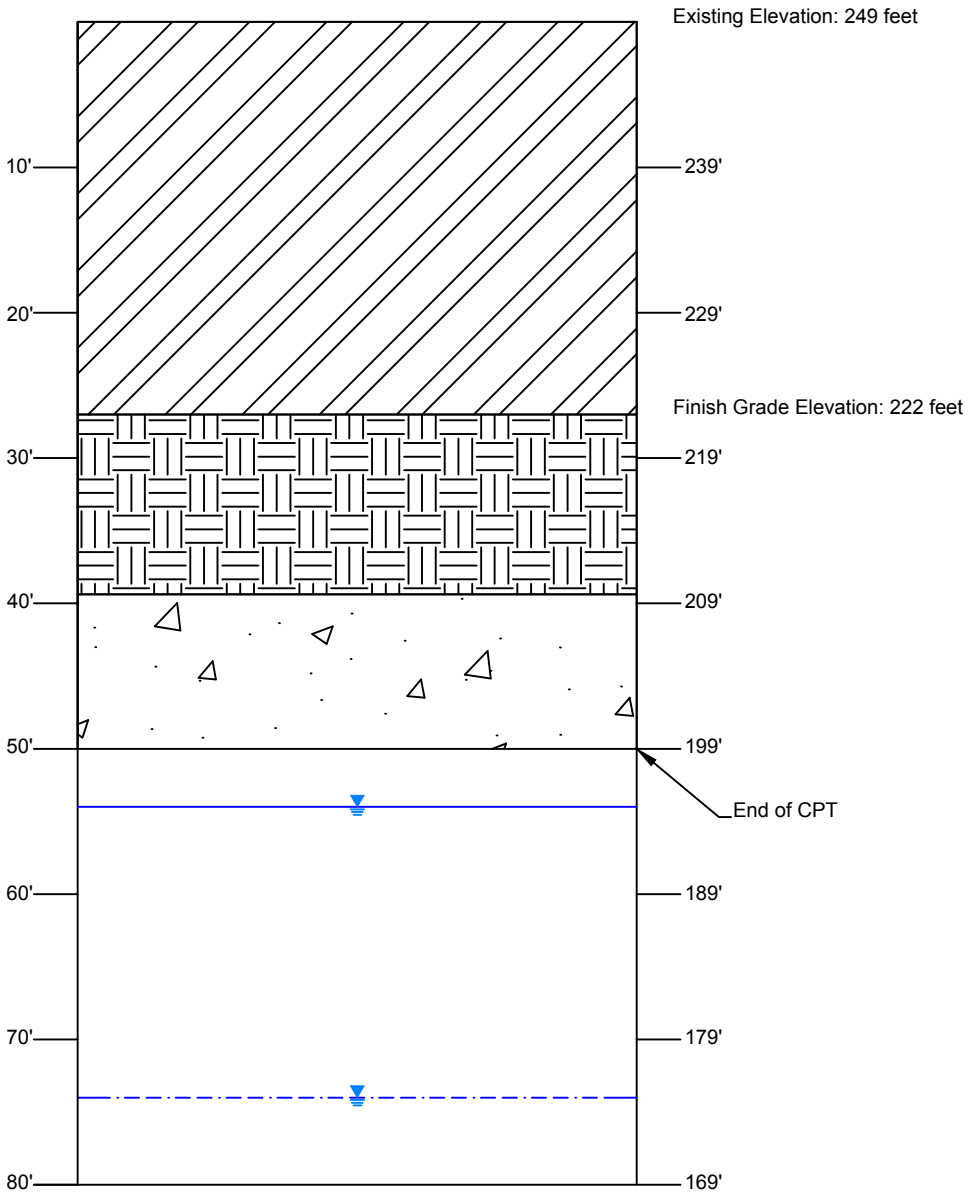
***Summary of Seismic Strength Loss***

| **CPT** | **Minimum Liquefied** $\frac{S_u}{\sigma_v'}$ |
|---|---|
| CPT-1A | N/A |
| CPT-2 | .67 |
| CPT-3 | .70 |
| CPT-4 | .70 |
| CPT-5 | N/A |
| CPT-6 | N/A |
| CPT-10 | .67 |
| CPT-11B | .67 |

***TABLE 4***

***Summary of Estimated Vertical Seismic Settlement***

| CPT | Estimated Vertical Settlement (in) |
|---|---|
| CPT-1A | 0 |
| CPT-2 | < ½” |
| CPT-3 | < 1 ½” |
| CPT-4 | < ½” |
| CPT-5 | 0 |
| CPT-6 | 0 |
| CPT-10 | 0 |
| CPT-11B | 0 |




## LEGEND

Soil to be Cut

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

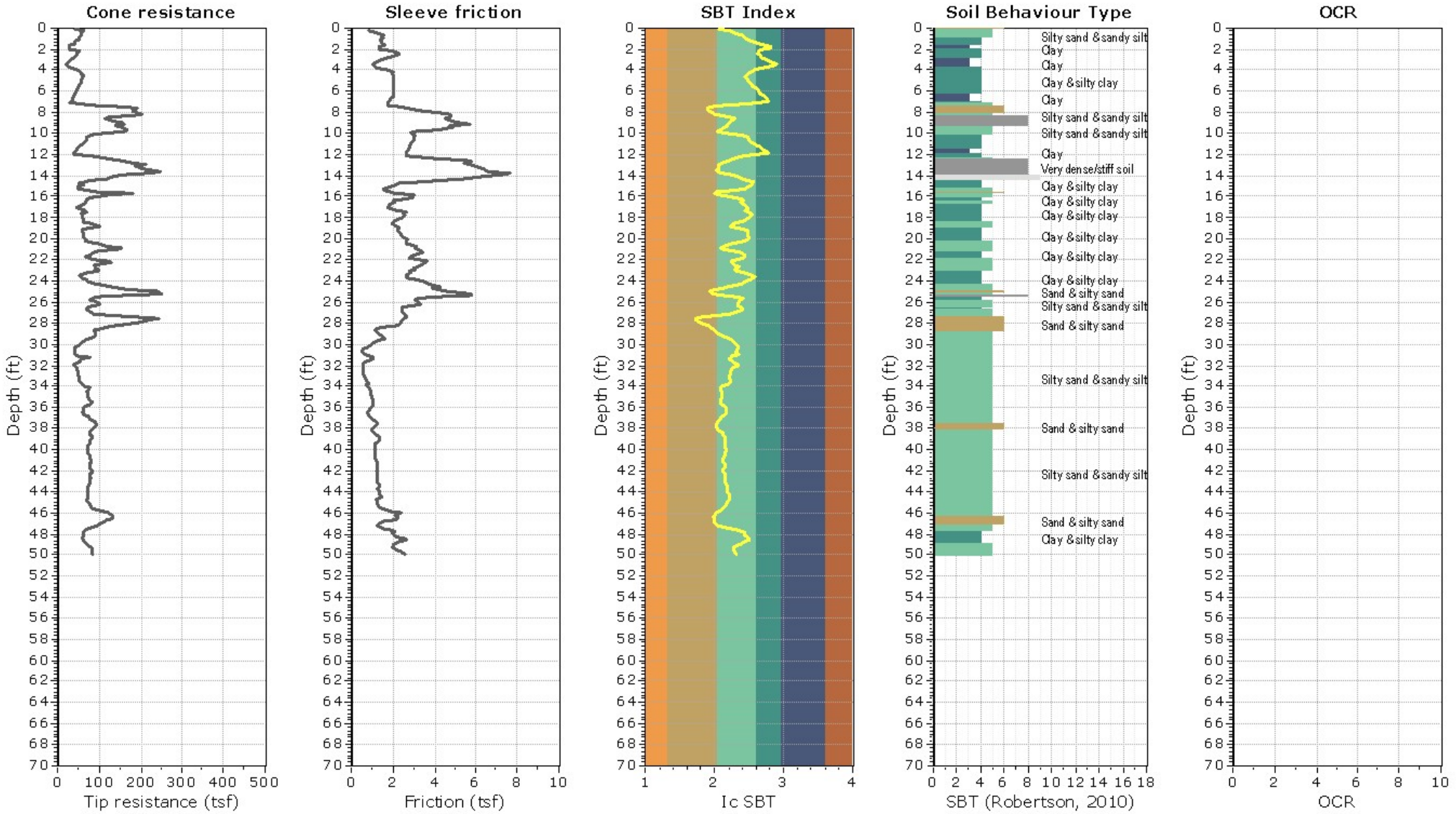
**CPT-1A**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | February 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

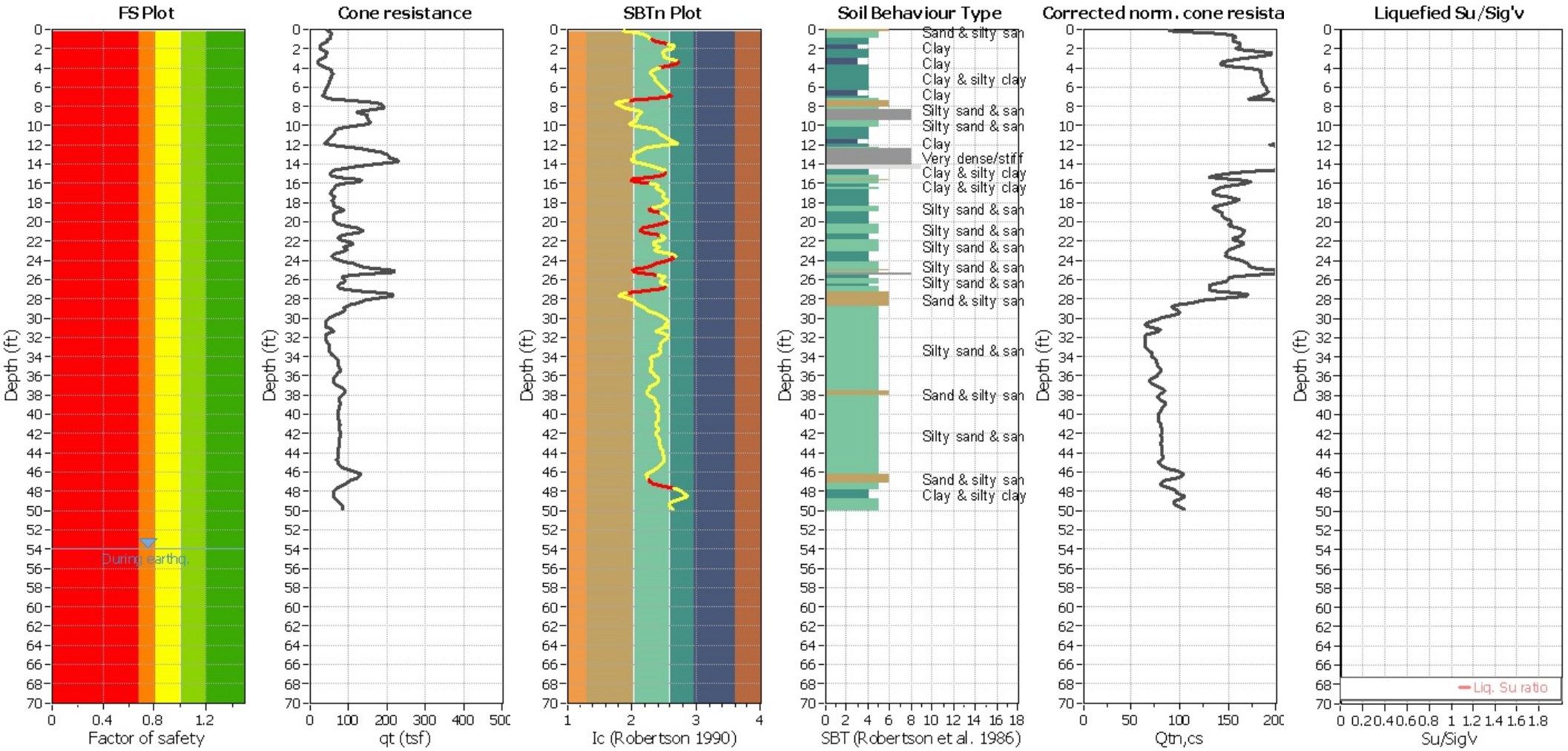
**CPT-1A**
Total depth: 49.88 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

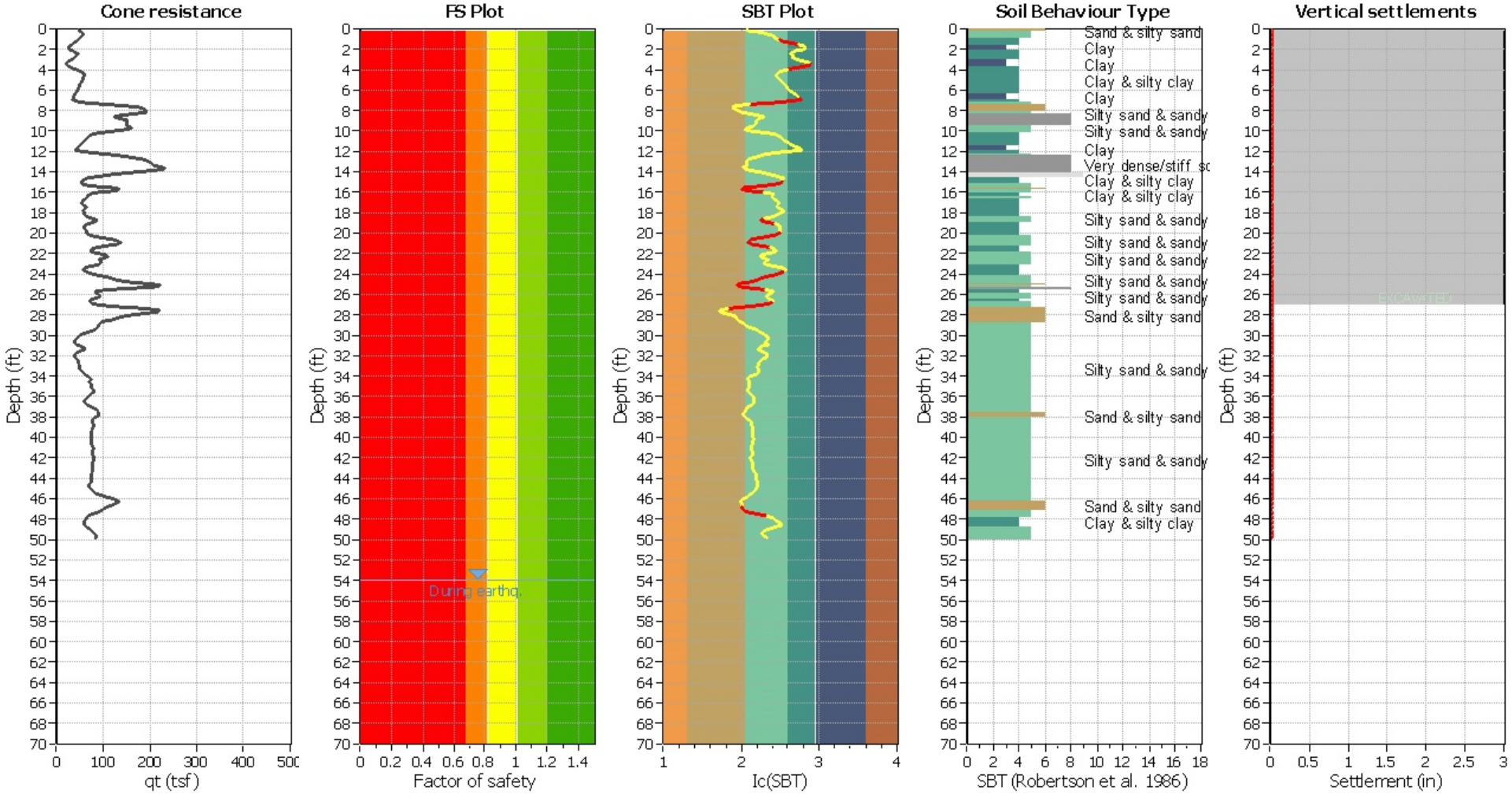
**CPT: CPT-1A**
Total depth: 49.88 ft



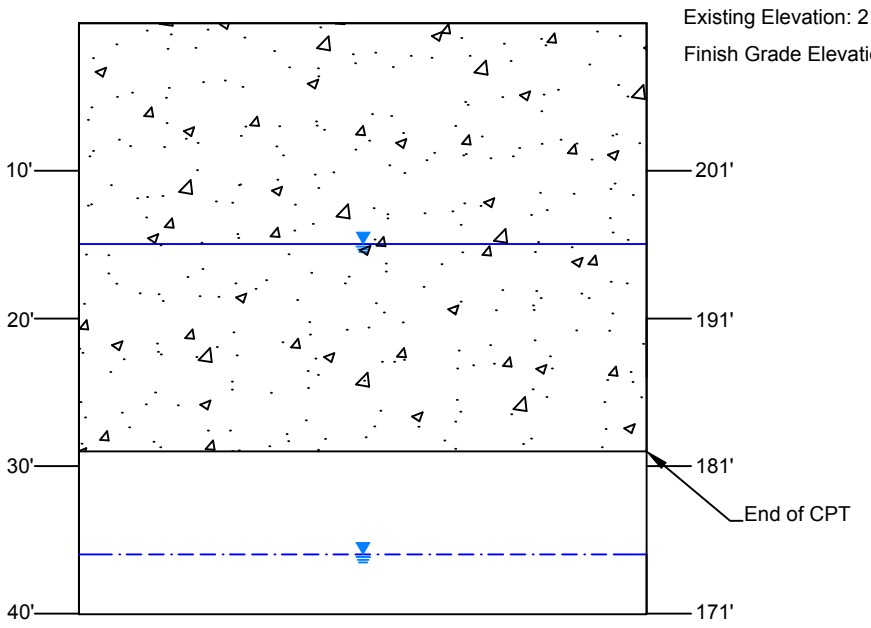

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 74.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 54.00 ft | Excavation depth: | 27.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-1A**
Total depth: 49.88 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 74.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 54.00 ft | Excavation depth: | 27.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

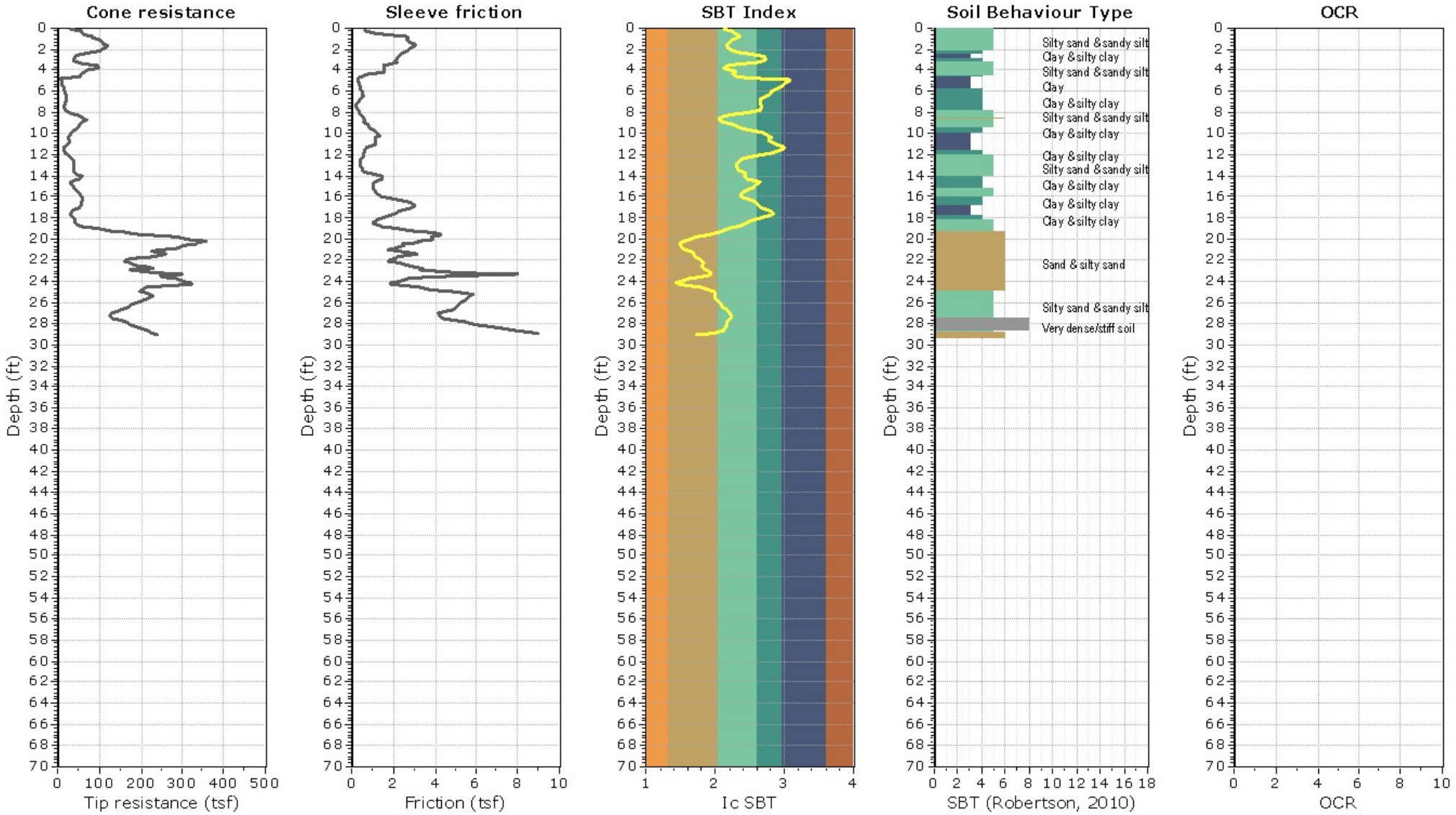
**CPT-2**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | February 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

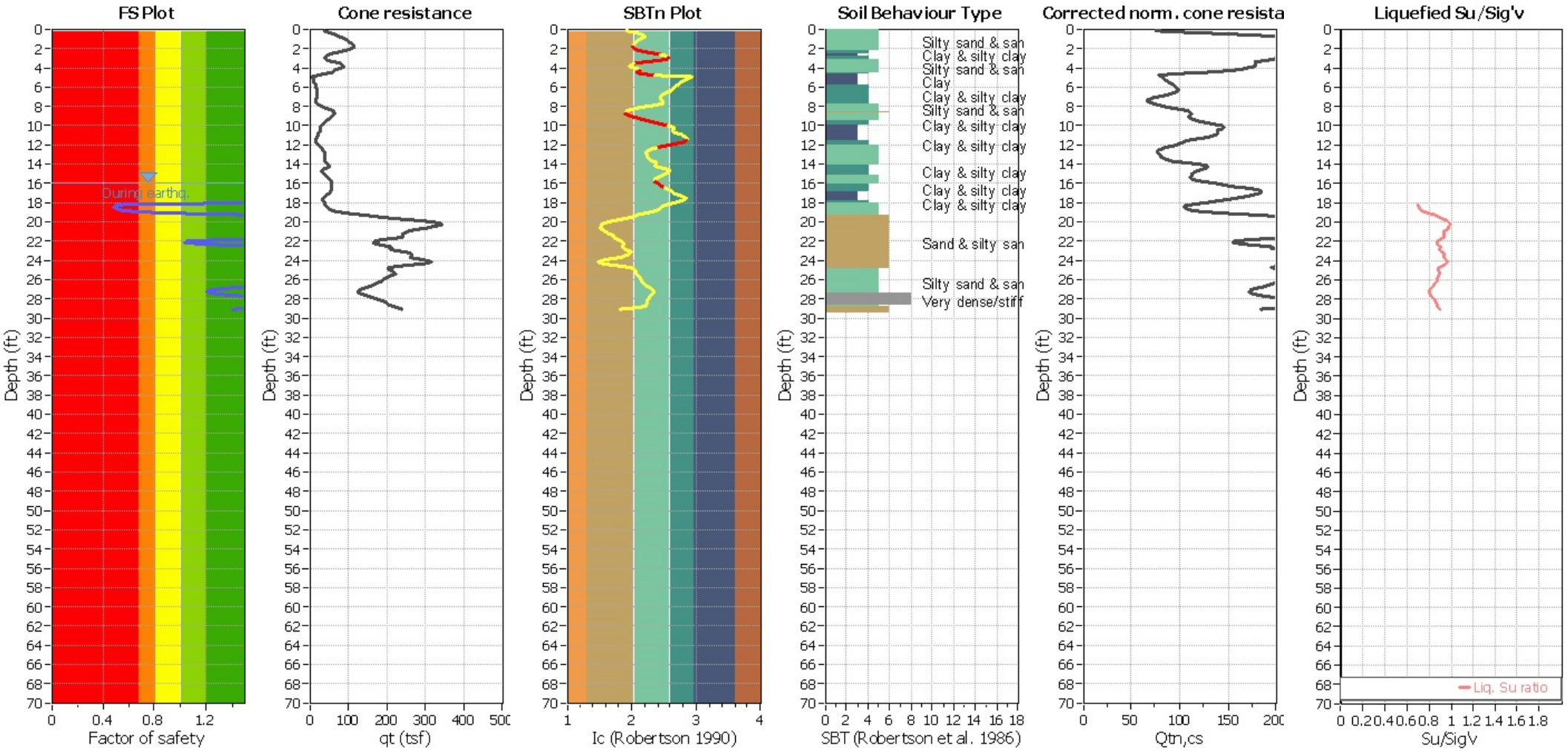
**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

**CPT-2**
Total depth: 29.04 ft



**Project:** Rancho La Habra
**Location:** City of La Habra

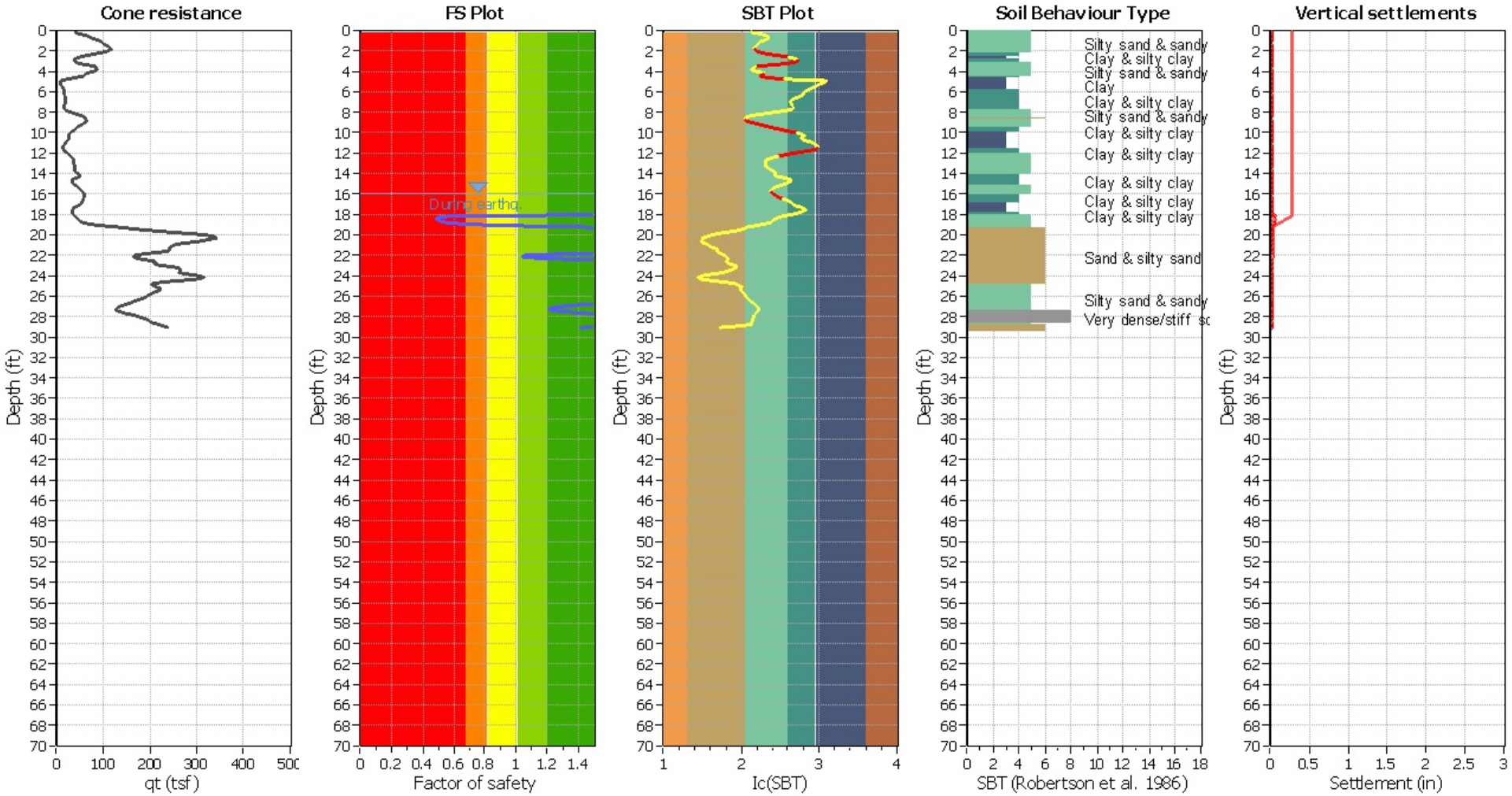
**CPT: CPT-2**
Total depth: 29.04 ft



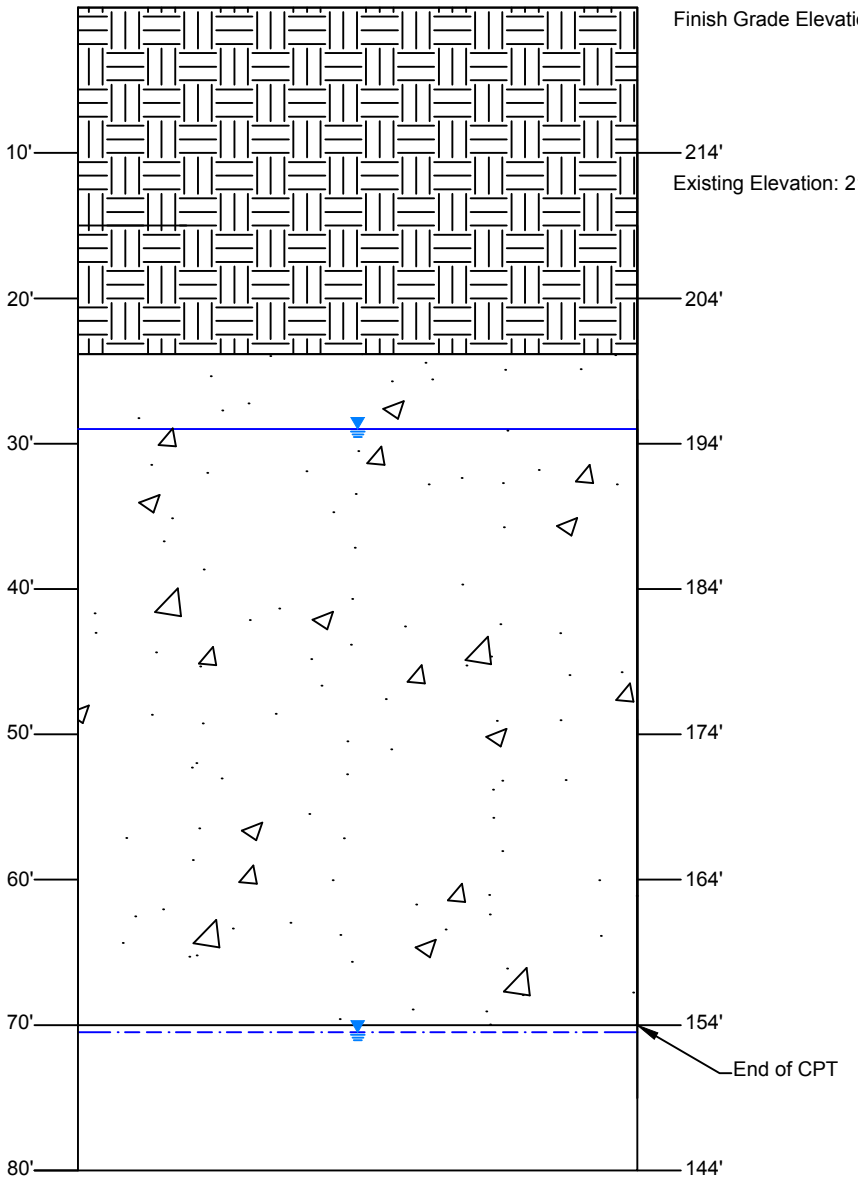

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 36.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 16.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-2**
Total depth: 29.04 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 36.00 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 16.00 ft | Fill height: | N/A | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

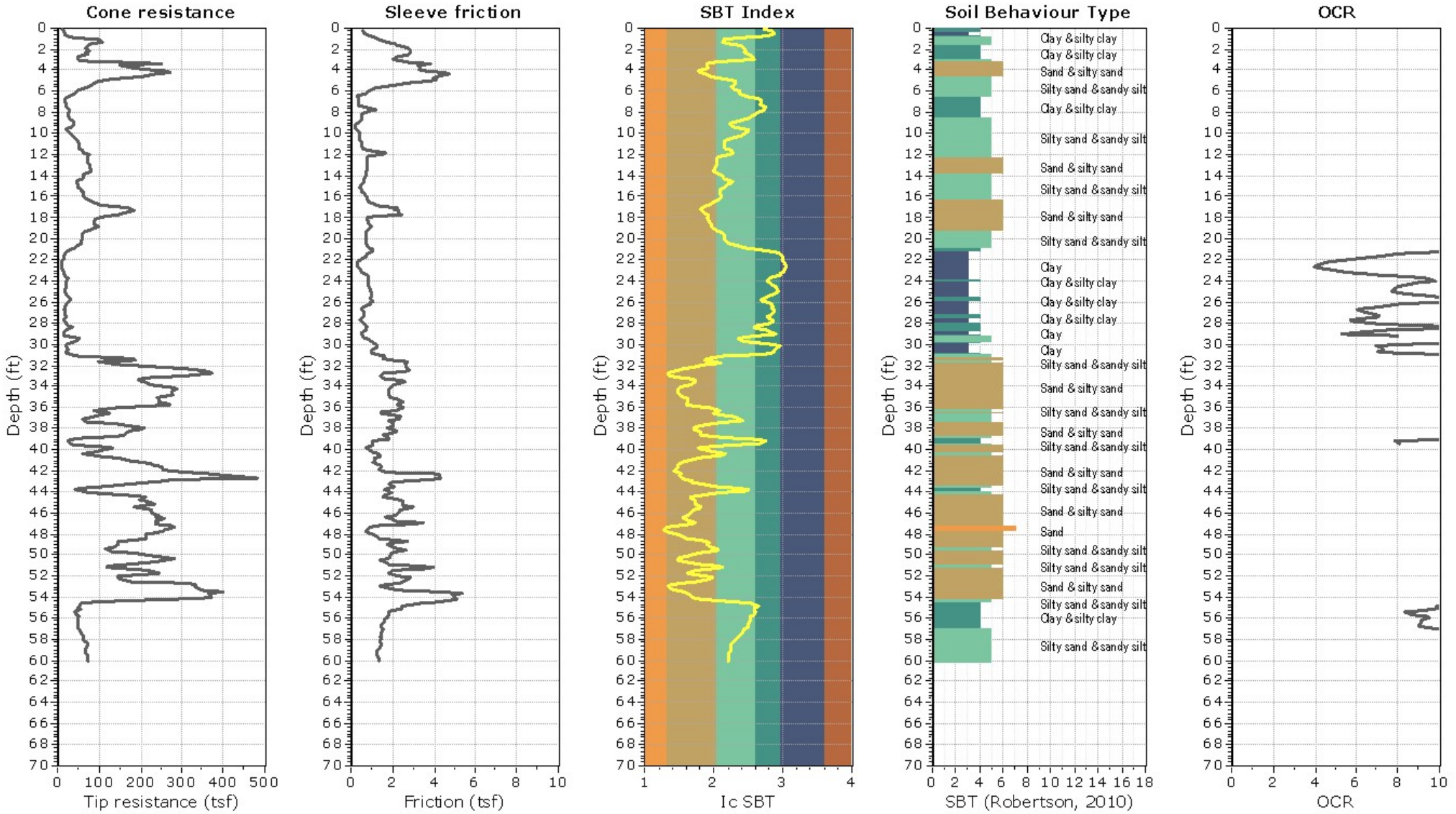
LGC Geotechnical, Inc.

**CPT-3**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | February 2017 |

**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

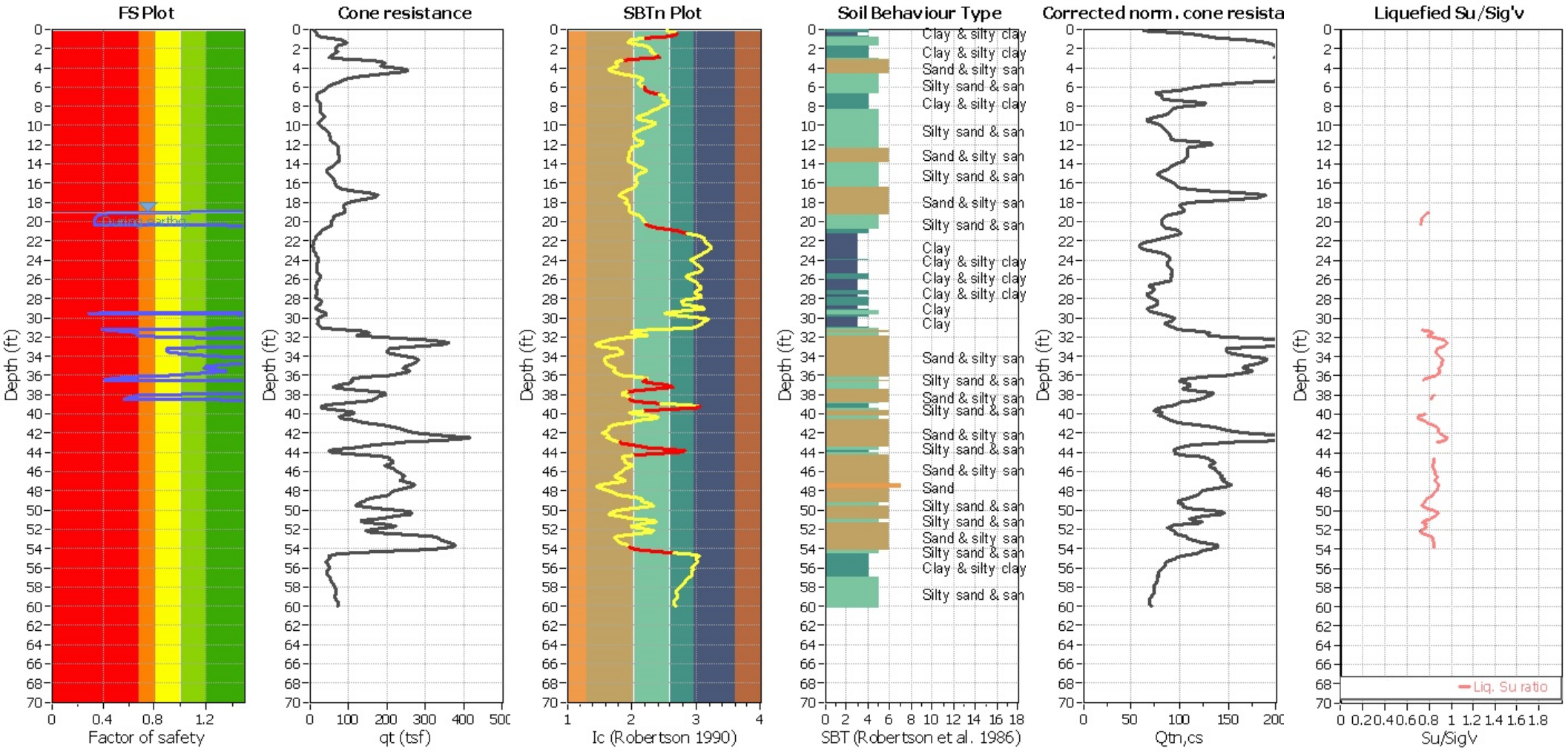
**CPT-3**
Total depth: 60.04 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-3**
Total depth: 60.04 ft

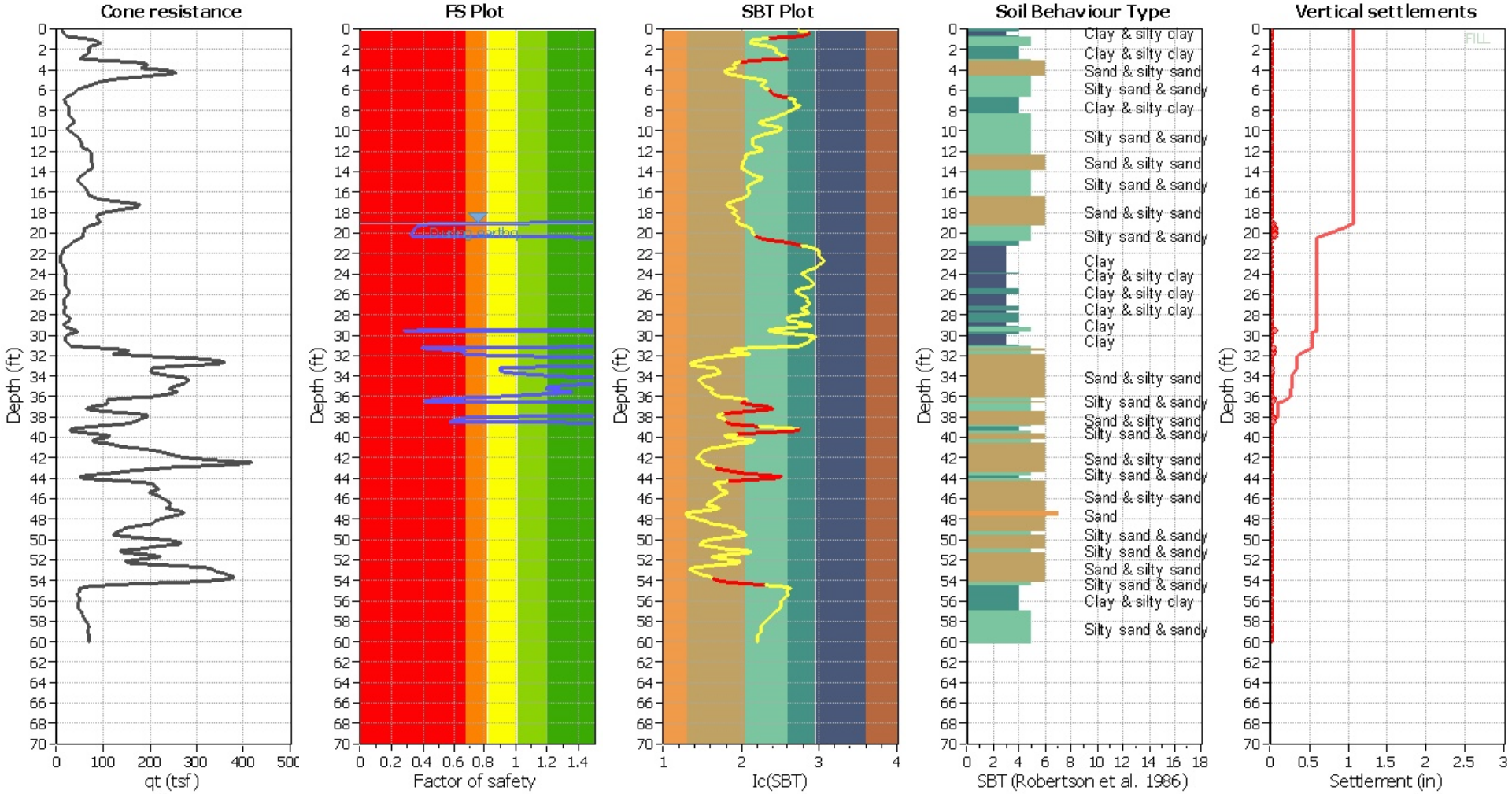



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 60.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 29.00 ft | Fill height: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

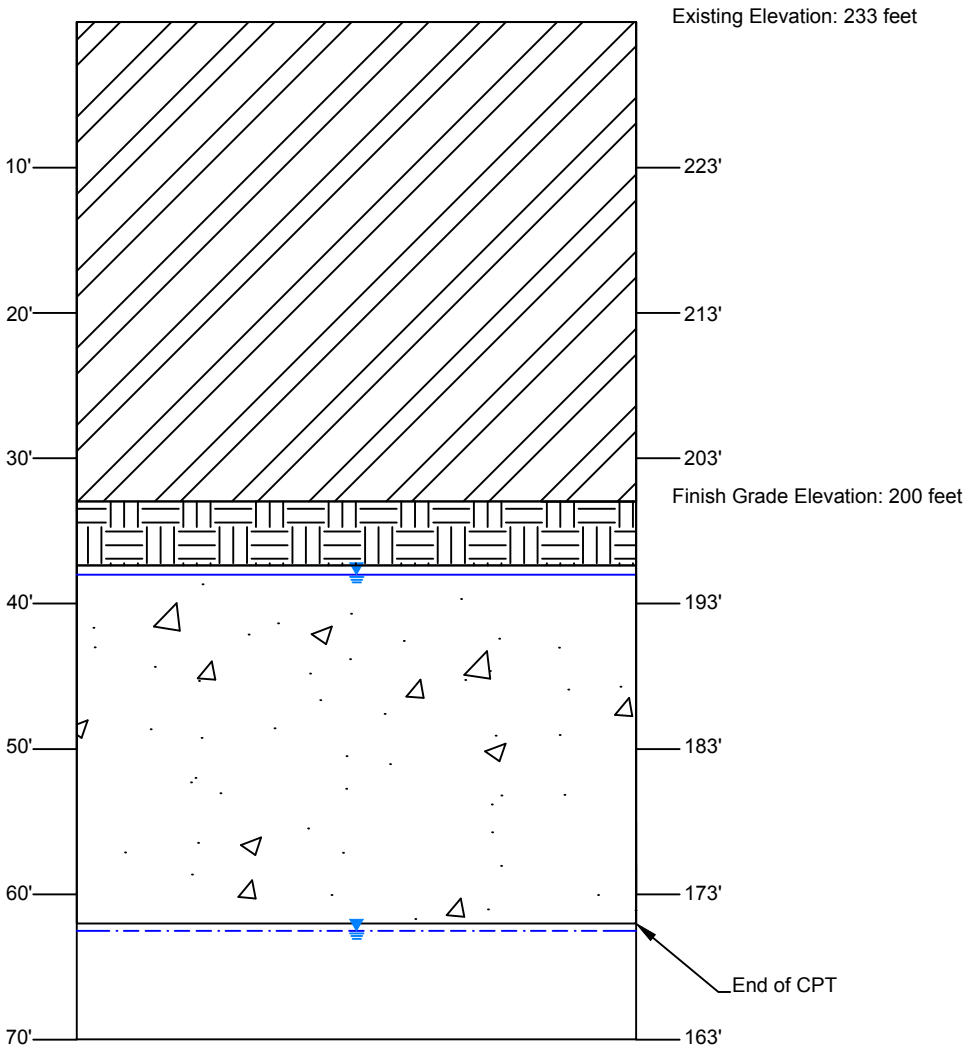
**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-3**
Total depth: 60.04 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 60.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 29.00 ft | Fill height: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Soil to be Cut

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

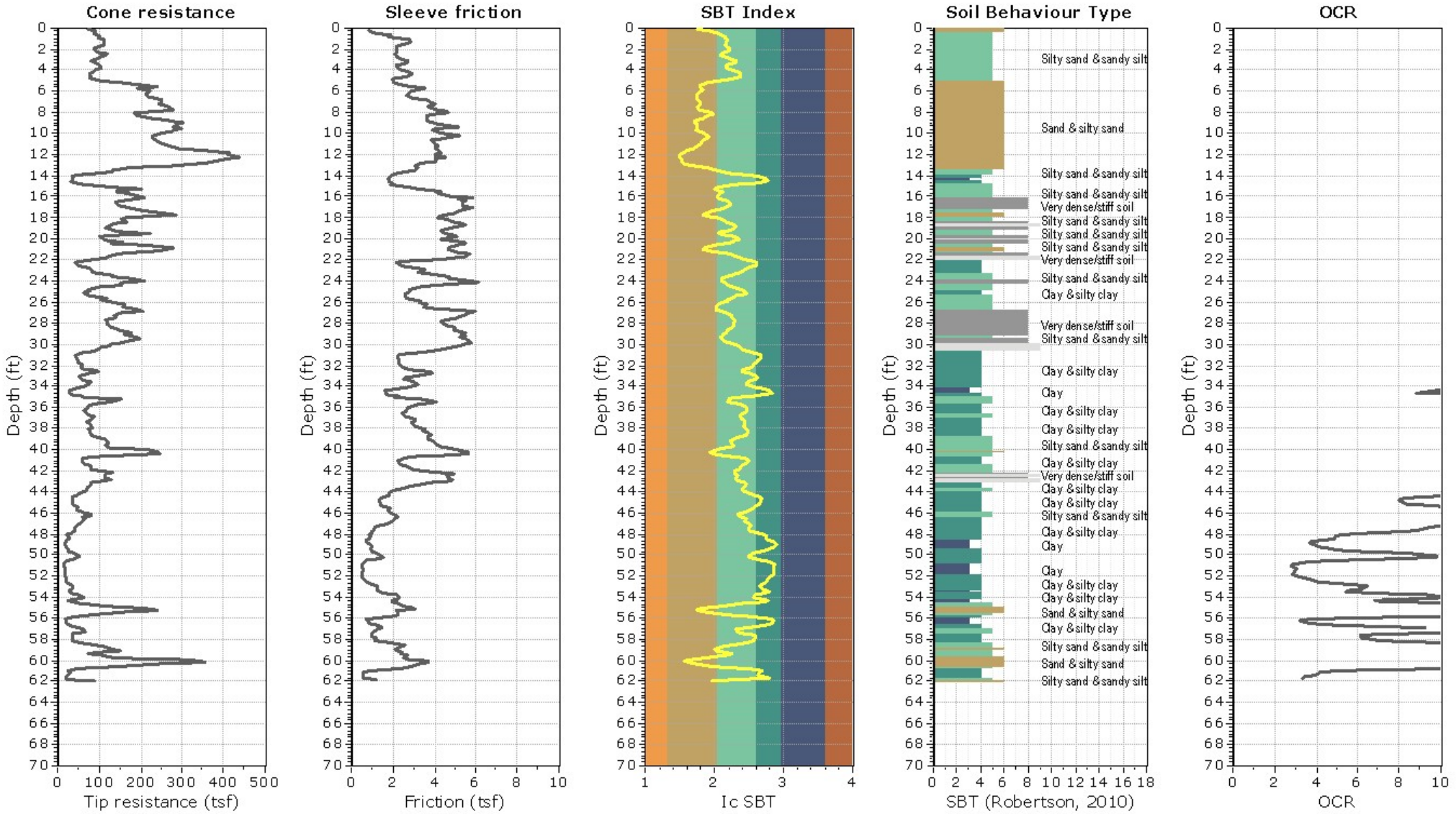
***CPT-4***

| | |
|---|---|
| *PROJECT NAME* | *Rancho La Habra - VTTm 17845* |
| *PROJECT NO.* | *14057-01* |
| *ENG. / GEOL.* | *DJB / KTM* |
| *SCALE* | *Not to Scale* |
| *DATE* | *February 2017* |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

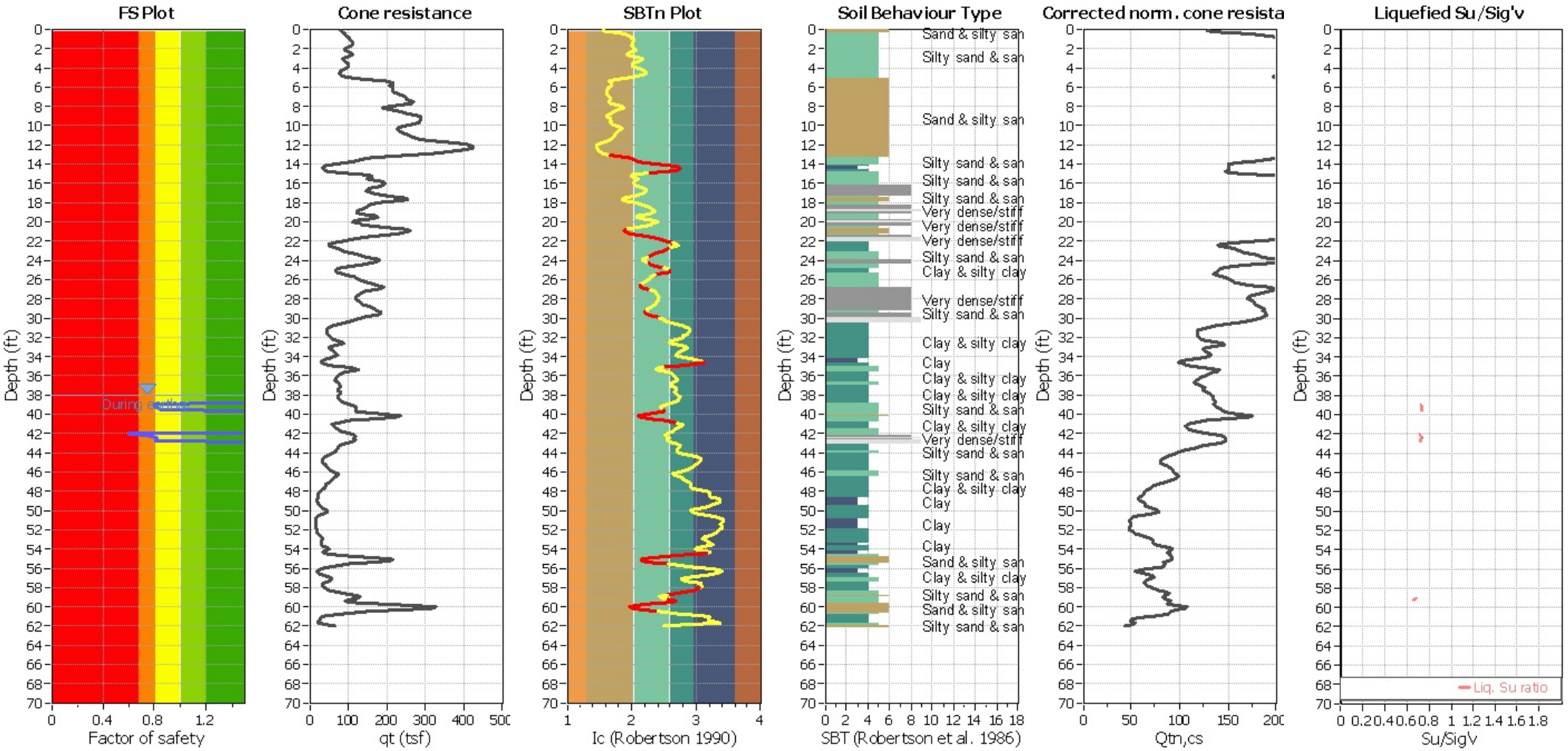
**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT-4**
Total depth: 62.01 ft



**Project:** Rancho La Habra
**Location:** City of La Habra

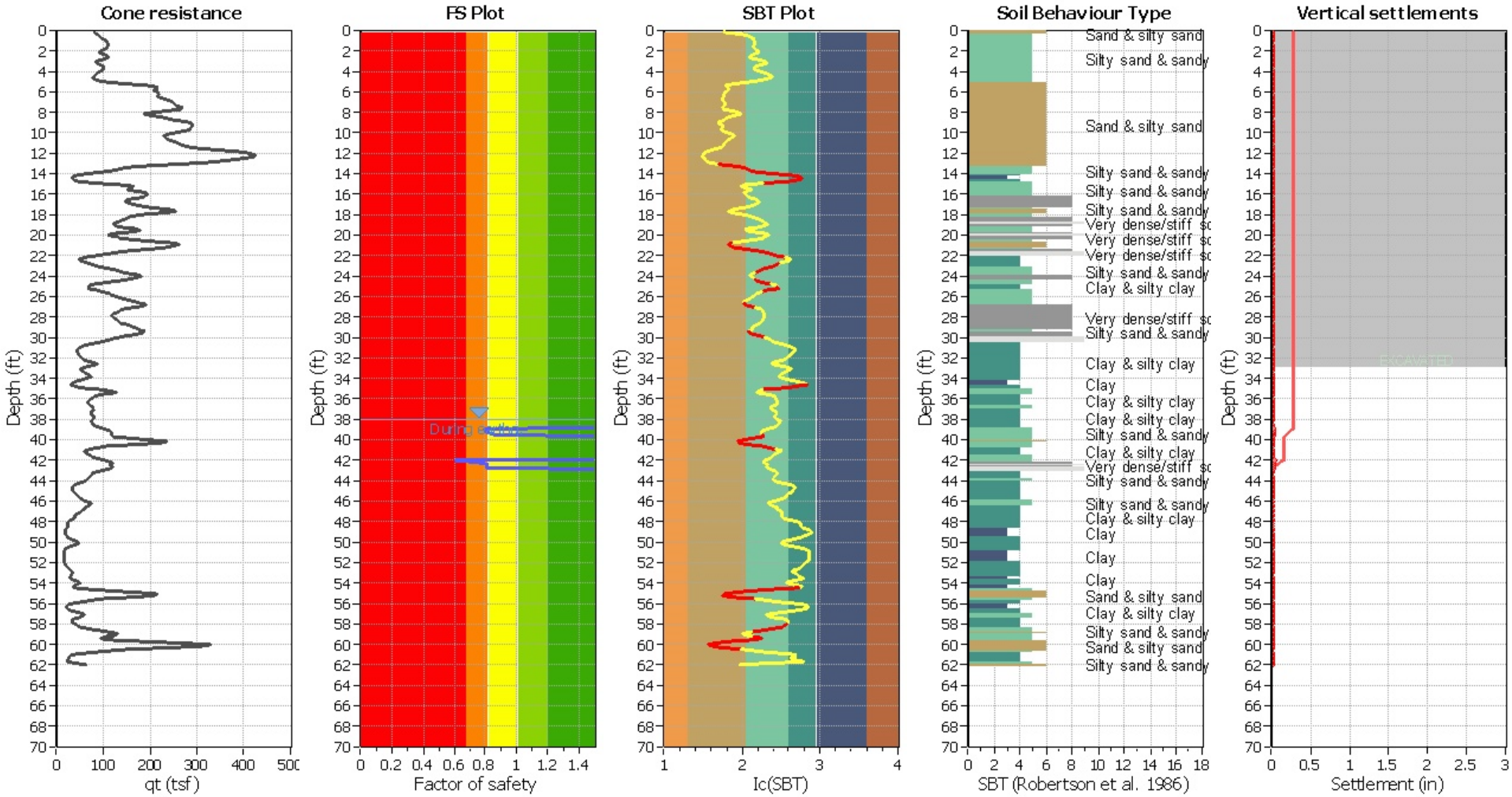
**CPT: CPT-4**
Total depth: 62.01 ft



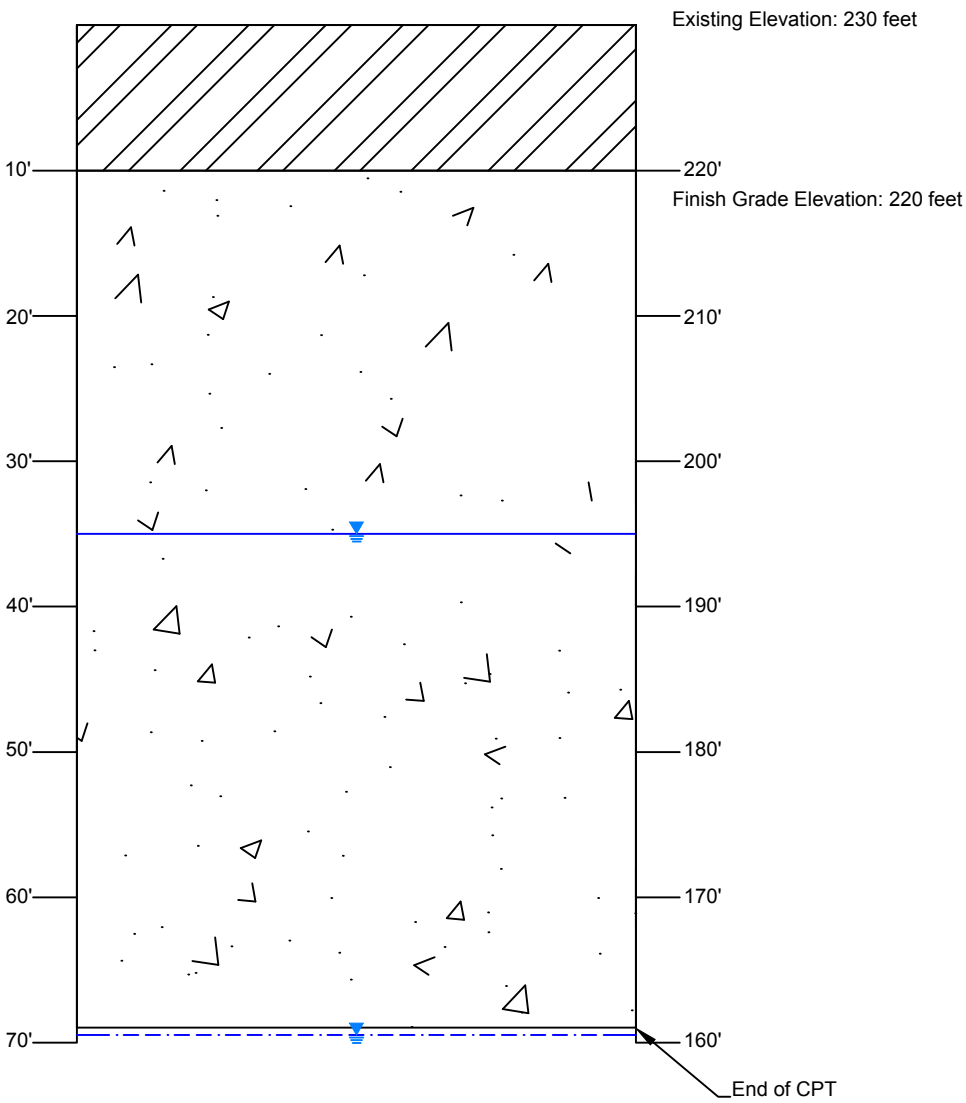

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 62.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 38.00 ft | Excavation depth: | 33.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-4**
Total depth: 62.01 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 62.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 38.00 ft | Excavation depth: | 33.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Soil to be Cut

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

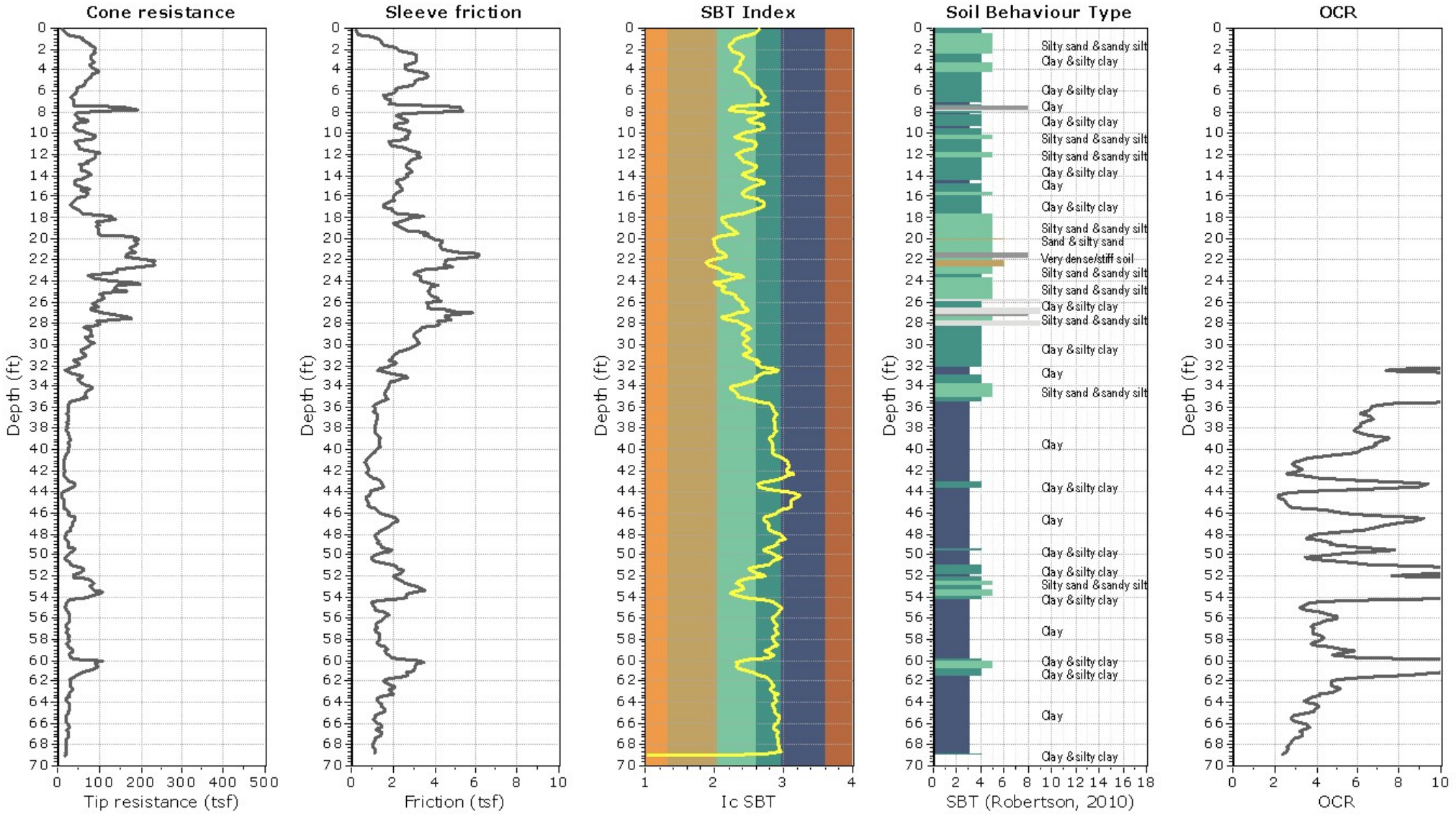
LGC Geotechnical, Inc.

***CPT-5***

| | |
|---|---|
| *PROJECT NAME* | *Rancho La Habra - VTTm 17845* |
| *PROJECT NO.* | *14057-01* |
| *ENG. / GEOL.* | *DJB / KTM* |
| *SCALE* | *Not to Scale* |
| *DATE* | *February 2017* |

**Project:** Rancho La Habra
**Location:** City of La Habra

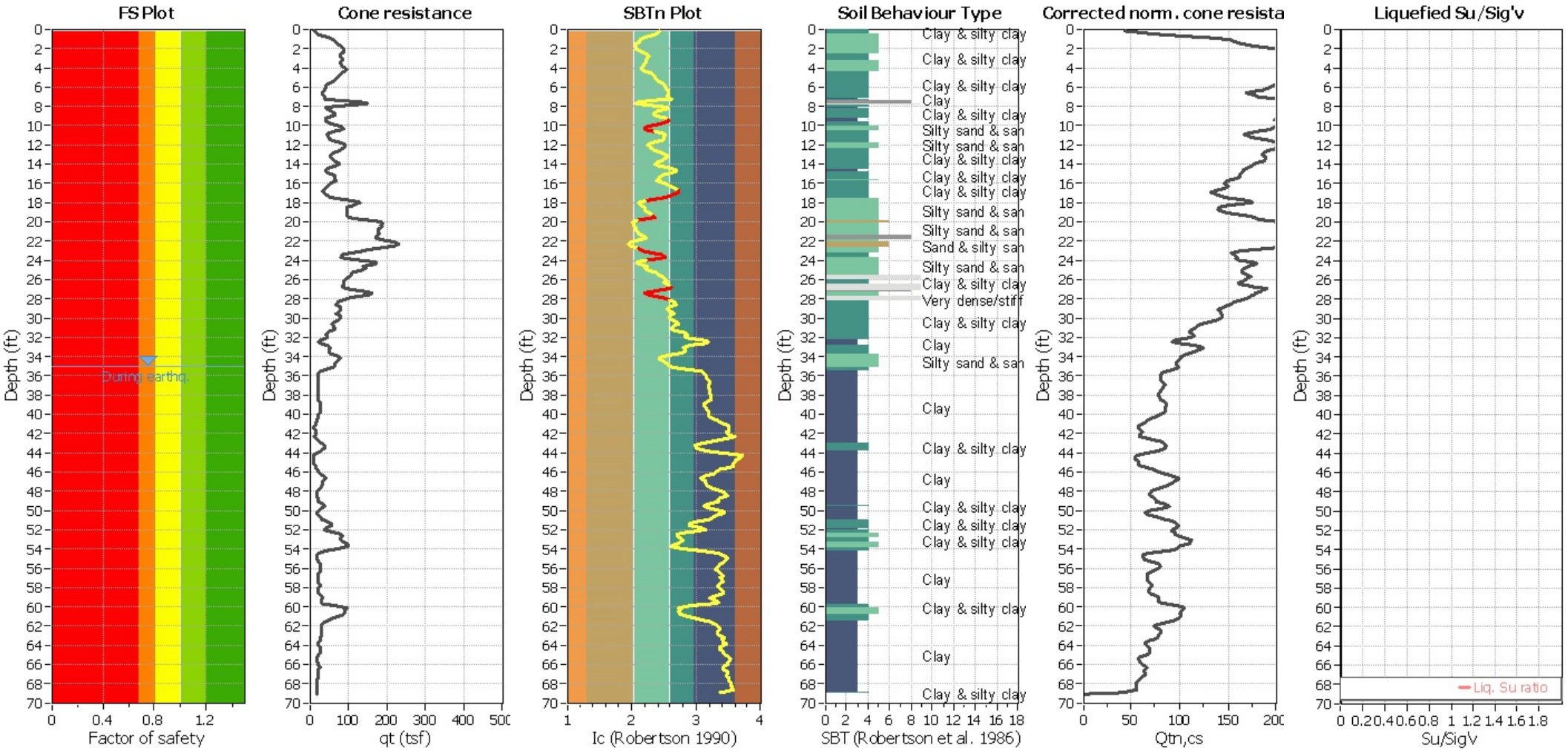
**CPT-5**
Total depth: 69.06 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** **Stan Pac - Westridge**
**Location:**

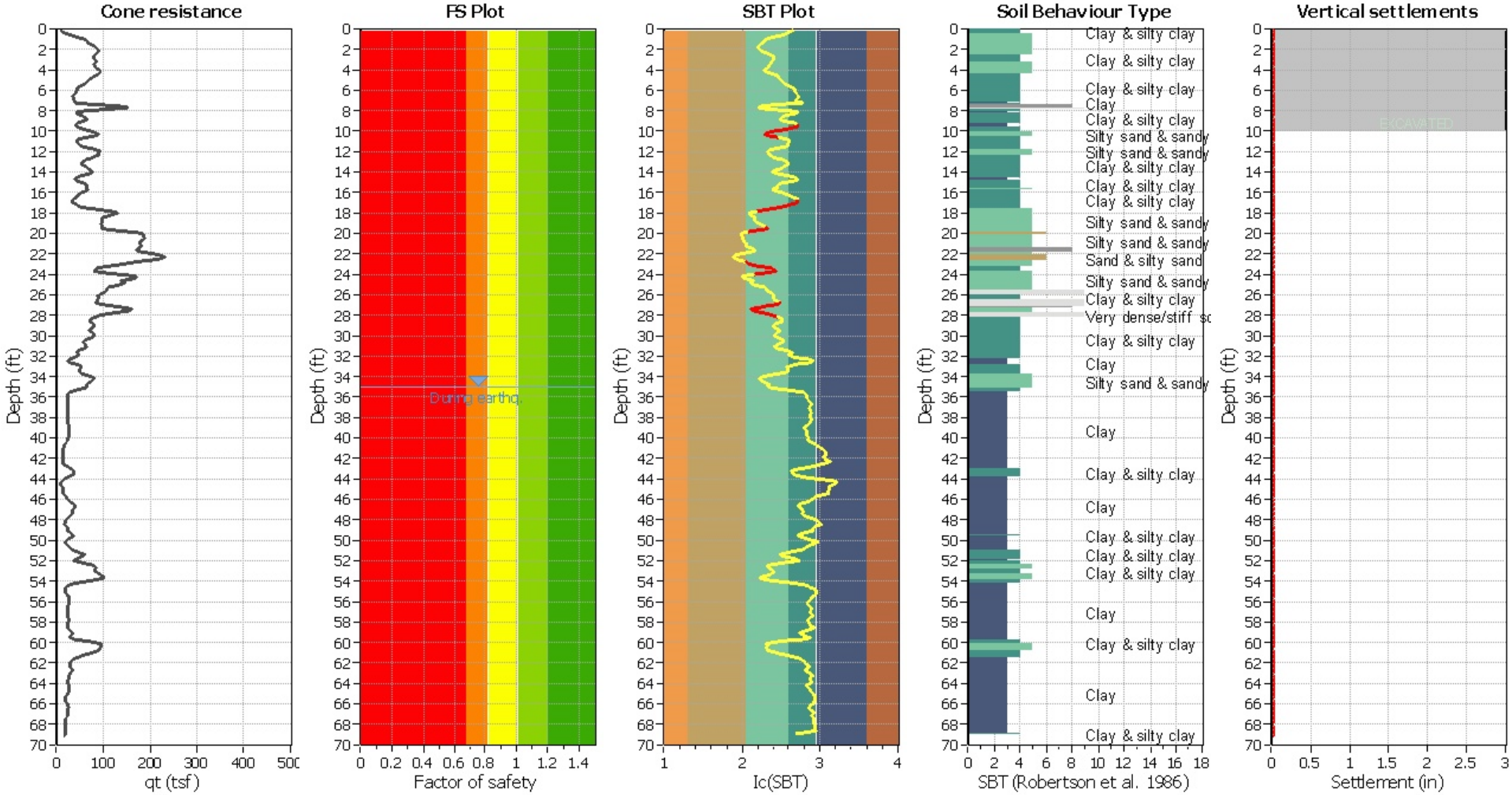
**CPT: CPT-5**
Total depth: 69.06 ft



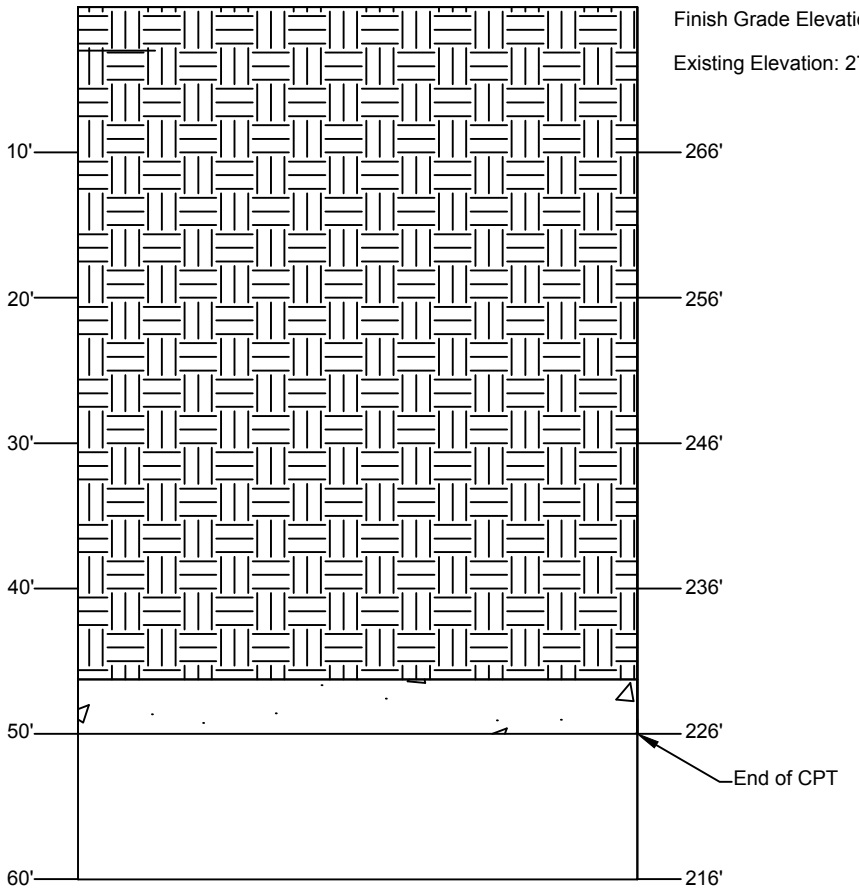

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 69.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 35.00 ft | Excavation depth: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**Project:** **Stan Pac - Westridge**
**Location:**

**CPT: CPT-5**
Total depth: 69.06 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 69.00 ft | Excavation: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 35.00 ft | Excavation depth: | 10.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Footing load: | 0.00 tsf | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




**LEGEND**

Fill

Alluvium

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | February 2017 |

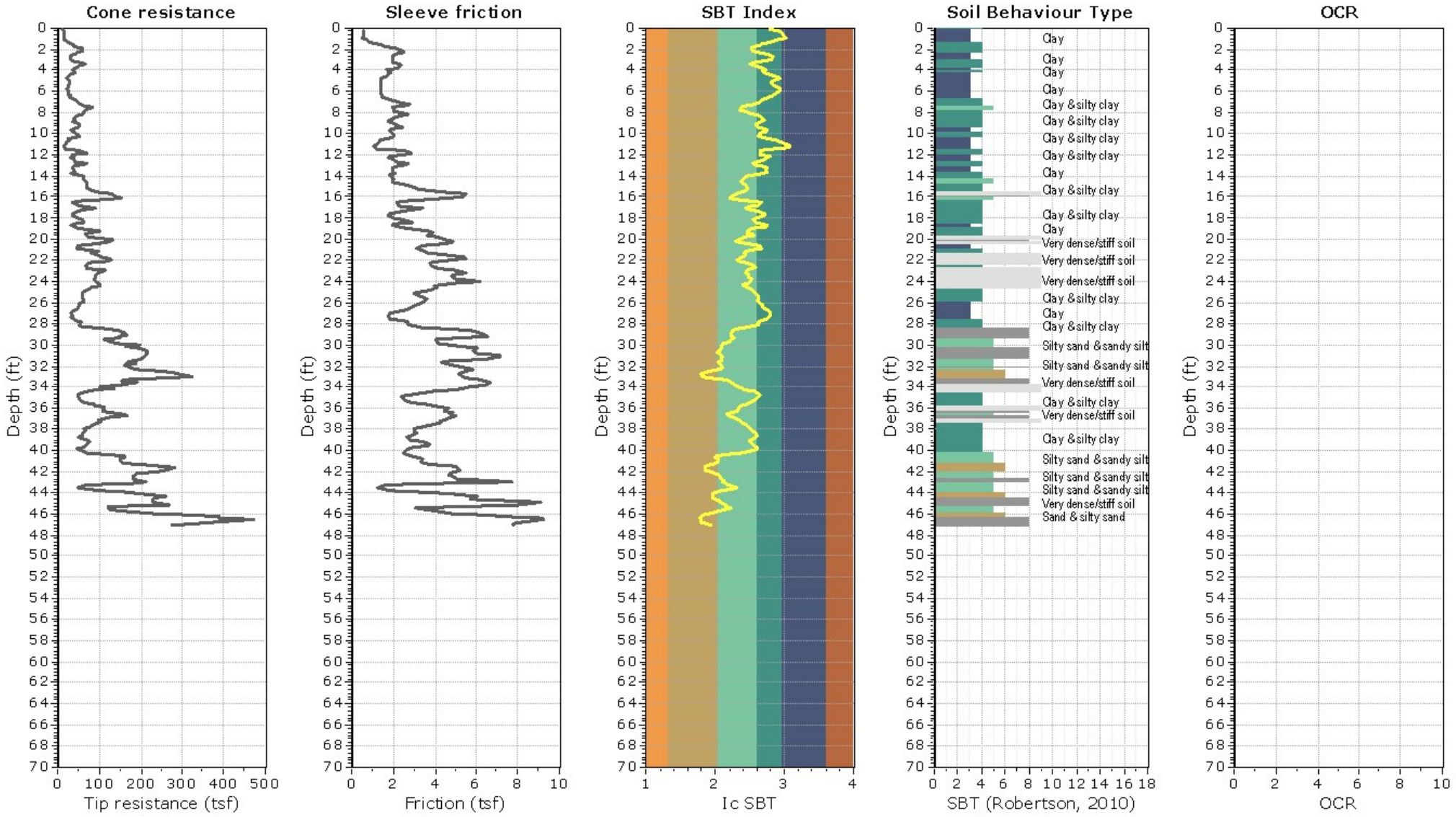
LGC Geotechnical, Inc.

**CPT-6**

**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

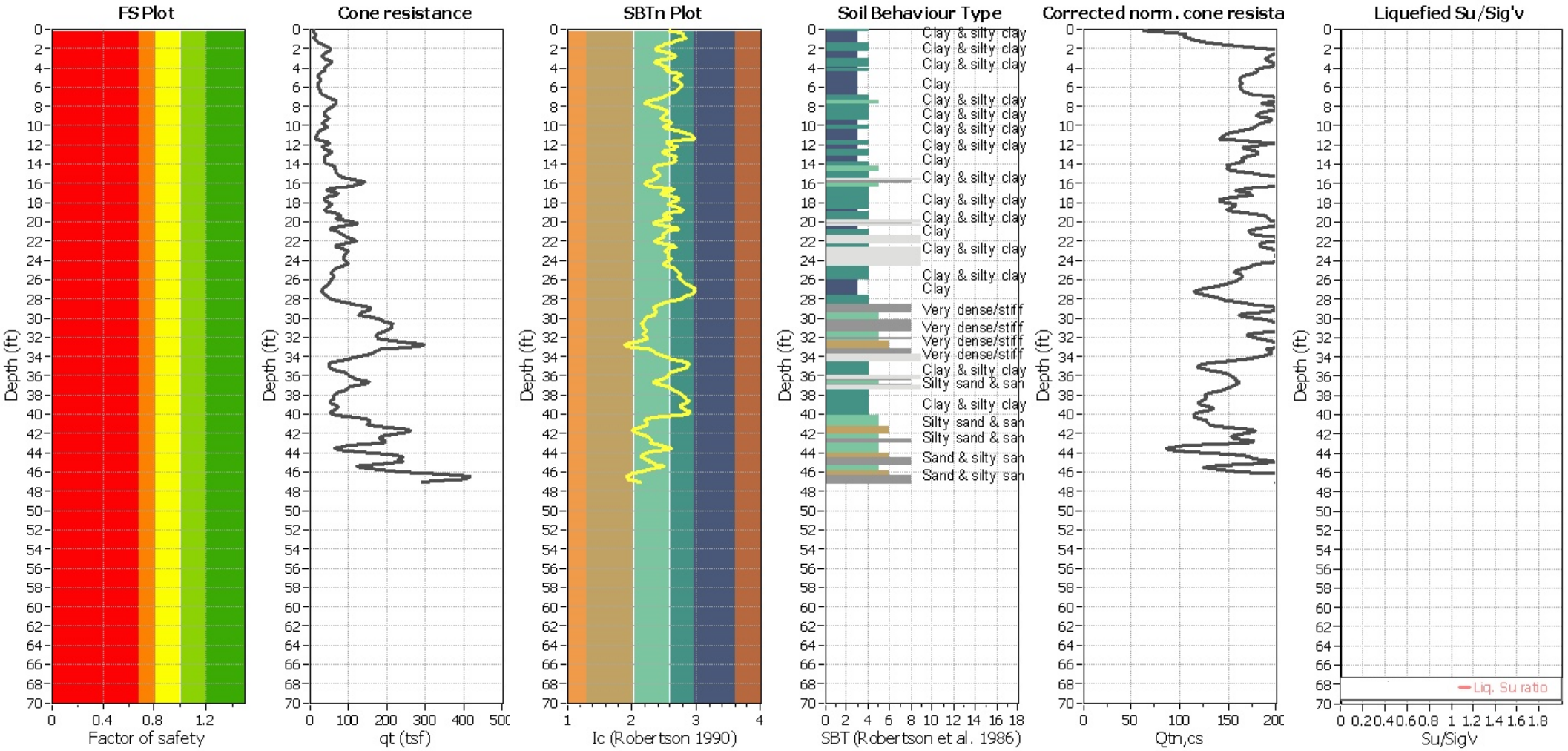
**CPT-6**
Total depth: 47.08 ft



**LGC Geotechnical, Inc.**
Geotechnical Engineers

**Project:** Rancho La Habra
**Location:** City of La Habra

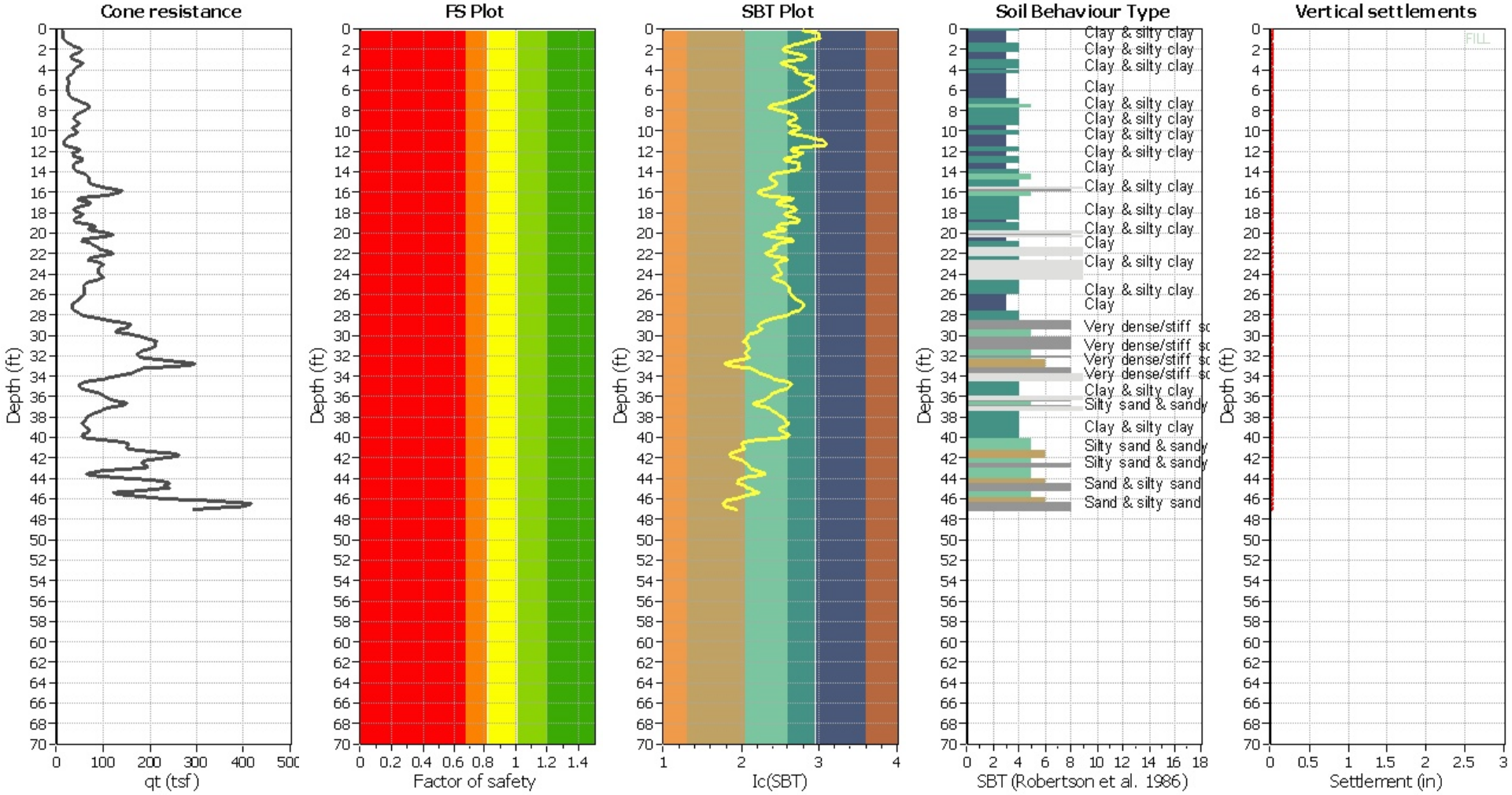
**CPT: CPT-6**
Total depth: 47.08 ft



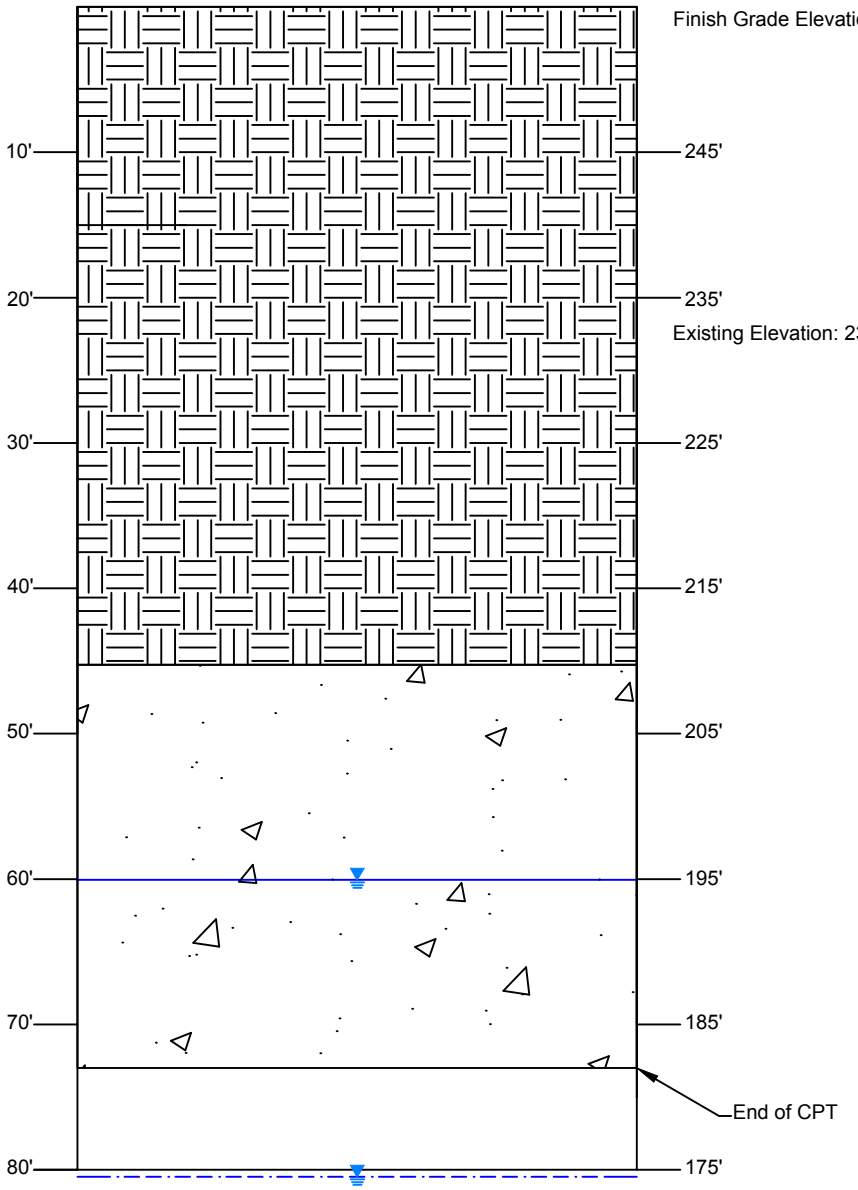

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 101.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 81.00 ft | Fill height: | 3.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | No | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-6**
Total depth: 47.08 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 101.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 81.00 ft | Fill height: | 3.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | No | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




## LEGEND

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

LGC Geotechnical, Inc.

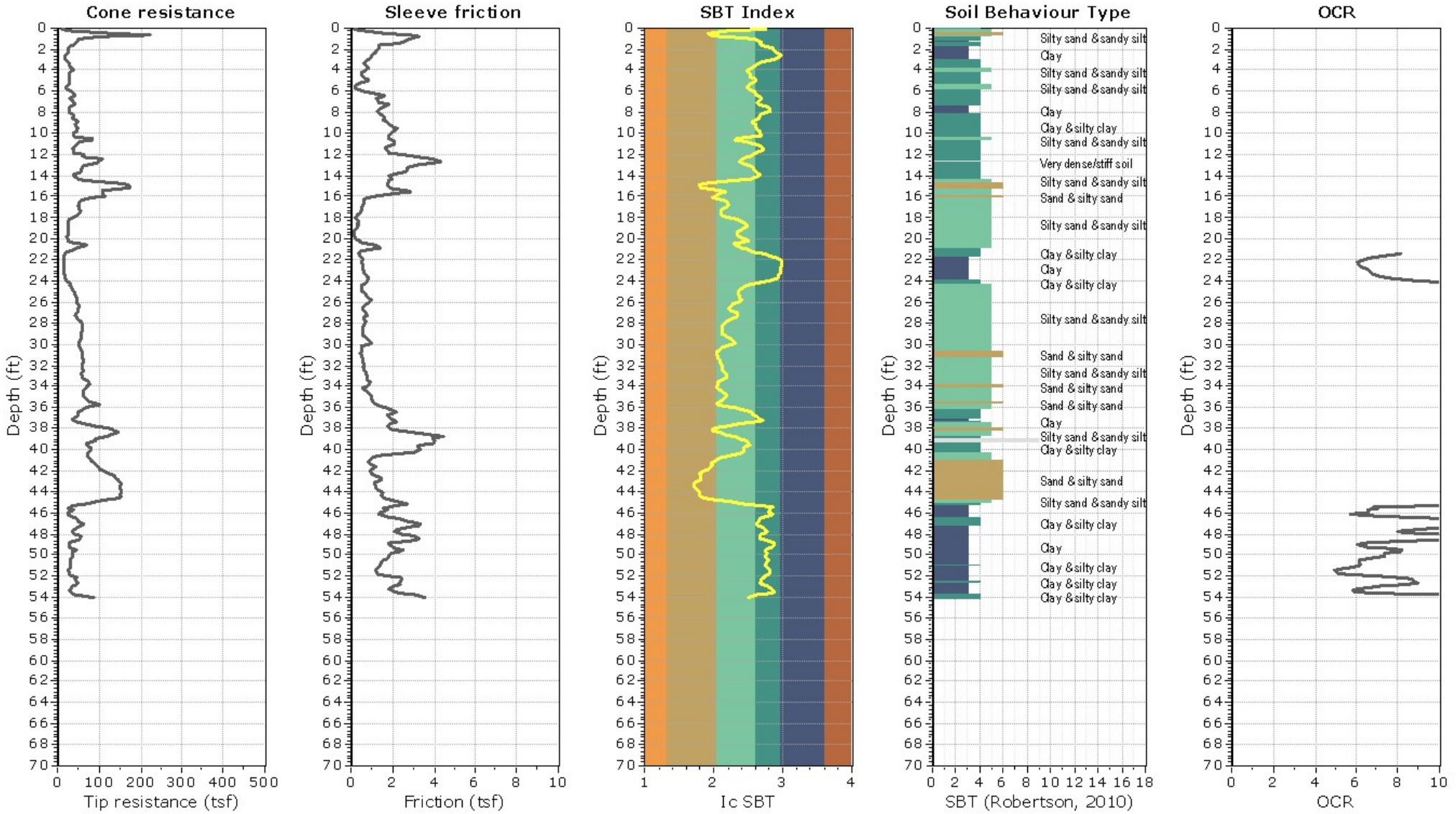
**CPT-10**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | February 2017 |

**LGC Geotechnical, Inc.**
Geotechnical Engineers

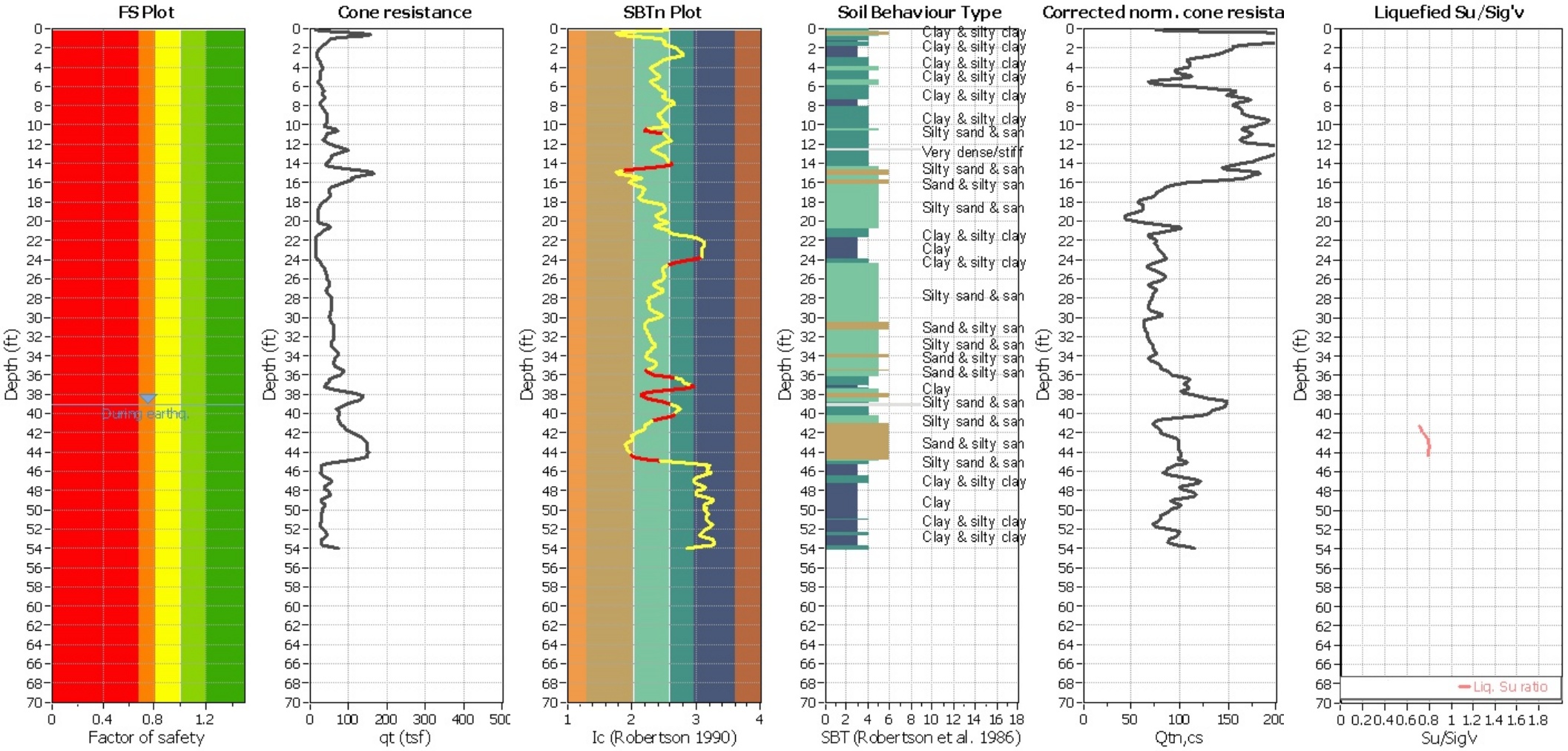
**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

**CPT-10**
Total depth: 53.97 ft



**Project:** Rancho La Habra
**Location:** City of La Habra

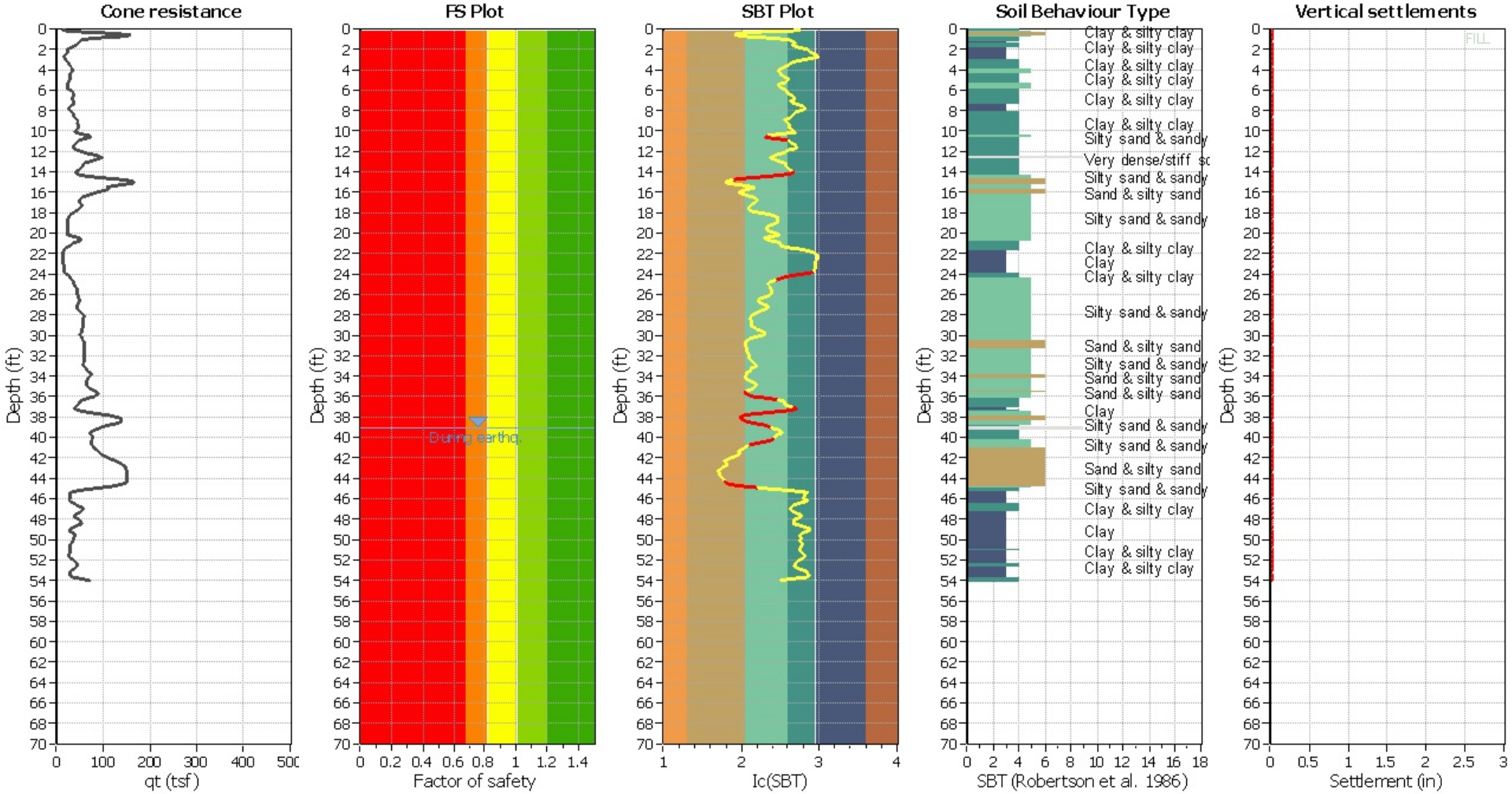
**CPT: CPT-10**
Total depth: 53.97 ft



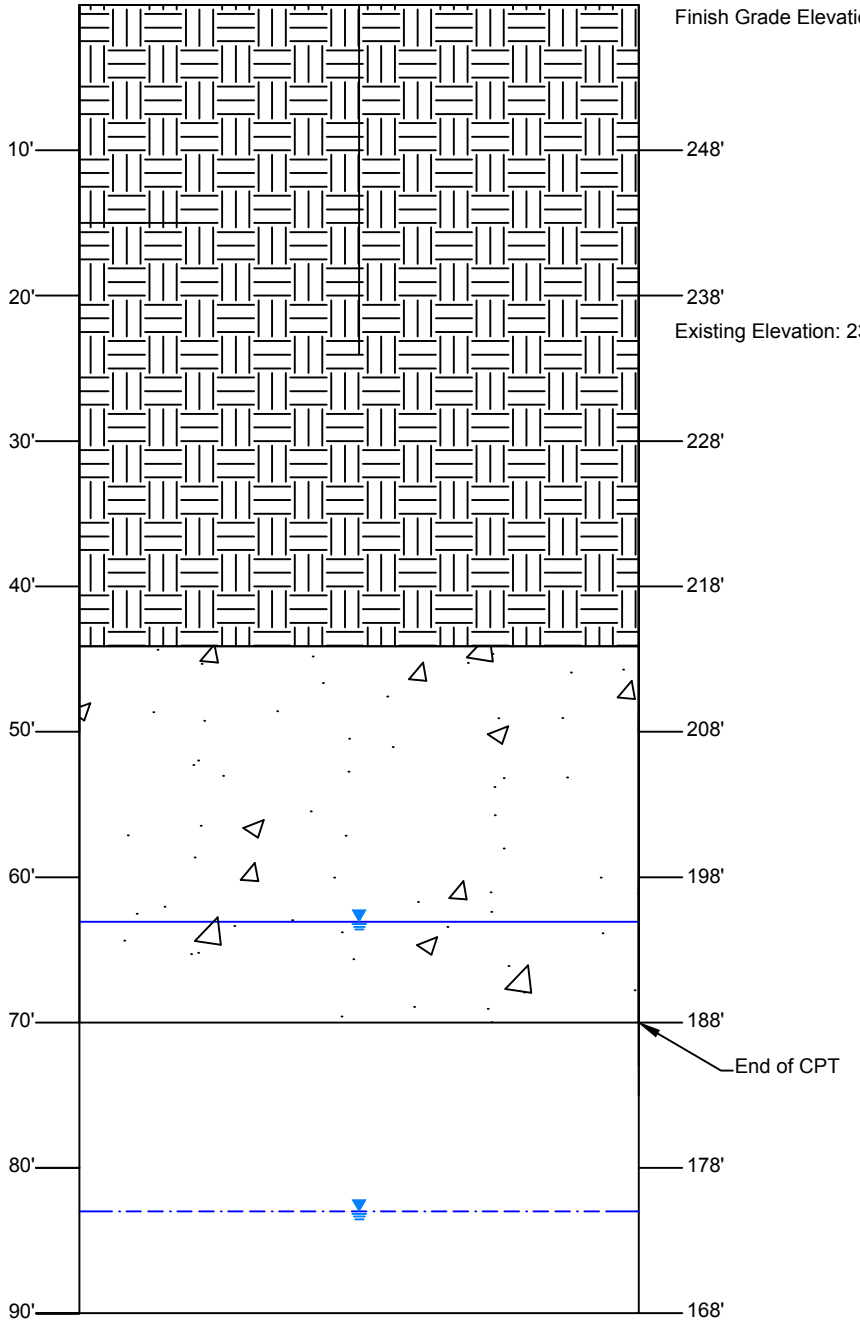

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 80.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 60.00 ft | Fill height: | 21.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-10**
Total depth: 53.97 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 80.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 60.00 ft | Fill height: | 21.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |




## LEGEND

Fill

Alluvium

Design Groundwater Elevation

In-situ Groundwater Elevation

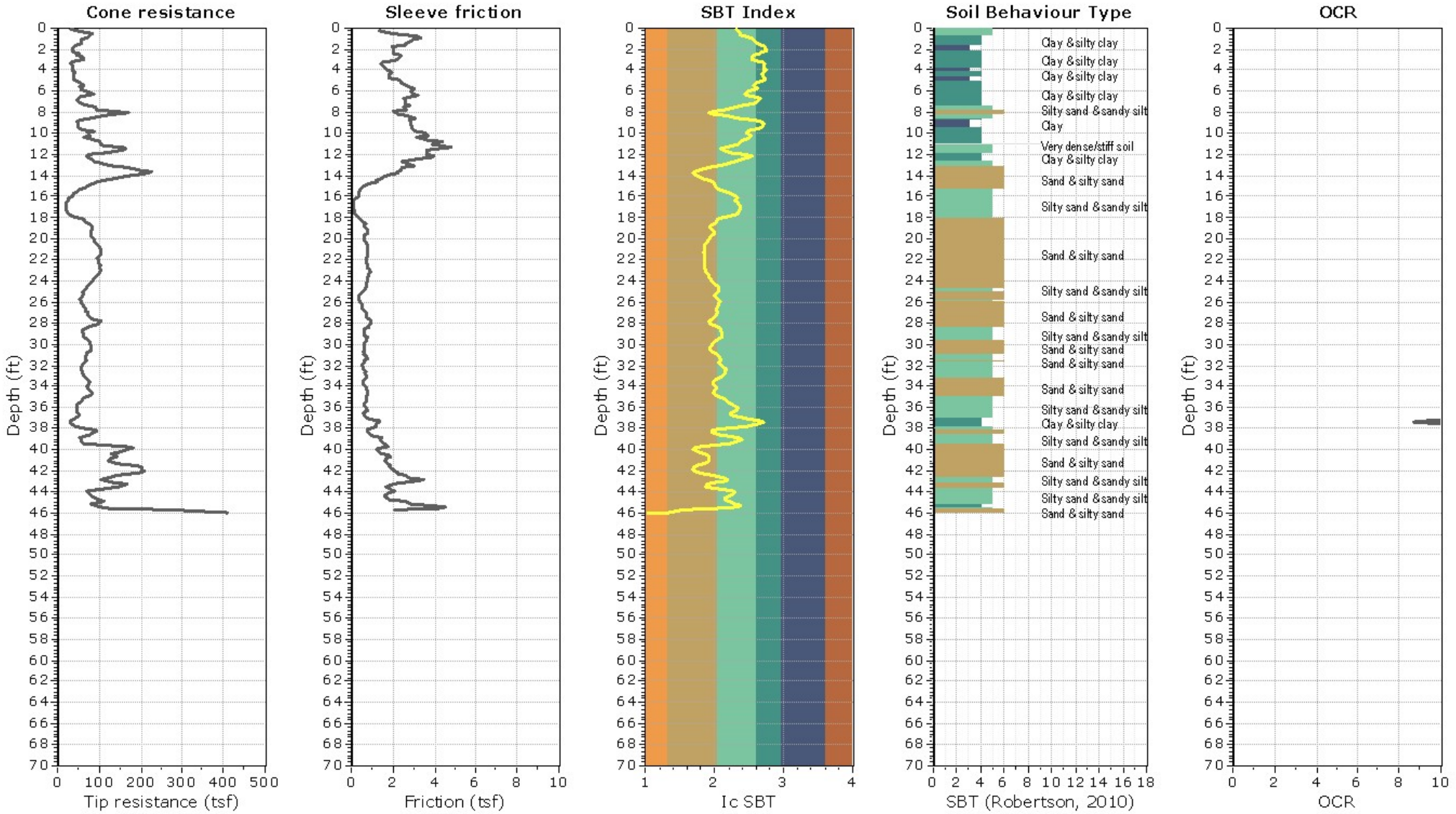
LGC Geotechnical, Inc.

**CPT-11B**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTm 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | Not to Scale |
| DATE | February 2017 |

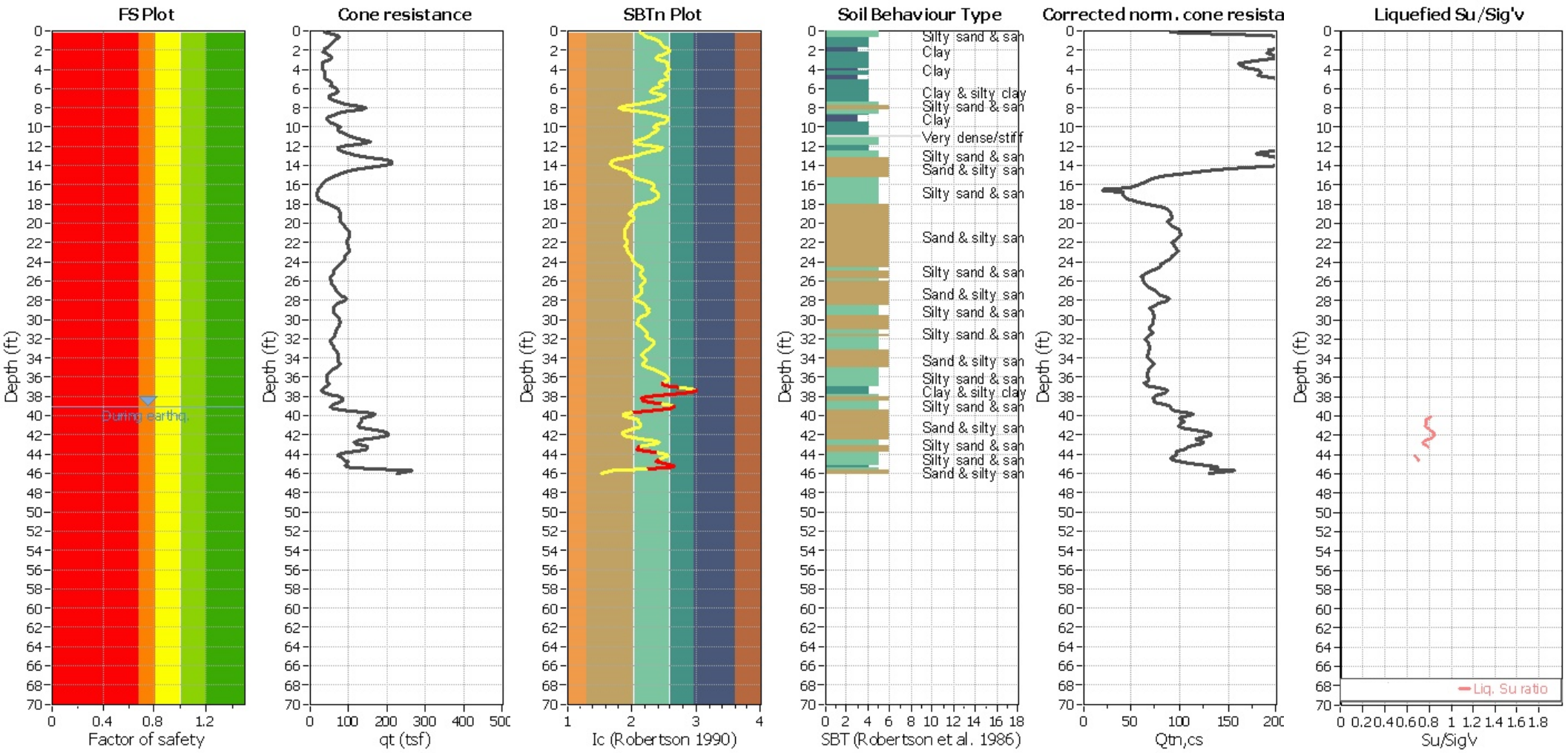
**Project:** **Rancho La Habra**
**Location:** **City of La Habra**

**CPT-11B**
Total depth: 46.10 ft



**Project:** Rancho La Habra
**Location:** City of La Habra

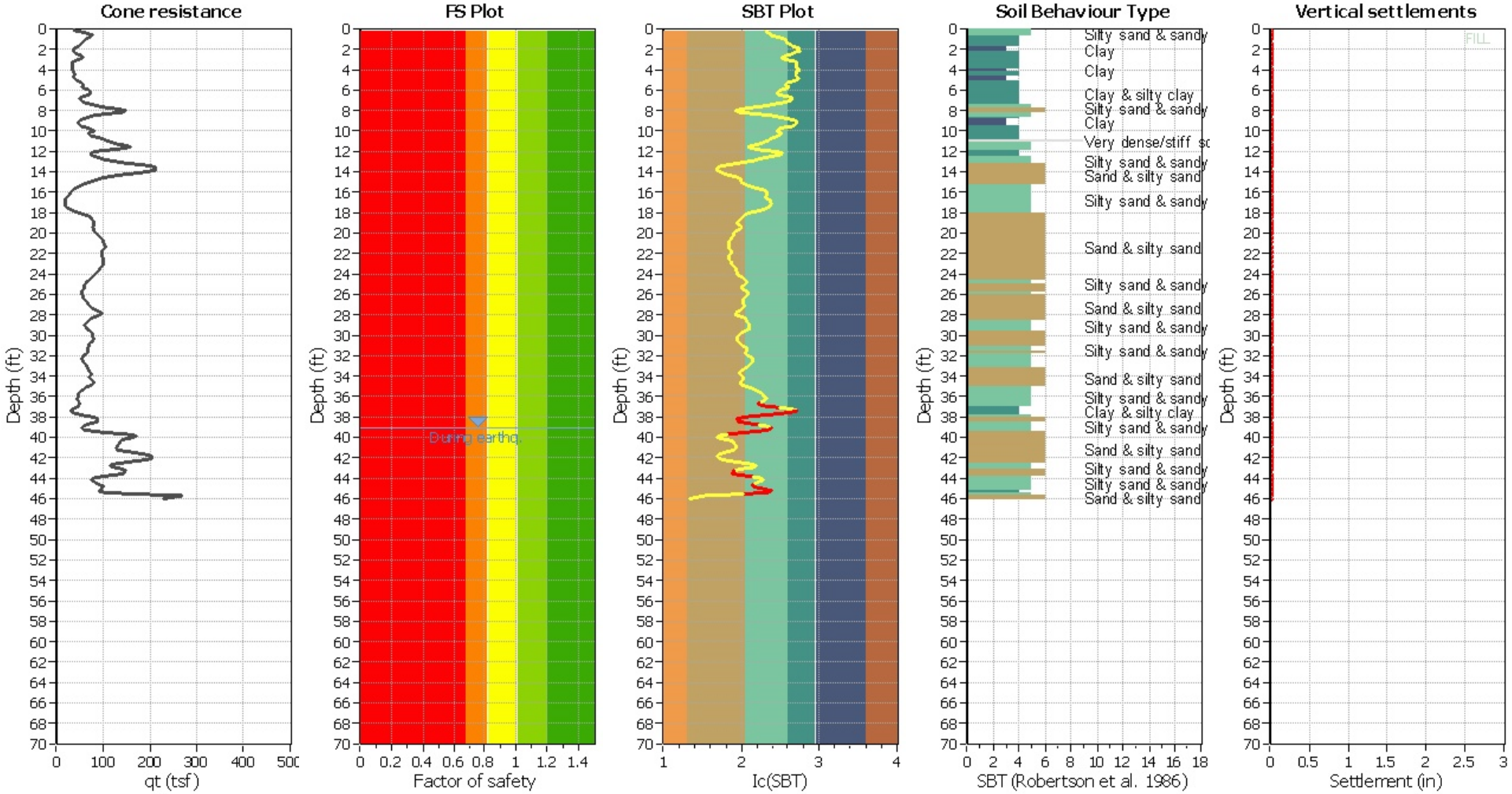
**CPT: CPT-11B**
Total depth: 46.10 ft




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 83.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 63.00 ft | Fill height: | 24.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

**Project:** Rancho La Habra
**Location:** City of La Habra

**CPT: CPT-11B**
Total depth: 46.10 ft

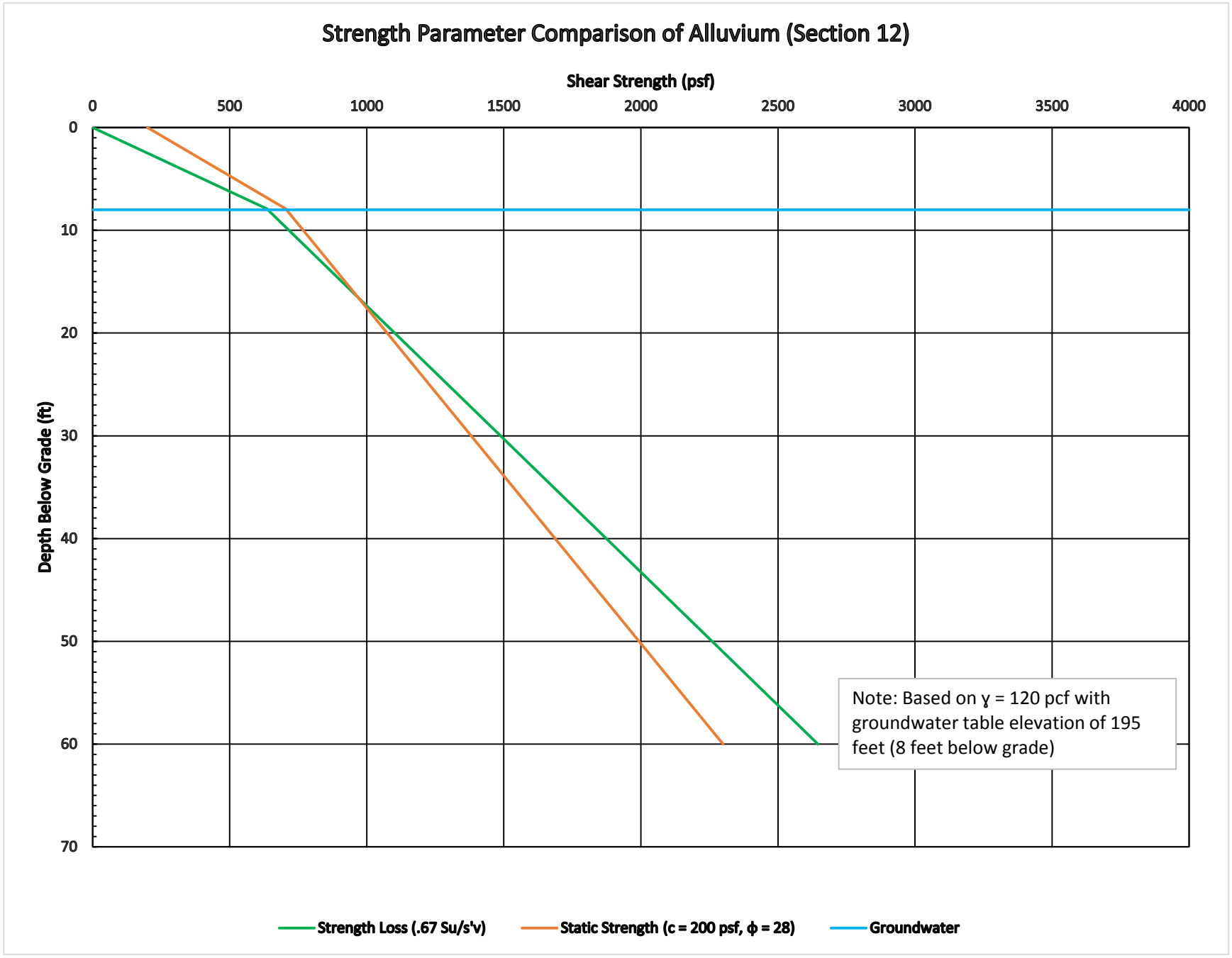


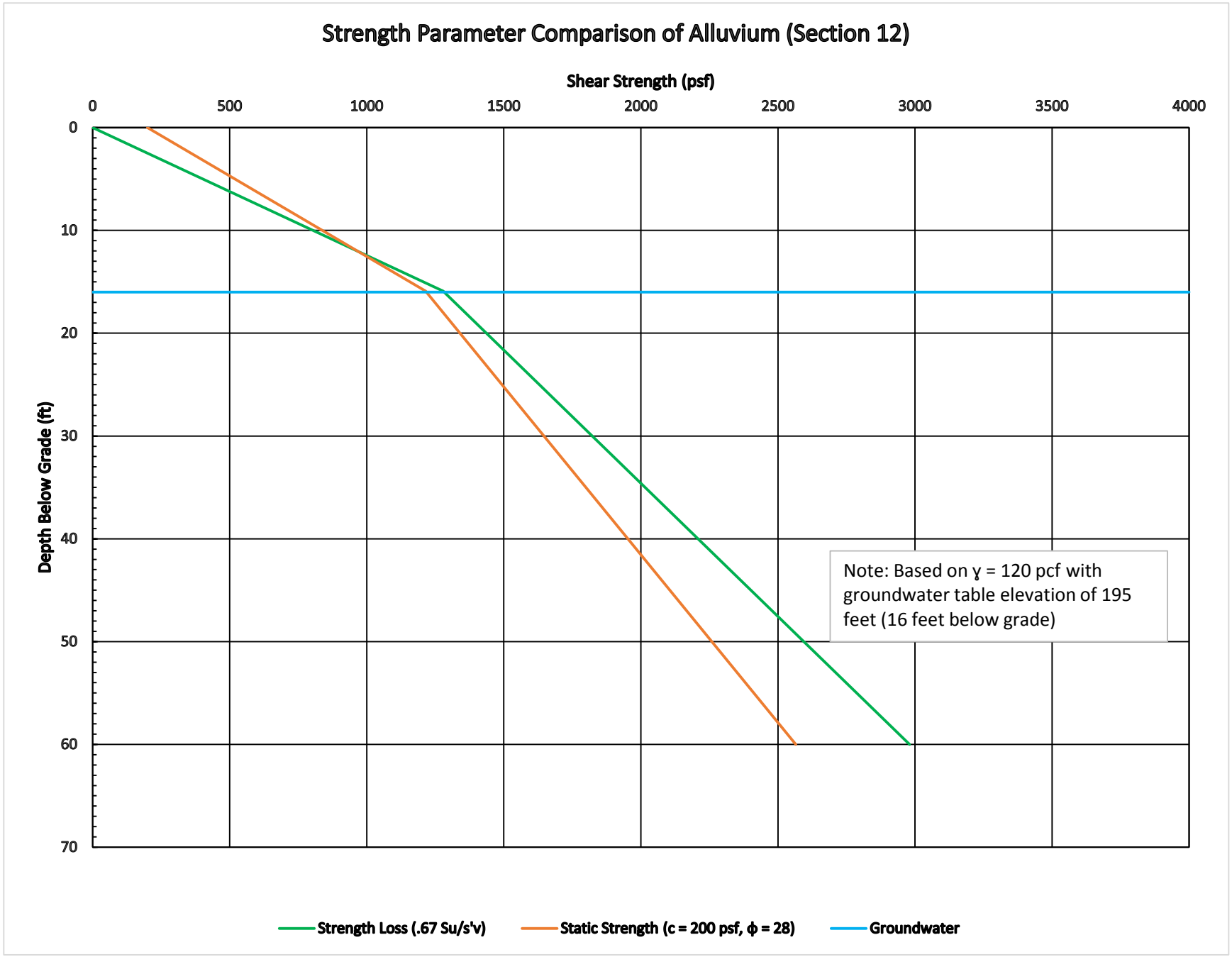

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 83.00 ft | Use fill: | Yes | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 63.00 ft | Fill height: | 24.00 ft | Limit depth applied: | Yes |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | 120.00 lb/ft$^3$ | Limit depth: | 50.00 ft |
| Earthquake magnitude $M_w$: | 6.70 | Ic cut-off value: | 2.60 | Trans. detect. applied: | Yes | MSF method: | Method based |
| Peak ground acceleration: | 0.76 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

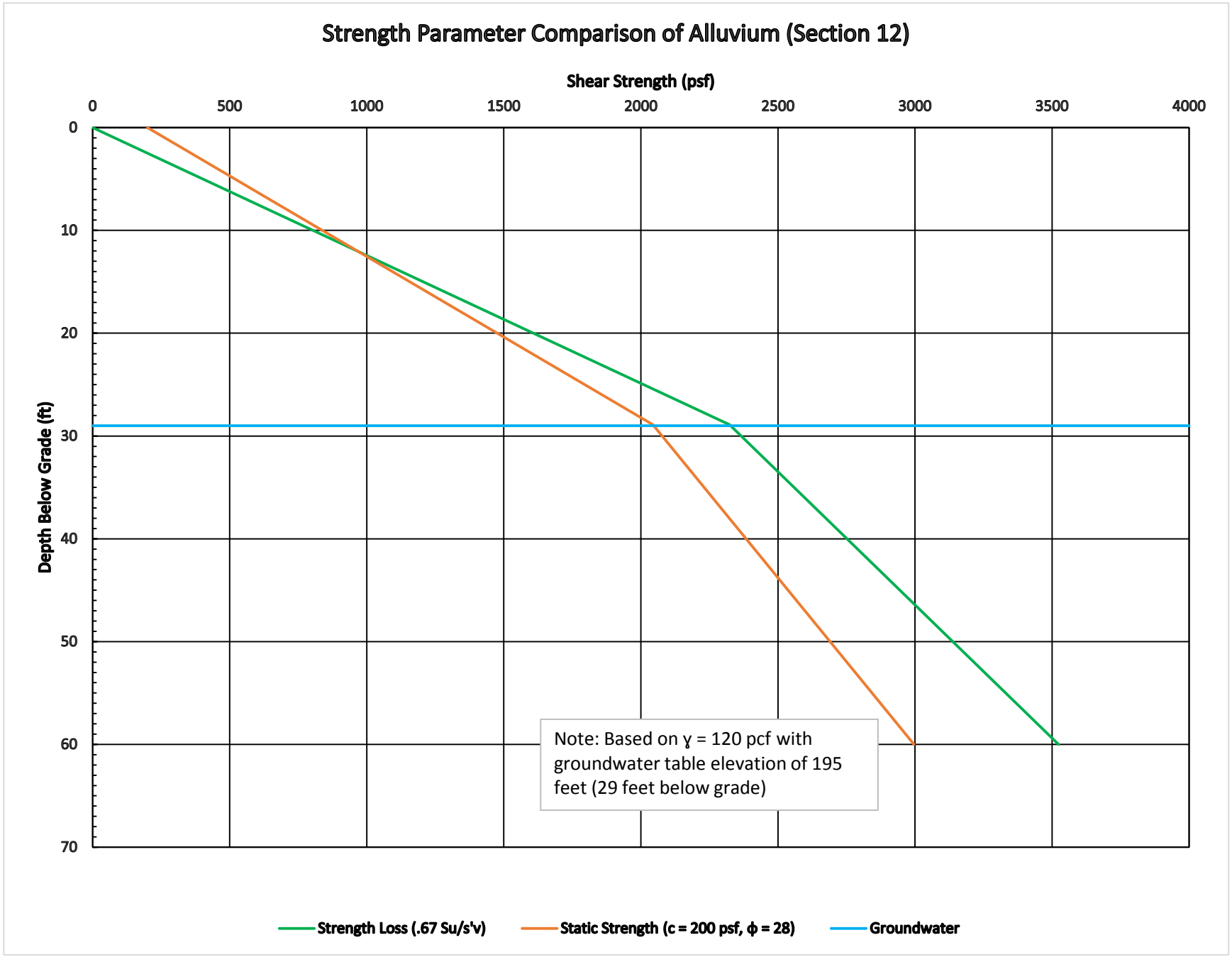
***Summary of Lateral Spreading Analysis***

| Cross-Section | File Name | Factor of Safety | Description | Comment # | Page # |
|---|---|---|---|---|---|
| 11-11’ | x11ls | 1.31 | Lower Slope - Lateral Spreading | 10 | 37 |
| 12-12’ | x12l1ls | 1.96 | Lower Slope 1 - Lateral Spreading | 10 | 41 |
| | x12l2ls | 1.78 | Lower Slope 2 - Lateral Spreading | 10 | 45 |
| 15-15’ | x15ls | 1.20 | Lower Slope - Lateral Spreading | 10 | 50 |

*Please Note:* Soil shear strengths not increased for seismic loading conditions

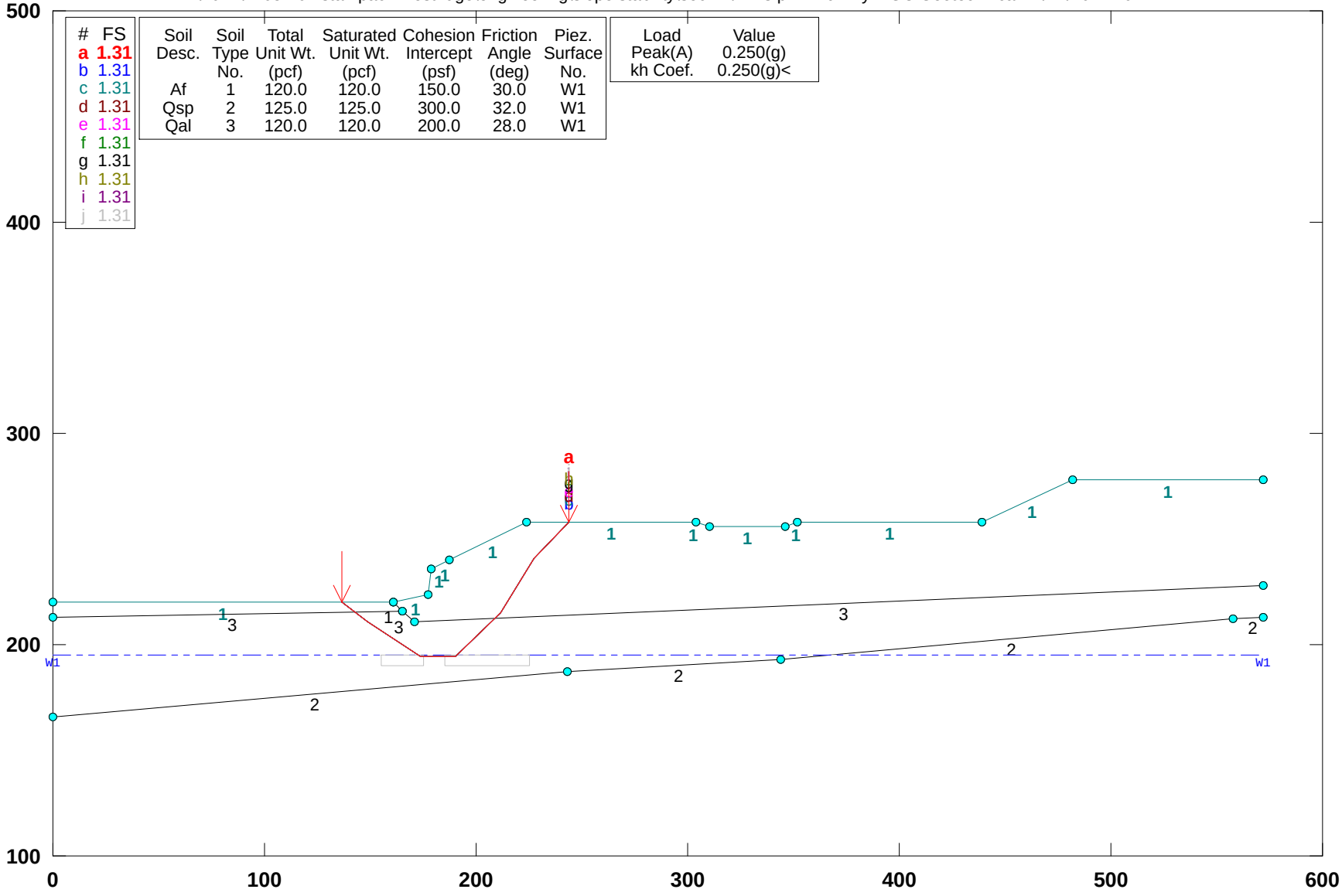

Strength Parameter Comparison of Alluvium (Section 12)
Shear Strength (psf)
0
500
1000
1500
2000
2500
3000
3500
4000
Depth Below Grade (ft)
0
10
20
30
40
50
60
70
Note: Based on γ = 120 pcf with groundwater table elevation of 195 feet (8 feet below grade)
Strength Loss (.67 Su/s'v)
Static Strength (c = 200 psf, ϕ = 28)
Groundwater


Strength Parameter Comparison of Alluvium (Section 12)
Shear Strength (psf)
0
500
1000
1500
2000
2500
3000
3500
4000
Depth Below Grade (ft)
0
10
20
30
40
50
60
70
Note: Based on ɣ = 120 pcf with groundwater table elevation of 195 feet (16 feet below grade)
Strength Loss (.67 Su/s'v)
Static Strength (c = 200 psf, ϕ = 28)
Groundwater


Strength Parameter Comparison of Alluvium (Section 12)
Shear Strength (psf)
0
500
1000
1500
2000
2500
3000
3500
4000
Depth Below Grade (ft)
0
10
20
30
40
50
60
70
Note: Based on ɣ = 120 pcf with groundwater table elevation of 195 feet (29 feet below grade)
Strength Loss (.67 Su/s'v)
Static Strength (c = 200 psf, ϕ = 28)
Groundwater

# Westridge/14057-01/Sec 11-11'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 11\x11ls.pl2 Run By: LGC Geotechnical 2/17/2017 01:12PM




| # | FS |
|---|---|
| a | 1.31 |
| b | 1.31 |
| c | 1.31 |
| d | 1.31 |
| e | 1.31 |
| f | 1.31 |
| g | 1.31 |
| h | 1.31 |
| i | 1.31 |
| j | 1.31 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | 300.0 | 32.0 | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

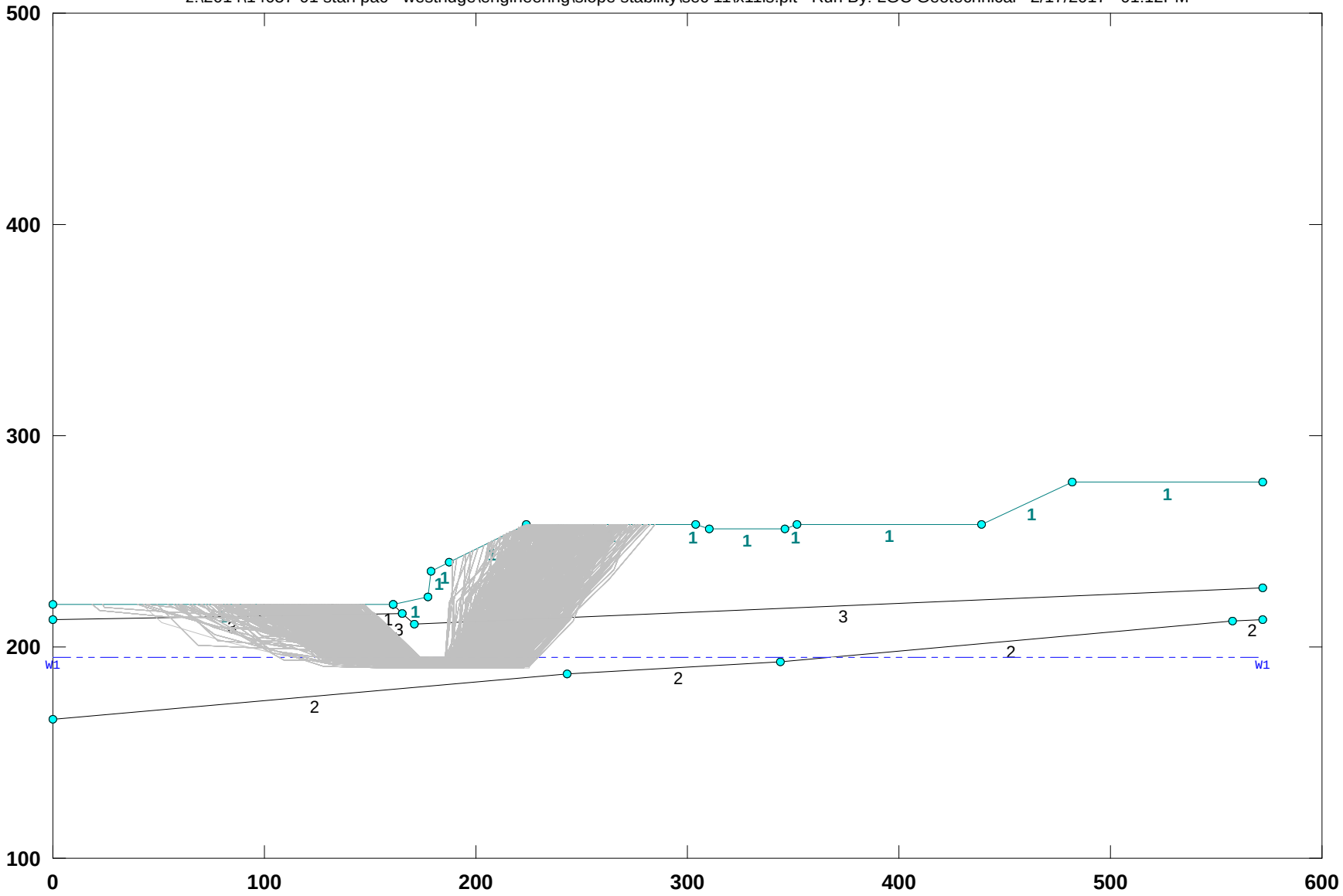
| Load | Value |
|---|---|
| Peak(A) | 0.250(g) |
| kh Coef. | 0.250(g)< |

**GSTABL7 v.2 FSmin=1.31**

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

# Westridge/14057-01/Sec 11-11'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 11\x11ls.plt Run By: LGC Geotechnical 2/17/2017 01:12PM



```
                                   ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
     ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                   (All Rights Reserved-Unauthorized Use Prohibited)
 ************************************************************************************
                        SLOPE STABILITY ANALYSIS SYSTEM
          Modified Bishop, Simplified Janbu, or GLE Method of Slices.
          (Includes Spencer & Morgenstern-Price Type Analysis)
          Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
          Nonlinear Undrained Shear Strength, Curved Phi Envelope,
          Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
          Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
 ************************************************************************************
     Analysis Run Date:        2/17/2017
     Time of Run:              01:12PM
     Run By:                   LGC Geotechnical
     Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 11\x11ls.in
     Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 11\x11ls.OUT
     Unit System:              English
     Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 11\x11ls.PLT
     PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 11-11'/Lower
                           Slope/Lateral Spreading
     BOUNDARY COORDINATES
        12 Top   Boundaries
        20 Total Boundaries
     Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
        No.         (ft)       (ft)       (ft)       (ft)     Below Bnd
         1          0.00     220.00     161.00     220.00        1
         2        161.00     220.00     177.00     224.00        1
         3        177.00     224.00     179.00     236.00        1
         4        179.00     236.00     187.00     240.00        1
         5        187.00     240.00     224.00     258.00        1
         6        224.00     258.00     304.00     258.00        1
         7        304.00     258.00     310.00     256.00        1
         8        310.00     256.00     346.00     256.00        1
         9        346.00     256.00     352.00     258.00        1
        10        352.00     258.00     439.00     258.00        1
        11        439.00     258.00     482.00     278.00        1
        12        482.00     278.00     572.00     278.00        1
        13        161.00     220.00     165.00     216.00        1
        14          0.00     213.00     165.00     216.00        3
        15        165.00     216.00     171.00     211.00        3
        16        171.00     211.00     572.00     228.00        3
        17          0.00     166.00     243.00     187.00        2
        18        243.00     187.00     344.00     193.00        2
        19        344.00     193.00     558.00     212.00        2
        20        558.00     212.00     572.00     213.00        2
     User Specified Y-Origin =       100.00(ft)
     Default X-Plus Value = 0.00(ft)
     User Specified Y-Plus Value =  100.00(ft)
    ISOTROPIC SOIL PARAMETERS
      3 Type(s) of Soil
     Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
     Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
      No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
        1   120.0    120.0     150.0     30.0    0.00       0.0      1
        2   125.0    125.0     300.0     32.0    0.00       0.0      1
        3   120.0    120.0     200.0     28.0    0.00       0.0      1
     1 PIEZOMETRIC SURFACE(S) SPECIFIED
     Unit Weight of Water =  62.40 (pcf)
     Piezometric Surface No.  1 Specified by  2 Coordinate Points
     Pore Pressure Inclination Factor =  0.50
       Point      X-Water     Y-Water
        No.         (ft)        (ft)
         1          0.00      195.00
         2        572.00      195.00
     Specified Peak Ground Acceleration Coefficient (A) =   0.250(g)
```



```
     Specified Horizontal Earthquake Coefficient (kh) =   0.250(g)
     Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
     Specified Seismic Pore-Pressure Factor =   0.000
     Janbus Empirical Coef is being used for the case of  c & phi both > 0
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Sliding Block Surfaces, Has Been
     Specified.
     5000 Trial Surfaces Have Been Generated.
     2 Boxes Specified For Generation Of Central Block Base
     Length Of Line Segments For Active And Passive Portions Of
     Sliding Block Is  30.0
     Box        X-Left     Y-Left    X-Right    Y-Right      Height
     No.          (ft)       (ft)       (ft)       (ft)        (ft)
      1         155.00     192.50     175.00     192.50       5.00
      2         185.00     192.50     225.00     192.50       5.00
     Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  5000
           Number of Trial Surfaces With Valid FS = 5000
           Statistical Data On All Valid FS Values:
              FS Max =   5.317   FS Min =   1.311   FS Ave =   1.689
              Standard Deviation =    0.439   Coefficient of Variation =   26.02 %
           Failure Surface Specified By  7 Coordinate Points
             Point      X-Surf      Y-Surf
              No.         (ft)        (ft)
               1        136.707     220.000
               2        148.482     210.534
               3        173.983     194.732
               4        190.525     194.124
               5        211.738     215.338
               6        227.265     241.007
               7        243.884     258.000
                  Factor of Safety
                   ***    1.311   ***
                  Individual data on the    17  slices
                            Water  Water     Tie      Tie      Earthquake
                            Force  Force     Force    Force       Force   Surcharge
     Slice  Width   Weight    Top    Bot      Norm     Tan      Hor     Ver     Load
      No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
       1     5.5    1454.5     0.0    0.0       0.      0.    363.6     0.0      0.0
       2     6.3    5233.2     0.0    0.0       0.      0.   1308.3     0.0      0.0
       3    12.5   20045.5     0.0    0.0       0.      0.   5011.4     0.0      0.0
       4     4.0    9101.8     0.0    0.0       0.      0.   2275.4     0.0      0.0
       5     6.0   16783.4     0.0    0.0       0.      0.   4195.8     0.0      0.0
       6     2.6    8274.7     0.0    0.0       0.      0.   2068.7     0.0      0.0
       7     0.4    1468.2     0.0    4.2       0.      0.    367.0     0.0      0.0
       8     3.0   10479.1     0.0   60.9       0.      0.   2619.8     0.0      0.0
       9     2.0    8499.7     0.0   51.9       0.      0.   2124.9     0.0      0.0
      10     8.0   41855.1     0.0  299.2       0.      0.  10463.8     0.0      0.0
      11     3.5   19740.1     0.0  178.5       0.      0.   4935.0     0.0      0.0
      12     0.9    4976.3     0.0   33.8       0.      0.   1244.1     0.0      0.0
      13    17.6   90066.8     0.0    0.0       0.      0.  22516.7     0.0      0.0
      14     2.7   12235.1     0.0    0.0       0.      0.   3058.8     0.0      0.0
      15    12.3   43472.4     0.0    0.0       0.      0.  10868.1     0.0      0.0
      16     3.3    7715.3     0.0    0.0       0.      0.   1928.8     0.0      0.0
      17    16.6   16943.8     0.0    0.0       0.      0.   4236.0     0.0      0.0
           Failure Surface Specified By  7 Coordinate Points
             Point      X-Surf      Y-Surf
              No.         (ft)        (ft)
               1        136.707     220.000
               2        148.482     210.534
               3        173.983     194.732
               4        190.525     194.124
               5        211.738     215.338
               6        227.265     241.007
               7        243.884     258.000
                  Factor of Safety
                   ***    1.311   ***
```

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |



Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

Failure Surface Specified By 7 Coordinate Points

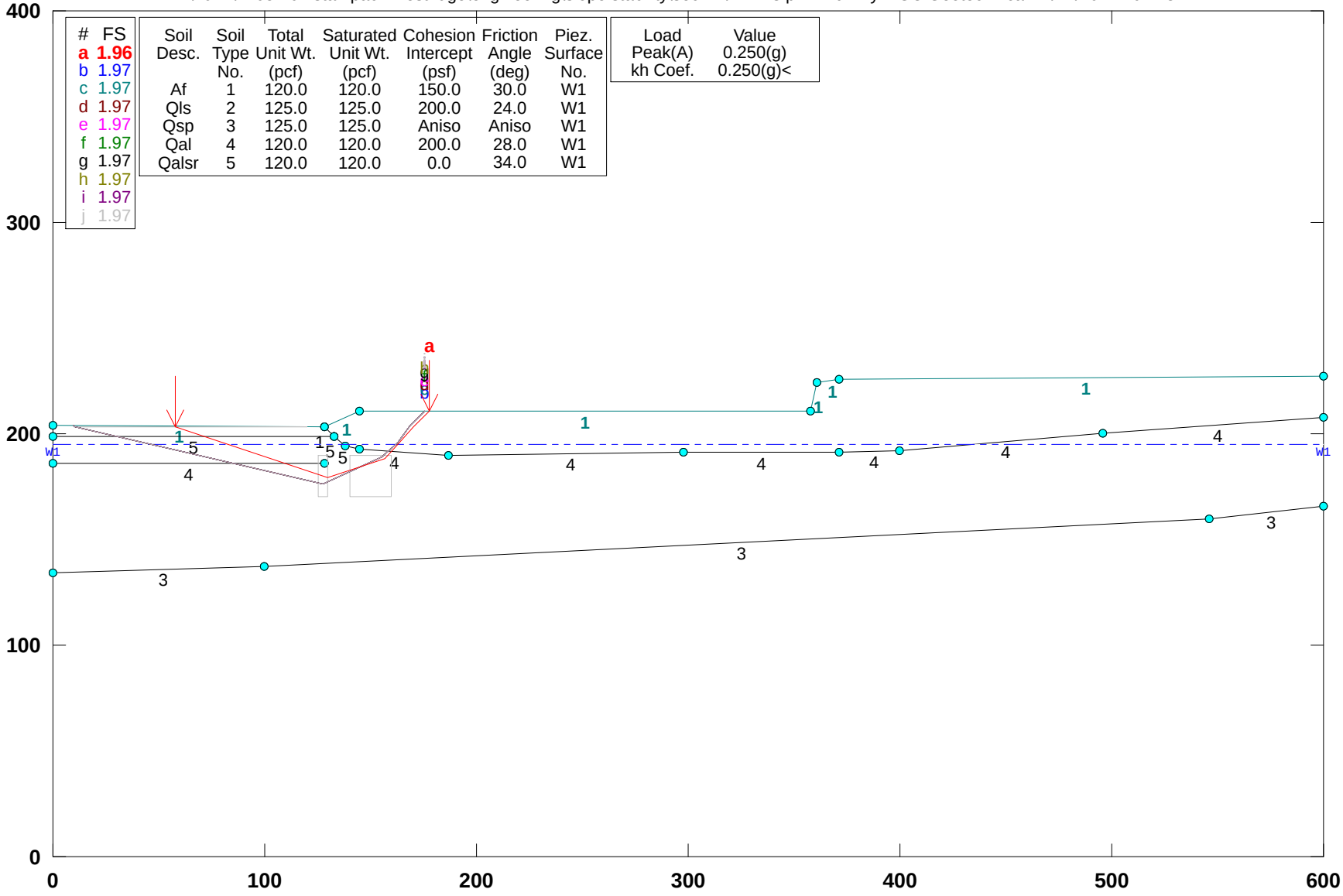
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 136.707 | 220.000 |
| 2 | 148.482 | 210.534 |
| 3 | 173.983 | 194.732 |
| 4 | 190.525 | 194.124 |
| 5 | 211.738 | 215.338 |
| 6 | 227.265 | 241.007 |
| 7 | 243.884 | 258.000 |

Factor of Safety
*** 1.311 ***

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

# Westridge/14057-01/Sec 12-12'/Lower Slope 1/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l1ls.pl2  Run By: LGC Geotechnical  2/22/2017  04:23PM




| # | FS |
|---|---|
| a | 1.96 |
| b | 1.97 |
| c | 1.97 |
| d | 1.97 |
| e | 1.97 |
| f | 1.97 |
| g | 1.97 |
| h | 1.97 |
| i | 1.97 |
| j | 1.97 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |
| Qalsr | 5 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |

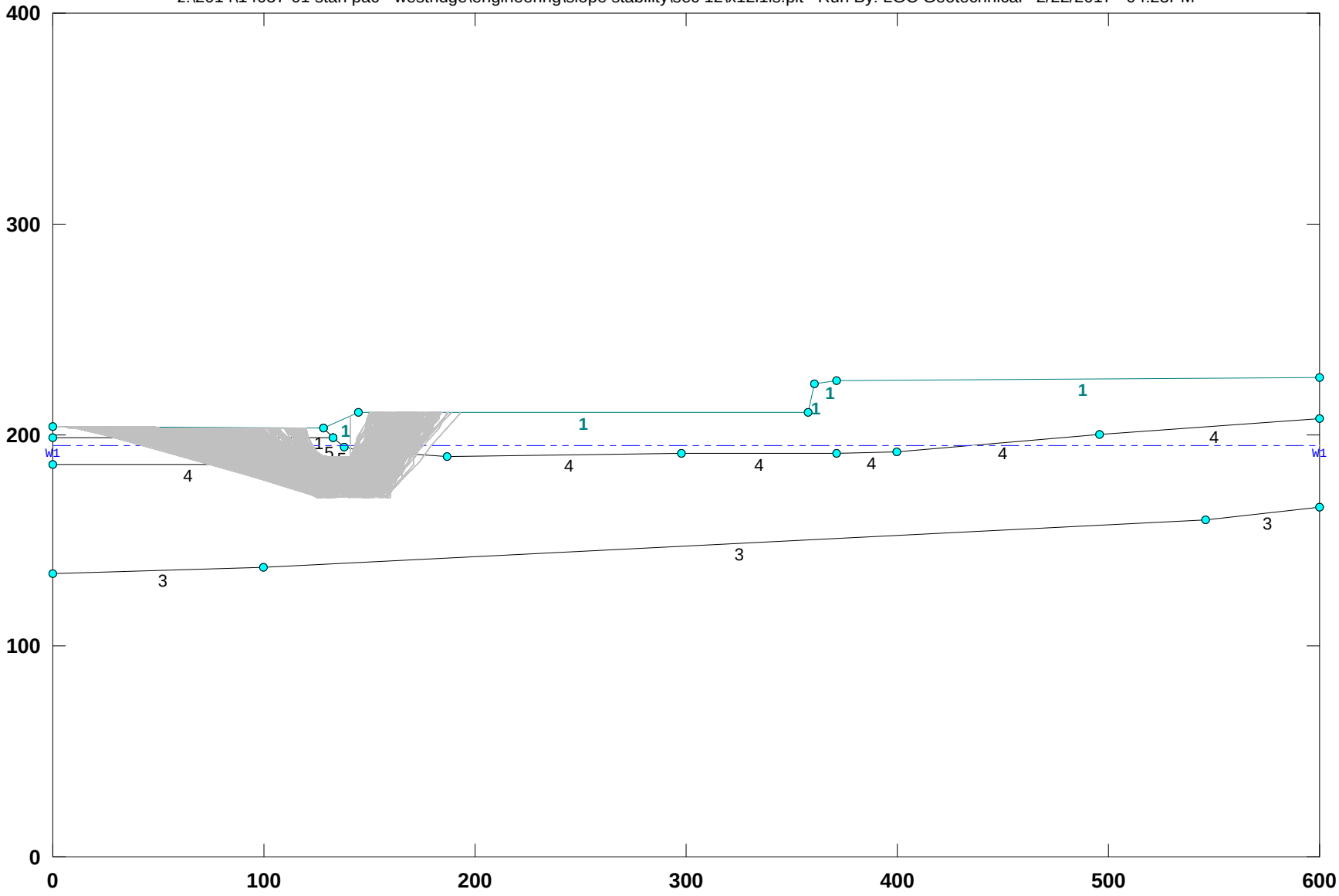
| Load | Value |
|---|---|
| Peak(A) | 0.250(g) |
| kh Coef. | 0.250(g)< |

**GSTABL7 v.2  FSmin=1.96**

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

# Westridge/14057-01/Sec 12-12'/Lower Slope 1/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l1ls.plt Run By: LGC Geotechnical 2/22/2017 04:23PM



```
                                  ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        2/22/2017
    Time of Run:              04:23PM
    Run By:                   LGC Geotechnical
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 12\x12l1ls.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 12\x12l1ls.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 12\x12l1ls.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 12-12'/Lower
                          Slope 1/Lateral Spreading
    BOUNDARY COORDINATES
        6 Top   Boundaries
       20 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     204.00     128.00     203.00        1
        2       128.00     203.00     145.00     211.00        1
        3       145.00     211.00     358.00     211.00        1
        4       358.00     211.00     361.00     224.00        1
        5       361.00     224.00     371.00     226.00        1
        6       371.00     226.00     600.00     227.00        1
        7       128.00     203.00     133.00     199.00        1
        8       133.00     199.00     138.00     194.00        5
        9       138.00     194.00     145.00     193.00        5
       10       145.00     193.00     187.00     190.00        4
       11       187.00     190.00     298.00     191.00        4
       12       298.00     191.00     371.00     191.00        4
       13       371.00     191.00     400.00     192.00        4
       14       400.00     192.00     496.00     200.00        4
       15       496.00     200.00     600.00     208.00        4
       16         0.00     199.00     133.00     199.00        5
       17         0.00     186.00     128.00     186.00        4
       18         0.00     134.00     100.00     137.00        3
       19       100.00     137.00     546.00     160.00        3
       20       546.00     160.00     600.00     166.00        3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     5 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
       1   120.0    120.0     150.0     30.0    0.00       0.0      1
       2   125.0    125.0     200.0     24.0    0.00       0.0      1
       3   125.0    125.0     300.0     32.0    0.00       0.0      1
       4   120.0    120.0     200.0     28.0    0.00       0.0      1
       5   120.0    120.0       0.0     34.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.           (deg)            (psf)        (deg)
```



```
        1              5.0            300.00         32.00
        2             10.0            200.00         27.00
        3             90.0            300.00         32.00
   ANISOTROPIC SOIL NOTES:
      (1) An input value of 0.01 for C and/or Phi will cause Aniso
          C and/or Phi to be ignored in that range.
      (2) An input value of 0.02 for Phi will set both Phi and
          C equal to zero, with no water weight in the tension crack.
      (3) An input value of 0.03 for Phi will set both Phi and
          C equal to zero, with water weight in the tension crack.
   1 PIEZOMETRIC SURFACE(S) SPECIFIED
   Unit Weight of Water =  62.40 (pcf)
   Piezometric Surface No.  1 Specified by  2 Coordinate Points
   Pore Pressure Inclination Factor =  0.50
     Point      X-Water     Y-Water
      No.         (ft)        (ft)
       1         0.00      195.00
       2       600.00      195.00
   Specified Peak Ground Acceleration Coefficient (A) =   0.250(g)
   Specified Horizontal Earthquake Coefficient (kh) =   0.250(g)
   Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
   Specified Seismic Pore-Pressure Factor =   0.000
   Janbus Empirical Coef is being used for the case of  c & phi both > 0
   A Critical Failure Surface Searching Method, Using A Random
   Technique For Generating Sliding Block Surfaces, Has Been
   Specified.
   5000 Trial Surfaces Have Been Generated.
   3 Boxes Specified For Generation Of Central Block Base
   Length Of Line Segments For Active And Passive Portions Of
   Sliding Block Is  10.0
   Box        X-Left     Y-Left    X-Right    Y-Right      Height
   No.         (ft)       (ft)       (ft)       (ft)        (ft)
    1          10.00     202.90     120.00     202.90       0.00
    2         125.00     180.00     130.00     180.00      20.00
    3         140.00     180.00     160.00     180.00      20.00
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Evaluated. They Are
         Ordered - Most Critical First.
         * * Safety Factors Are Calculated By The Simplified Janbu Method * *
         Total Number of Trial Surfaces Attempted =  5000
         Number of Trial Surfaces With Valid FS = 5000
         Statistical Data On All Valid FS Values:
            FS Max =   5.700   FS Min =   1.964   FS Ave =   2.576
            Standard Deviation =    0.593   Coefficient of Variation =   23.04 %
         Failure Surface Specified By  8 Coordinate Points
           Point      X-Surf      Y-Surf
            No.         (ft)        (ft)
             1         57.460      203.551
             2         58.118      202.900
             3        129.538      179.076
             4        156.854      188.129
             5        163.582      195.527
             6        170.347      202.892
             7        177.213      210.162
             8        177.649      211.000
               Factor of Safety
              ***    1.964   ***
             Individual data on the    17  slices
                          Water  Water     Tie      Tie      Earthquake
                          Force  Force     Force    Force       Force   Surcharge
Slice  Width    Weight     Top    Bot      Norm     Tan      Hor      Ver     Load
 No.    (ft)     (lbs)    (lbs)  (lbs)    (lbs)   (lbs)    (lbs)    (lbs)   (lbs)
  1      0.7      25.5      0.0     0.0       0.      0.      6.4      0.0      0.0
  2     11.7    3578.0      0.0     0.0       0.      0.    894.5      0.0      0.0
  3     12.0    9220.5      0.0     0.0       0.      0.   2305.1      0.0      0.0
  4     27.0   41297.7      0.0  7986.5       0.      0. 10324.4      0.0      0.0
  5     19.2   46772.1      0.0 15430.3       0.      0. 11693.0      0.0      0.0
  6      1.5    4435.7      0.0  1585.4       0.      0.  1108.9      0.0      0.0
  7      3.5   10339.0      0.0  3493.2       0.      0.  2584.8      0.0      0.0
  8      4.0   12195.9      0.0  3711.3       0.      0.  3049.0      0.0      0.0
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 1.0 | 3090.7 | 0.0 | 873.4 | 0. | 0. | 772.7 | 0.0 | 0.0 |
| 10 | 7.0 | 22102.7 | 0.0 | 5503.5 | 0. | 0. | 5525.7 | 0.0 | 0.0 |
| 11 | 11.9 | 35328.9 | 0.0 | 6885.3 | 0. | 0. | 8832.2 | 0.0 | 0.0 |
| 12 | 3.4 | 8652.5 | 0.0 | 1587.9 | 0. | 0. | 2163.1 | 0.0 | 0.0 |
| 13 | 2.8 | 5920.5 | 0.0 | 403.2 | 0. | 0. | 1480.1 | 0.0 | 0.0 |
| 14 | 0.5 | 905.2 | 0.0 | 0.0 | 0. | 0. | 226.3 | 0.0 | 0.0 |
| 15 | 6.8 | 9571.6 | 0.0 | 0.0 | 0. | 0. | 2392.9 | 0.0 | 0.0 |
| 16 | 6.9 | 3686.0 | 0.0 | 0.0 | 0. | 0. | 921.5 | 0.0 | 0.0 |
| 17 | 0.4 | 21.9 | 0.0 | 0.0 | 0. | 0. | 5.5 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

Failure Surface Specified By 7 Coordinate Points

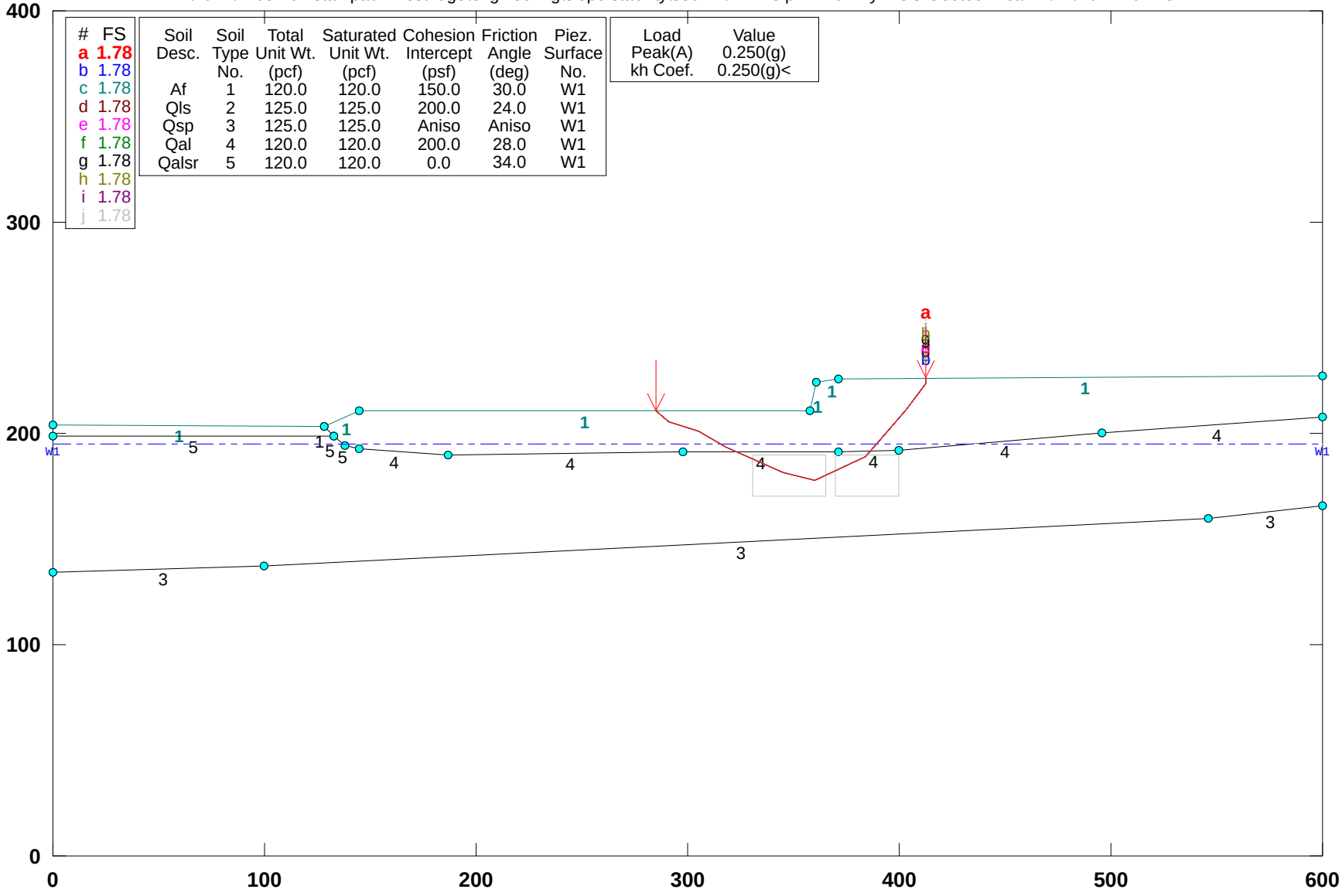
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 9.634 | 203.925 |
| 2 | 10.799 | 202.900 |
| 3 | 127.758 | 176.215 |
| 4 | 155.594 | 188.939 |
| 5 | 162.643 | 196.033 |
| 6 | 168.714 | 203.979 |
| 7 | 175.552 | 211.000 |

Factor of Safety
*** 1.969 ***

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

# Westridge/14057-01/Sec 12-12'/Lower Slope 2/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l2ls.pl2  Run By: LGC Geotechnical  2/17/2017  01:23PM




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

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |
| Qalsr | 5 | 120.0 | 120.0 | 0.0 | 34.0 | W1 |

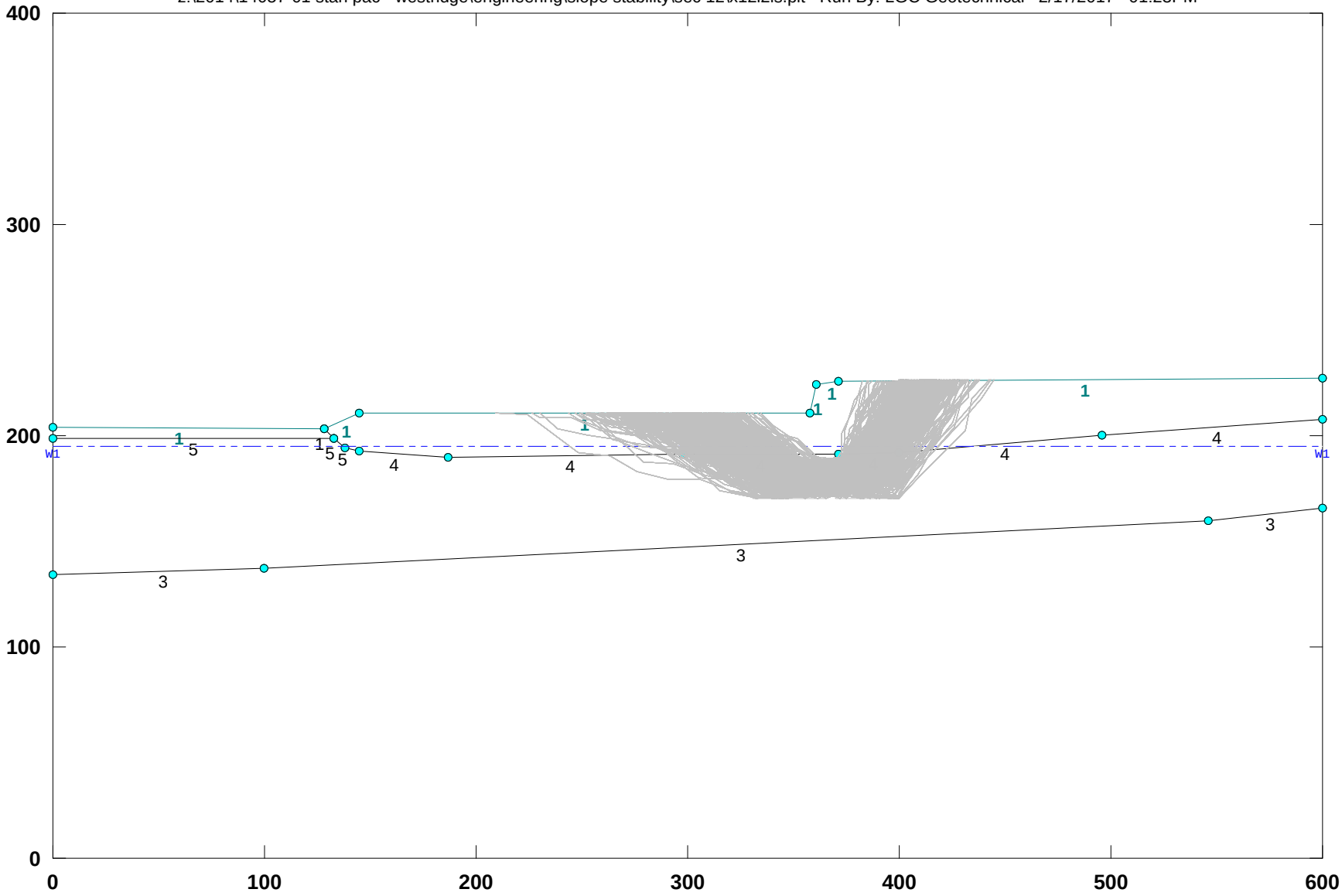
| Load | Value |
|---|---|
| Peak(A) | 0.250(g) |
| kh Coef. | 0.250(g)< |

**GSTABL7 v.2  FSmin=1.78**

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

# Westridge/14057-01/Sec 12-12'/Lower Slope 2/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 12\x12l2ls.plt Run By: LGC Geotechnical 2/17/2017 01:23PM



```
                                  ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        2/17/2017
    Time of Run:              01:23PM
    Run By:                   LGC Geotechnical
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 12\x12l2ls.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 12\x12l2ls.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 12\x12l2ls.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 12-12'/Lower
                          Slope 2/Lateral Spreading
    BOUNDARY COORDINATES
        6 Top   Boundaries
       19 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     204.00     128.00     203.00         1
        2       128.00     203.00     145.00     211.00         1
        3       145.00     211.00     358.00     211.00         1
        4       358.00     211.00     361.00     224.00         1
        5       361.00     224.00     371.00     226.00         1
        6       371.00     226.00     600.00     227.00         1
        7       128.00     203.00     133.00     199.00         1
        8       133.00     199.00     138.00     194.00         5
        9       138.00     194.00     145.00     193.00         5
       10       145.00     193.00     187.00     190.00         4
       11       187.00     190.00     298.00     191.00         4
       12       298.00     191.00     371.00     191.00         4
       13       371.00     191.00     400.00     192.00         4
       14       400.00     192.00     496.00     200.00         4
       15       496.00     200.00     600.00     208.00         4
       16         0.00     199.00     133.00     199.00         5
       17         0.00     134.00     100.00     137.00         3
       18       100.00     137.00     546.00     160.00         3
       19       546.00     160.00     600.00     166.00         3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     5 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
      5   120.0    120.0       0.0     34.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.           (deg)            (psf)         (deg)
        1             5.0             300.00         32.00
```



```
        2             10.0            200.00         27.00
        3             90.0            300.00         32.00
   ANISOTROPIC SOIL NOTES:
      (1) An input value of 0.01 for C and/or Phi will cause Aniso
          C and/or Phi to be ignored in that range.
      (2) An input value of 0.02 for Phi will set both Phi and
          C equal to zero, with no water weight in the tension crack.
      (3) An input value of 0.03 for Phi will set both Phi and
          C equal to zero, with water weight in the tension crack.
   1 PIEZOMETRIC SURFACE(S) SPECIFIED
   Unit Weight of Water =  62.40 (pcf)
   Piezometric Surface No.  1 Specified by  2 Coordinate Points
   Pore Pressure Inclination Factor =  0.50
     Point      X-Water     Y-Water
      No.         (ft)        (ft)
       1          0.00      195.00
       2        600.00      195.00
   Specified Peak Ground Acceleration Coefficient (A) =   0.250(g)
   Specified Horizontal Earthquake Coefficient (kh) =   0.250(g)
   Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
   Specified Seismic Pore-Pressure Factor =   0.000
   Janbus Empirical Coef is being used for the case of  c & phi both > 0
   A Critical Failure Surface Searching Method, Using A Random
   Technique For Generating Sliding Block Surfaces, Has Been
   Specified.
   5000 Trial Surfaces Have Been Generated.
   2 Boxes Specified For Generation Of Central Block Base
   Length Of Line Segments For Active And Passive Portions Of
   Sliding Block Is  15.0
   Box        X-Left     Y-Left    X-Right    Y-Right      Height
   No.         (ft)       (ft)       (ft)       (ft)        (ft)
    1         331.00     180.00     365.00     180.00      20.00
    2         370.00     180.00     400.00     180.00      20.00
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Evaluated. They Are
         Ordered - Most Critical First.
         * * Safety Factors Are Calculated By The Simplified Janbu Method * *
         Total Number of Trial Surfaces Attempted =  5000
         Number of Trial Surfaces With Valid FS = 5000
         Statistical Data On All Valid FS Values:
            FS Max =   5.161   FS Min =   1.776   FS Ave =   2.312
            Standard Deviation =    0.476   Coefficient of Variation =   20.57 %
         Failure Surface Specified By 12 Coordinate Points
           Point      X-Surf      Y-Surf
            No.         (ft)        (ft)
             1        284.976     211.000
             2        290.761     205.853
             3        304.987     201.096
             4        317.769     193.246
             5        331.679     187.632
             6        345.335     181.426
             7        359.818     177.523
             8        384.222     188.842
             9        393.966     200.246
            10        403.669     211.685
            11        412.427     223.862
            12        412.721     226.182
               Factor of Safety
                ***    1.776   ***
              Individual data on the    18  slices
                        Water  Water     Tie      Tie     Earthquake
                        Force  Force    Force    Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver     Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      5.8    1786.6     0.0     0.0       0.      0.   446.7     0.0      0.0
  2     14.2   12846.4     0.0     0.0       0.      0.  3211.6     0.0      0.0
  3      9.9   15426.7     0.0     0.0       0.      0.  3856.7     0.0      0.0
  4      2.9    5784.8     0.0   183.5       0.      0.  1446.2     0.0      0.0
  5      5.6   12605.5     0.0  1077.3       0.      0.  3151.4     0.0      0.0
  6      8.3   21715.0     0.0  3191.8       0.      0.  5428.8     0.0      0.0
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7 | 13.7 | 43378.5 | 0.0 | 9800.6 | 0. | 0. | 10844.6 | 0.0 | 0.0 |
| 8 | 12.7 | 47539.7 | 0.0 | 12506.7 | 0. | 0. | 11884.9 | 0.0 | 0.0 |
| 9 | 1.8 | 8110.4 | 0.0 | 2024.8 | 0. | 0. | 2027.6 | 0.0 | 0.0 |
| 10 | 1.2 | 6189.0 | 0.0 | 1398.4 | 0. | 0. | 1547.2 | 0.0 | 0.0 |
| 11 | 10.0 | 53531.7 | 0.0 | 10049.3 | 0. | 0. | 13382.9 | 0.0 | 0.0 |
| 12 | 13.2 | 63866.8 | 0.0 | 8389.4 | 0. | 0. | 15966.7 | 0.0 | 0.0 |
| 13 | 2.3 | 9907.8 | 0.0 | 1063.8 | 0. | 0. | 2477.0 | 0.0 | 0.0 |
| 14 | 3.0 | 11654.0 | 0.0 | 492.6 | 0. | 0. | 2913.5 | 0.0 | 0.0 |
| 15 | 4.5 | 15311.2 | 0.0 | 0.0 | 0. | 0. | 3827.8 | 0.0 | 0.0 |
| 16 | 9.7 | 23469.7 | 0.0 | 0.0 | 0. | 0. | 5867.4 | 0.0 | 0.0 |
| 17 | 8.8 | 8815.7 | 0.0 | 0.0 | 0. | 0. | 2203.9 | 0.0 | 0.0 |
| 18 | 0.3 | 40.9 | 0.0 | 0.0 | 0. | 0. | 10.2 | 0.0 | 0.0 |

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 284.976 | 211.000 |
| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
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| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
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Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
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Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

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| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
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Factor of Safety
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Failure Surface Specified By 12 Coordinate Points

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Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 3 | 304.987 | 201.096 |
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Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 3 | 304.987 | 201.096 |
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| 5 | 331.679 | 187.632 |
| 6 | 345.335 | 181.426 |

| | | |
|---|---|---|
| 7 | 359.818 | 177.523 |
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
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Factor of Safety
*** 1.776 ***

Failure Surface Specified By 12 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 2 | 290.761 | 205.853 |
| 3 | 304.987 | 201.096 |
| 4 | 317.769 | 193.246 |
| 5 | 331.679 | 187.632 |
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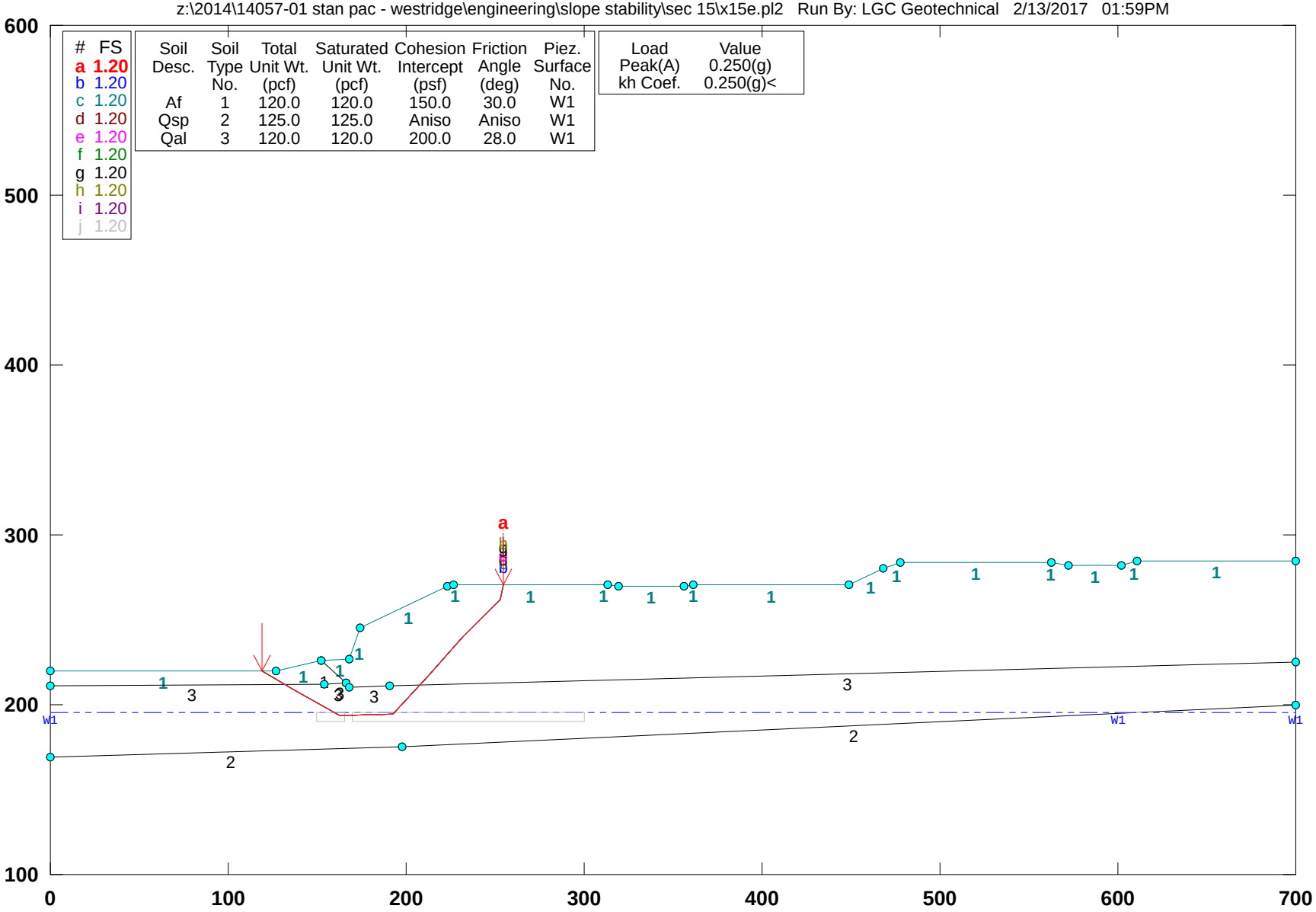
| 8 | 384.222 | 188.842 |
| 9 | 393.966 | 200.246 |
| 10 | 403.669 | 211.685 |
| 11 | 412.427 | 223.862 |
| 12 | 412.721 | 226.182 |

Factor of Safety
*** 1.776 ***

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

# Westridge/14057-01/Sec 15-15'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 15\x15e.pl2  Run By: LGC Geotechnical  2/13/2017  01:59PM

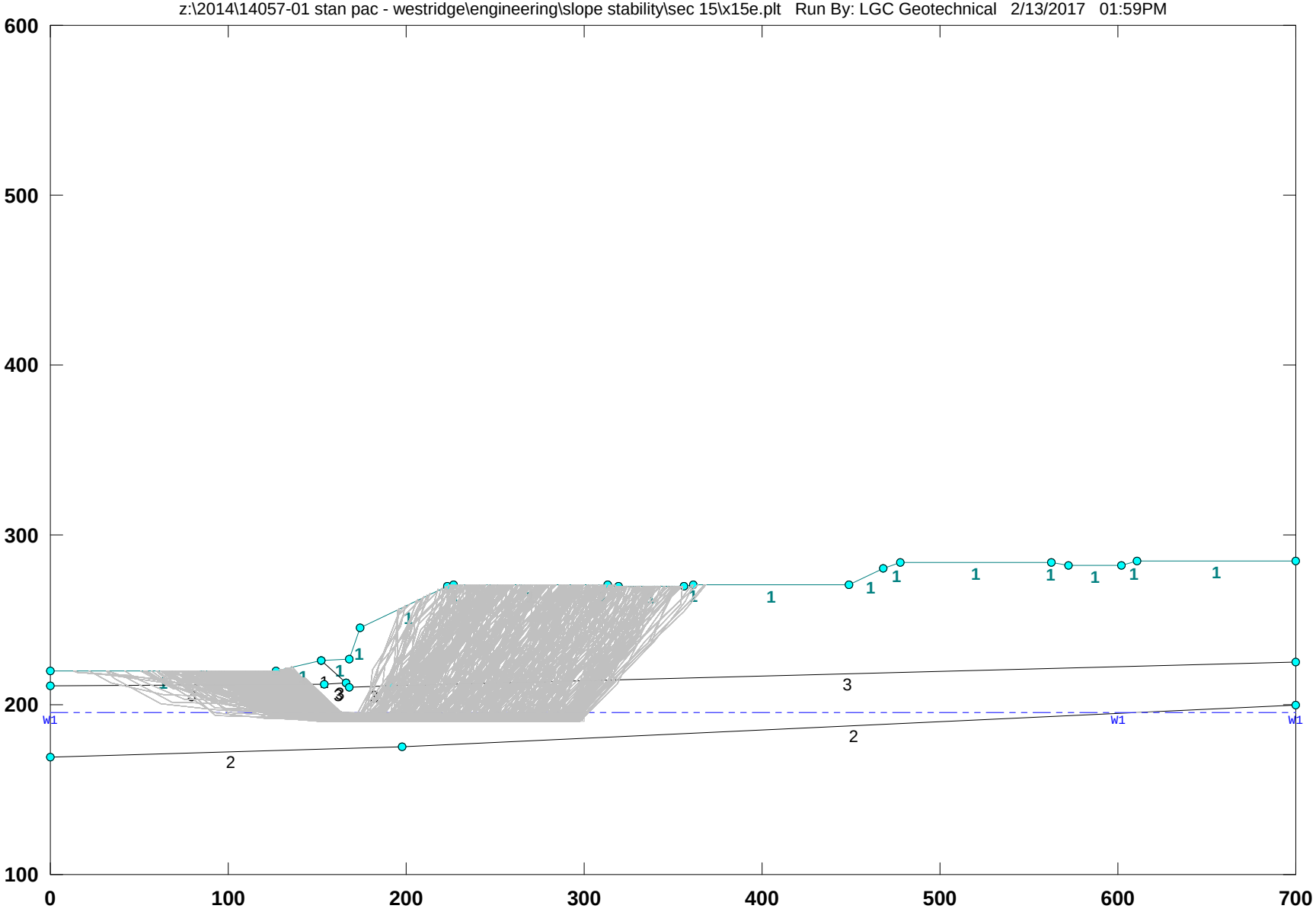



**GSTABL7 v.2  FSmin=1.20**

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

# Westridge/14057-01/Sec 15-15'/Lower Slope/Lateral Spreading

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\sec 15\x15e.plt Run By: LGC Geotechnical 2/13/2017 01:59PM



```
                                  ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
          ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
              Modified Bishop, Simplified Janbu, or GLE Method of Slices.
              (Includes Spencer & Morgenstern-Price Type Analysis)
              Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
              Nonlinear Undrained Shear Strength, Curved Phi Envelope,
              Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
              Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        2/13/2017
    Time of Run:              01:59PM
    Run By:                   LGC Geotechnical
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 15\x15e.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 15\x15e.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Sec 15\x15e.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 15-15'/Lower
                          Slope/Lateral Spreading
    BOUNDARY COORDINATES
       18 Top   Boundaries
       26 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)    Below Bnd
        1          0.00     220.00     127.00     220.00        1
        2        127.00     220.00     152.00     226.00        1
        3        152.00     226.00     168.00     227.00        1
        4        168.00     227.00     174.00     245.00        1
        5        174.00     245.00     223.00     270.00        1
        6        223.00     270.00     227.00     271.00        1
        7        227.00     271.00     313.00     271.00        1
        8        313.00     271.00     319.00     270.00        1
        9        319.00     270.00     356.00     270.00        1
       10        356.00     270.00     361.00     271.00        1
       11        361.00     271.00     449.00     271.00        1
       12        449.00     271.00     468.00     280.00        1
       13        468.00     280.00     478.00     284.00        1
       14        478.00     284.00     563.00     284.00        1
       15        563.00     284.00     572.00     282.00        1
       16        572.00     282.00     602.00     282.00        1
       17        602.00     282.00     611.00     285.00        1
       18        611.00     285.00     700.00     285.00        1
       19        152.00     226.00     166.00     213.00        1
       20          0.00     211.00     154.00     212.00        3
       21        154.00     212.00     166.00     213.00        3
       22        166.00     213.00     168.00     210.00        3
       23        168.00     210.00     191.00     211.00        3
       24        191.00     211.00     700.00     225.00        3
       25          0.00     169.00     198.00     175.00        2
       26        198.00     175.00     700.00     200.00        2
    User Specified Y-Origin =       100.00(ft)
    Default X-Plus Value = 0.00(ft)
    User Specified Y-Plus Value =  100.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
       1   120.0    120.0     150.0     30.0    0.00       0.0      1
       2   125.0    125.0     300.0     32.0    0.00       0.0      1
       3   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
```



```
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              5.0             300.00         32.00
        2             10.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    1 PIEZOMETRIC SURFACE(S) SPECIFIED
    Unit Weight of Water =  62.40 (pcf)
    Piezometric Surface No.  1 Specified by  3 Coordinate Points
    Pore Pressure Inclination Factor =  0.50
      Point      X-Water     Y-Water
       No.         (ft)        (ft)
        1          0.00      195.00
        2        600.00      195.00
        3        700.00      195.00
    Specified Peak Ground Acceleration Coefficient (A) =   0.250(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.250(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    5000 Trial Surfaces Have Been Generated.
    2 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  30.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1         150.00     192.50     165.00     192.50       5.00
     2         170.00     192.50     300.00     192.50       5.00
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
          * * Safety Factors Are Calculated By The Simplified Janbu Method * *
          Total Number of Trial Surfaces Attempted =  5000
          Number of Trial Surfaces With Valid FS = 5000
          Statistical Data On All Valid FS Values:
             FS Max =   3.207   FS Min =   1.202   FS Ave =   1.583
             Standard Deviation =    0.245   Coefficient of Variation =   15.46 %
          Failure Surface Specified By  8 Coordinate Points
            Point      X-Surf      Y-Surf
             No.         (ft)        (ft)
              1        118.814     220.000
              2        136.960     208.465
              3        162.827     193.271
              4        192.748     194.607
              5        212.842     216.883
              6        232.296     239.721
              7        252.799     261.621
              8        254.389     271.000
                Factor of Safety
                ***    1.202   ***
               Individual data on the    20  slices
                         Water  Water     Tie     Tie     Earthquake
                         Force  Force    Force   Force       Force   Surcharge
Slice  Width    Weight    Top    Bot     Norm     Tan     Hor     Ver     Load
 No.    (ft)     (lbs)   (lbs)  (lbs)   (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     8.2    2555.9     0.0    0.0      0.      0.    639.0     0.0     0.0
  2     4.6    4014.9     0.0    0.0      0.      0.   1003.7     0.0     0.0
  3     5.3    7416.1     0.0    0.0      0.      0.   1854.0     0.0     0.0
  4    15.0   36361.8     0.0    0.0      0.      0.   9090.5     0.0     0.0
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 2.0 | 6484.5 | 0.0 | 0.0 | 0. | 0. | 1621.1 | 0.0 | 0.0 |
| 6 | 5.9 | 20887.0 | 0.0 | 0.0 | 0. | 0. | 5221.8 | 0.0 | 0.0 |
| 7 | 2.9 | 11460.8 | 0.0 | 184.1 | 0. | 0. | 2865.2 | 0.0 | 0.0 |
| 8 | 3.2 | 12728.5 | 0.0 | 328.6 | 0. | 0. | 3182.1 | 0.0 | 0.0 |
| 9 | 2.0 | 8035.2 | 0.0 | 192.7 | 0. | 0. | 2008.8 | 0.0 | 0.0 |
| 10 | 6.0 | 30502.1 | 0.0 | 511.2 | 0. | 0. | 7625.5 | 0.0 | 0.0 |
| 11 | 17.0 | 112582.5 | 0.0 | 903.4 | 0. | 0. | 28145.6 | 0.0 | 0.0 |
| 12 | 1.7 | 12494.6 | 0.0 | 47.2 | 0. | 0. | 3123.6 | 0.0 | 0.0 |
| 13 | 0.4 | 2548.4 | 0.0 | 6.5 | 0. | 0. | 637.1 | 0.0 | 0.0 |
| 14 | 14.9 | 98564.3 | 0.0 | 0.0 | 0. | 0. | 24641.1 | 0.0 | 0.0 |
| 15 | 4.9 | 28962.6 | 0.0 | 0.0 | 0. | 0. | 7240.6 | 0.0 | 0.0 |
| 16 | 10.2 | 54321.7 | 0.0 | 0.0 | 0. | 0. | 13580.4 | 0.0 | 0.0 |
| 17 | 4.0 | 18885.2 | 0.0 | 0.0 | 0. | 0. | 4721.3 | 0.0 | 0.0 |
| 18 | 5.3 | 21854.4 | 0.0 | 0.0 | 0. | 0. | 5463.6 | 0.0 | 0.0 |
| 19 | 20.5 | 50018.2 | 0.0 | 0.0 | 0. | 0. | 12504.5 | 0.0 | 0.0 |
| 20 | 1.6 | 894.9 | 0.0 | 0.0 | 0. | 0. | 223.7 | 0.0 | 0.0 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
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Factor of Safety
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Failure Surface Specified By 8 Coordinate Points

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| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
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Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point |
|---|



| No. | (ft) | (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 118.814 | 220.000 |
| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
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| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
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| 2 | 136.960 | 208.465 |
| 3 | 162.827 | 193.271 |
| 4 | 192.748 | 194.607 |
| 5 | 212.842 | 216.883 |
| 6 | 232.296 | 239.721 |
| 7 | 252.799 | 261.621 |
| 8 | 254.389 | 271.000 |

Factor of Safety
*** 1.202 ***

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

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# *Appendix E*
# *Slope Stability Analysis*

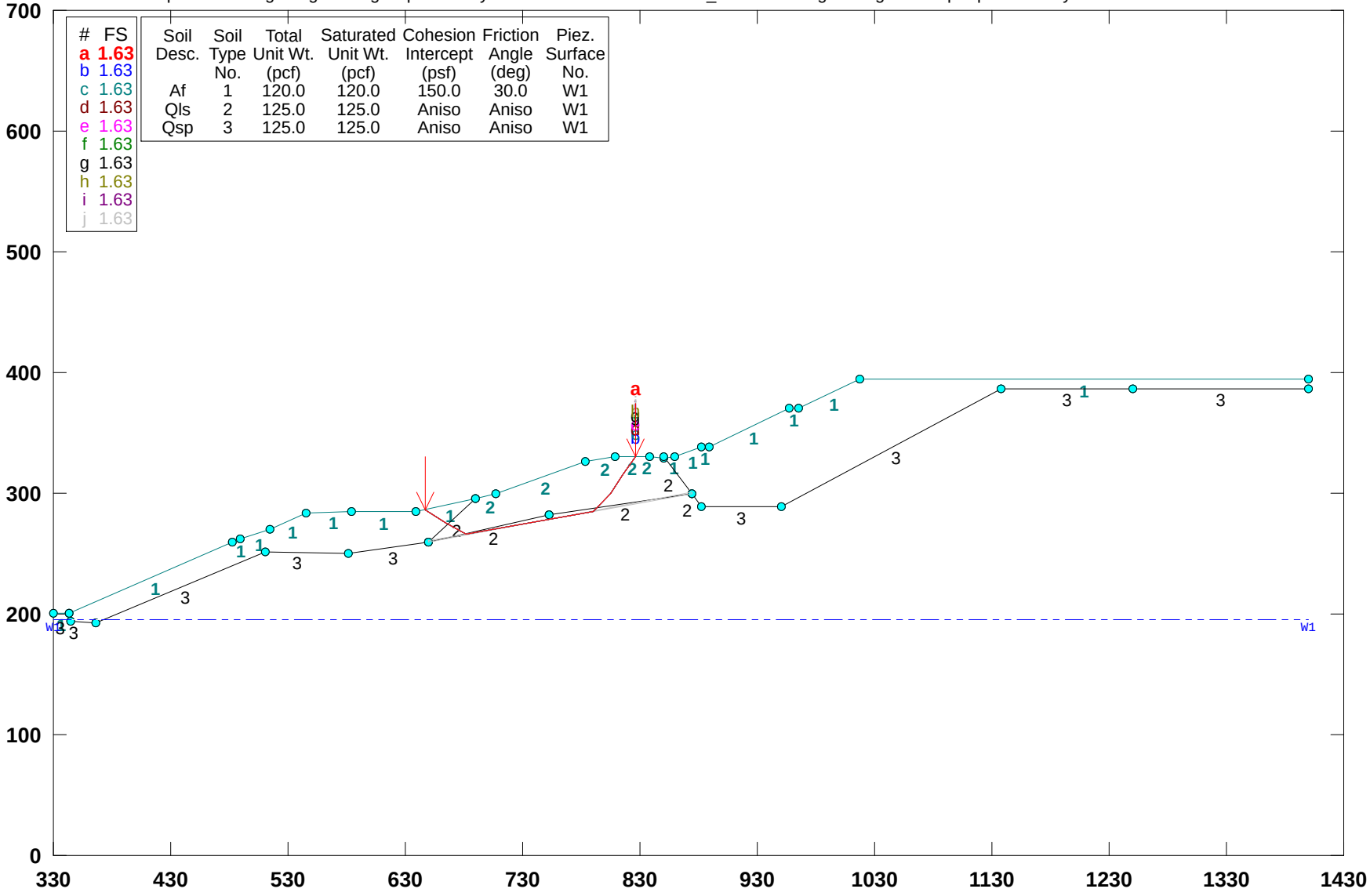
***Summary of Slope Stability Analysis***

| Cross-Section | File Name | Factor of Safety | Description | Comment # | Page # |
|---|---|---|---|---|---|
| 1-1’ | x1tl | 2.19 | Entire Length – Static | 23 | 40 |
| | x1t1e | 1.49 | Seismic | 23 | 45 |
| | x1tlu | 1.99 | Entire Length Upper Slope – Static | 23 | 48 |
| | x1tlue | 1.50 | Seismic | 23 | 52 |
| | x1rd | 1.55 | Lower Basin Cut Slope – Drawdown | 14 | 6 |
| 2-2” | x2tlx | 2.27 | Entire Length – Static | 24 | 55 |
| | x2tle | 1.42 | Seismic | 24 | 59 |
| | x2qlsx | 1.63 | Landslide | 11 | 1 |
| 4-4’ | x4u | 1.70 | Upper Slope – Static | 25 | 62 |
| | x4ue | 1.42 | Seismic | 25 | 66 |
| 5-5’ | x5tc | 1.28 | Upper Slope – Temp Backcut | 15 | 11 |
| 8-8’ | x8dlb | 2.25 | Lower Slope – Qsp Search – Static | 27 | 69 |
| | x8dlbe | 1.59 | Seismic | 27 | 73 |
| | x8utc | 1.37 | Upper Slope – Temp Backcut | 15 | 15 |
| 10-10’ | x10b | 2.33 | Static – Lower Slope | 28 | 76 |
| | x10be | 2.08 | Seismic | 28 | 80 |
| 11-11’ | x11e | 1.49 | Seismic | 29 | 83 |
| 12-12” | x12tlx | 4.86 | Entire Length – Static | 30 | 86 |
| | x12tl | 2.29 | Seismic | 30 | 91 |
| | x12tcx | 1.31 | Upper Slope – Temp Backcut | 15 | 18 |
| 13-13’ | x13tc | 1.86 | Upper Slope – Temp Backcut | 15 | 21 |
| | x13tcbx | 1.80 | Upper Slope – Temp Backcut - Search | 15 | 25 |
| | x13tcbkl | 1.98 | Upper Slope – Temp Backcut – Search Low | 15 | 29 |
| 14-14’ | x14ux | 2.42 | Upper Slope - Static | 16 | 33 |
| | x14ue | 1.84 | Seismic | 16 | 37 |

#11 Qls

# Westridge / 14057-01 /Sec 2-2' / Qls / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#11 sec 2_buttress sizing\13 degrees\x2qlsx.pl2 Run By: LGC Geotechnical 12/21/2016 08:45AM



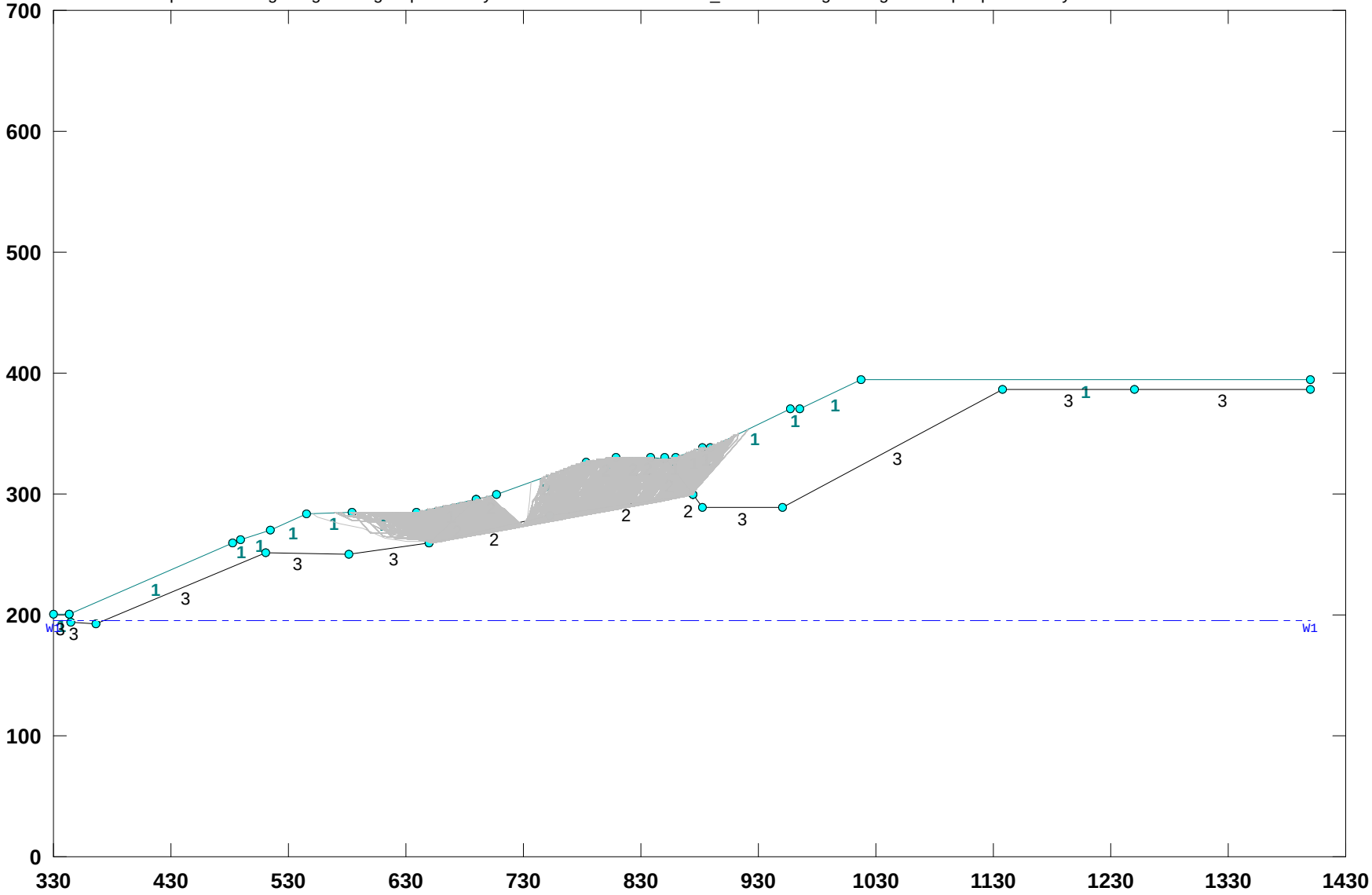

**GSTABL7 v.2 FSmin=1.63**

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

#11 Qls

# Westridge / 14057-01 /Sec 2-2' / Qls / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#11 sec 2_buttress sizing\13 degrees\x2qlsx.plt Run By: LGC Geotechnical 12/21/2016 08:45AM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 12/21/2016
Time of Run: 08:45AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#11 Sec 2_buttress sizing\13 degrees\x2qlsx.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#11 Sec 2_buttress sizing\13 degrees\x2qlsx.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#11 Sec 2_buttress sizing\13 degrees\x2qlsx.PLT
PROBLEM DESCRIPTION: Westridge / 14057-01 /Sec 2-2' / Qls / Static
BOUNDARY COORDINATES
Note: User origin value specified.
Add 330.00 to X-values and 0.00 to Y-values listed.

20 Top Boundaries
34 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 330.00 | 200.00 | 343.00 | 200.00 | 1 |
| 2 | 343.00 | 200.00 | 482.00 | 260.00 | 1 |
| 3 | 482.00 | 260.00 | 489.00 | 262.00 | 1 |
| 4 | 489.00 | 262.00 | 515.00 | 270.00 | 1 |
| 5 | 515.00 | 270.00 | 545.00 | 283.00 | 1 |
| 6 | 545.00 | 283.00 | 584.00 | 285.00 | 1 |
| 7 | 584.00 | 285.00 | 639.00 | 285.00 | 1 |
| 8 | 639.00 | 285.00 | 690.00 | 295.00 | 1 |
| 9 | 690.00 | 295.00 | 707.00 | 300.00 | 2 |
| 10 | 707.00 | 300.00 | 783.00 | 327.00 | 2 |
| 11 | 783.00 | 327.00 | 809.00 | 331.00 | 2 |
| 12 | 809.00 | 331.00 | 838.00 | 330.00 | 2 |
| 13 | 838.00 | 330.00 | 850.00 | 329.00 | 2 |
| 14 | 850.00 | 329.00 | 860.00 | 330.00 | 1 |
| 15 | 860.00 | 330.00 | 883.00 | 339.00 | 1 |
| 16 | 883.00 | 339.00 | 889.00 | 339.00 | 1 |
| 17 | 889.00 | 339.00 | 957.00 | 370.00 | 1 |
| 18 | 957.00 | 370.00 | 965.00 | 370.00 | 1 |
| 19 | 965.00 | 370.00 | 1017.00 | 394.00 | 1 |
| 20 | 1017.00 | 394.00 | 1400.00 | 394.00 | 1 |
| 21 | 343.00 | 200.00 | 345.00 | 194.00 | 3 |
| 22 | 345.00 | 194.00 | 366.00 | 193.00 | 3 |
| 23 | 366.00 | 193.00 | 511.00 | 252.00 | 3 |
| 24 | 511.00 | 252.00 | 582.00 | 250.00 | 3 |
| 25 | 582.00 | 250.00 | 650.00 | 260.00 | 3 |
| 26 | 650.00 | 260.00 | 690.00 | 295.00 | 2 |
| 27 | 650.00 | 260.00 | 752.00 | 282.00 | 2 |
| 28 | 850.00 | 330.00 | 874.00 | 300.00 | 2 |
| 29 | 752.00 | 282.00 | 874.00 | 300.00 | 2 |
| 30 | 874.00 | 300.00 | 882.00 | 289.00 | 2 |
| 31 | 882.00 | 289.00 | 951.00 | 289.00 | 3 |
| 32 | 951.00 | 289.00 | 1138.00 | 386.00 | 3 |
| 33 | 1138.00 | 386.00 | 1250.00 | 386.00 | 3 |
| 34 | 1250.00 | 386.00 | 1400.00 | 386.00 | 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 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 8.0 | 200.00 | 24.00 |
| 2 | 11.0 | 0.00 | 13.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 330.00 | 195.00 |
| 2 | 1400.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 20.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 650.00 | 260.00 | 730.00 | 274.10 | 1.00 |
| 2 | 730.10 | 274.10 | 875.00 | 300.00 | 1.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Failure Surfaces Attempted = 9999
Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.
Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |

| | | | |
|---|---|---|---|
| 6 | 804.352 | 299.263 | |
| 7 | 815.026 | 316.177 | |
| 8 | 825.613 | 330.427 | |

Factor of Safety
*** 1.629 ***

Individual data on the 15 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.5 | 16.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 17.0 | 15264.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 2.2 | 4110.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 13.9 | 36264.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 1.4 | 4567.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 8.5 | 29366.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 17.0 | 61238.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 45.0 | 190985.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 31.0 | 158427.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 7.7 | 42141.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 3.3 | 17516.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 10.3 | 46006.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 4.6 | 16091.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 6.0 | 14684.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 10.6 | 9670.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.629 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.629 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.629 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |



| | | |
|---|---|---|
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.629 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.629 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.629 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

Factor of Safety
*** 1.629 ***

Failure Surface Specified By 8 Coordinate Points

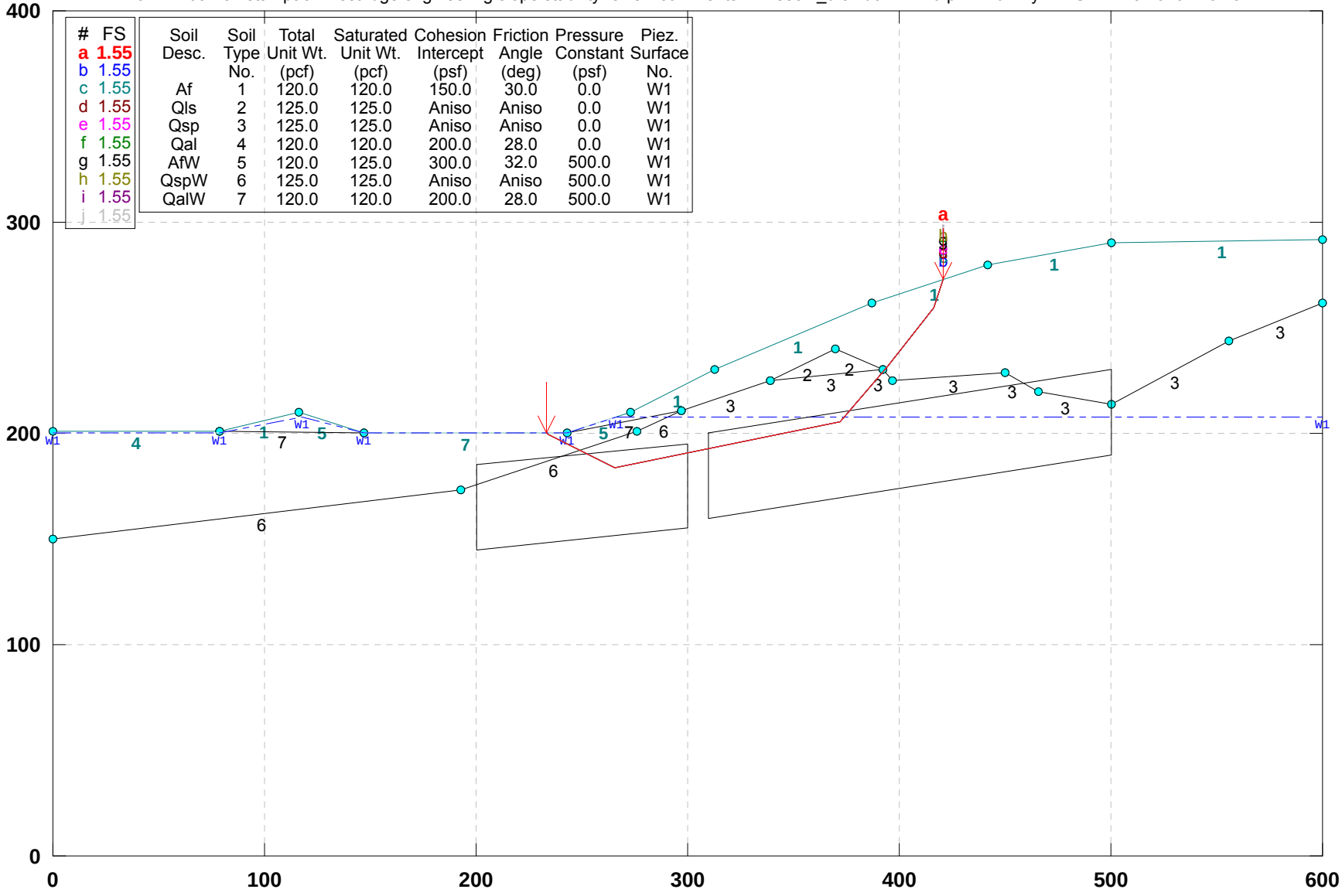
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 646.529 | 286.476 |
| 2 | 647.025 | 286.034 |
| 3 | 663.993 | 275.447 |
| 4 | 681.479 | 265.740 |
| 5 | 790.726 | 284.624 |
| 6 | 804.352 | 299.263 |
| 7 | 815.026 | 316.177 |
| 8 | 825.613 | 330.427 |

```
 Factor of Safety
***     1.629    ***
    **** END OF GSTABL7 OUTPUT ****
```

#14 Drawdown

# Westridge/14057-01/Sec 1-1'/ 4-4-16 Design - Lower Basin Cut Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#14 sec 1_drawdown\x1rd.pl2 Run By: KMS 11/28/2016 10:45AM




| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | Aniso | Aniso | 0.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | 0.0 | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.0 | W1 |
| AfW | 5 | 120.0 | 125.0 | 300.0 | 32.0 | 500.0 | W1 |
| QspW | 6 | 125.0 | 125.0 | Aniso | Aniso | 500.0 | W1 |
| QalW | 7 | 120.0 | 120.0 | 200.0 | 28.0 | 500.0 | W1 |

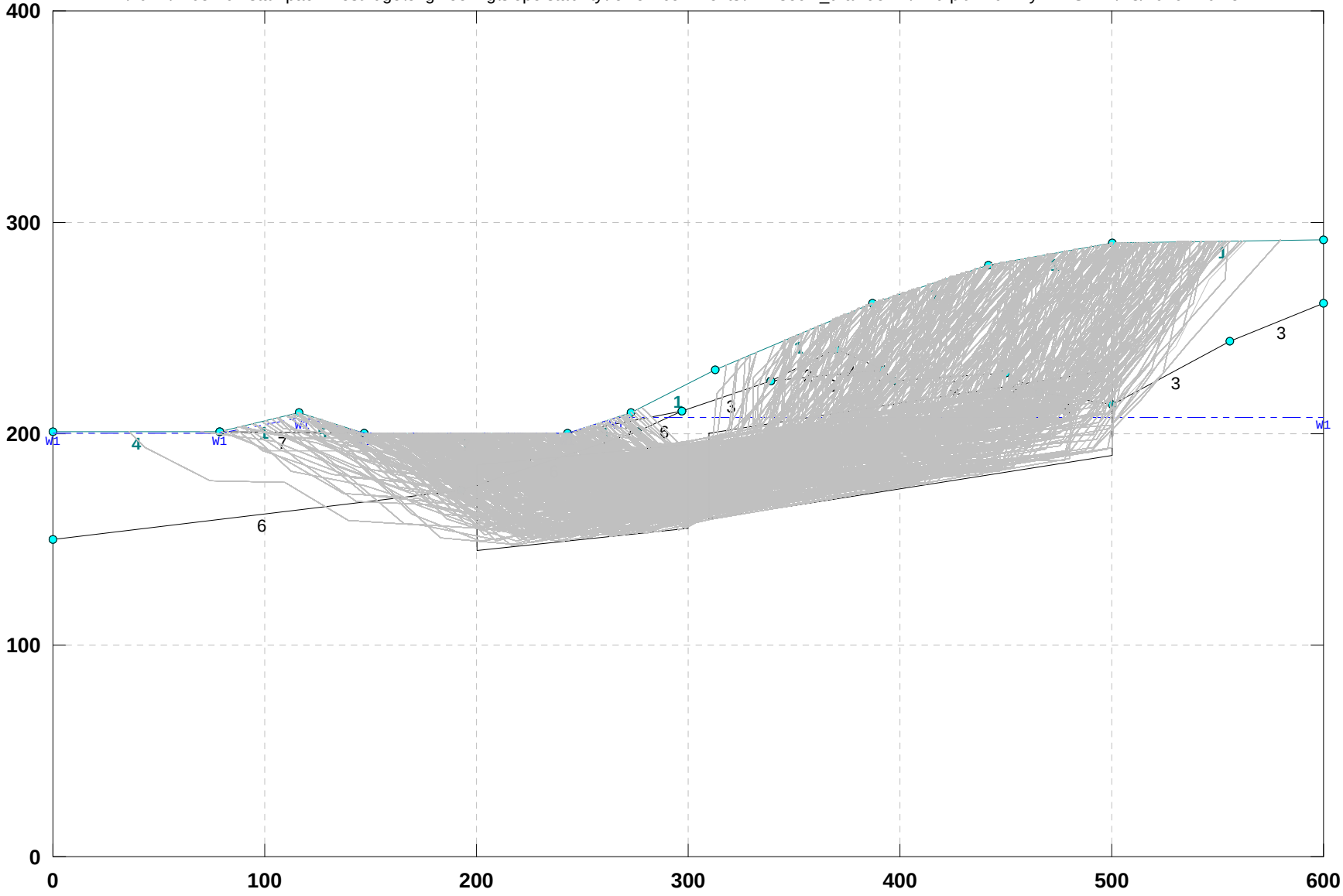
**GSTABL7 v.2 FSmin=1.55**

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

#14 Drawdown

# Westridge/14057-01/Sec 1-1'/ 4-4-16 Design - Lower Basin Cut Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#14 sec 1_drawdown\x1rd.plt Run By: KMS 11/28/2016 10:45AM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 11/28/2016
Time of Run: 10:45AM
Run By: KMS
Input Data Filename: z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#14 Sec 1_drawdown\x1rd.in
Output Filename: z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#14 Sec 1_drawdown\x1rd.OUT
Unit System: English
Plotted Output Filename: z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#14 Sec 1_drawdown\x1rd.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ 4-4-16
Design - Lower Basin Cut Slope - Static

BOUNDARY COORDINATES
10 Top Boundaries
25 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 201.00 | 79.00 | 201.00 | 4 |
| 2 | 79.00 | 201.00 | 116.00 | 210.00 | 1 |
| 3 | 116.00 | 210.00 | 147.00 | 200.00 | 5 |
| 4 | 147.00 | 200.00 | 243.00 | 200.00 | 7 |
| 5 | 243.00 | 200.00 | 273.00 | 210.00 | 5 |
| 6 | 273.00 | 210.00 | 313.00 | 230.00 | 1 |
| 7 | 313.00 | 230.00 | 387.00 | 262.00 | 1 |
| 8 | 387.00 | 262.00 | 442.00 | 280.00 | 1 |
| 9 | 442.00 | 280.00 | 500.00 | 290.00 | 1 |
| 10 | 500.00 | 290.00 | 600.00 | 292.00 | 1 |
| 11 | 79.00 | 201.00 | 147.00 | 200.00 | 7 |
| 12 | 243.00 | 200.00 | 297.00 | 211.00 | 7 |
| 13 | 0.00 | 150.00 | 193.00 | 173.00 | 6 |
| 14 | 193.00 | 173.00 | 276.00 | 201.00 | 6 |
| 15 | 276.00 | 201.00 | 297.00 | 211.00 | 6 |
| 16 | 297.00 | 211.00 | 339.00 | 225.00 | 3 |
| 17 | 339.00 | 225.00 | 370.00 | 240.00 | 2 |
| 18 | 370.00 | 240.00 | 392.00 | 230.00 | 2 |
| 19 | 392.00 | 230.00 | 397.00 | 225.00 | 3 |
| 20 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 21 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 22 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 23 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 24 | 556.00 | 244.00 | 600.00 | 262.00 | 3 |
| 25 | 339.00 | 225.00 | 392.00 | 230.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
7 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |
| 5 | 120.0 | 125.0 | 300.0 | 32.0 | 0.00 | 500.0 | 1 |
| 6 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 500.0 | 1 |
| 7 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 500.0 | 1 |



ANISOTROPIC STRENGTH PARAMETERS
3 soil type(s)

Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 200.00 | 24.00 |
| 2 | 10.0 | 0.00 | 8.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

Soil Type 6 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 7 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 200.00 |
| 2 | 79.00 | 200.00 |
| 3 | 118.00 | 208.00 |
| 4 | 147.00 | 200.00 |
| 5 | 243.00 | 200.00 |
| 6 | 266.00 | 208.00 |
| 7 | 600.00 | 208.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 35.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 200.00 | 165.00 | 300.00 | 175.00 | 40.00 |
| 2 | 310.00 | 180.00 | 500.00 | 210.00 | 40.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 9999
Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.
Failure Surface Specified By 7 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Factor of Safety
*** 1.553 ***

Individual data on the 21 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.6 | 9.3 | 0.0 | 314.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 8.9 | 2710.9 | 0.0 | 6567.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 6.3 | 5630.0 | 0.0 | 6656.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 16.0 | 33017.0 | 0.0 | 27083.2 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 0.7 | 2036.4 | 0.0 | 1365.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 7.0 | 20866.3 | 0.0 | 13964.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.0 | 9236.4 | 0.0 | 5789.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 6.3 | 20378.4 | 0.0 | 11727.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 8.4 | 29661.9 | 0.0 | 14951.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 6.3 | 23885.0 | 0.0 | 10574.2 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 16.0 | 67147.3 | 0.0 | 16371.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 26.0 | 126117.2 | 0.0 | 19508.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 31.0 | 175516.0 | 0.0 | 11779.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 1.6 | 10027.6 | 0.0 | 274.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 2.2 | 13006.4 | 0.0 | 252.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 13.2 | 70363.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 5.0 | 22194.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 0.5 | 2101.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 2.1 | 8494.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 21.9 | 59315.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 4.3 | 3254.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Factor of Safety
*** 1.553 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Factor of Safety
*** 1.553 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Factor of Safety



*** 1.553 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Factor of Safety
*** 1.553 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Factor of Safety
*** 1.553 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Factor of Safety
*** 1.553 ***

Failure Surface Specified By 7 Coordinate Points

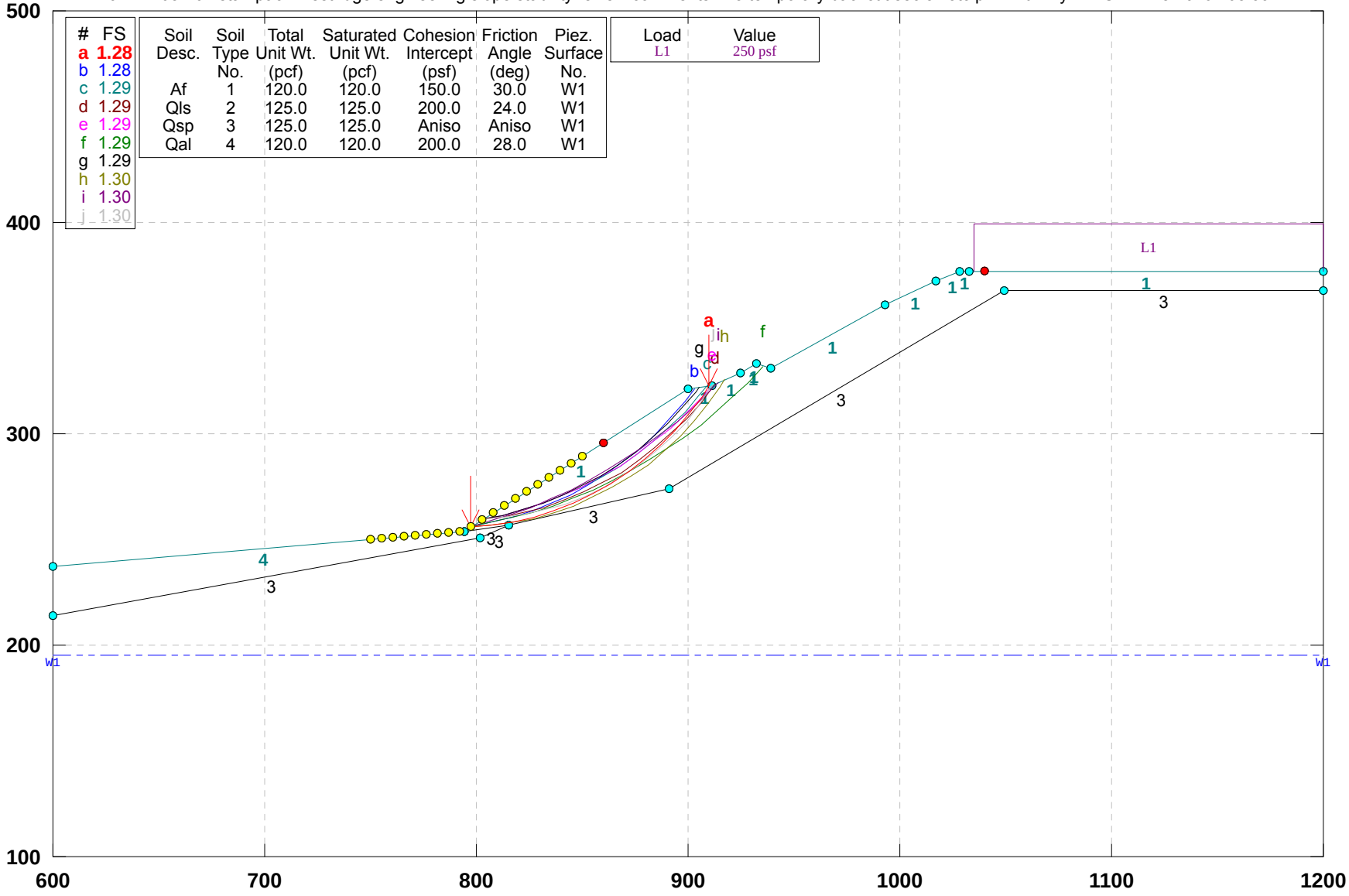
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |

```
7        420.909      273.098
   Factor of Safety
  ***    1.553   ***
      **** END OF GSTABL7 OUTPUT ****
```

#15 Temp Backcut

# Westridge/14057-01/Sec 5-5'/Temp Backcut Analysis/1.6H:1V

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#15 temporary backcut\sec 5\x5tc.pl2 Run By: KMS 11/18/2016 08:39AM




**GSTABL7 v.2 FSmin=1.28**

**Safety Factors Are Calculated By The Modified Bishop Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 11/18/2016
Time of Run: 08:39AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 5\x5tc.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 5\x5tc.OUT
**Unit System: English**
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 5\x5tc.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 5-5'/Temp
Backcut Analysis/1.6H:1V

BOUNDARY COORDINATES
11 Top Boundaries
17 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 600.00 | 237.00 | 794.00 | 254.00 | 4 |
| 2 | 794.00 | 254.00 | 900.00 | 321.00 | 1 |
| 3 | 900.00 | 321.00 | 911.00 | 323.00 | 1 |
| 4 | 911.00 | 323.00 | 925.00 | 329.00 | 1 |
| 5 | 925.00 | 329.00 | 932.00 | 333.00 | 1 |
| 6 | 932.00 | 333.00 | 939.00 | 331.00 | 1 |
| 7 | 939.00 | 331.00 | 993.00 | 361.00 | 1 |
| 8 | 993.00 | 361.00 | 1017.00 | 372.00 | 1 |
| 9 | 1017.00 | 372.00 | 1028.00 | 377.00 | 1 |
| 10 | 1028.00 | 377.00 | 1033.00 | 377.00 | 1 |
| 11 | 1033.00 | 377.00 | 1200.00 | 377.00 | 1 |
| 12 | 794.00 | 254.00 | 815.00 | 257.00 | 3 |
| 13 | 815.00 | 257.00 | 891.00 | 274.00 | 3 |
| 14 | 891.00 | 274.00 | 1049.00 | 368.00 | 3 |
| 15 | 1049.00 | 368.00 | 1200.00 | 368.00 | 3 |
| 16 | 600.00 | 214.00 | 802.00 | 251.00 | 3 |
| 17 | 802.00 | 251.00 | 815.00 | 257.00 | 3 |

User Specified Y-Origin = 100.00(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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 22.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

ANISOTROPIC SOIL NOTES:



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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 600.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1035.00 | 1200.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
250 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 750.00(ft)
and X = 850.00(ft)
Each Surface Terminates Between X = 860.00(ft)
and X =1040.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
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 = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 6.298 FS Min = 1.282 FS Ave = 1.929
Standard Deviation = 0.364 Coefficient of Variation = 18.86 %
Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.335 | 256.948 |
| 3 | 817.217 | 258.483 |
| 4 | 826.962 | 260.726 |
| 5 | 836.520 | 263.666 |
| 6 | 845.841 | 267.287 |
| 7 | 854.877 | 271.570 |
| 8 | 863.581 | 276.494 |
| 9 | 871.907 | 282.033 |
| 10 | 879.813 | 288.157 |
| 11 | 887.256 | 294.835 |
| 12 | 894.199 | 302.032 |
| 13 | 900.604 | 309.711 |
| 14 | 906.440 | 317.832 |
| 15 | 909.441 | 322.717 |

Circle Center At X = 791.010 ; Y = 394.623 ; and Radius = 138.639
Factor of Safety
*** 1.282 ***
Individual data on the 15 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.0 | 3277.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 9.9 | 9292.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.7 | 14208.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 9.6 | 17960.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 9.3 | 20520.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 9.0 | 21897.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 8.7 | 22139.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 8.3 | 21330.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 7.9 | 19586.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 7.4 | 17057.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 6.9 | 13917.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 5.8 | 9507.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 0.6 | 849.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 5.8 | 5510.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 3.0 | 781.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.207 | 257.922 |
| 3 | 816.911 | 260.336 |
| 4 | 826.443 | 263.360 |
| 5 | 835.763 | 266.983 |
| 6 | 844.835 | 271.190 |
| 7 | 853.622 | 275.965 |
| 8 | 862.088 | 281.287 |
| 9 | 870.199 | 287.136 |
| 10 | 877.923 | 293.488 |
| 11 | 885.228 | 300.317 |
| 12 | 892.085 | 307.595 |
| 13 | 898.466 | 315.295 |
| 14 | 903.012 | 321.548 |

Circle Center At X = 774.172 ; Y = 411.599 ; and Radius = 157.191

Factor of Safety

*** 1.283 ***

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.439 | 261.412 |
| 3 | 822.115 | 263.936 |
| 4 | 831.628 | 267.019 |
| 5 | 840.945 | 270.650 |
| 6 | 850.035 | 274.819 |
| 7 | 858.867 | 279.509 |
| 8 | 867.410 | 284.706 |
| 9 | 875.636 | 290.392 |
| 10 | 883.517 | 296.548 |
| 11 | 891.026 | 303.152 |
| 12 | 898.138 | 310.182 |
| 13 | 904.829 | 317.614 |
| 14 | 908.819 | 322.603 |

Circle Center At X = 774.146 ; Y = 428.211 ; and Radius = 171.143

Factor of Safety

*** 1.287 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.545 | 260.767 |
| 3 | 822.352 | 262.725 |
| 4 | 832.009 | 265.320 |
| 5 | 841.476 | 268.542 |
| 6 | 850.712 | 272.377 |
| 7 | 859.676 | 276.808 |
| 8 | 868.332 | 281.816 |
| 9 | 876.641 | 287.380 |
| 10 | 884.568 | 293.477 |
| 11 | 892.079 | 300.079 |
| 12 | 899.141 | 307.158 |
| 13 | 905.725 | 314.685 |
| 14 | 911.802 | 322.626 |
| 15 | 912.471 | 323.631 |



Circle Center At X = 787.577 ; Y = 411.392 ; and Radius = 152.681

Factor of Safety

*** 1.287 ***

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.414 | 261.530 |
| 3 | 822.070 | 264.133 |
| 4 | 831.569 | 267.257 |
| 5 | 840.885 | 270.893 |
| 6 | 849.988 | 275.031 |
| 7 | 858.854 | 279.657 |
| 8 | 867.455 | 284.759 |
| 9 | 875.765 | 290.321 |
| 10 | 883.761 | 296.327 |
| 11 | 891.418 | 302.759 |
| 12 | 898.714 | 309.598 |
| 13 | 905.627 | 316.823 |
| 14 | 910.911 | 322.984 |

Circle Center At X = 769.530 ; Y = 439.917 ; and Radius = 183.472

Factor of Safety

*** 1.288 ***

Failure Surface Specified By 18 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.198 | 257.970 |
| 3 | 816.941 | 260.223 |
| 4 | 826.580 | 262.886 |
| 5 | 836.098 | 265.953 |
| 6 | 845.478 | 269.419 |
| 7 | 854.703 | 273.278 |
| 8 | 863.757 | 277.523 |
| 9 | 872.624 | 282.147 |
| 10 | 881.288 | 287.140 |
| 11 | 889.734 | 292.495 |
| 12 | 897.946 | 298.201 |
| 13 | 905.910 | 304.249 |
| 14 | 913.611 | 310.628 |
| 15 | 921.036 | 317.326 |
| 16 | 928.172 | 324.332 |
| 17 | 935.006 | 331.632 |
| 18 | 935.358 | 332.041 |

Circle Center At X = 758.733 ; Y = 489.731 ; and Radius = 236.775

Factor of Safety

*** 1.294 ***

Failure Surface Specified By 14 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.426 | 261.473 |
| 3 | 822.080 | 264.082 |
| 4 | 831.557 | 267.274 |
| 5 | 840.822 | 271.036 |
| 6 | 849.841 | 275.355 |
| 7 | 858.581 | 280.215 |
| 8 | 867.009 | 285.597 |
| 9 | 875.094 | 291.482 |
| 10 | 882.806 | 297.848 |
| 11 | 890.116 | 304.672 |
| 12 | 896.998 | 311.927 |
| 13 | 903.425 | 319.588 |
| 14 | 905.166 | 321.939 |

Circle Center At X = 774.562 ; Y = 420.888 ; and Radius = 163.854

Factor of Safety

*** 1.294 ***

Failure Surface Specified By 16 Coordinate Points

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

| | | |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.351 | 256.725 |
| 3 | 817.268 | 258.012 |
| 4 | 827.071 | 259.984 |
| 5 | 836.715 | 262.632 |
| 6 | 846.151 | 265.942 |
| 7 | 855.335 | 269.899 |
| 8 | 864.222 | 274.483 |
| 9 | 872.770 | 279.673 |
| 10 | 880.937 | 285.443 |
| 11 | 888.684 | 291.766 |
| 12 | 895.974 | 298.611 |
| 13 | 902.772 | 305.945 |
| 14 | 909.044 | 313.734 |
| 15 | 914.761 | 321.939 |
| 16 | 916.912 | 325.534 |

Circle Center At X = 793.870 ; Y = 399.810 ; and Radius = 143.723

Factor of Safety

*** 1.296 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 797.369 | 256.129 |
| 2 | 807.001 | 258.814 |
| 3 | 816.518 | 261.885 |
| 4 | 825.904 | 265.336 |
| 5 | 835.143 | 269.163 |
| 6 | 844.220 | 273.359 |
| 7 | 853.121 | 277.916 |
| 8 | 861.831 | 282.828 |
| 9 | 870.337 | 288.087 |
| 10 | 878.624 | 293.685 |
| 11 | 886.678 | 299.611 |
| 12 | 894.488 | 305.857 |
| 13 | 902.040 | 312.412 |
| 14 | 909.321 | 319.266 |
| 15 | 914.415 | 324.464 |

Circle Center At X = 735.529 ; Y = 496.604 ; and Radius = 248.299

Factor of Safety

*** 1.297 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 802.632 | 259.456 |
| 2 | 812.604 | 260.203 |
| 3 | 822.492 | 261.693 |
| 4 | 832.242 | 263.917 |
| 5 | 841.798 | 266.865 |
| 6 | 851.106 | 270.518 |
| 7 | 860.116 | 274.856 |
| 8 | 868.777 | 279.856 |
| 9 | 877.039 | 285.489 |
| 10 | 884.858 | 291.724 |
| 11 | 892.188 | 298.525 |
| 12 | 898.990 | 305.856 |
| 13 | 905.225 | 313.674 |
| 14 | 910.858 | 321.936 |
| 15 | 911.628 | 323.269 |

Circle Center At X = 797.640 ; Y = 393.076 ; and Radius = 133.713

Factor of Safety

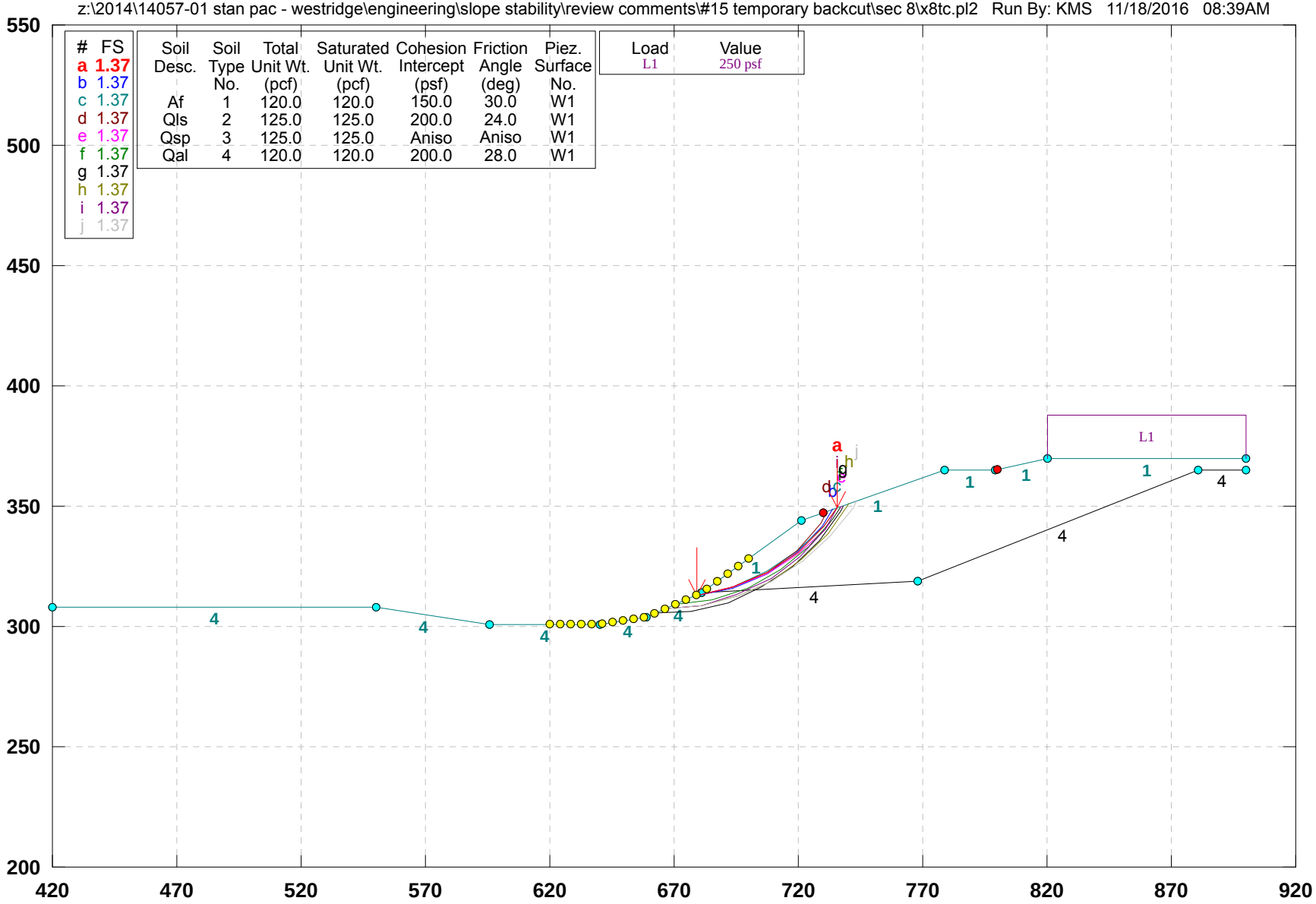
*** 1.298 ***

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

#15 Temp Backcut

# Westridge/14057-01/Sec 8-8'/Temp Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#15 temporary backcut\sec 8\x8tc.pl2 Run By: KMS 11/18/2016 08:39AM




**GSTABL7 v.2 FSmin=1.37**

**Safety Factors Are Calculated By The Modified Bishop Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:  11/18/2016
Time of Run:  08:39AM
**Run By:  KMS**
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 8\x8tc.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 8\x8tc.OUT
Unit System:  English
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 8\x8tc.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 8-8'/Temp Backcut Analysis

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 | 420.00 | 308.00 | 550.00 | 308.00 | 4 |
| 2 | 550.00 | 308.00 | 596.00 | 301.00 | 4 |
| 3 | 596.00 | 301.00 | 640.00 | 301.00 | 4 |
| 4 | 640.00 | 301.00 | 659.00 | 304.00 | 4 |
| 5 | 659.00 | 304.00 | 681.00 | 314.00 | 4 |
| 6 | 681.00 | 314.00 | 721.00 | 344.00 | 1 |
| 7 | 721.00 | 344.00 | 779.00 | 365.00 | 1 |
| 8 | 779.00 | 365.00 | 799.00 | 365.00 | 1 |
| 9 | 799.00 | 365.00 | 820.00 | 370.00 | 1 |
| 10 | 820.00 | 370.00 | 900.00 | 370.00 | 1 |
| 11 | 681.00 | 314.00 | 768.00 | 319.00 | 4 |
| 12 | 768.00 | 319.00 | 881.00 | 365.00 | 4 |
| 13 | 881.00 | 365.00 | 900.00 | 365.00 | 4 |

User Specified Y-Origin =  200.00(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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 0.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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



(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 820.00 | 900.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
250 Surface(s) Initiate(s) From Each Of  20 Points Equally Spaced
Along The Ground Surface Between  X = 620.00(ft)
and  X = 700.00(ft)
Each Surface Terminates Between  X = 730.00(ft)
and  X = 800.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =  0.00(ft)
15.00(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 =  5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max =  3.159  FS Min =  1.365  FS Ave =  1.917
Standard Deviation =  0.344  Coefficient of Variation =  17.94 %
Failure Surface Specified By  6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.615 | 316.208 |
| 3 | 707.394 | 322.135 |
| 4 | 719.762 | 330.622 |
| 5 | 730.248 | 341.348 |
| 6 | 735.385 | 349.208 |

Circle Center At X =  670.707 ; Y =  388.071 ; and Radius =  75.455
Factor of Safety
***  1.365  ***
Individual data on the  8  slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.1 | 60.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 3.1 | 505.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.5 | 5357.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 13.8 | 15637.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 12.4 | 17890.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 1.2 | 1824.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 9.2 | 10049.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 5.1 | 1849.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By  6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.679 | 315.889 |
| 3 | 707.460 | 321.812 |
| 4 | 719.645 | 330.560 |
| 5 | 729.665 | 341.723 |
| 6 | 733.516 | 348.532 |

Circle Center At X =  673.803 ; Y =  380.697 ; and Radius =  67.826
Factor of Safety
***  1.367  ***
Failure Surface Specified By  6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |

| | | |
|---|---|---|
| 2 | 693.521 | 316.615 |
| 3 | 707.222 | 322.722 |
| 4 | 719.603 | 331.191 |
| 5 | 730.262 | 341.745 |
| 6 | 735.506 | 349.252 |

Circle Center At X = 667.178 ; Y = 393.757 ; and Radius = 81.544

Factor of Safety

*** 1.367 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.614 | 316.212 |
| 3 | 707.240 | 322.483 |
| 4 | 719.169 | 331.577 |
| 5 | 728.826 | 343.055 |
| 6 | 731.246 | 347.710 |

Circle Center At X = 672.537 ; Y = 379.543 ; and Radius = 66.784

Factor of Safety

*** 1.367 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 678.947 | 313.067 |
| 2 | 693.633 | 316.123 |
| 3 | 707.484 | 321.880 |
| 4 | 720.009 | 330.134 |
| 5 | 730.763 | 340.591 |
| 6 | 737.272 | 349.891 |

Circle Center At X = 670.487 ; Y = 391.067 ; and Radius = 78.458

Factor of Safety

*** 1.367 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 670.526 | 309.239 |
| 2 | 685.388 | 311.269 |
| 3 | 699.618 | 316.014 |
| 4 | 712.724 | 323.310 |
| 5 | 724.254 | 332.905 |
| 6 | 733.809 | 344.467 |
| 7 | 736.688 | 349.680 |

Circle Center At X = 667.081 ; Y = 389.883 ; and Radius = 80.717

Factor of Safety

*** 1.368 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 662.105 | 305.411 |
| 2 | 677.070 | 306.432 |
| 3 | 691.618 | 310.089 |
| 4 | 705.287 | 316.266 |
| 5 | 717.645 | 324.768 |
| 6 | 728.301 | 335.324 |
| 7 | 736.918 | 347.602 |
| 8 | 738.121 | 350.199 |

Circle Center At X = 664.041 ; Y = 389.028 ; and Radius = 83.639

Factor of Safety

*** 1.368 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 666.316 | 307.325 |
| 2 | 681.255 | 308.675 |
| 3 | 695.723 | 312.634 |
| 4 | 709.268 | 319.079 |
| 5 | 721.466 | 327.808 |
| 6 | 731.936 | 338.550 |
| 7 | 740.351 | 350.967 |
| 8 | 740.372 | 351.014 |



Circle Center At X = 666.186 ; Y = 392.155 ; and Radius = 84.830

Factor of Safety

*** 1.369 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 666.316 | 307.325 |
| 2 | 681.240 | 308.834 |
| 3 | 695.619 | 313.105 |
| 4 | 708.947 | 319.987 |
| 5 | 720.755 | 329.237 |
| 6 | 730.627 | 340.531 |
| 7 | 735.804 | 349.360 |

Circle Center At X = 665.771 ; Y = 387.259 ; and Radius = 79.936

Factor of Safety

*** 1.370 ***

Failure Surface Specified By 8 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 666.316 | 307.325 |
| 2 | 681.248 | 308.749 |
| 3 | 695.746 | 312.598 |
| 4 | 709.417 | 318.770 |
| 5 | 721.893 | 327.097 |
| 6 | 732.837 | 337.355 |
| 7 | 741.954 | 349.267 |
| 8 | 743.482 | 352.140 |

Circle Center At X = 665.358 ; Y = 397.819 ; and Radius = 90.499

Factor of Safety

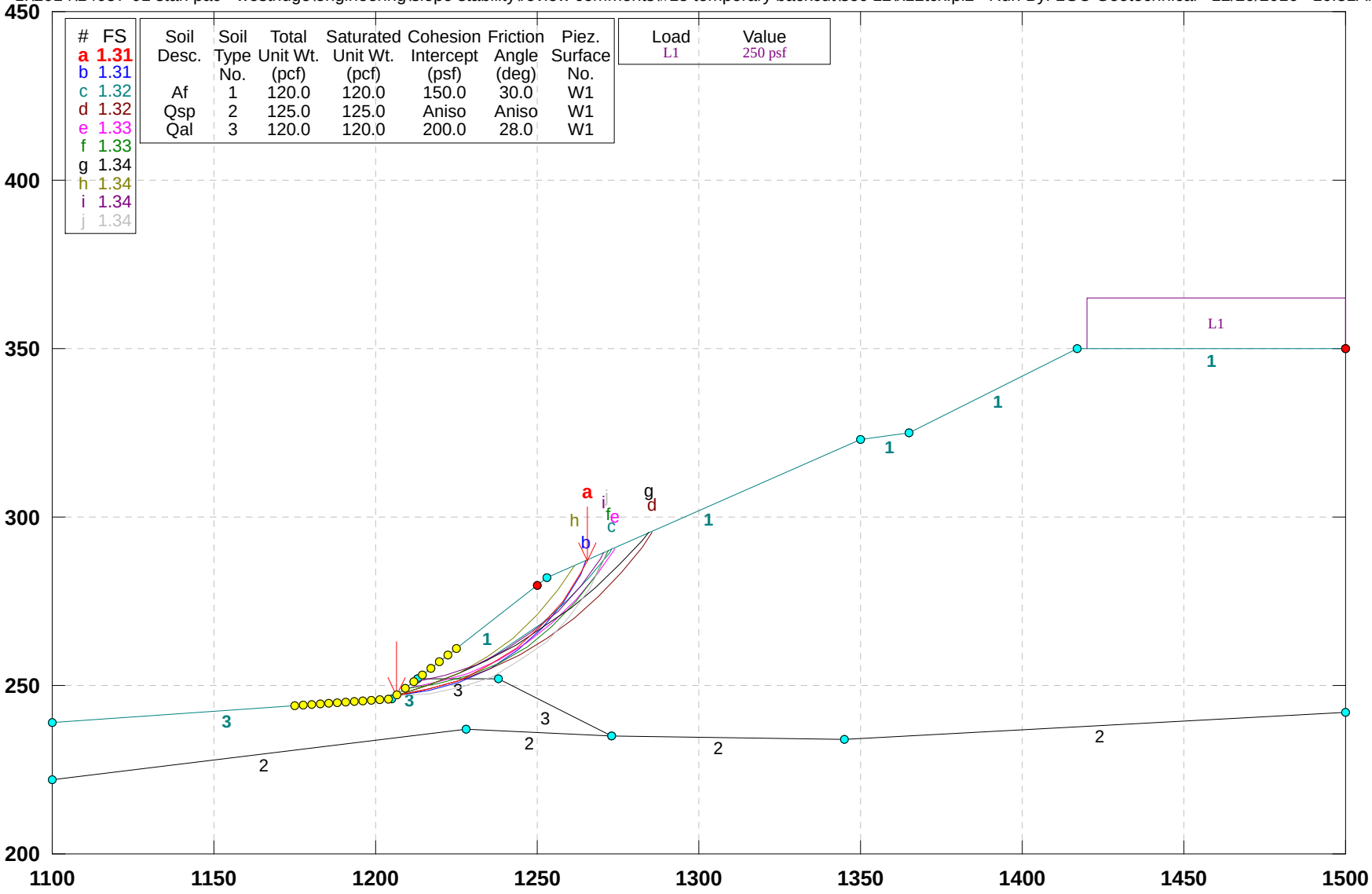
*** 1.370 ***

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

#15 Temp Backcut

# Westridge/14057-01/Sec 12'-12"/Temp Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#15 temporary backcut\sec 12\x12tcx.pl2 Run By: LGC Geotechnical 12/20/2016 10:31AM




**GSTABL7 v.2 FSmin=1.31**

**Safety Factors Are Calculated By The Modified Bishop Method**

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 12/20/2016
Time of Run: 10:31AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 12\x12tcx.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 12\x12tcx.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 12\x12tcx.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12'-12"/Temp Backcut Analysis

BOUNDARY COORDINATES
7 Top Boundaries
13 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 1100.00 | 239.00 | 1205.00 | 246.00 | 3 |
| 2 | 1205.00 | 246.00 | 1213.00 | 252.00 | 3 |
| 3 | 1213.00 | 252.00 | 1253.10 | 282.00 | 1 |
| 4 | 1253.10 | 282.00 | 1350.00 | 323.00 | 1 |
| 5 | 1350.00 | 323.00 | 1365.00 | 325.00 | 1 |
| 6 | 1365.00 | 325.00 | 1417.00 | 350.00 | 1 |
| 7 | 1417.00 | 350.00 | 1500.00 | 350.00 | 1 |
| 8 | 1213.00 | 252.00 | 1238.00 | 252.00 | 3 |
| 9 | 1238.00 | 252.00 | 1273.00 | 235.00 | 3 |
| 10 | 1273.00 | 235.00 | 1345.00 | 234.00 | 2 |
| 11 | 1345.00 | 234.00 | 1500.00 | 242.00 | 2 |
| 12 | 1100.00 | 222.00 | 1228.00 | 237.00 | 2 |
| 13 | 1228.00 | 237.00 | 1273.00 | 235.00 | 2 |

User Specified Y-Origin = 200.00(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 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 300.00 | 32.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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



C equal to zero, with water weight in the tension crack.

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1420.00 | 1500.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
5000 Trial Surfaces Have Been Generated.
250 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X =1175.00(ft)
and X =1225.00(ft)
Each Surface Terminates Between X =1250.00(ft)
and X =1500.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
10.00(ft) Line Segments Define Each Trial Failure Surface.
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 = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 3.666 FS Min = 1.306 FS Ave = 2.338
Standard Deviation = 0.622 Coefficient of Variation = 26.61 %
Failure Surface Specified By 9 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.453 | 248.769 |
| 3 | 1226.020 | 251.679 |
| 4 | 1235.104 | 255.860 |
| 5 | 1243.536 | 261.236 |
| 6 | 1251.161 | 267.706 |
| 7 | 1257.836 | 275.152 |
| 8 | 1263.440 | 283.434 |
| 9 | 1265.276 | 287.152 |

Circle Center At X = 1199.896 ; Y = 320.388 ; and Radius = 73.508
Factor of Safety
*** 1.306 ***
Individual data on the 11 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.4 | 1458.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 3.5 | 1988.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.6 | 9113.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 0.7 | 851.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 8.4 | 11541.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 8.4 | 13298.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 7.6 | 12101.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 1.9 | 2905.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 4.7 | 5963.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 5.6 | 3965.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 1.8 | 323.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 9 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1206.579 | 247.184 |
| 2 | 1216.505 | 248.402 |
| 3 | 1226.146 | 251.057 |
| 4 | 1235.296 | 255.091 |
| 5 | 1243.759 | 260.417 |
| 6 | 1251.354 | 266.923 |
| 7 | 1257.917 | 274.468 |
| 8 | 1263.308 | 282.890 |

```
    9       1265.214      287.126
Circle Center At X =  1203.245 ; Y =   315.400 ; and Radius =    68.297
      Factor of Safety
     ***    1.312   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1       1206.579      247.184
    2       1216.206      249.890
    3       1225.567      253.407
    4       1234.594      257.711
    5       1243.221      262.768
    6       1251.384      268.543
    7       1259.026      274.994
    8       1266.089      282.073
    9       1272.522      289.729
   10       1273.013      290.425
Circle Center At X =  1179.846 ; Y =   360.909 ; and Radius =   116.824
      Factor of Safety
     ***    1.318   ***
Failure Surface Specified By 11 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1       1206.579      247.184
    2       1216.430      248.905
    3       1226.091      251.487
    4       1235.487      254.910
    5       1244.544      259.148
    6       1253.193      264.168
    7       1261.365      269.931
    8       1268.998      276.392
    9       1276.032      283.500
   10       1282.412      291.200
   11       1285.529      295.721
Circle Center At X =  1192.021 ; Y =   359.597 ; and Radius =   113.351
      Factor of Safety
     ***    1.320   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1       1209.211      249.158
    2       1219.061      250.884
    3       1228.648      253.726
    4       1237.848      257.647
    5       1246.538      262.595
    6       1254.604      268.505
    7       1261.941      275.300
    8       1268.453      282.889
    9       1273.759      290.741
Circle Center At X =  1199.107 ; Y =   335.792 ; and Radius =    87.221
      Factor of Safety
     ***    1.325   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1       1209.211      249.158
    2       1219.137      250.371
    3       1228.815      252.886
    4       1238.076      256.659
    5       1246.757      261.623
    6       1254.705      267.692
    7       1261.780      274.759
    8       1267.858      282.700
    9       1272.057      290.021
Circle Center At X =  1205.045 ; Y =   324.486 ; and Radius =    75.443
      Factor of Safety
     ***    1.332   ***
Failure Surface Specified By 11 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
```

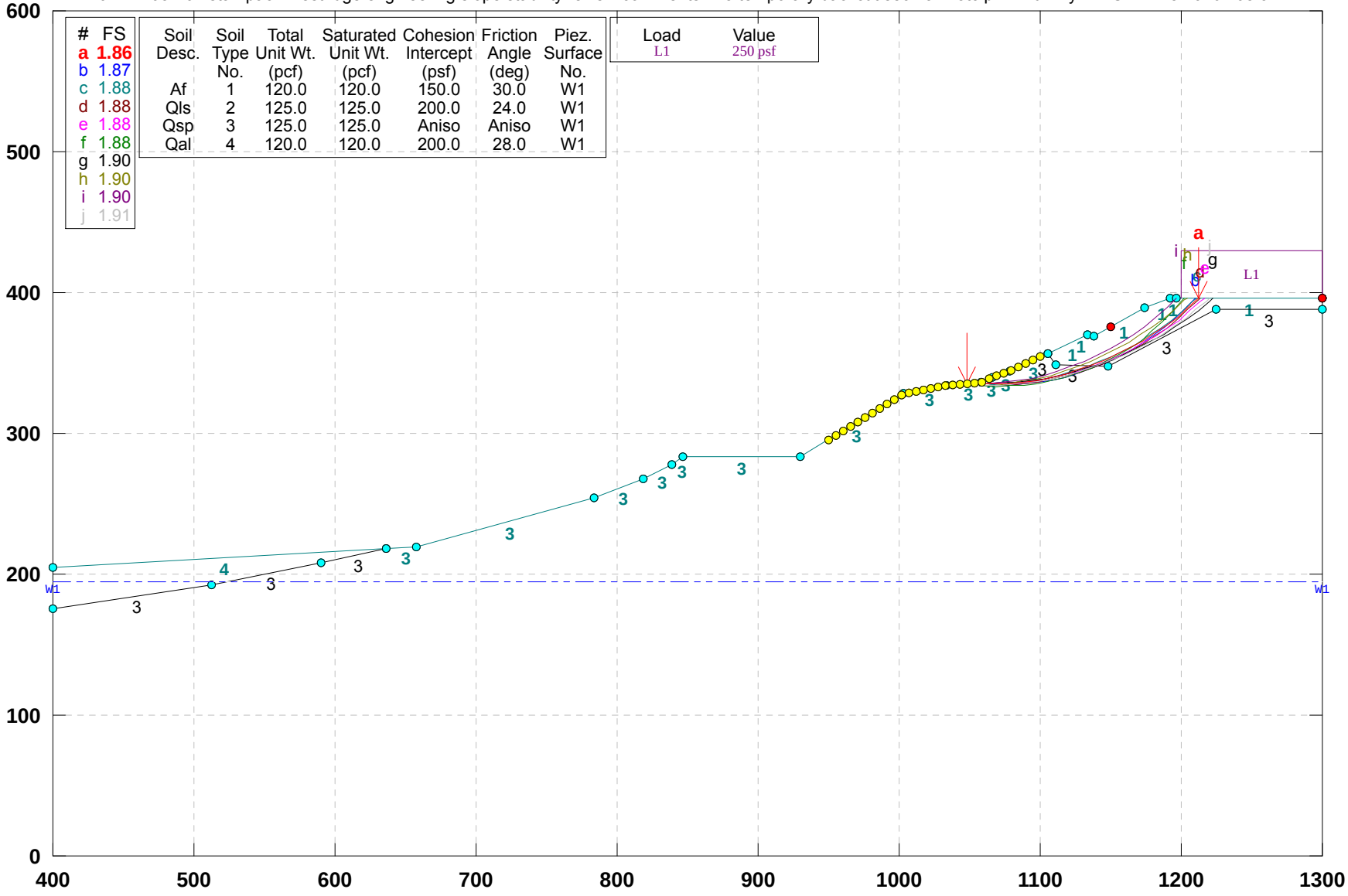


```
    1       1206.579      247.184
    2       1216.164      250.036
    3       1225.548      253.490
    4       1234.695      257.533
    5       1243.566      262.148
    6       1252.127      267.317
    7       1260.342      273.019
    8       1268.179      279.231
    9       1275.605      285.927
   10       1282.592      293.082
   11       1284.480      295.277
Circle Center At X =  1166.484 ; Y =   399.482 ; and Radius =   157.488
      Factor of Safety
     ***    1.335   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1       1206.579      247.184
    2       1216.225      249.823
    3       1225.499      253.563
    4       1234.277      258.354
    5       1242.439      264.131
    6       1249.876      270.816
    7       1256.487      278.319
    8       1261.502      285.555
Circle Center At X =  1188.870 ; Y =   331.027 ; and Radius =    85.692
      Factor of Safety
     ***    1.336   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1       1211.842      251.132
    2       1221.650      253.082
    3       1231.148      256.212
    4       1240.194      260.475
    5       1248.653      265.808
    6       1256.400      272.131
    7       1263.320      279.350
    8       1269.310      287.358
    9       1270.444      289.339
Circle Center At X =  1200.786 ; Y =   332.367 ; and Radius =    81.984
      Factor of Safety
     ***    1.336   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1       1206.579      247.184
    2       1216.573      247.543
    3       1226.402      249.383
    4       1235.849      252.661
    5       1244.705      257.307
    6       1252.772      263.216
    7       1259.872      270.258
    8       1265.847      278.277
    9       1270.565      287.094
   10       1271.528      289.797
Circle Center At X =  1209.280 ; Y =   313.871 ; and Radius =    66.742
      Factor of Safety
     ***    1.339   ***
         **** END OF GSTABL7 OUTPUT ****
```

#15 Temp Backcut

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#15 temporary backcut\sec 13\x13tc.pl2 Run By: KMS 11/18/2016 08:31AM




**GSTABL7 v.2 FSmin=1.86**

**Safety Factors Are Calculated By The Modified Bishop Method**

```
                                  ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                         SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        11/18/2016
    Time of Run:              08:31AM
    Run By:                   KMS
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ility\Review Comments\#15 Temporary backcut\Sec 13\x13tc.in
    Output Filename:          z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#15 Temporary backcut\Sec 13\x13tc.OUT
    Unit System:              English
    Plotted Output Filename:  z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#15 Temporary backcut\Sec 13\x13tc.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 13-13'/
                          Temp Backcut Analysis
    BOUNDARY COORDINATES
       19 Top   Boundaries
       26 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)    Below Bnd
        1        400.00     205.00     636.00     218.00        4
        2        636.00     218.00     658.00     219.00        3
        3        658.00     219.00     784.00     254.00        3
        4        784.00     254.00     818.00     268.00        3
        5        818.00     268.00     839.00     278.00        3
        6        839.00     278.00     847.00     284.00        3
        7        847.00     284.00     930.00     283.00        3
        8        930.00     283.00    1003.00     328.00        3
        9       1003.00     328.00    1033.00     334.00        3
       10       1033.00     334.00    1058.00     336.00        3
       11       1058.00     336.00    1066.00     340.00        3
       12       1066.00     340.00    1078.00     344.00        3
       13       1078.00     344.00    1105.00     357.00        3
       14       1105.00     357.00    1134.00     370.00        1
       15       1134.00     370.00    1138.00     369.00        1
       16       1138.00     369.00    1174.00     389.00        1
       17       1174.00     389.00    1192.00     396.00        1
       18       1192.00     396.00    1196.00     396.00        1
       19       1196.00     396.00    1300.00     396.00        1
       20        400.00     176.00     513.00     192.00        3
       21        513.00     192.00     590.00     208.00        3
       22        590.00     208.00     636.00     218.00        3
       23       1105.00     357.00    1111.00     349.00        3
       24       1111.00     349.00    1148.00     348.00        3
       25       1148.00     348.00    1225.00     388.00        3
       26       1225.00     388.00    1300.00     388.00        3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
```



```
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             300.00         32.00
        2             12.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    1 PIEZOMETRIC SURFACE(S) SPECIFIED
    Unit Weight of Water =  62.40 (pcf)
    Piezometric Surface No.  1 Specified by  2 Coordinate Points
    Pore Pressure Inclination Factor =  0.50
      Point      X-Water     Y-Water
       No.         (ft)        (ft)
        1        400.00      195.00
        2       1300.00      195.00
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)          (deg)
      1        1200.00      1300.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    EARTHQUAKE DATA HAS BEEN SUPPRESSED
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Circular Surfaces, Has Been Specified.
    7500 Trial Surfaces Have Been Generated.
     250 Surface(s) Initiate(s) From Each Of    30 Points Equally Spaced
    Along The Ground Surface Between  X = 950.00(ft)
                                  and  X =1100.00(ft)
    Each Surface Terminates Between   X =1150.00(ft)
                                  and   X =1300.00(ft)
    Unless Further Limitations Were Imposed, The Minimum Elevation
    At Which A Surface Extends Is  Y =      0.00(ft)
    10.00(ft) Line Segments Define Each Trial Failure Surface.
    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 =     0
          Number of Trial Surfaces With Valid FS =    0
          Statistical Data On All Valid FS Values:
             FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
             Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
          Failure Surface Specified By 19 Coordinate Points
            Point      X-Surf      Y-Surf
             No.         (ft)        (ft)
              1       1048.276      335.222
              2       1058.269      334.861
              3       1068.269      334.961
              4       1078.253      335.522
              5       1088.201      336.544
              6       1098.091      338.023
              7       1107.902      339.957
              8       1117.614      342.341
              9       1127.205      345.171
             10       1136.655      348.440
             11       1145.945      352.142
             12       1155.054      356.268
```

| | | | |
|---|---|---|---|
| 13 | 1163.963 | 360.810 | |
| 14 | 1172.653 | 365.759 | |
| 15 | 1181.105 | 371.103 | |
| 16 | 1189.302 | 376.831 | |
| 17 | 1197.226 | 382.931 | |
| 18 | 1204.860 | 389.390 | |
| 19 | 1211.978 | 396.000 | |

Circle Center At X = 1061.099 ; Y = 551.556 ; and Radius = 216.713
Factor of Safety
*** 1.862 ***
Individual data on the 0 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Top Force (lbs) | Water Bot Force (lbs) | Tie Norm Force (lbs) | Tie Tan Force (lbs) | Earthquake Hor Force (lbs) | Ver Force (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|

Failure Surface Specified By 19 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1048.276 | 335.222 |
| 2 | 1058.239 | 334.363 |
| 3 | 1068.233 | 334.029 |
| 4 | 1078.231 | 334.220 |
| 5 | 1088.206 | 334.935 |
| 6 | 1098.129 | 336.173 |
| 7 | 1107.973 | 337.930 |
| 8 | 1117.712 | 340.202 |
| 9 | 1127.318 | 342.981 |
| 10 | 1136.764 | 346.261 |
| 11 | 1146.026 | 350.033 |
| 12 | 1155.077 | 354.285 |
| 13 | 1163.892 | 359.007 |
| 14 | 1172.447 | 364.185 |
| 15 | 1180.718 | 369.805 |
| 16 | 1188.683 | 375.852 |
| 17 | 1196.319 | 382.308 |
| 18 | 1203.606 | 389.156 |
| 19 | 1210.162 | 396.000 |

Circle Center At X = 1069.603 ; Y = 524.444 ; and Radius = 190.420
Factor of Safety
*** 1.874 ***
Failure Surface Specified By 20 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1043.103 | 334.808 |
| 2 | 1053.093 | 334.347 |
| 3 | 1063.093 | 334.340 |
| 4 | 1073.083 | 334.789 |
| 5 | 1083.042 | 335.691 |
| 6 | 1092.950 | 337.045 |
| 7 | 1102.786 | 338.849 |
| 8 | 1112.530 | 341.099 |
| 9 | 1122.161 | 343.789 |
| 10 | 1131.660 | 346.914 |
| 11 | 1141.007 | 350.469 |
| 12 | 1150.182 | 354.445 |
| 13 | 1159.168 | 358.834 |
| 14 | 1167.944 | 363.628 |
| 15 | 1176.493 | 368.816 |
| 16 | 1184.797 | 374.387 |
| 17 | 1192.839 | 380.330 |
| 18 | 1200.603 | 386.633 |
| 19 | 1208.072 | 393.283 |
| 20 | 1210.857 | 396.000 |

Circle Center At X = 1058.279 ; Y = 553.744 ; and Radius = 219.461
Factor of Safety
*** 1.876 ***
Failure Surface Specified By 20 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1048.276 | 335.222 |



| | | |
|---|---|---|
| 2 | 1058.247 | 334.461 |
| 3 | 1068.243 | 334.199 |
| 4 | 1078.240 | 334.439 |
| 5 | 1088.213 | 335.179 |
| 6 | 1098.136 | 336.417 |
| 7 | 1107.984 | 338.151 |
| 8 | 1117.734 | 340.376 |
| 9 | 1127.360 | 343.085 |
| 10 | 1136.838 | 346.274 |
| 11 | 1146.144 | 349.933 |
| 12 | 1155.256 | 354.053 |
| 13 | 1164.150 | 358.625 |
| 14 | 1172.804 | 363.636 |
| 15 | 1181.196 | 369.074 |
| 16 | 1189.305 | 374.926 |
| 17 | 1197.111 | 381.176 |
| 18 | 1204.594 | 387.809 |
| 19 | 1211.736 | 394.809 |
| 20 | 1212.836 | 396.000 |

Circle Center At X = 1068.479 ; Y = 533.687 ; and Radius = 199.491
Factor of Safety
*** 1.877 ***
Failure Surface Specified By 20 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1048.276 | 335.222 |
| 2 | 1058.267 | 334.809 |
| 3 | 1068.267 | 334.841 |
| 4 | 1078.256 | 335.320 |
| 5 | 1088.213 | 336.244 |
| 6 | 1098.119 | 337.611 |
| 7 | 1107.954 | 339.418 |
| 8 | 1117.699 | 341.662 |
| 9 | 1127.334 | 344.339 |
| 10 | 1136.841 | 347.443 |
| 11 | 1146.199 | 350.967 |
| 12 | 1155.391 | 354.906 |
| 13 | 1164.398 | 359.250 |
| 14 | 1173.202 | 363.992 |
| 15 | 1181.786 | 369.122 |
| 16 | 1190.132 | 374.630 |
| 17 | 1198.225 | 380.504 |
| 18 | 1206.048 | 386.734 |
| 19 | 1213.585 | 393.306 |
| 20 | 1216.410 | 396.000 |

Circle Center At X = 1062.577 ; Y = 558.608 ; and Radius = 223.843
Factor of Safety
*** 1.879 ***
Failure Surface Specified By 19 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1048.276 | 335.222 |
| 2 | 1058.210 | 334.076 |
| 3 | 1068.195 | 333.530 |
| 4 | 1078.195 | 333.584 |
| 5 | 1088.173 | 334.240 |
| 6 | 1098.094 | 335.495 |
| 7 | 1107.922 | 337.344 |
| 8 | 1117.621 | 339.780 |
| 9 | 1127.155 | 342.795 |
| 10 | 1136.492 | 346.378 |
| 11 | 1145.595 | 350.515 |
| 12 | 1154.434 | 355.193 |
| 13 | 1162.975 | 360.393 |
| 14 | 1171.189 | 366.098 |
| 15 | 1179.044 | 372.286 |
| 16 | 1186.513 | 378.935 |
| 17 | 1193.569 | 386.021 |
| 18 | 1200.187 | 393.518 |
| 19 | 1202.124 | 396.000 |

Circle Center At X = 1072.285 ; Y = 499.733 ; and Radius = 166.253
Factor of Safety
*** 1.882 ***
Failure Surface Specified By 20 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1053.448 | 335.636 |
| 2 | 1063.448 | 335.526 |
| 3 | 1073.443 | 335.822 |
| 4 | 1083.419 | 336.523 |
| 5 | 1093.357 | 337.627 |
| 6 | 1103.243 | 339.133 |
| 7 | 1113.060 | 341.039 |
| 8 | 1122.792 | 343.341 |
| 9 | 1132.422 | 346.035 |
| 10 | 1141.935 | 349.117 |
| 11 | 1151.315 | 352.583 |
| 12 | 1160.547 | 356.425 |
| 13 | 1169.616 | 360.639 |
| 14 | 1178.507 | 365.217 |
| 15 | 1187.205 | 370.151 |
| 16 | 1195.696 | 375.433 |
| 17 | 1203.966 | 381.056 |
| 18 | 1212.001 | 387.009 |
| 19 | 1219.788 | 393.282 |
| 20 | 1222.895 | 396.000 |

Circle Center At X = 1061.201 ; Y = 581.880 ; and Radius = 246.366
Factor of Safety
*** 1.895 ***
Failure Surface Specified By 20 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1037.931 | 334.394 |
| 2 | 1047.925 | 334.037 |
| 3 | 1057.924 | 334.134 |
| 4 | 1067.909 | 334.684 |
| 5 | 1077.859 | 335.688 |
| 6 | 1087.752 | 337.143 |
| 7 | 1097.570 | 339.045 |
| 8 | 1107.290 | 341.391 |
| 9 | 1116.895 | 344.177 |
| 10 | 1126.363 | 347.395 |
| 11 | 1135.674 | 351.041 |
| 12 | 1144.811 | 355.105 |
| 13 | 1153.754 | 359.580 |
| 14 | 1162.484 | 364.457 |
| 15 | 1170.984 | 369.725 |
| 16 | 1179.236 | 375.374 |
| 17 | 1187.222 | 381.392 |
| 18 | 1194.927 | 387.766 |
| 19 | 1202.335 | 394.484 |
| 20 | 1203.861 | 396.000 |

Circle Center At X = 1050.829 ; Y = 553.918 ; and Radius = 219.903
Factor of Safety
*** 1.896 ***
Failure Surface Specified By 19 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1043.103 | 334.808 |
| 2 | 1053.102 | 334.657 |
| 3 | 1063.097 | 334.997 |
| 4 | 1073.062 | 335.826 |
| 5 | 1082.975 | 337.144 |
| 6 | 1092.811 | 338.946 |
| 7 | 1102.547 | 341.229 |
| 8 | 1112.160 | 343.987 |
| 9 | 1121.625 | 347.212 |
| 10 | 1130.921 | 350.899 |
| 11 | 1140.024 | 355.037 |
| 12 | 1148.914 | 359.617 |



| | | |
|---|---|---|
| 13 | 1157.568 | 364.627 |
| 14 | 1165.966 | 370.056 |
| 15 | 1174.088 | 375.890 |
| 16 | 1181.913 | 382.116 |
| 17 | 1189.424 | 388.718 |
| 18 | 1196.602 | 395.681 |
| 19 | 1196.900 | 396.000 |

Circle Center At X = 1051.181 ; Y = 538.409 ; and Radius = 203.761
Factor of Safety
*** 1.902 ***
Failure Surface Specified By 21 Coordinate Points

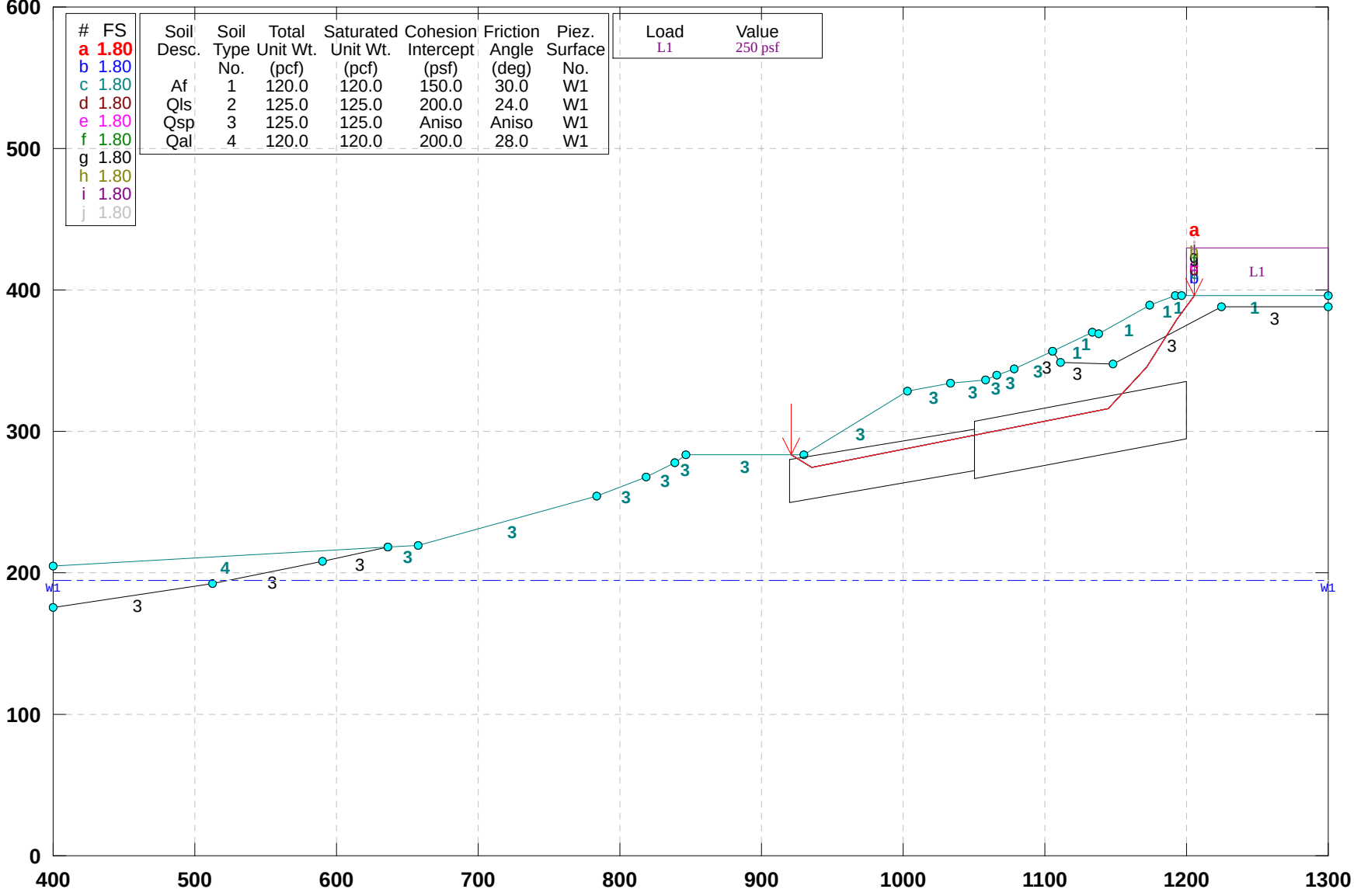
| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 1043.103 | 334.808 |
| 2 | 1053.087 | 334.244 |
| 3 | 1063.086 | 334.106 |
| 4 | 1073.082 | 334.394 |
| 5 | 1083.057 | 335.109 |
| 6 | 1092.991 | 336.249 |
| 7 | 1102.869 | 337.812 |
| 8 | 1112.670 | 339.795 |
| 9 | 1122.378 | 342.195 |
| 10 | 1131.974 | 345.006 |
| 11 | 1141.442 | 348.225 |
| 12 | 1150.764 | 351.844 |
| 13 | 1159.923 | 355.858 |
| 14 | 1168.903 | 360.260 |
| 15 | 1177.686 | 365.040 |
| 16 | 1186.257 | 370.191 |
| 17 | 1194.601 | 375.703 |
| 18 | 1202.702 | 381.566 |
| 19 | 1210.545 | 387.769 |
| 20 | 1218.117 | 394.302 |
| 21 | 1219.923 | 396.000 |

Circle Center At X = 1061.321 ; Y = 568.384 ; and Radius = 234.285
Factor of Safety
*** 1.908 ***
**** END OF GSTABL7 OUTPUT ****

#15 Temp Backcut

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#15 temporary backcut\sec 13\x13tcbx.pl2 Run By: LGC Geotechnical 12/20/2016 11:07AM




**GSTABL7 v.2 FSmin=1.80**

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

#15 Temp Backcut

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis

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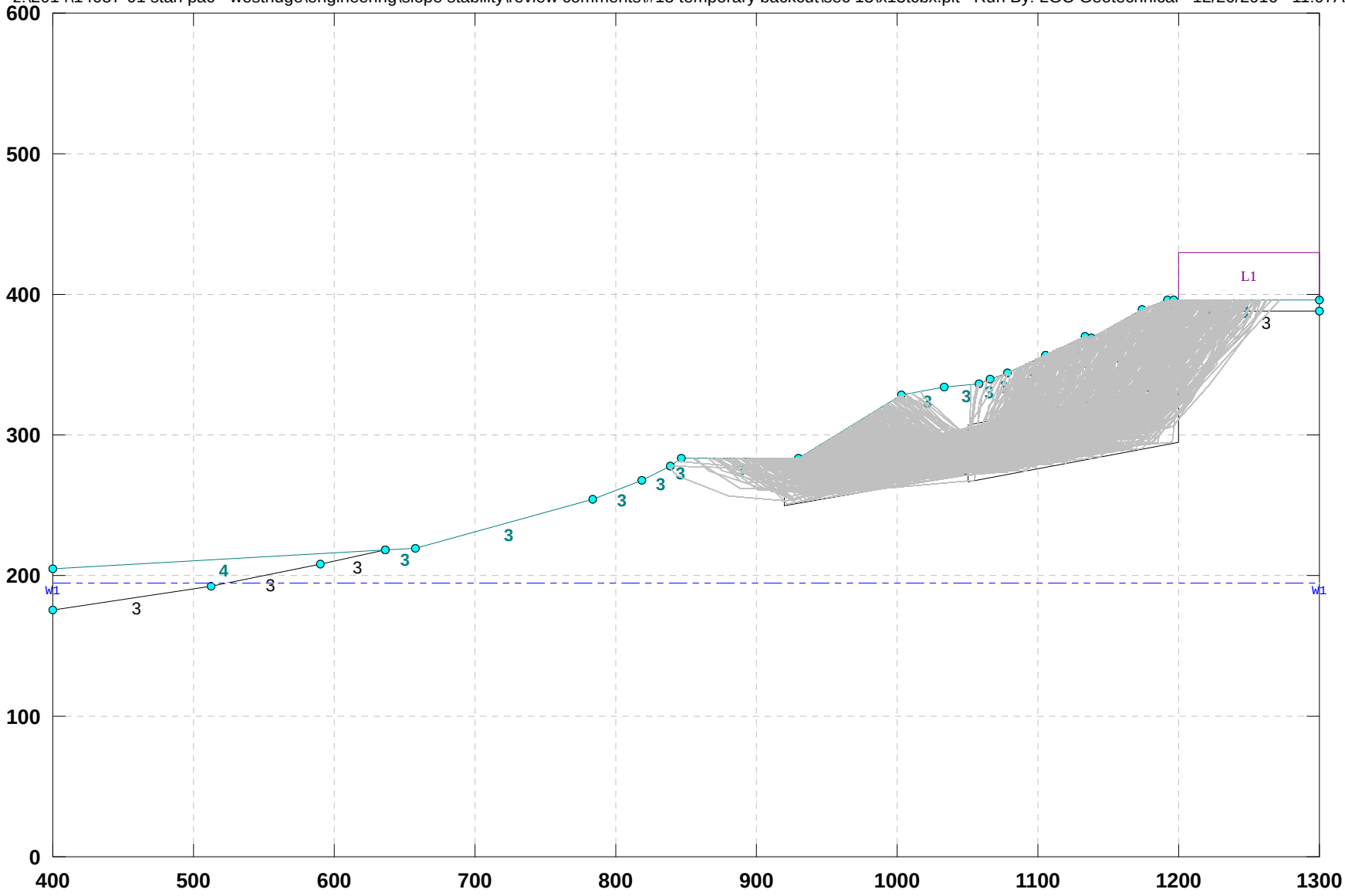

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 12/20/2016
Time of Run: 11:07AM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 13\x13tcbx.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 13\x13tcbx.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#15 Temporary backcut\Sec 13\x13tcbx.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 13-13'/
Temp Backcut Analysis

BOUNDARY COORDINATES
**19 Top Boundaries**
26 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 400.00 | 205.00 | 636.00 | 218.00 | 4 |
| 2 | 636.00 | 218.00 | 658.00 | 219.00 | 3 |
| 3 | 658.00 | 219.00 | 784.00 | 254.00 | 3 |
| 4 | 784.00 | 254.00 | 818.00 | 268.00 | 3 |
| 5 | 818.00 | 268.00 | 839.00 | 278.00 | 3 |
| 6 | 839.00 | 278.00 | 847.00 | 284.00 | 3 |
| 7 | 847.00 | 284.00 | 930.00 | 283.00 | 3 |
| 8 | 930.00 | 283.00 | 1003.00 | 328.00 | 3 |
| 9 | 1003.00 | 328.00 | 1033.00 | 334.00 | 3 |
| 10 | 1033.00 | 334.00 | 1058.00 | 336.00 | 3 |
| 11 | 1058.00 | 336.00 | 1066.00 | 340.00 | 3 |
| 12 | 1066.00 | 340.00 | 1078.00 | 344.00 | 3 |
| 13 | 1078.00 | 344.00 | 1105.00 | 357.00 | 3 |
| 14 | 1105.00 | 357.00 | 1134.00 | 370.00 | 1 |
| 15 | 1134.00 | 370.00 | 1138.00 | 369.00 | 1 |
| 16 | 1138.00 | 369.00 | 1174.00 | 389.00 | 1 |
| 17 | 1174.00 | 389.00 | 1192.00 | 396.00 | 1 |
| 18 | 1192.00 | 396.00 | 1196.00 | 396.00 | 1 |
| 19 | 1196.00 | 396.00 | 1300.00 | 396.00 | 1 |
| 20 | 400.00 | 176.00 | 513.00 | 192.00 | 3 |
| 21 | 513.00 | 192.00 | 590.00 | 208.00 | 3 |
| 22 | 590.00 | 208.00 | 636.00 | 218.00 | 3 |
| 23 | 1105.00 | 357.00 | 1111.00 | 349.00 | 3 |
| 24 | 1111.00 | 349.00 | 1148.00 | 348.00 | 3 |
| 25 | 1148.00 | 348.00 | 1225.00 | 388.00 | 3 |
| 26 | 1225.00 | 388.00 | 1300.00 | 388.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)



Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 400.00 | 195.00 |
| 2 | 1300.00 | 195.00 |

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1200.00 | 1300.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 920.00 | 265.00 | 1050.00 | 287.00 | 30.00 |
| 2 | 1050.10 | 287.00 | 1200.00 | 315.00 | 40.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 9999
Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.
Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***
Individual data on the 21 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.6 | 2850.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 5.3 | 5727.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 67.7 | 220481.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 30.0 | 150840.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 25.0 | 121136.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 8.0 | 38487.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 12.0 | 60752.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 27.0 | 152312.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 6.0 | 37113.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 23.0 | 151433.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 4.0 | 27223.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 7.0 | 47795.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 3.0 | 20739.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 24.0 | 142930.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 2.0 | 10239.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 11.6 | 46352.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 6.4 | 16975.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 1.0 | 2120.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 3.0 | 5154.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 4.0 | 4627.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 5.0 | 2081.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1257.3 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |



| | | |
|---|---|---|
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

Factor of Safety
*** 1.803 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 921.396 | 283.104 |
| 2 | 935.322 | 274.359 |
| 3 | 1144.986 | 315.991 |
| 4 | 1171.960 | 345.527 |
| 5 | 1193.022 | 379.533 |
| 6 | 1205.029 | 396.000 |

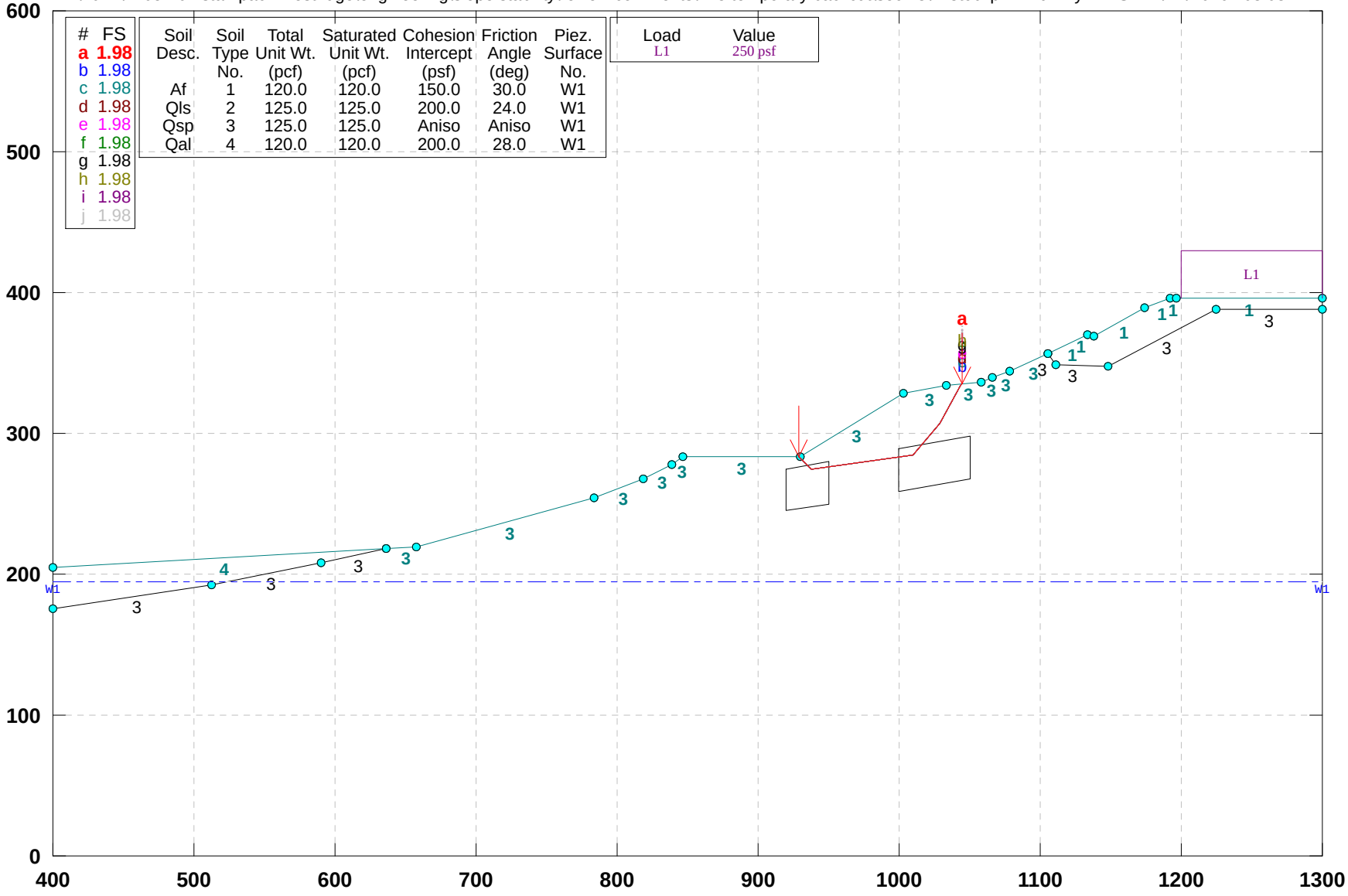
Factor of Safety
*** 1.803 ***

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

#15 Temp Backcut

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis Lower Slope

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#15 temporary backcut\sec 13\x13tcbl.pl2 Run By: KMS 12/21/2016 08:08AM



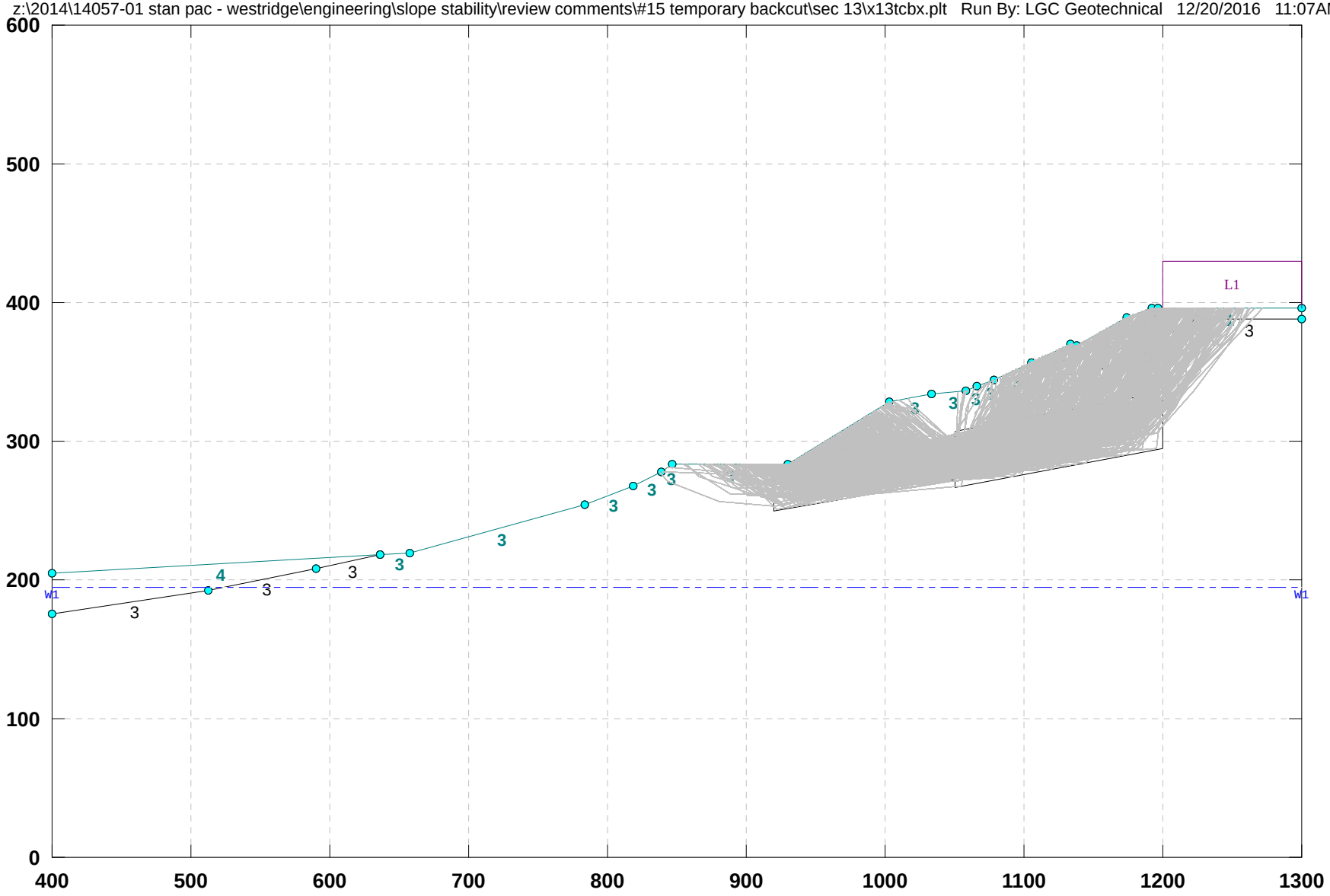

**GSTABL7 v.2 FSmin=1.98**

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

#15 Temp Backcut

# Westridge/14057-01/Sec 13-13'/ Temp Backcut Analysis

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#15 temporary backcut\sec 13\x13tcbx.plt Run By: LGC Geotechnical 12/20/2016 11:07AM



```
                                  ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                         SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        12/21/2016
    Time of Run:              08:08AM
    Run By:                   KMS
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#15 Temporary backcut\Sec 13\x13tcbl.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#15 Temporary backcut\Sec 13\x13tcbl.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#15 Temporary backcut\Sec 13\x13tcbl.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 13-13'/
                          Temp Backcut Analysis Lower Slope
    BOUNDARY COORDINATES
       19 Top   Boundaries
       26 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)    Below Bnd
        1        400.00     205.00     636.00     218.00        4
        2        636.00     218.00     658.00     219.00        3
        3        658.00     219.00     784.00     254.00        3
        4        784.00     254.00     818.00     268.00        3
        5        818.00     268.00     839.00     278.00        3
        6        839.00     278.00     847.00     284.00        3
        7        847.00     284.00     930.00     283.00        3
        8        930.00     283.00    1003.00     328.00        3
        9       1003.00     328.00    1033.00     334.00        3
       10       1033.00     334.00    1058.00     336.00        3
       11       1058.00     336.00    1066.00     340.00        3
       12       1066.00     340.00    1078.00     344.00        3
       13       1078.00     344.00    1105.00     357.00        3
       14       1105.00     357.00    1134.00     370.00        1
       15       1134.00     370.00    1138.00     369.00        1
       16       1138.00     369.00    1174.00     389.00        1
       17       1174.00     389.00    1192.00     396.00        1
       18       1192.00     396.00    1196.00     396.00        1
       19       1196.00     396.00    1300.00     396.00        1
       20        400.00     176.00     513.00     192.00        3
       21        513.00     192.00     590.00     208.00        3
       22        590.00     208.00     636.00     218.00        3
       23       1105.00     357.00    1111.00     349.00        3
       24       1111.00     349.00    1148.00     348.00        3
       25       1148.00     348.00    1225.00     388.00        3
       26       1225.00     388.00    1300.00     388.00        3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
```



```
    1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept       Angle
    No.            (deg)            (psf)         (deg)
     1              7.0             300.00         32.00
     2             12.0             200.00         27.00
     3             90.0             300.00         32.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 1 PIEZOMETRIC SURFACE(S) SPECIFIED
 Unit Weight of Water =  62.40 (pcf)
 Piezometric Surface No.  1 Specified by  2 Coordinate Points
 Pore Pressure Inclination Factor =  0.50
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1        400.00      195.00
     2       1300.00      195.00
BOUNDARY LOAD(S)
    1 Load(s) Specified
 Load        X-Left      X-Right     Intensity     Deflection
  No.         (ft)         (ft)        (psf)          (deg)
   1        1200.00      1300.00       250.0          0.0
 NOTE - Intensity Is Specified As A Uniformly Distributed
        Force Acting On A Horizontally Projected Surface.
 Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
 Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
 Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
 Specified Seismic Pore-Pressure Factor =   0.000
 EARTHQUAKE DATA HAS BEEN SUPPRESSED
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 9998 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
 Sliding Block Is  30.0
 Box        X-Left     Y-Left     X-Right    Y-Right      Height
 No.         (ft)       (ft)       (ft)       (ft)         (ft)
  1         920.00     260.00     950.00     265.00       30.00
  2        1000.00     274.00    1050.00     283.00       30.00
 Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Evaluated. They Are
       Ordered - Most Critical First.
       * * Safety Factors Are Calculated By The Simplified Janbu Method * *
       Total Number of Trial Surfaces Attempted =  9998
       Number of Trial Failure Surfaces is Greater Than 5000.
       Statistical Data on FS Values are Not Generated.
       To Generate Stastical Data, Reduce Number of Trial
       Failure Surfaces to 5000 or less.
       Failure Surface Specified By  6 Coordinate Points
         Point      X-Surf      Y-Surf
          No.         (ft)        (ft)
           1        928.864     283.014
           2        937.803     274.274
           3       1009.726     284.758
           4       1029.241     307.543
           5       1043.985     333.669
           6       1045.157     334.973
             Factor of Safety
              ***    1.977   ***
            Individual data on the     8  slices
                      Water  Water     Tie     Tie     Earthquake
```

| Slice No. | Width (ft) | Weight (lbs) | Force Top (lbs) | Force Bot (lbs) | Force Norm (lbs) | Force Tan (lbs) | Force Hor (lbs) | Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.1 | 77.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 7.8 | 7136.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 65.2 | 235356.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 6.7 | 37333.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 19.5 | 85736.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 3.8 | 10689.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 11.0 | 14422.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 1.2 | 88.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

Factor of Safety
*** 1.977 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 928.864 | 283.014 |
| 2 | 937.803 | 274.274 |
| 3 | 1009.726 | 284.758 |
| 4 | 1029.241 | 307.543 |
| 5 | 1043.985 | 333.669 |
| 6 | 1045.157 | 334.973 |

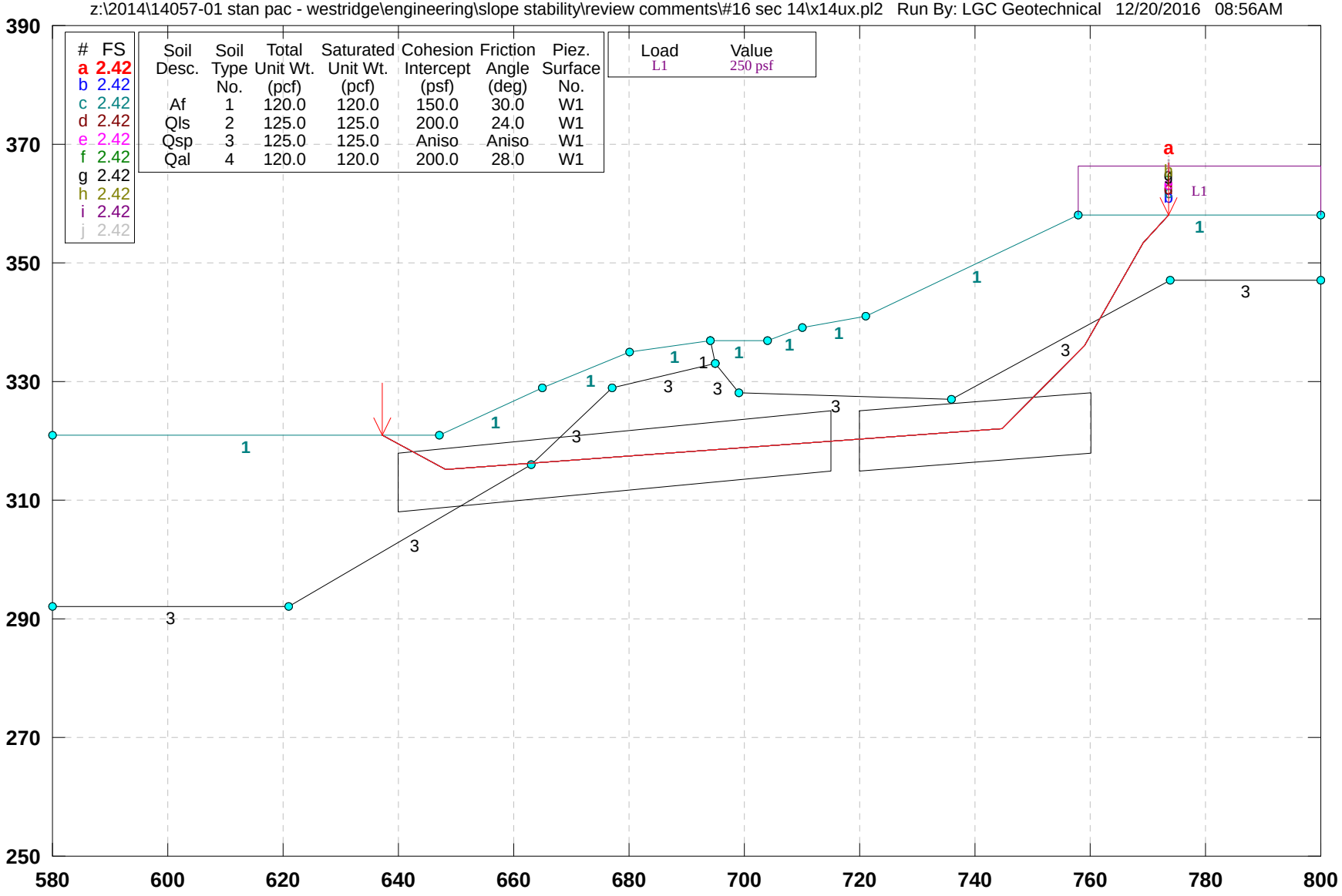
Factor of Safety
*** 1.977 ***

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

#16 New section

# Westridge/14057-01/Sec 14-14'/Upper Slope/Static

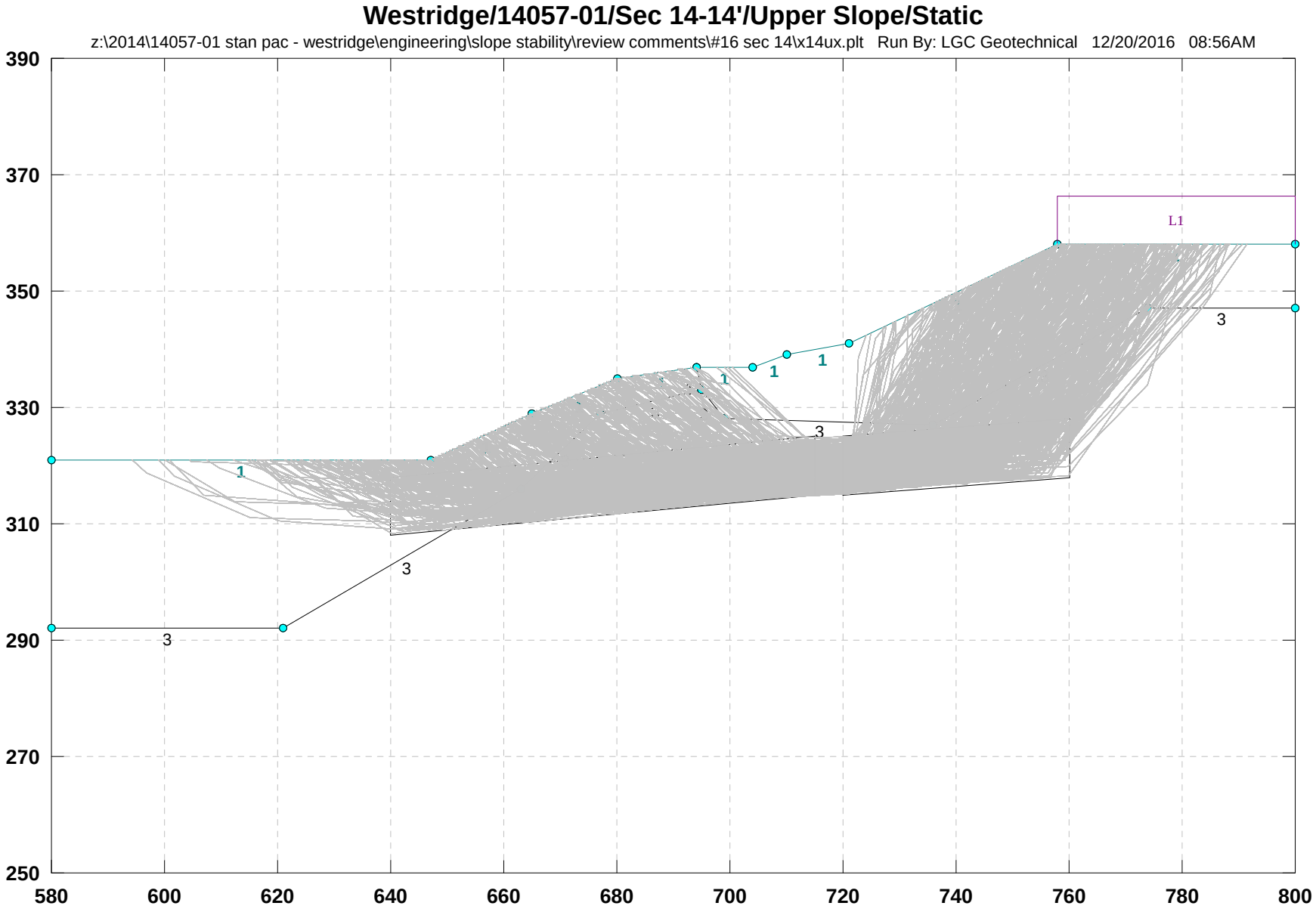
z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#16 sec 14\x14ux.pl2 Run By: LGC Geotechnical 12/20/2016 08:56AM




**GSTABL7 v.2 FSmin=2.42**

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

#16 New section



```
                              ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                         SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        12/20/2016
    Time of Run:              08:56AM
    Run By:                   LGC Geotechnical
    Input Data Filename:      z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#16 Sec 14\x14ux.in
    Output Filename:          z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#16 Sec 14\x14ux.OUT
    Unit System:              English
    Plotted Output Filename:  z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#16 Sec 14\x14ux.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 14-14'/Upper
                          Slope/Static
    BOUNDARY COORDINATES
        9 Top   Boundaries
       23 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        580.00     321.00     647.00     321.00        1
        2        647.00     321.00     665.00     329.00        1
        3        665.00     329.00     680.00     335.00        1
        4        680.00     335.00     694.00     337.00        1
        5        694.00     337.00     704.00     337.00        1
        6        704.00     337.00     710.00     339.00        1
        7        710.00     339.00     721.00     341.00        1
        8        721.00     341.00     758.00     358.00        1
        9        758.00     358.00     800.00     358.00        1
       10        694.00     337.00     695.00     333.00        1
       11        695.00     333.00     699.00     328.00        3
       12        699.00     328.00     736.00     327.00        3
       13        736.00     327.00     774.00     347.00        3
       14        774.00     347.00     800.00     347.00        3
       15         60.00     300.00      73.00     299.00        1
       16         73.00     299.00      86.00     300.00        1
       17         86.00     300.00      90.00     296.00        1
       18        580.00     292.00     621.00     292.00        3
       19        621.00     292.00     663.00     316.00        3
       20        663.00     316.00     677.00     329.00        3
       21        677.00     329.00     695.00     333.00        3
       22          0.00     279.00      67.00     279.00        3
       23         67.00     279.00      88.00     297.00        3
    User Specified Y-Origin =       250.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0      30.0     32.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
```



```
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              3.0             300.00         32.00
        2              6.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)          (deg)
       1        758.00       800.00       250.0           0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Sliding Block Surfaces, Has Been
     Specified.
     9999 Trial Surfaces Have Been Generated.
     2 Boxes Specified For Generation Of Central Block Base
     Length Of Line Segments For Active And Passive Portions Of
     Sliding Block Is  20.0
     Box        X-Left     Y-Left     X-Right    Y-Right      Height
     No.         (ft)       (ft)       (ft)       (ft)        (ft)
      1         640.00     313.00     715.00     320.00      10.00
      2         720.00     320.00     760.00     323.00      10.00
     Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  9999
           Number of Trial Failure Surfaces is Greater Than 5000.
           Statistical Data on FS Values are Not Generated.
           To Generate Stastical Data, Reduce Number of Trial
           Failure Surfaces to 5000 or less.
           Failure Surface Specified By  6 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1        637.161     321.000
               2        648.070     315.144
               3        744.753     322.051
               4        758.891     336.198
               5        769.286     353.285
               6        773.602     358.000
                  Factor of Safety
                ***    2.423   ***
                Individual data on the    19  slices
                           Water  Water     Tie      Tie      Earthquake
                           Force  Force     Force    Force       Force    Surcharge
Slice  Width    Weight      Top    Bot      Norm     Tan      Hor      Ver     Load
 No.    (ft)     (lbs)     (lbs)  (lbs)    (lbs)    (lbs)    (lbs)    (lbs)   (lbs)
  1      9.8    3117.6      0.0    0.0        0.       0.      0.0      0.0     0.0
  2      1.1     745.8      0.0    0.0        0.       0.      0.0      0.0     0.0
  3     15.2   16684.2      0.0    0.0        0.       0.      0.0      0.0     0.0
  4      1.8    2599.7      0.0    0.0        0.       0.      0.0      0.0     0.0
  5     12.0   21448.2      0.0    0.0        0.       0.      0.0      0.0     0.0
  6      3.0    6329.7      0.0    0.0        0.       0.      0.0      0.0     0.0
  7     14.0   31296.2      0.0    0.0        0.       0.      0.0      0.0     0.0
  8      1.0    2296.8      0.0    0.0        0.       0.      0.0      0.0     0.0
  9      4.0    9050.1      0.0    0.0        0.       0.      0.0      0.0     0.0
 10      5.0   11047.6      0.0    0.0        0.       0.      0.0      0.0     0.0
 11      6.0   13677.9      0.0    0.0        0.       0.      0.0      0.0     0.0
 12     11.0   26868.6      0.0    0.0        0.       0.      0.0      0.0     0.0
 13     15.0   42874.0      0.0    0.0        0.       0.      0.0      0.0     0.0
 14      8.8   29915.1      0.0    0.0        0.       0.      0.0      0.0     0.0
 15     13.2   42195.8      0.0    0.0        0.       0.      0.0      0.0     0.0
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 0.9 | 2391.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 222.7 |
| 17 | 2.6 | 6048.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 637.5 |
| 18 | 7.8 | 10508.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1961.2 |
| 19 | 4.3 | 1221.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 1079.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***



Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 637.161 | 321.000 |
| 2 | 648.070 | 315.144 |
| 3 | 744.753 | 322.051 |
| 4 | 758.891 | 336.198 |
| 5 | 769.286 | 353.285 |
| 6 | 773.602 | 358.000 |

Factor of Safety
*** 2.423 ***

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

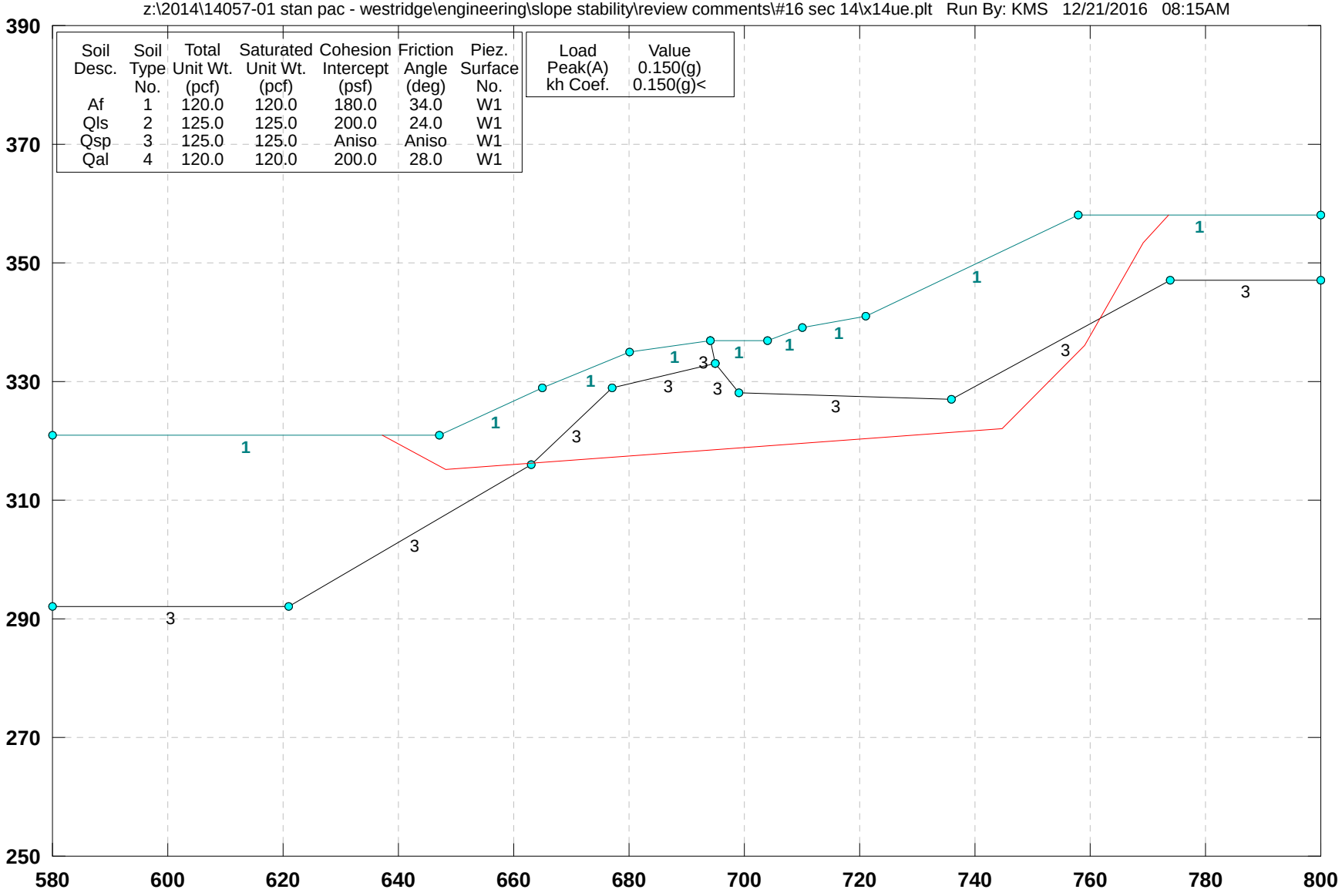
#16 New section

# Westridge/14057-01/Sec 14-14'/Upper Slope/ Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#16 sec 14\x14ue.plt Run By: KMS 12/21/2016 08:15AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.84**
**Factor Of Safety Is Calculated By The Simplified Janbu Method**

```
                              ***  GSTABL7  ***
                ** GSTABL7 by Dr. Gary H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                   (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                        SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        12/21/2016
    Time of Run:              08:15AM
    Run By:                   KMS
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#16 Sec 14\x14ue Surface #1.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#16 Sec 14\x14ue Surface #1.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#16 Sec 14\x14ue Surface #1.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 14-14'/Upper
                          Slope/ Seismic
    BOUNDARY COORDINATES
        9 Top   Boundaries
       23 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        580.00     321.00     647.00     321.00        1
        2        647.00     321.00     665.00     329.00        1
        3        665.00     329.00     680.00     335.00        1
        4        680.00     335.00     694.00     337.00        1
        5        694.00     337.00     704.00     337.00        1
        6        704.00     337.00     710.00     339.00        1
        7        710.00     339.00     721.00     341.00        1
        8        721.00     341.00     758.00     358.00        1
        9        758.00     358.00     800.00     358.00        1
       10        694.00     337.00     695.00     333.00        3
       11        695.00     333.00     699.00     328.00        3
       12        699.00     328.00     736.00     327.00        3
       13        736.00     327.00     774.00     347.00        3
       14        774.00     347.00     800.00     347.00        3
       15         60.00     300.00      73.00     299.00        1
       16         73.00     299.00      86.00     300.00        1
       17         86.00     300.00      90.00     296.00        1
       18        580.00     292.00     621.00     292.00        3
       19        621.00     292.00     663.00     316.00        3
       20        663.00     316.00     677.00     329.00        3
       21        677.00     329.00     695.00     333.00        3
       22          0.00     279.00      67.00     279.00        3
       23         67.00     279.00      88.00     297.00        3
    User Specified Y-Origin =       250.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
```



```
     Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1              3.0             500.00         32.00
       2              6.0             200.00         27.00
       3             90.0             500.00         32.00
   ANISOTROPIC SOIL NOTES:
      (1) An input value of 0.01 for C and/or Phi will cause Aniso
          C and/or Phi to be ignored in that range.
      (2) An input value of 0.02 for Phi will set both Phi and
          C equal to zero, with no water weight in the tension crack.
      (3) An input value of 0.03 for Phi will set both Phi and
          C equal to zero, with water weight in the tension crack.
   Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
   Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
   Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
   Specified Seismic Pore-Pressure Factor =   0.000
   Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
   Trial Failure Surface Specified By  6 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1       637.161     321.000
       2       648.070     315.144
       3       744.753     322.051
       4       758.891     336.198
       5       769.286     353.285
       6       773.602     358.000
   Janbu's Empirical Coefficient (fo) =  1.070
   * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
   Factor Of Safety For The Preceding Specified Surface =  1.839
       ***Table 1 - Individual Data on the   19 Slices***
                          Water  Water     Tie      Tie      Earthquake
                          Force  Force     Force    Force       Force   Surcharge
Slice  Width    Weight     Top    Bot      Norm     Tan      Hor      Ver     Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)    (lbs)    (lbs)    (lbs)   (lbs)
  1      9.8    3117.9     0.0    0.0      0.0      0.0     467.7     0.0      0.0
  2      1.1     745.6     0.0    0.0      0.0      0.0     111.8     0.0      0.0
  3     15.2   16684.5     0.0    0.0      0.0      0.0    2502.7     0.0      0.0
  4      1.8    2600.0     0.0    0.0      0.0      0.0     390.0     0.0      0.0
  5     12.0   21448.5     0.0    0.0      0.0      0.0    3217.3     0.0      0.0
  6      3.0    6329.8     0.0    0.0      0.0      0.0     949.5     0.0      0.0
  7     14.0   31296.6     0.0    0.0      0.0      0.0    4694.5     0.0      0.0
  8      1.0    2307.4     0.0    0.0      0.0      0.0     346.1     0.0      0.0
  9      4.0    9050.2     0.0    0.0      0.0      0.0    1357.5     0.0      0.0
 10      5.0   11047.7     0.0    0.0      0.0      0.0    1657.2     0.0      0.0
 11      6.0   13678.1     0.0    0.0      0.0      0.0    2051.7     0.0      0.0
 12     11.0   26868.8     0.0    0.0      0.0      0.0    4030.3     0.0      0.0
 13     15.0   42874.4     0.0    0.0      0.0      0.0    6431.2     0.0      0.0
 14      8.8   29913.8     0.0    0.0      0.0      0.0    4487.1     0.0      0.0
 15     13.2   42197.6     0.0    0.0      0.0      0.0    6329.6     0.0      0.0
 16      0.9    2392.3     0.0    0.0      0.0      0.0     358.9     0.0      0.0
 17      2.6    6049.0     0.0    0.0      0.0      0.0     907.4     0.0      0.0
 18      7.8   10507.9     0.0    0.0      0.0      0.0    1576.2     0.0      0.0
 19      4.3    1221.0     0.0    0.0      0.0      0.0     183.2     0.0      0.0
       ***Table 2 - Base Stress Data on the   19 Slices***
Slice   Alpha     X-Coord.      Base          Available             Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)        (ft)          (psf)                 (psf)
  1    -28.23      642.08       11.17          556.47               -108.00
  2    -28.23      647.54        1.21          918.61               -237.47
  3      4.09      655.66       15.21          900.32                242.84
  4      4.09      664.12        1.76          939.00                327.36
  5      4.09      671.00       12.03         1091.93                394.79
  6      4.09      678.50        3.01         1253.50                466.03
  7      4.09      687.00       14.04         1316.38                493.76
  8      4.09      694.50        1.00         1352.40                509.65
  9      4.09      697.00        4.01         1329.95                499.75
 10      4.09      701.50        5.01         1303.39                488.03
 11      4.09      707.00        6.02         1338.53                503.53
 12      4.09      715.50       11.03         1420.15                539.52
 13      4.09      728.50       15.04         1628.36                631.33
```

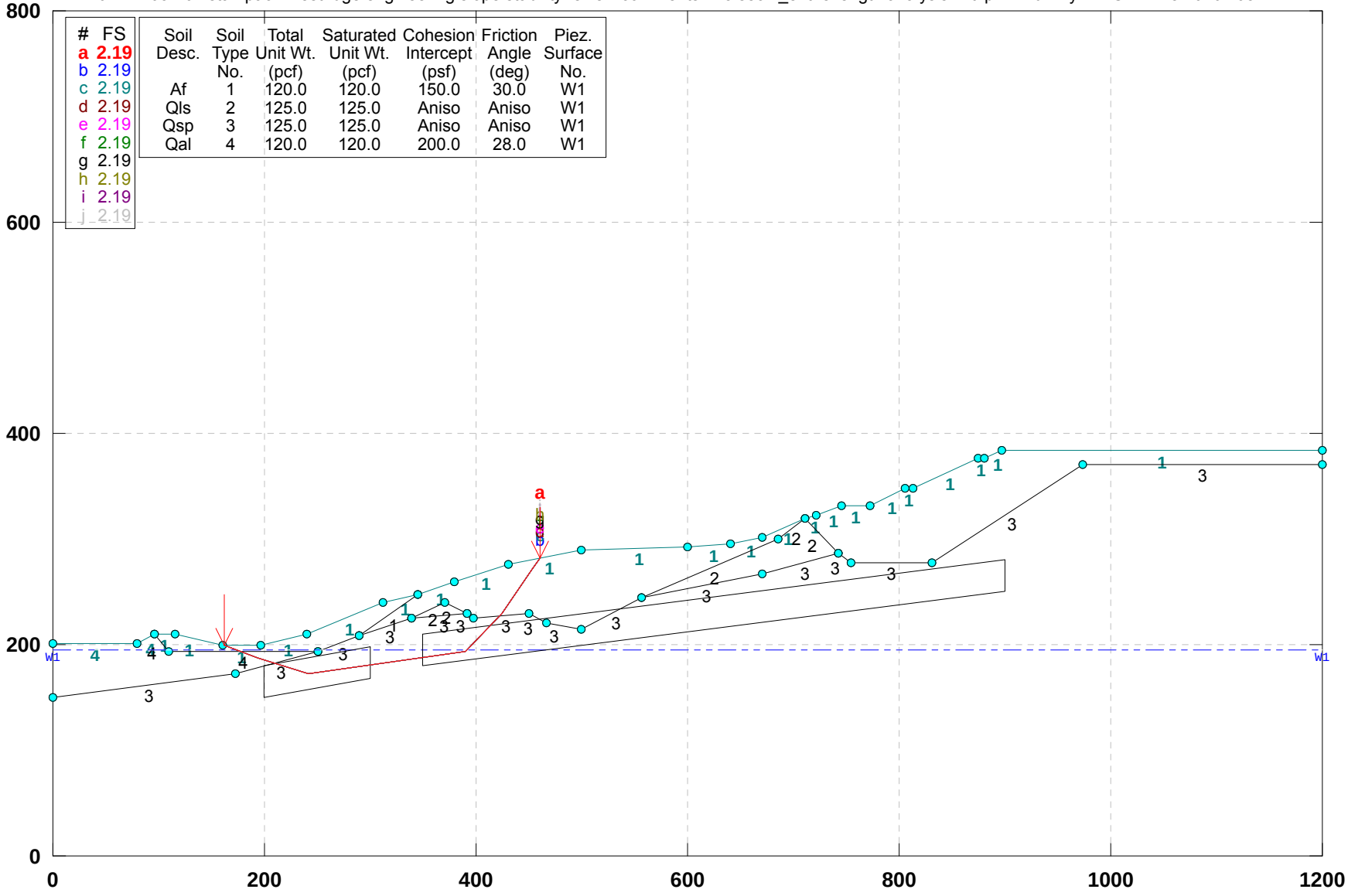
| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | 4.09 | 740.38 | 8.78 | 1908.50 | 754.86 |
| 15 | 45.02 | 751.38 | 18.74 | 2629.16 | 2590.92 |
| 16 | 45.02 | 758.45 | 1.26 | 2299.07 | 2183.91 |
| 17 | 58.69 | 760.17 | 4.91 | 2446.84 | 2211.24 |
| 18 | 58.69 | 765.36 | 15.09 | 1300.53 | 1248.79 |
| 19 | 47.53 | 771.44 | 6.39 | 392.08 | 237.33 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) =  220678.73 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   1417.30(psf)
Sum of the Driving Forces =   128438.80 (lbs)
Average Mobilized Shear Stress =     824.89(psf)
Total length of the failure surface =     155.70(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.4675(g)
Calculated Newmark Seismic Displacement =   0.001(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

#23 Entire length

# Westridge/14057-01/Sec 1-1'/Entire Length/Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#23 sec 1_entire length analysis\x1tl.pl2 Run By: KMS 11/18/2016 08:42AM



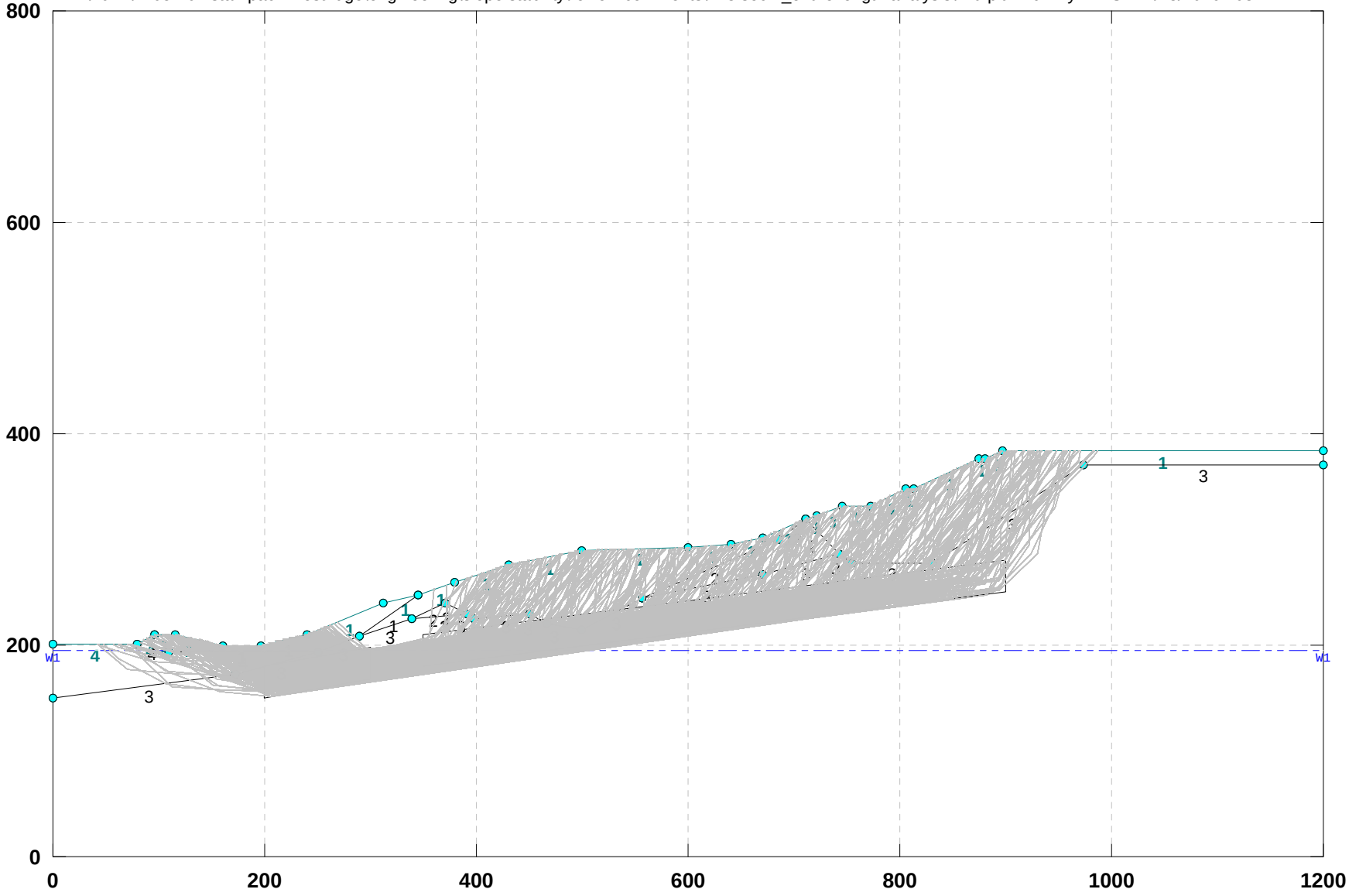

**GSTABL7 v.2 FSmin=2.19**

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

#23 Entire length

# Westridge/14057-01/Sec 1-1'/Entire Length/Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#23 sec 1_entire length analysis\x1tl.plt Run By: KMS 11/18/2016 08:42AM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:  11/18/2016
Time of Run:  08:42AM
Run By:  KMS
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tl.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tl.OUT
Unit System:  English
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tl.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 1-1'/Entire Length/Static

BOUNDARY COORDINATES
24 Top Boundaries
48 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 201.00 | 79.00 | 201.00 | 4 |
| 2 | 79.00 | 201.00 | 96.00 | 210.00 | 4 |
| 3 | 96.00 | 210.00 | 116.00 | 210.00 | 1 |
| 4 | 116.00 | 210.00 | 160.00 | 200.00 | 1 |
| 5 | 160.00 | 200.00 | 196.00 | 200.00 | 1 |
| 6 | 196.00 | 200.00 | 240.00 | 210.00 | 1 |
| 7 | 240.00 | 210.00 | 312.00 | 240.00 | 1 |
| 8 | 312.00 | 240.00 | 345.00 | 248.00 | 1 |
| 9 | 345.00 | 248.00 | 380.00 | 260.00 | 1 |
| 10 | 380.00 | 260.00 | 430.00 | 276.00 | 1 |
| 11 | 430.00 | 276.00 | 500.00 | 290.00 | 1 |
| 12 | 500.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 96.00 | 210.00 | 109.00 | 194.00 | 4 |
| 26 | 109.00 | 194.00 | 250.00 | 194.00 | 4 |
| 27 | 250.00 | 194.00 | 290.00 | 209.00 | 3 |
| 28 | 290.00 | 209.00 | 345.00 | 248.00 | 1 |
| 29 | 0.00 | 150.00 | 173.00 | 173.00 | 3 |
| 30 | 173.00 | 173.00 | 250.00 | 194.00 | 3 |
| 31 | 290.00 | 209.00 | 339.00 | 225.00 | 3 |
| 32 | 339.00 | 225.00 | 370.00 | 240.00 | 2 |
| 33 | 370.00 | 240.00 | 392.00 | 230.00 | 2 |
| 34 | 392.00 | 230.00 | 397.00 | 225.00 | 3 |
| 35 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 36 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 37 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 38 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 39 | 556.00 | 244.00 | 686.00 | 300.00 | 2 |
| 40 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 711.00 | 320.00 | 743.00 | 287.00 | 2 |
| 42 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 43 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 44 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |
| 45 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 46 | 556.00 | 244.00 | 670.00 | 267.00 | 3 |
| 47 | 670.00 | 267.00 | 743.00 | 287.00 | 3 |
| 48 | 339.00 | 225.00 | 392.00 | 230.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 200.00 | 24.00 |
| 2 | 10.0 | 0.00 | 8.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type  3 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is  50.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 200.00 | 165.00 | 300.00 | 183.00 | 30.00 |
| 2 | 350.00 | 195.00 | 900.00 | 265.00 | 30.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted =  9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial
Failure Surfaces to 5000 or less.
Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety
*** 2.191 ***

Individual data on the 24 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.2 | 3661.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 2.4 | 1611.2 | 0.0 | 82.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 17.6 | 20279.1 | 0.0 | 5462.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 1.8 | 2945.0 | 0.0 | 1009.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 11.9 | 24313.9 | 0.0 | 8281.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 32.1 | 112321.4 | 0.0 | 36545.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 1.9 | 9048.4 | 0.0 | 2875.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 8.1 | 39444.0 | 0.0 | 11404.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 2.7 | 13523.5 | 0.0 | 3641.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 37.3 | 214554.0 | 0.0 | 44164.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 22.0 | 148424.3 | 0.0 | 20069.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 27.0 | 196723.2 | 0.0 | 18594.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 6.0 | 44981.0 | 0.0 | 3228.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 25.0 | 196386.9 | 0.0 | 9916.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 10.0 | 82777.5 | 0.0 | 2369.8 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 10.2 | 86856.2 | 0.0 | 1482.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 1.5 | 12722.8 | 0.0 | 104.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 0.3 | 2128.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 5.0 | 40813.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 25.6 | 172870.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 2.4 | 13250.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 22 | 5.0 | 25348.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 23 | 22.8 | 66460.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 24 | 7.2 | 4147.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety
*** 2.191 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety
*** 2.191 ***

Failure Surface Specified By 7 Coordinate Points



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety
*** 2.191 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety
*** 2.191 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety
*** 2.191 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety
*** 2.191 ***

Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Factor of Safety

```
     ***    2.191   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.         (ft)        (ft)
    1        161.937      200.000
    2        194.181      186.792
    3        241.937      171.983
    4        390.250      193.448
    5        424.972      229.426
    6        452.776      270.982
    7        459.997      281.999
       Factor of Safety
      ***    2.191   ***
          **** END OF GSTABL7 OUTPUT ****
```

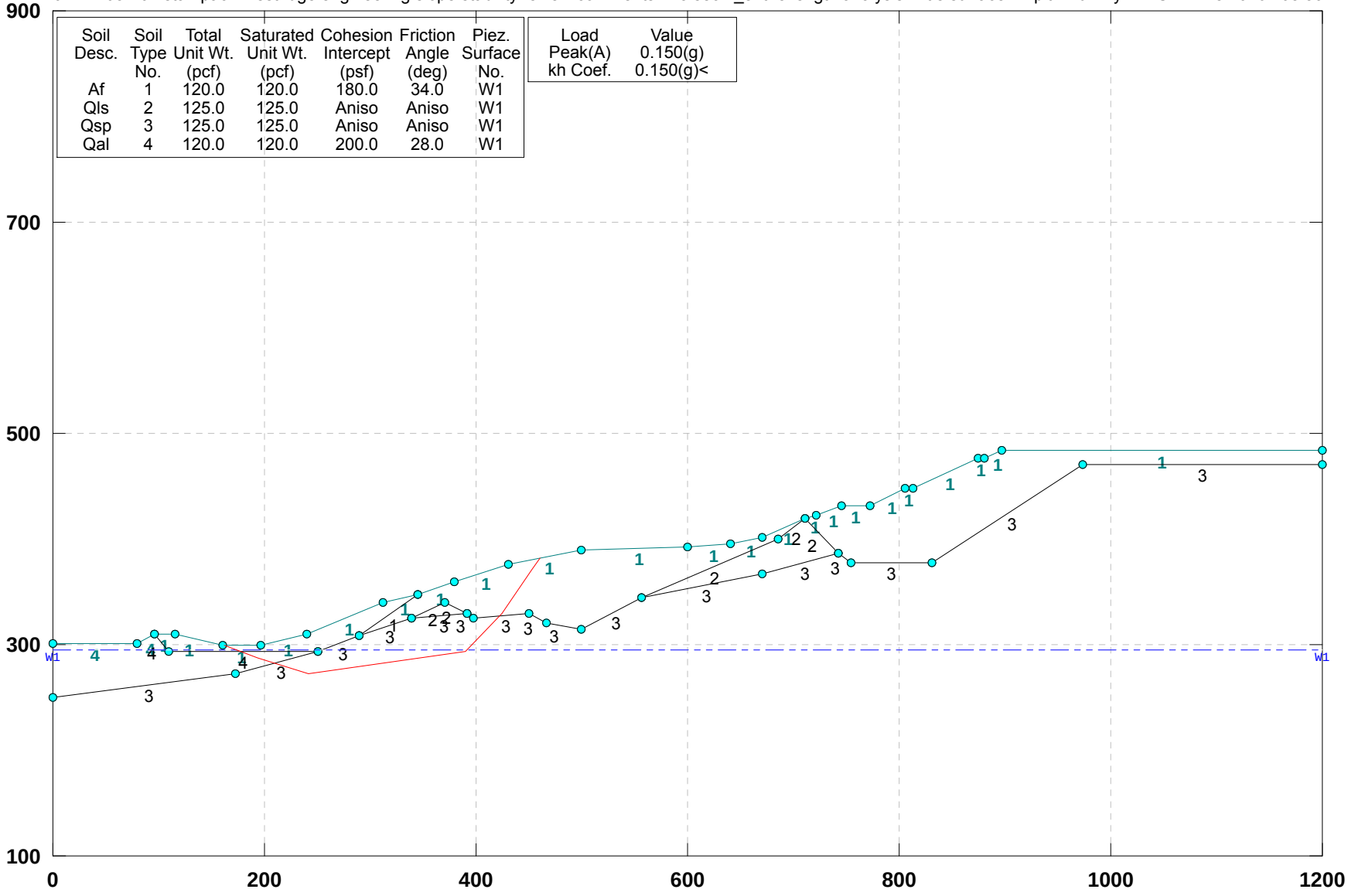
#23 Entire length

# Westridge/14057-01/Sec 1-1'/Entire Length/Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#23 sec 1_entire length analysis\x1tle surface #1.plt Run By: KMS 11/18/2016 08:50AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.49**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:  11/18/2016
Time of Run:  08:50AM
Run By:  KMS
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tle Surface #1.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tle Surface #1.OUT
Unit System:  English
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tle Surface #1.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 1-1'/Entire Length/Seismic

BOUNDARY COORDINATES
24 Top Boundaries
48 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 201.00 | 79.00 | 201.00 | 4 |
| **2** | **79.00** | **201.00** | **96.00** | **210.00** | **4** |
| 3 | 96.00 | 210.00 | 116.00 | 210.00 | 1 |
| 4 | 116.00 | 210.00 | 160.00 | 200.00 | 1 |
| 5 | 160.00 | 200.00 | 196.00 | 200.00 | 1 |
| 6 | 196.00 | 200.00 | 240.00 | 210.00 | 1 |
| 7 | 240.00 | 210.00 | 312.00 | 240.00 | 1 |
| 8 | 312.00 | 240.00 | 345.00 | 248.00 | 1 |
| 9 | 345.00 | 248.00 | 380.00 | 260.00 | 1 |
| 10 | 380.00 | 260.00 | 430.00 | 276.00 | 1 |
| 11 | 430.00 | 276.00 | 500.00 | 290.00 | 1 |
| 12 | 500.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 96.00 | 210.00 | 109.00 | 194.00 | 4 |
| 26 | 109.00 | 194.00 | 250.00 | 194.00 | 4 |
| 27 | 250.00 | 194.00 | 290.00 | 209.00 | 3 |
| 28 | 290.00 | 209.00 | 345.00 | 248.00 | 1 |
| 29 | 0.00 | 150.00 | 173.00 | 173.00 | 3 |
| 30 | 173.00 | 173.00 | 250.00 | 194.00 | 3 |
| 31 | 290.00 | 209.00 | 339.00 | 225.00 | 3 |
| 32 | 339.00 | 225.00 | 370.00 | 240.00 | 2 |
| 33 | 370.00 | 240.00 | 392.00 | 230.00 | 2 |
| 34 | 392.00 | 230.00 | 397.00 | 225.00 | 3 |
| 35 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 36 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 37 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 38 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 39 | 556.00 | 244.00 | 686.00 | 300.00 | 2 |
| 40 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 711.00 | 320.00 | 743.00 | 287.00 | 2 |
| 42 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 43 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 44 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |
| 45 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 46 | 556.00 | 244.00 | 670.00 | 267.00 | 3 |
| 47 | 670.00 | 267.00 | 743.00 | 287.00 | 3 |
| 48 | 339.00 | 225.00 | 392.00 | 230.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)

Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 200.00 | 24.00 |
| 2 | 10.0 | 0.00 | 8.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type  3 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) =  0.150(g)
Specified Horizontal Earthquake Coefficient (kh) =  0.150(g)
Specified Vertical Earthquake Coefficient (kv) =  0.000(g)
Specified Seismic Pore-Pressure Factor =  0.000
Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
Trial Failure Surface Specified By  7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 161.937 | 200.000 |
| 2 | 194.181 | 186.792 |
| 3 | 241.937 | 171.983 |
| 4 | 390.250 | 193.448 |
| 5 | 424.972 | 229.426 |
| 6 | 452.776 | 270.982 |
| 7 | 459.997 | 281.999 |

Janbu's Empirical Coefficient (fo) =  1.075
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.494

***Table 1 - Individual Data on the 24 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.2 | 3661.9 | 0.0 | 0.0 | 0.0 | 0.0 | 549.3 | 0.0 | 0.0 |
| 2 | 2.4 | 1611.2 | 0.0 | 82.3 | 0.0 | 0.0 | 241.7 | 0.0 | 0.0 |
| 3 | 17.6 | 20279.7 | 0.0 | 5463.0 | 0.0 | 0.0 | 3041.9 | 0.0 | 0.0 |
| 4 | 1.8 | 2944.6 | 0.0 | 1008.9 | 0.0 | 0.0 | 441.7 | 0.0 | 0.0 |
| 5 | 11.9 | 24313.7 | 0.0 | 8281.6 | 0.0 | 0.0 | 3647.1 | 0.0 | 0.0 |
| 6 | 32.1 | 112321.9 | 0.0 | 36545.2 | 0.0 | 0.0 | 16848.3 | 0.0 | 0.0 |
| 7 | 1.9 | 9047.1 | 0.0 | 2874.7 | 0.0 | 0.0 | 1357.1 | 0.0 | 0.0 |
| 8 | 8.1 | 39445.2 | 0.0 | 11404.6 | 0.0 | 0.0 | 5916.8 | 0.0 | 0.0 |
| 9 | 2.7 | 13523.5 | 0.0 | 3641.3 | 0.0 | 0.0 | 2028.5 | 0.0 | 0.0 |
| 10 | 37.3 | 214554.1 | 0.0 | 44164.6 | 0.0 | 0.0 | 32183.1 | 0.0 | 0.0 |
| 11 | 22.0 | 148424.7 | 0.0 | 20069.9 | 0.0 | 0.0 | 22263.7 | 0.0 | 0.0 |
| 12 | 27.0 | 196724.1 | 0.0 | 18595.0 | 0.0 | 0.0 | 29508.6 | 0.0 | 0.0 |
| 13 | 6.0 | 44981.2 | 0.0 | 3228.8 | 0.0 | 0.0 | 6747.2 | 0.0 | 0.0 |
| 14 | 25.0 | 196388.1 | 0.0 | 9917.5 | 0.0 | 0.0 | 29458.2 | 0.0 | 0.0 |
| 15 | 10.0 | 82778.1 | 0.0 | 2370.1 | 0.0 | 0.0 | 12416.7 | 0.0 | 0.0 |
| 16 | 10.2 | 86860.0 | 0.0 | 1482.4 | 0.0 | 0.0 | 13029.0 | 0.0 | 0.0 |
| 17 | 1.5 | 12726.5 | 0.0 | 104.4 | 0.0 | 0.0 | 1909.0 | 0.0 | 0.0 |
| 18 | 0.3 | 2122.0 | 0.0 | 0.0 | 0.0 | 0.0 | 318.3 | 0.0 | 0.0 |
| 19 | 5.0 | 40814.2 | 0.0 | 0.0 | 0.0 | 0.0 | 6122.1 | 0.0 | 0.0 |
| 20 | 25.6 | 172871.2 | 0.0 | 0.0 | 0.0 | 0.0 | 25930.7 | 0.0 | 0.0 |
| 21 | 2.4 | 13251.3 | 0.0 | 0.0 | 0.0 | 0.0 | 1987.7 | 0.0 | 0.0 |
| 22 | 5.0 | 25348.3 | 0.0 | 0.0 | 0.0 | 0.0 | 3802.3 | 0.0 | 0.0 |
| 23 | 22.8 | 66459.2 | 0.0 | 0.0 | 0.0 | 0.0 | 9968.9 | 0.0 | 0.0 |
| 24 | 7.2 | 4147.7 | 0.0 | 0.0 | 0.0 | 0.0 | 622.2 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 24 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -22.28 | 168.04 | 13.19 | 506.91 | -72.08 |
| 2 | -22.28 | 175.36 | 2.64 | 800.93 | -158.57 |
| 3 | -22.28 | 185.38 | 19.02 | 834.95 | -276.89 |
| 4 | -17.23 | 195.09 | 1.90 | 916.80 | -247.54 |
| 5 | -17.23 | 201.97 | 12.49 | 1095.47 | -311.55 |
| 6 | -17.23 | 223.97 | 33.57 | 2591.08 | -535.63 |
| 7 | -17.23 | 240.97 | 2.03 | 3279.94 | -714.21 |
| 8 | 8.24 | 245.97 | 8.15 | 1905.97 | 1426.98 |
| 9 | 8.24 | 251.33 | 2.69 | 2017.65 | 1479.24 |
| 10 | 8.24 | 271.33 | 37.72 | 2437.77 | 1676.33 |
| 11 | 8.24 | 301.00 | 22.23 | 3059.65 | 1967.90 |
| 12 | 8.24 | 325.50 | 27.28 | 3432.89 | 2125.27 |
| 13 | 8.24 | 342.00 | 6.06 | 3609.42 | 2186.75 |
| 14 | 8.24 | 357.50 | 25.26 | 3854.06 | 2291.37 |
| 15 | 8.24 | 375.00 | 10.10 | 4138.79 | 2414.54 |
| 16 | 8.24 | 385.12 | 10.36 | 4279.97 | 2471.81 |
| 17 | 46.02 | 391.00 | 2.16 | 6081.55 | 6998.85 |
| 18 | 46.02 | 391.87 | 0.36 | 6059.52 | 6931.54 |
| 19 | 46.02 | 394.50 | 7.20 | 5892.69 | 6723.90 |
| 20 | 46.02 | 409.78 | 36.81 | 4966.10 | 5570.58 |
| 21 | 46.02 | 423.77 | 3.47 | 3816.04 | 4529.92 |
| 22 | 56.21 | 427.49 | 9.04 | 3844.96 | 4610.60 |
| 23 | 56.21 | 441.39 | 40.96 | 2306.84 | 2668.57 |
| 24 | 56.76 | 456.39 | 13.17 | 613.00 | 527.64 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 994981.94 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 2860.17(psf)

Sum of the Driving Forces = 716013.94 (lbs)

Average Mobilized Shear Stress = 2058.25(psf)

Total length of the failure surface = 347.87(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***

(Note: kv is set = zero for displacement calculations)

Seismic Yield Coefficient (ky) = 0.3406(g)

Calculated Newmark Seismic Displacement = 0.003(ft)

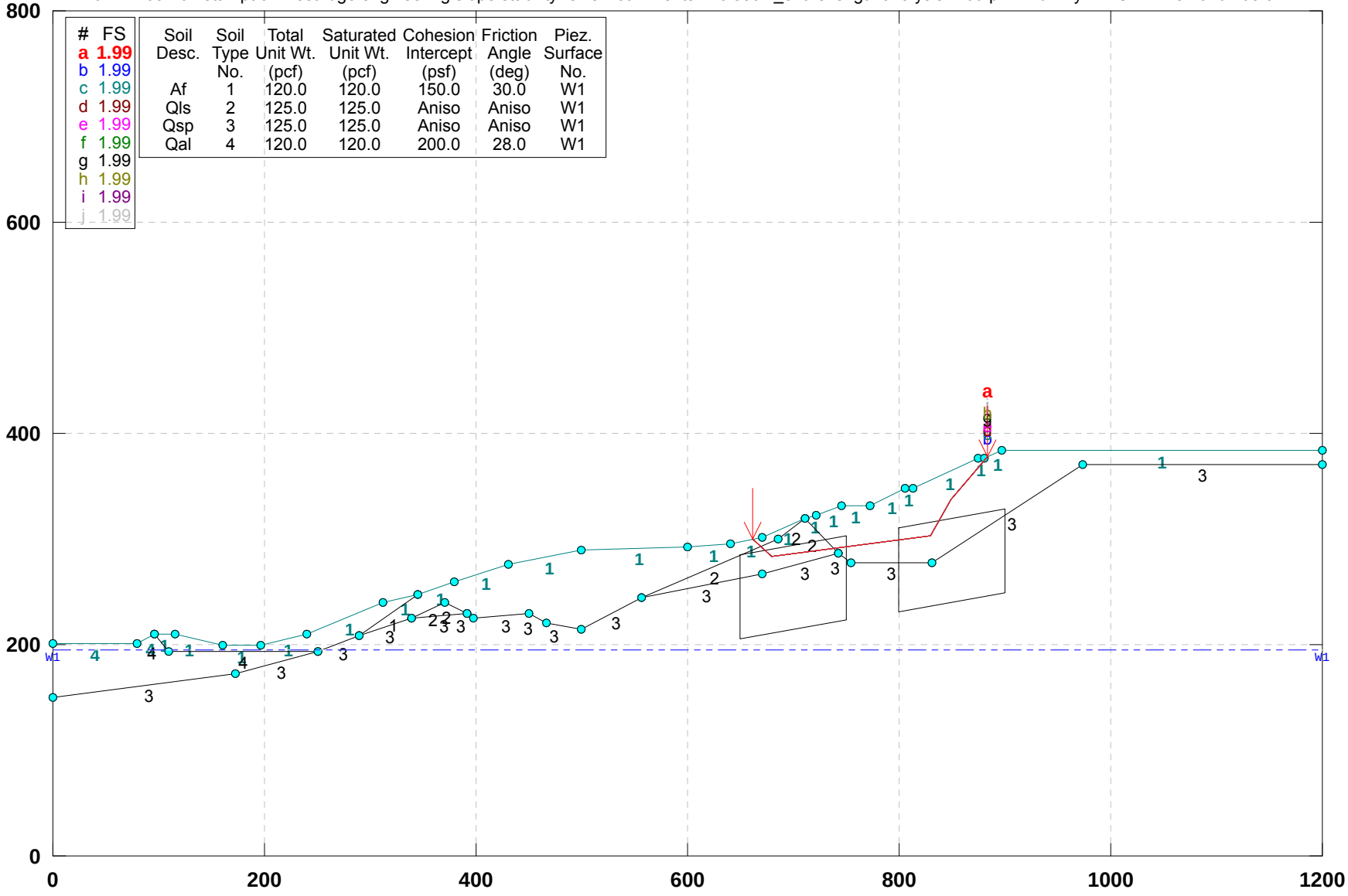
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

#23 Entire length

# Westridge/14057-01/Sec 1-1'/Entire Length - Upper Section/Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#23 sec 1_entire length analysis\x1tlu.pl2 Run By: KMS 11/18/2016 08:51AM



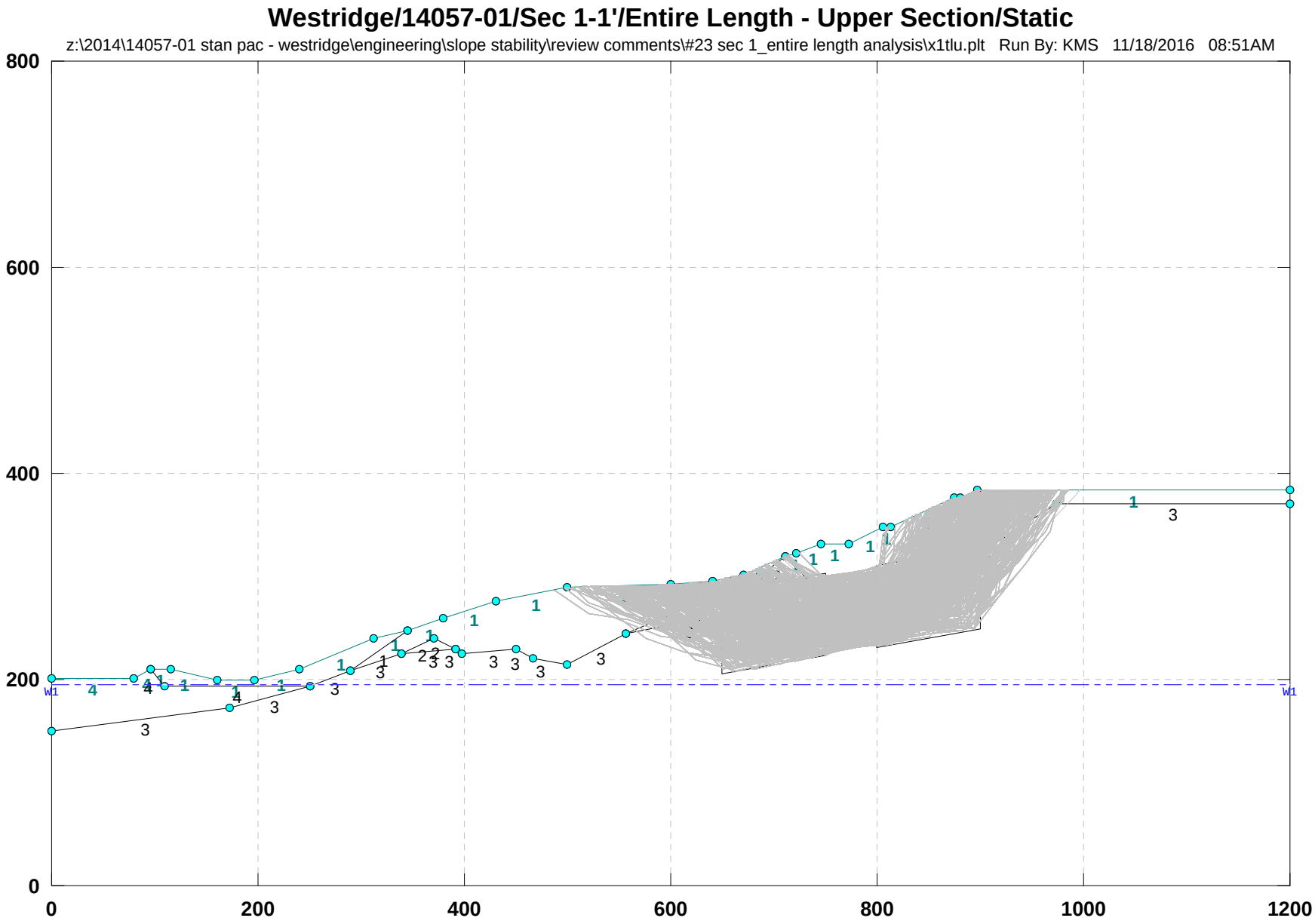

| # | FS |
|---|---|
| a | 1.99 |
| b | 1.99 |
| c | 1.99 |
| d | 1.99 |
| e | 1.99 |
| f | 1.99 |
| g | 1.99 |
| h | 1.99 |
| i | 1.99 |
| j | 1.99 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

**GSTABL7 v.2 FSmin=1.99**

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

#23 Entire length



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 11/18/2016
Time of Run: 08:51AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tlu.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tlu.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tlu.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/Entire
**Length - Upper Section/Static**

BOUNDARY COORDINATES
24 Top Boundaries
48 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 201.00 | 79.00 | 201.00 | 4 |
| 2 | 79.00 | 201.00 | 96.00 | 210.00 | 4 |
| 3 | 96.00 | 210.00 | 116.00 | 210.00 | 1 |
| 4 | 116.00 | 210.00 | 160.00 | 200.00 | 1 |
| 5 | 160.00 | 200.00 | 196.00 | 200.00 | 1 |
| 6 | 196.00 | 200.00 | 240.00 | 210.00 | 1 |
| 7 | 240.00 | 210.00 | 312.00 | 240.00 | 1 |
| 8 | 312.00 | 240.00 | 345.00 | 248.00 | 1 |
| 9 | 345.00 | 248.00 | 380.00 | 260.00 | 1 |
| 10 | 380.00 | 260.00 | 430.00 | 276.00 | 1 |
| 11 | 430.00 | 276.00 | 500.00 | 290.00 | 1 |
| 12 | 500.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 96.00 | 210.00 | 109.00 | 194.00 | 4 |
| 26 | 109.00 | 194.00 | 250.00 | 194.00 | 4 |
| 27 | 250.00 | 194.00 | 290.00 | 209.00 | 3 |
| 28 | 290.00 | 209.00 | 345.00 | 248.00 | 1 |
| 29 | 0.00 | 150.00 | 173.00 | 173.00 | 3 |
| 30 | 173.00 | 173.00 | 250.00 | 194.00 | 3 |
| 31 | 290.00 | 209.00 | 339.00 | 225.00 | 3 |
| 32 | 339.00 | 225.00 | 370.00 | 240.00 | 2 |
| 33 | 370.00 | 240.00 | 392.00 | 230.00 | 2 |
| 34 | 392.00 | 230.00 | 397.00 | 225.00 | 3 |
| 35 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 36 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 37 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 38 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 39 | 556.00 | 244.00 | 686.00 | 300.00 | 2 |
| 40 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 711.00 | 320.00 | 743.00 | 287.00 | 2 |
| 42 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 43 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 44 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |
| 45 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 46 | 556.00 | 244.00 | 670.00 | 267.00 | 3 |
| 47 | 670.00 | 267.00 | 743.00 | 287.00 | 3 |
| 48 | 339.00 | 225.00 | 392.00 | 230.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 200.00 | 24.00 |
| 2 | 10.0 | 0.00 | 8.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 40.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 650.00 | 245.00 | 750.00 | 263.00 | 80.00 |
| 2 | 800.00 | 271.00 | 900.00 | 289.00 | 80.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 9999

Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial
Failure Surfaces to 5000 or less.
Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***

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 | 7.8 | 4103.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 1.5 | 1691.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 9.1 | 18407.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 5.9 | 17037.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 25.0 | 88580.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 10.0 | 41449.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 18.1 | 80078.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 6.9 | 32487.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 26.0 | 120025.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 33.0 | 169198.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 8.0 | 46200.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 16.1 | 97135.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 20.4 | 98873.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 24.5 | 54752.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 0.9 | 914.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 5.1 | 3172.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 2.8 | 342.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***





Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Factor of Safety
*** 1.988 ***

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

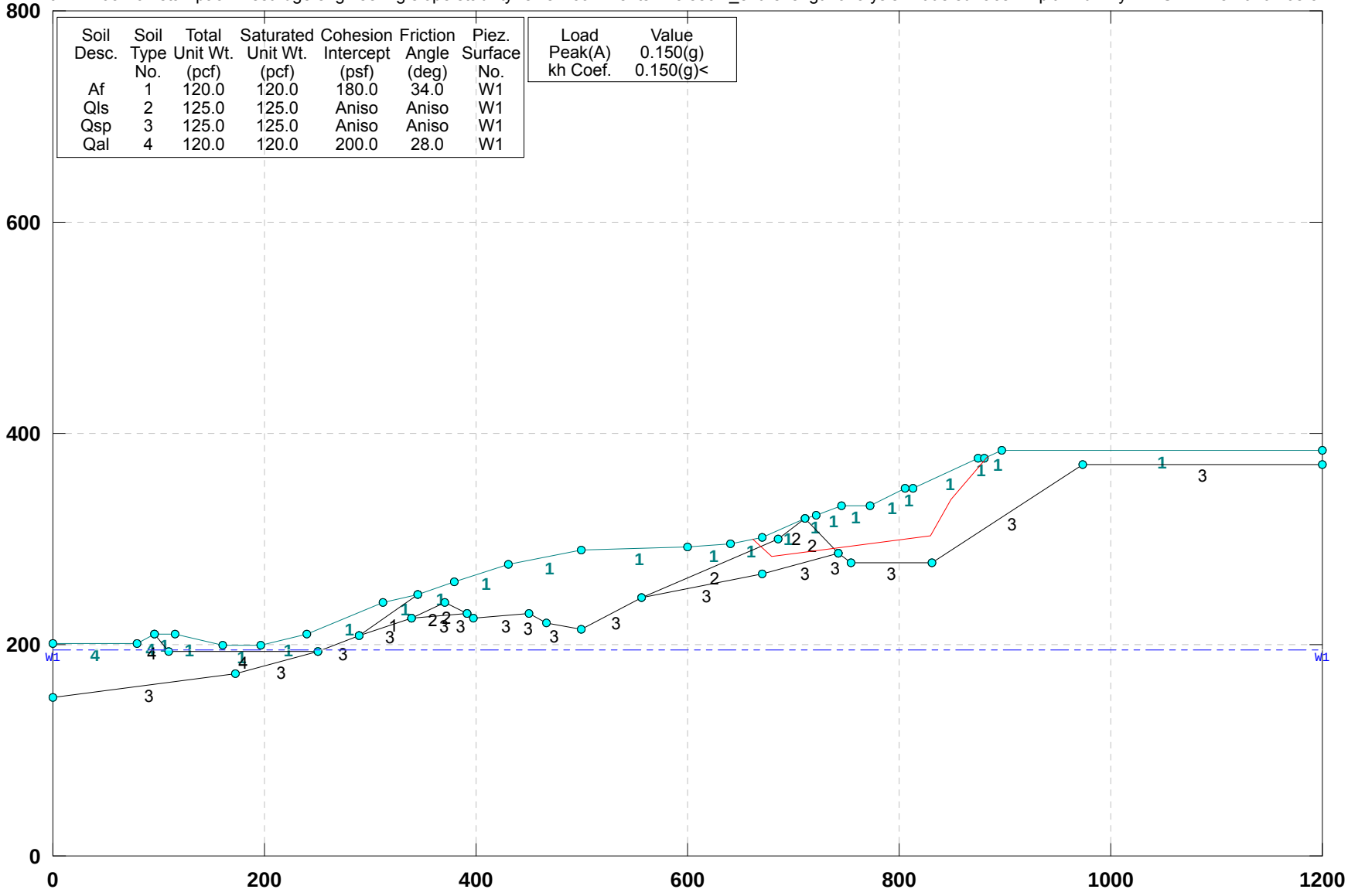
#23 Entire length

# Westridge/14057-01/Sec 1-1'/Entire Length - Upper Section/Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#23 sec 1_entire length analysis\x1tlue surface #1.plt Run By: KMS 11/18/2016 08:52AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.50**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:  11/18/2016
Time of Run:  08:52AM
Run By:  KMS
Input Data Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tlue Surface #1.in
Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tlue Surface #1.OUT
**Unit System:  English**
Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#23 Sec 1_Entire Length Analysis\x1tlue Surface #1.PLT
PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 1-1'/Entire Length - Upper Section/Seismic

BOUNDARY COORDINATES
24 Top Boundaries
48 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 201.00 | 79.00 | 201.00 | 4 |
| 2 | 79.00 | 201.00 | 96.00 | 210.00 | 4 |
| 3 | 96.00 | 210.00 | 116.00 | 210.00 | 1 |
| 4 | 116.00 | 210.00 | 160.00 | 200.00 | 1 |
| 5 | 160.00 | 200.00 | 196.00 | 200.00 | 1 |
| 6 | 196.00 | 200.00 | 240.00 | 210.00 | 1 |
| 7 | 240.00 | 210.00 | 312.00 | 240.00 | 1 |
| 8 | 312.00 | 240.00 | 345.00 | 248.00 | 1 |
| 9 | 345.00 | 248.00 | 380.00 | 260.00 | 1 |
| 10 | 380.00 | 260.00 | 430.00 | 276.00 | 1 |
| 11 | 430.00 | 276.00 | 500.00 | 290.00 | 1 |
| 12 | 500.00 | 290.00 | 600.00 | 292.00 | 1 |
| 13 | 600.00 | 292.00 | 641.00 | 295.00 | 1 |
| 14 | 641.00 | 295.00 | 671.00 | 302.00 | 1 |
| 15 | 671.00 | 302.00 | 711.00 | 320.00 | 1 |
| 16 | 711.00 | 320.00 | 721.00 | 323.00 | 1 |
| 17 | 721.00 | 323.00 | 746.00 | 332.00 | 1 |
| 18 | 746.00 | 332.00 | 772.00 | 332.00 | 1 |
| 19 | 772.00 | 332.00 | 805.00 | 348.00 | 1 |
| 20 | 805.00 | 348.00 | 813.00 | 348.00 | 1 |
| 21 | 813.00 | 348.00 | 874.00 | 376.00 | 1 |
| 22 | 874.00 | 376.00 | 880.00 | 376.00 | 1 |
| 23 | 880.00 | 376.00 | 897.00 | 384.00 | 1 |
| 24 | 897.00 | 384.00 | 1200.00 | 384.00 | 1 |
| 25 | 96.00 | 210.00 | 109.00 | 194.00 | 4 |
| 26 | 109.00 | 194.00 | 250.00 | 194.00 | 4 |
| 27 | 250.00 | 194.00 | 290.00 | 209.00 | 3 |
| 28 | 290.00 | 209.00 | 345.00 | 248.00 | 1 |
| 29 | 0.00 | 150.00 | 173.00 | 173.00 | 3 |
| 30 | 173.00 | 173.00 | 250.00 | 194.00 | 3 |
| 31 | 290.00 | 209.00 | 339.00 | 225.00 | 3 |
| 32 | 339.00 | 225.00 | 370.00 | 240.00 | 2 |
| 33 | 370.00 | 240.00 | 392.00 | 230.00 | 2 |
| 34 | 392.00 | 230.00 | 397.00 | 225.00 | 3 |
| 35 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 36 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 37 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 38 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 39 | 556.00 | 244.00 | 686.00 | 300.00 | 2 |
| 40 | 686.00 | 300.00 | 711.00 | 320.00 | 2 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 711.00 | 320.00 | 743.00 | 287.00 | 2 |
| 42 | 743.00 | 287.00 | 754.00 | 277.00 | 3 |
| 43 | 754.00 | 277.00 | 831.00 | 277.00 | 3 |
| 44 | 831.00 | 277.00 | 974.00 | 371.00 | 3 |
| 45 | 974.00 | 371.00 | 1200.00 | 371.00 | 3 |
| 46 | 556.00 | 244.00 | 670.00 | 267.00 | 3 |
| 47 | 670.00 | 267.00 | 743.00 | 287.00 | 3 |
| 48 | 339.00 | 225.00 | 392.00 | 230.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 200.00 | 24.00 |
| 2 | 10.0 | 0.00 | 8.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type  3 Is Anisotropic
Number Of Direction Ranges Specified =  3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 34.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  2 Coordinate Points
Pore Pressure Inclination Factor =  0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1200.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) =  0.150(g)
Specified Horizontal Earthquake Coefficient (kh) =  0.150(g)
Specified Vertical Earthquake Coefficient (kv) =  0.000(g)
Specified Seismic Pore-Pressure Factor =  0.000
Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
Trial Failure Surface Specified By  6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 661.718 | 299.834 |
| 2 | 680.121 | 283.522 |
| 3 | 829.095 | 302.424 |
| 4 | 849.474 | 336.843 |
| 5 | 874.868 | 367.749 |
| 6 | 882.782 | 377.309 |

Janbu's Empirical Coefficient (fo) =  1.077
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface =  1.504

***Table 1 - 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 | 7.8 | 4103.6 | 0.0 | 0.0 | 0.0 | 0.0 | 615.5 | 0.0 | 0.0 |
| 2 | 1.5 | 1691.7 | 0.0 | 0.0 | 0.0 | 0.0 | 253.7 | 0.0 | 0.0 |
| 3 | 9.1 | 18408.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2761.2 | 0.0 | 0.0 |
| 4 | 5.9 | 17037.8 | 0.0 | 0.0 | 0.0 | 0.0 | 2555.7 | 0.0 | 0.0 |
| 5 | 25.0 | 88581.4 | 0.0 | 0.0 | 0.0 | 0.0 | 13287.2 | 0.0 | 0.0 |
| 6 | 10.0 | 41449.2 | 0.0 | 0.0 | 0.0 | 0.0 | 6217.4 | 0.0 | 0.0 |
| 7 | 18.1 | 80079.1 | 0.0 | 0.0 | 0.0 | 0.0 | 12011.9 | 0.0 | 0.0 |
| 8 | 6.9 | 32486.6 | 0.0 | 0.0 | 0.0 | 0.0 | 4873.0 | 0.0 | 0.0 |
| 9 | 26.0 | 120025.6 | 0.0 | 0.0 | 0.0 | 0.0 | 18003.8 | 0.0 | 0.0 |
| 10 | 33.0 | 169197.9 | 0.0 | 0.0 | 0.0 | 0.0 | 25379.7 | 0.0 | 0.0 |
| 11 | 8.0 | 46200.7 | 0.0 | 0.0 | 0.0 | 0.0 | 6930.1 | 0.0 | 0.0 |
| 12 | 16.1 | 97132.3 | 0.0 | 0.0 | 0.0 | 0.0 | 14569.8 | 0.0 | 0.0 |
| 13 | 20.4 | 98874.7 | 0.0 | 0.0 | 0.0 | 0.0 | 14831.2 | 0.0 | 0.0 |
| 14 | 24.5 | 54751.5 | 0.0 | 0.0 | 0.0 | 0.0 | 8212.7 | 0.0 | 0.0 |
| 15 | 0.9 | 914.4 | 0.0 | 0.0 | 0.0 | 0.0 | 137.2 | 0.0 | 0.0 |
| 16 | 5.1 | 3172.4 | 0.0 | 0.0 | 0.0 | 0.0 | 475.9 | 0.0 | 0.0 |
| 17 | 2.8 | 342.4 | 0.0 | 0.0 | 0.0 | 0.0 | 51.4 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 17 Slices***

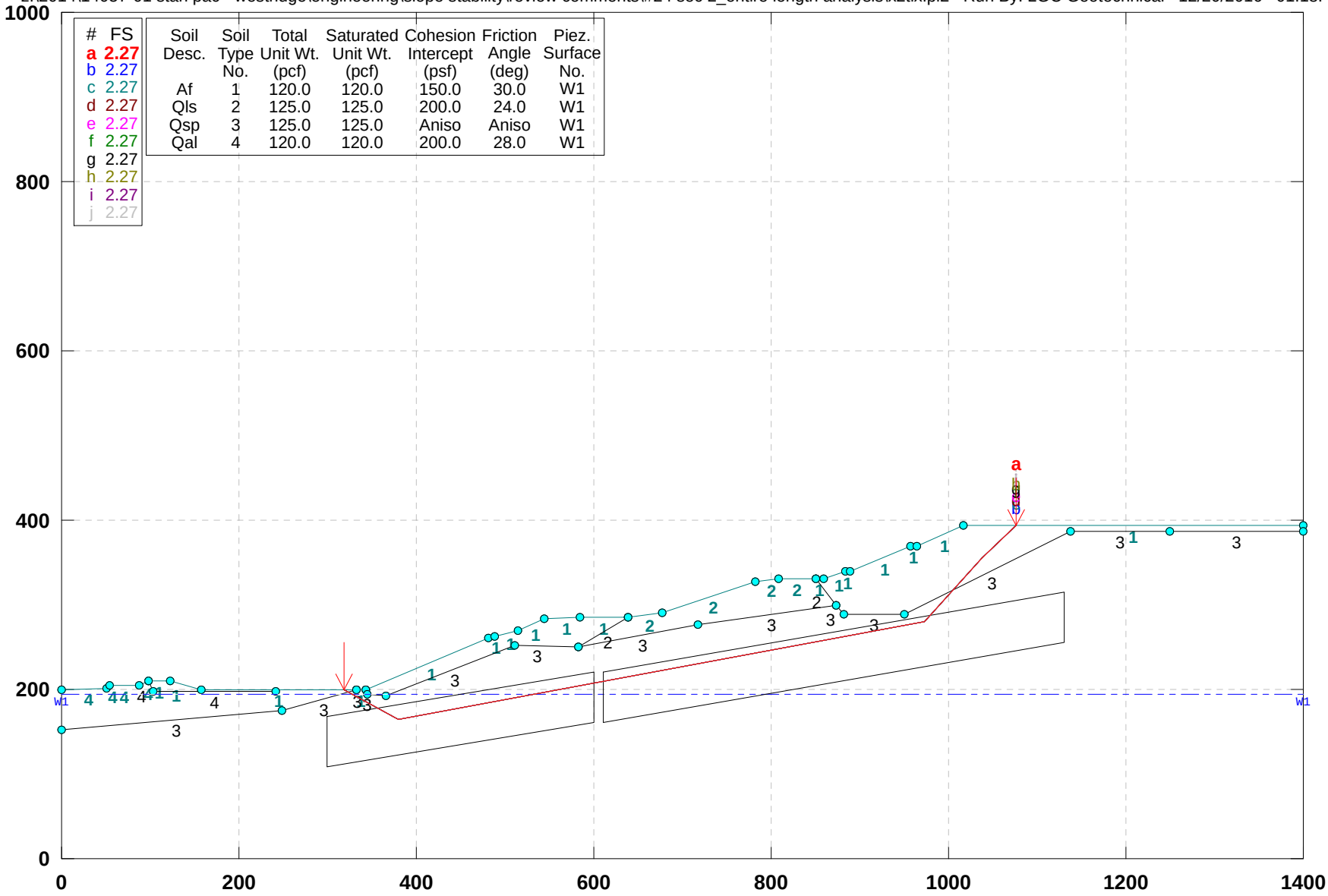
| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -41.55 | 665.63 | 10.44 | 1184.68 | -289.35 |
| 2 | -41.55 | 670.27 | 1.96 | 1292.69 | -635.65 |
| 3 | -41.55 | 675.56 | 12.19 | 1990.17 | -1112.19 |
| 4 | 7.23 | 683.06 | 5.93 | 405.75 | 796.04 |
| 5 | 7.23 | 698.50 | 25.20 | 496.08 | 973.26 |
| 6 | 7.23 | 716.00 | 10.08 | 580.32 | 1138.52 |
| 7 | 7.23 | 730.06 | 18.26 | 618.94 | 1214.29 |
| 8 | 7.23 | 742.56 | 6.94 | 3206.83 | 1295.93 |
| 9 | 7.23 | 759.00 | 26.21 | 3141.45 | 1268.02 |
| 10 | 7.23 | 788.50 | 33.26 | 3470.08 | 1408.34 |
| 11 | 7.23 | 809.00 | 8.06 | 3886.87 | 1586.29 |
| 12 | 7.23 | 821.05 | 16.22 | 4054.03 | 1657.67 |
| 13 | 59.37 | 839.28 | 40.00 | 3856.17 | 4545.66 |
| 14 | 50.59 | 861.74 | 38.63 | 1717.88 | 1937.42 |
| 15 | 50.59 | 874.43 | 1.37 | 907.56 | 914.30 |
| 16 | 50.38 | 877.43 | 8.05 | 607.22 | 535.29 |
| 17 | 50.38 | 881.39 | 4.36 | 267.55 | 106.59 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 609548.81 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2281.49(psf)
Sum of the Driving Forces = 436528.09 (lbs)
Average Mobilized Shear Stress = 1633.89(psf)
Total length of the failure surface = 267.17(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3610(g)
Calculated Newmark Seismic Displacement = 0.003(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

#24 Entire length

# Westridge/14057-01/Sec 2-2" / Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#24 sec 2_entire length analysis\x2tlx.pl2 Run By: LGC Geotechnical 12/20/2016 01:18PM



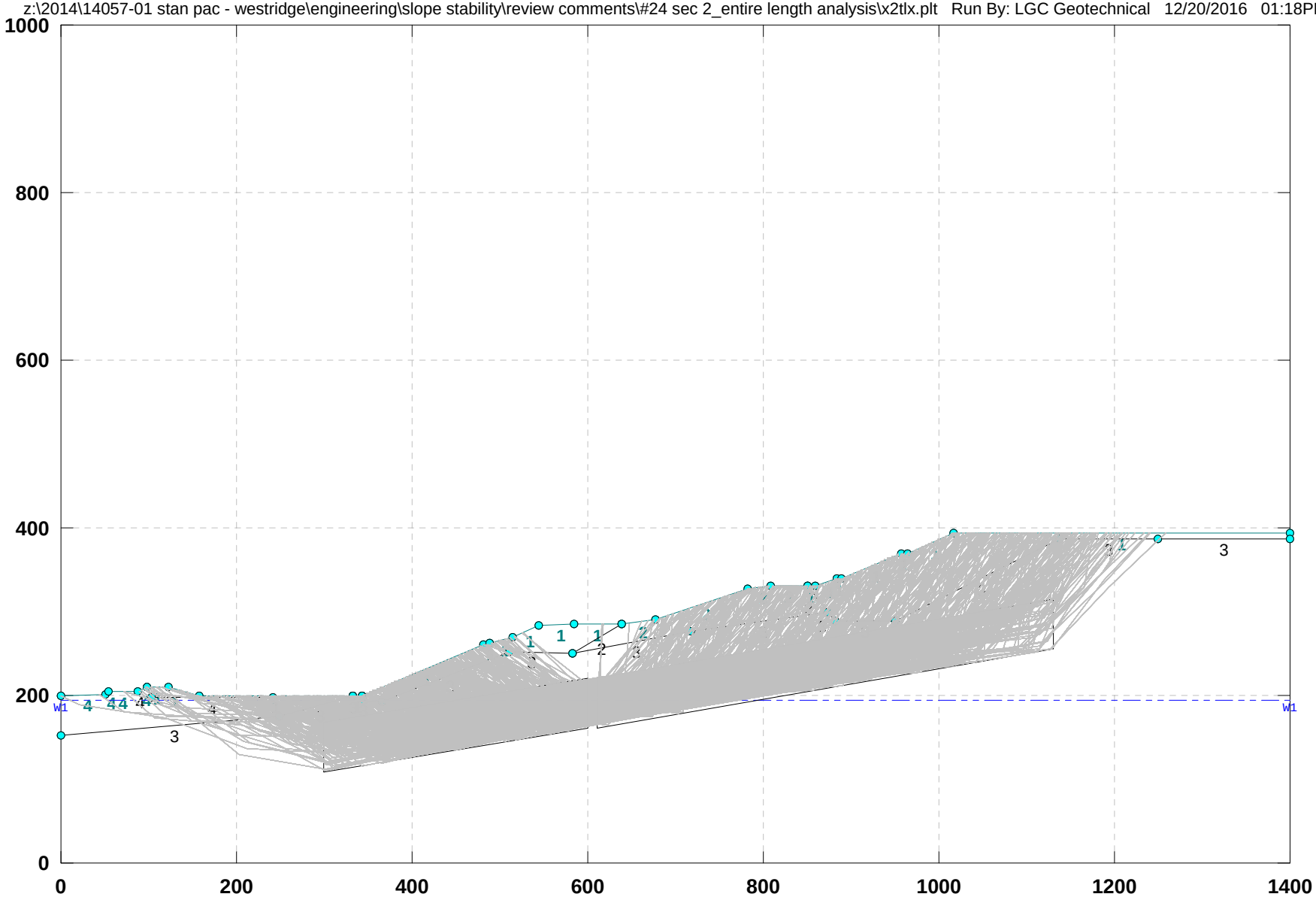

**GSTABL7 v.2 FSmin=2.27**

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

#24 Entire length

# Westridge/14057-01/Sec 2-2" / Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#24 sec 2_entire length analysis\x2tlx.plt Run By: LGC Geotechnical 12/20/2016 01:18PM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 12/20/2016
Time of Run: 01:18PM
Run By: LGC Geotechnical
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#24 Sec 2_Entire Length Analysis\x2tlx.in
**Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#24 Sec 2_Entire Length Analysis\x2tlx.OUT**
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#24 Sec 2_Entire Length Analysis\x2tlx.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 2-2" / Entire Length / Static

BOUNDARY COORDINATES
25 Top Boundaries
42 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 51.00 | 202.00 | 4 |
| 2 | 51.00 | 202.00 | 55.00 | 205.00 | 4 |
| 3 | 55.00 | 205.00 | 87.00 | 204.00 | 4 |
| 4 | 87.00 | 204.00 | 98.00 | 210.00 | 4 |
| 5 | 98.00 | 210.00 | 122.00 | 210.00 | 1 |
| 6 | 122.00 | 210.00 | 157.00 | 200.00 | 1 |
| 7 | 157.00 | 200.00 | 332.00 | 200.00 | 1 |
| 8 | 332.00 | 200.00 | 343.00 | 200.00 | 1 |
| 9 | 343.00 | 200.00 | 482.00 | 260.00 | 1 |
| 10 | 482.00 | 260.00 | 489.00 | 262.00 | 1 |
| 11 | 489.00 | 262.00 | 515.00 | 270.00 | 1 |
| 12 | 515.00 | 270.00 | 545.00 | 283.00 | 1 |
| 13 | 545.00 | 283.00 | 584.00 | 285.00 | 1 |
| 14 | 584.00 | 285.00 | 639.00 | 285.00 | 1 |
| 15 | 639.00 | 285.00 | 677.00 | 290.00 | 2 |
| 16 | 677.00 | 290.00 | 783.00 | 327.00 | 2 |
| 17 | 783.00 | 327.00 | 809.00 | 331.00 | 2 |
| 18 | 809.00 | 331.00 | 850.00 | 330.00 | 2 |
| 19 | 850.00 | 330.00 | 860.00 | 330.00 | 1 |
| 20 | 860.00 | 330.00 | 883.00 | 339.00 | 1 |
| 21 | 883.00 | 339.00 | 889.00 | 339.00 | 1 |
| 22 | 889.00 | 339.00 | 957.00 | 370.00 | 1 |
| 23 | 957.00 | 370.00 | 965.00 | 370.00 | 1 |
| 24 | 965.00 | 370.00 | 1017.00 | 394.00 | 1 |
| 25 | 1017.00 | 394.00 | 1400.00 | 394.00 | 1 |
| 26 | 98.00 | 210.00 | 103.00 | 197.00 | 4 |
| 27 | 103.00 | 197.00 | 241.00 | 198.00 | 4 |
| 28 | 343.00 | 200.00 | 345.00 | 194.00 | 3 |
| 29 | 345.00 | 194.00 | 366.00 | 193.00 | 3 |
| 30 | 366.00 | 193.00 | 511.00 | 252.00 | 3 |
| 31 | 511.00 | 252.00 | 582.00 | 250.00 | 3 |
| 32 | 582.00 | 250.00 | 639.00 | 285.00 | 2 |
| 33 | 0.00 | 153.00 | 249.00 | 175.00 | 3 |
| 34 | 249.00 | 175.00 | 332.00 | 200.00 | 3 |
| 35 | 850.00 | 330.00 | 874.00 | 300.00 | 2 |
| 36 | 874.00 | 300.00 | 882.00 | 289.00 | 3 |
| 37 | 882.00 | 289.00 | 951.00 | 289.00 | 3 |
| 38 | 951.00 | 289.00 | 1138.00 | 386.00 | 3 |
| 39 | 1138.00 | 386.00 | 1250.00 | 386.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 40 | 1250.00 | 386.00 | 1400.00 | 386.00 | 3 |
| 41 | 582.00 | 250.00 | 718.00 | 277.00 | 3 |
| 42 | 718.00 | 277.00 | 874.00 | 300.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

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

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 300.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1400.00 | 195.00 |

Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 100.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 300.00 | 138.00 | 600.00 | 191.00 | 60.00 |
| 2 | 610.00 | 191.00 | 1130.00 | 285.00 | 60.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 9999
Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.
Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Factor of Safety

*** 2.268 ***
Individual data on the 36 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 | 4.7 | 757.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 4.0 | 1861.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 5.0 | 4050.8 | 0.0 | 531.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 11.0 | 14672.9 | 0.0 | 4853.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 1.7 | 3132.6 | 0.0 | 1177.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 0.3 | 663.0 | 0.0 | 249.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 21.0 | 69513.9 | 0.0 | 25092.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 4.9 | 24201.8 | 0.0 | 8539.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.3 | 53931.1 | 0.0 | 18850.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 101.8 | 804662.8 | 0.0 | ******* | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 7.0 | 66094.6 | 0.0 | 4589.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 22.0 | 212161.0 | 0.0 | 10461.6 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 4.0 | 39313.4 | 0.0 | 1256.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 23.3 | 236893.9 | 0.0 | 3367.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 6.7 | 71046.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 37.0 | 382425.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 2.0 | 19960.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 55.0 | 515782.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 38.0 | 328295.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 41.0 | 364153.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 65.0 | 643508.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 22 | 26.0 | 271886.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 23 | 41.0 | 402892.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 24 | 10.0 | 91102.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 25 | 14.0 | 126992.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 26 | 8.0 | 73980.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 27 | 1.0 | 9321.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 28 | 6.0 | 55557.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 29 | 62.0 | 627762.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 30 | 6.0 | 66976.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 31 | 8.0 | 89392.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 32 | 7.2 | 80304.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 33 | 32.4 | 322035.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 34 | 12.5 | 100645.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 35 | 21.0 | 128360.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 36 | 38.1 | 89003.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Factor of Safety
*** 2.268 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Factor of Safety
*** 2.268 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |



Factor of Safety
*** 2.268 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Factor of Safety
*** 2.268 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Factor of Safety
*** 2.268 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Factor of Safety
*** 2.268 ***

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Factor of Safety
*** 2.268 ***

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

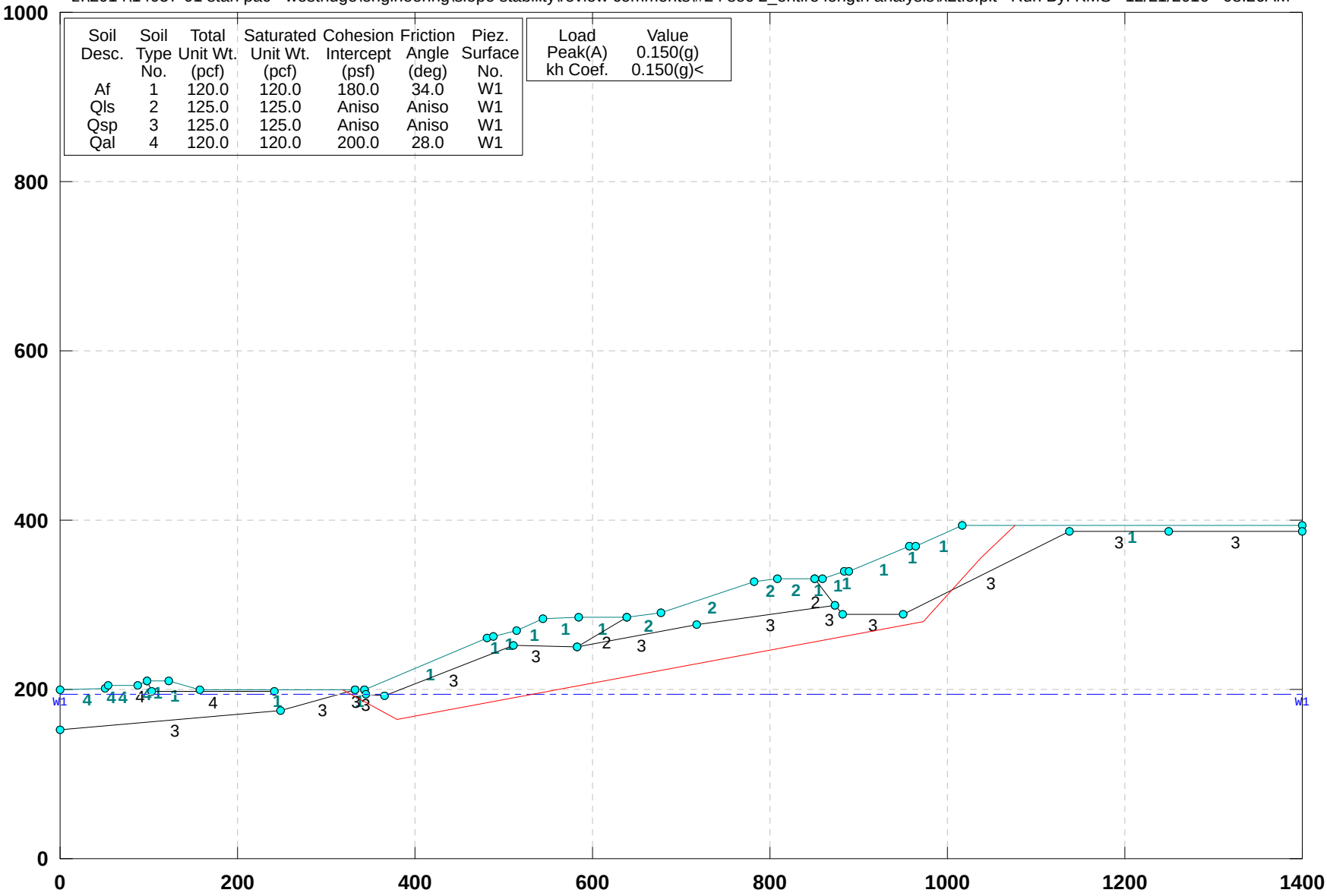
#24 Entire length

# Westridge/14057-01/Sec 2-2'/ Entire Length / Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#24 sec 2_entire length analysis\x2tle.plt Run By: KMS 12/21/2016 08:26AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.42**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 12/21/2016
Time of Run: 08:26AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#24 Sec 2_Entire Length Analysis\x2tle Surface #1.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#24 Sec 2_Entire Length Analysis\x2tle Surface #1.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#24 Sec 2_Entire Length Analysis\x2tle Surface #1.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 2-2'/ Entire Length / Seismic

BOUNDARY COORDINATES
25 Top Boundaries
42 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 200.00 | 51.00 | 202.00 | 4 |
| 2 | 51.00 | 202.00 | 55.00 | 205.00 | 4 |
| 3 | 55.00 | 205.00 | 87.00 | 204.00 | 4 |
| 4 | 87.00 | 204.00 | 98.00 | 210.00 | 4 |
| 5 | 98.00 | 210.00 | 122.00 | 210.00 | 1 |
| 6 | 122.00 | 210.00 | 157.00 | 200.00 | 1 |
| 7 | 157.00 | 200.00 | 332.00 | 200.00 | 1 |
| 8 | 332.00 | 200.00 | 343.00 | 200.00 | 1 |
| 9 | 343.00 | 200.00 | 482.00 | 260.00 | 1 |
| 10 | 482.00 | 260.00 | 489.00 | 262.00 | 1 |
| 11 | 489.00 | 262.00 | 515.00 | 270.00 | 1 |
| 12 | 515.00 | 270.00 | 545.00 | 283.00 | 1 |
| 13 | 545.00 | 283.00 | 584.00 | 285.00 | 1 |
| 14 | 584.00 | 285.00 | 639.00 | 285.00 | 1 |
| 15 | 639.00 | 285.00 | 677.00 | 290.00 | 2 |
| 16 | 677.00 | 290.00 | 783.00 | 327.00 | 2 |
| 17 | 783.00 | 327.00 | 809.00 | 331.00 | 2 |
| 18 | 809.00 | 331.00 | 850.00 | 330.00 | 2 |
| 19 | 850.00 | 330.00 | 860.00 | 330.00 | 1 |
| 20 | 860.00 | 330.00 | 883.00 | 339.00 | 1 |
| 21 | 883.00 | 339.00 | 889.00 | 339.00 | 1 |
| 22 | 889.00 | 339.00 | 957.00 | 370.00 | 1 |
| 23 | 957.00 | 370.00 | 965.00 | 370.00 | 1 |
| 24 | 965.00 | 370.00 | 1017.00 | 394.00 | 1 |
| 25 | 1017.00 | 394.00 | 1400.00 | 394.00 | 1 |
| 26 | 98.00 | 210.00 | 103.00 | 197.00 | 4 |
| 27 | 103.00 | 197.00 | 241.00 | 198.00 | 4 |
| 28 | 343.00 | 200.00 | 345.00 | 194.00 | 3 |
| 29 | 345.00 | 194.00 | 366.00 | 193.00 | 3 |
| 30 | 366.00 | 193.00 | 511.00 | 252.00 | 3 |
| 31 | 511.00 | 252.00 | 582.00 | 250.00 | 3 |
| 32 | 582.00 | 250.00 | 639.00 | 285.00 | 2 |
| 33 | 0.00 | 153.00 | 249.00 | 175.00 | 3 |
| 34 | 249.00 | 175.00 | 332.00 | 200.00 | 3 |
| 35 | 850.00 | 330.00 | 874.00 | 300.00 | 2 |
| 36 | 874.00 | 300.00 | 882.00 | 289.00 | 3 |
| 37 | 882.00 | 289.00 | 951.00 | 289.00 | 3 |
| 38 | 951.00 | 289.00 | 1138.00 | 386.00 | 3 |
| 39 | 1138.00 | 386.00 | 1250.00 | 386.00 | 3 |
| 40 | 1250.00 | 386.00 | 1400.00 | 386.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 582.00 | 250.00 | 718.00 | 277.00 | 3 |
| 42 | 718.00 | 277.00 | 874.00 | 300.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
2 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 200.00 | 24.00 |
| 2 | 10.0 | 0.00 | 8.00 |
| 3 | 90.0 | 200.00 | 24.00 |

Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 2 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 195.00 |
| 2 | 1400.00 | 195.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 318.345 | 200.000 |
| 2 | 380.182 | 164.115 |
| 3 | 972.166 | 279.756 |
| 4 | 1037.988 | 355.038 |
| 5 | 1076.061 | 394.000 |

Janbu's Empirical Coefficient (fo) = 1.046
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 1.424

***Table 1 - Individual Data on the 36 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 | 4.7 | 758.0 | 0.0 | 0.0 | 0.0 | 0.0 | 113.7 | 0.0 | 0.0 |
| 2 | 4.0 | 1861.2 | 0.0 | 0.0 | 0.0 | 0.0 | 279.2 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 5.0 | 4051.2 | 0.0 | 531.5 | 0.0 | 0.0 | 607.7 | 0.0 | 0.0 |
| 4 | 11.0 | 14673.1 | 0.0 | 4853.7 | 0.0 | 0.0 | 2201.0 | 0.0 | 0.0 |
| 5 | 1.7 | 3132.6 | 0.0 | 1177.3 | 0.0 | 0.0 | 469.9 | 0.0 | 0.0 |
| 6 | 0.3 | 663.0 | 0.0 | 249.4 | 0.0 | 0.0 | 99.4 | 0.0 | 0.0 |
| 7 | 21.0 | 69513.9 | 0.0 | 25092.0 | 0.0 | 0.0 | 10427.1 | 0.0 | 0.0 |
| 8 | 4.9 | 24201.8 | 0.0 | 8539.6 | 0.0 | 0.0 | 3630.3 | 0.0 | 0.0 |
| 9 | 9.3 | 53931.8 | 0.0 | 18850.8 | 0.0 | 0.0 | 8089.8 | 0.0 | 0.0 |
| 10 | 101.8 | 804661.1 | 0.0 | ******* | 0.0 | 0.0 | ******* | 0.0 | 0.0 |
| 11 | 7.0 | 66094.6 | 0.0 | 4589.3 | 0.0 | 0.0 | 9914.2 | 0.0 | 0.0 |
| 12 | 22.0 | 212160.8 | 0.0 | 10461.5 | 0.0 | 0.0 | 31824.1 | 0.0 | 0.0 |
| 13 | 4.0 | 39313.3 | 0.0 | 1256.2 | 0.0 | 0.0 | 5897.0 | 0.0 | 0.0 |
| 14 | 23.3 | 236888.5 | 0.0 | 3367.6 | 0.0 | 0.0 | 35533.3 | 0.0 | 0.0 |
| 15 | 6.7 | 71051.8 | 0.0 | 0.0 | 0.0 | 0.0 | 10657.8 | 0.0 | 0.0 |
| 16 | 37.0 | 382424.6 | 0.0 | 0.0 | 0.0 | 0.0 | 57363.7 | 0.0 | 0.0 |
| 17 | 2.0 | 19960.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2994.0 | 0.0 | 0.0 |
| 18 | 55.0 | 515781.7 | 0.0 | 0.0 | 0.0 | 0.0 | 77367.3 | 0.0 | 0.0 |
| 19 | 38.0 | 328294.8 | 0.0 | 0.0 | 0.0 | 0.0 | 49244.2 | 0.0 | 0.0 |
| 20 | 41.0 | 364152.9 | 0.0 | 0.0 | 0.0 | 0.0 | 54622.9 | 0.0 | 0.0 |
| 21 | 65.0 | 643507.8 | 0.0 | 0.0 | 0.0 | 0.0 | 96526.2 | 0.0 | 0.0 |
| 22 | 26.0 | 271885.6 | 0.0 | 0.0 | 0.0 | 0.0 | 40782.8 | 0.0 | 0.0 |
| 23 | 41.0 | 402891.9 | 0.0 | 0.0 | 0.0 | 0.0 | 60433.8 | 0.0 | 0.0 |
| 24 | 10.0 | 91102.2 | 0.0 | 0.0 | 0.0 | 0.0 | 13665.3 | 0.0 | 0.0 |
| 25 | 14.0 | 126992.6 | 0.0 | 0.0 | 0.0 | 0.0 | 19048.9 | 0.0 | 0.0 |
| 26 | 8.0 | 73980.6 | 0.0 | 0.0 | 0.0 | 0.0 | 11097.1 | 0.0 | 0.0 |
| 27 | 1.0 | 9321.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1398.2 | 0.0 | 0.0 |
| 28 | 6.0 | 55557.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8333.6 | 0.0 | 0.0 |
| 29 | 62.0 | 627760.8 | 0.0 | 0.0 | 0.0 | 0.0 | 94164.1 | 0.0 | 0.0 |
| 30 | 6.0 | 66976.4 | 0.0 | 0.0 | 0.0 | 0.0 | 10046.5 | 0.0 | 0.0 |
| 31 | 8.0 | 89392.7 | 0.0 | 0.0 | 0.0 | 0.0 | 13408.9 | 0.0 | 0.0 |
| 32 | 7.2 | 80309.1 | 0.0 | 0.0 | 0.0 | 0.0 | 12046.4 | 0.0 | 0.0 |
| 33 | 32.4 | 322026.3 | 0.0 | 0.0 | 0.0 | 0.0 | 48303.9 | 0.0 | 0.0 |
| 34 | 12.5 | 100649.3 | 0.0 | 0.0 | 0.0 | 0.0 | 15097.4 | 0.0 | 0.0 |
| 35 | 21.0 | 128356.6 | 0.0 | 0.0 | 0.0 | 0.0 | 19253.5 | 0.0 | 0.0 |
| 36 | 38.1 | 89004.1 | 0.0 | 0.0 | 0.0 | 0.0 | 13350.6 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 36 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -30.13 | 320.68 | 5.39 | 461.78 | -60.46 |
| 2 | -30.13 | 324.99 | 4.57 | 1232.43 | -175.36 |
| 3 | -30.13 | 329.48 | 5.83 | 1466.60 | -299.23 |
| 4 | -30.13 | 337.50 | 12.72 | 1311.32 | -496.46 |
| 5 | -30.13 | 343.83 | 1.93 | 2005.46 | -699.55 |
| 6 | -30.13 | 344.83 | 0.39 | 2076.35 | -740.24 |
| 7 | -30.13 | 355.50 | 24.28 | 2982.75 | -1232.00 |
| 8 | -30.13 | 368.46 | 5.68 | 4092.14 | -1832.57 |
| 9 | -30.13 | 375.55 | 10.71 | 4711.91 | -2166.09 |
| 10 | 11.05 | 431.09 | 103.74 | 3391.17 | 2678.61 |
| 11 | 11.05 | 485.50 | 7.13 | 4459.82 | 3200.28 |
| 12 | 11.05 | 500.00 | 22.42 | 4643.40 | 3268.61 |
| 13 | 11.05 | 513.00 | 4.08 | 4809.90 | 3331.20 |
| 14 | 11.05 | 526.64 | 23.73 | 5057.63 | 3447.88 |
| 15 | 11.05 | 541.64 | 6.84 | 5326.22 | 3587.39 |
| 16 | 11.05 | 563.50 | 37.70 | 5205.70 | 3503.20 |
| 17 | 11.05 | 583.00 | 2.04 | 5033.11 | 3382.64 |
| 18 | 11.05 | 611.50 | 56.04 | 4740.87 | 3178.51 |
| 19 | 11.05 | 658.00 | 38.72 | 4382.52 | 2928.20 |
| 20 | 11.05 | 697.50 | 41.77 | 4500.17 | 3010.38 |
| 21 | 11.05 | 750.50 | 66.23 | 4994.29 | 3355.53 |
| 22 | 11.05 | 796.00 | 26.49 | 5264.58 | 3544.33 |
| 23 | 11.05 | 829.50 | 41.77 | 4958.64 | 3330.62 |
| 24 | 11.05 | 855.00 | 10.19 | 4611.01 | 3087.80 |
| 25 | 11.05 | 867.00 | 14.26 | 4591.93 | 3074.48 |
| 26 | 11.05 | 878.00 | 8.15 | 4677.66 | 3134.36 |
| 27 | 11.05 | 882.50 | 1.02 | 4713.53 | 3159.41 |
| 28 | 11.05 | 886.00 | 6.11 | 4683.45 | 3138.40 |
| 29 | 11.05 | 920.00 | 63.17 | 5103.50 | 3431.81 |
| 30 | 11.05 | 954.00 | 6.11 | 5606.95 | 3783.48 |
| 31 | 11.05 | 961.00 | 8.15 | 5612.46 | 3787.33 |
| 32 | 11.05 | 968.58 | 7.30 | 5628.45 | 3798.50 |



| | | | | | |
|---|---|---|---|---|---|
| 33 | 48.84 | 988.34 | 49.16 | 6795.88 | 8474.97 |
| 34 | 48.84 | 1010.76 | 18.96 | 5538.39 | 6869.23 |
| 35 | 48.84 | 1027.49 | 31.89 | 4241.79 | 5207.87 |
| 36 | 45.66 | 1057.02 | 54.48 | 1692.85 | 1917.06 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 3633855.25 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 4382.66(psf)
Sum of the Driving Forces = 2670145.00 (lbs)
Average Mobilized Shear Stress = 3220.37(psf)
Total length of the failure surface = 829.14(ft)

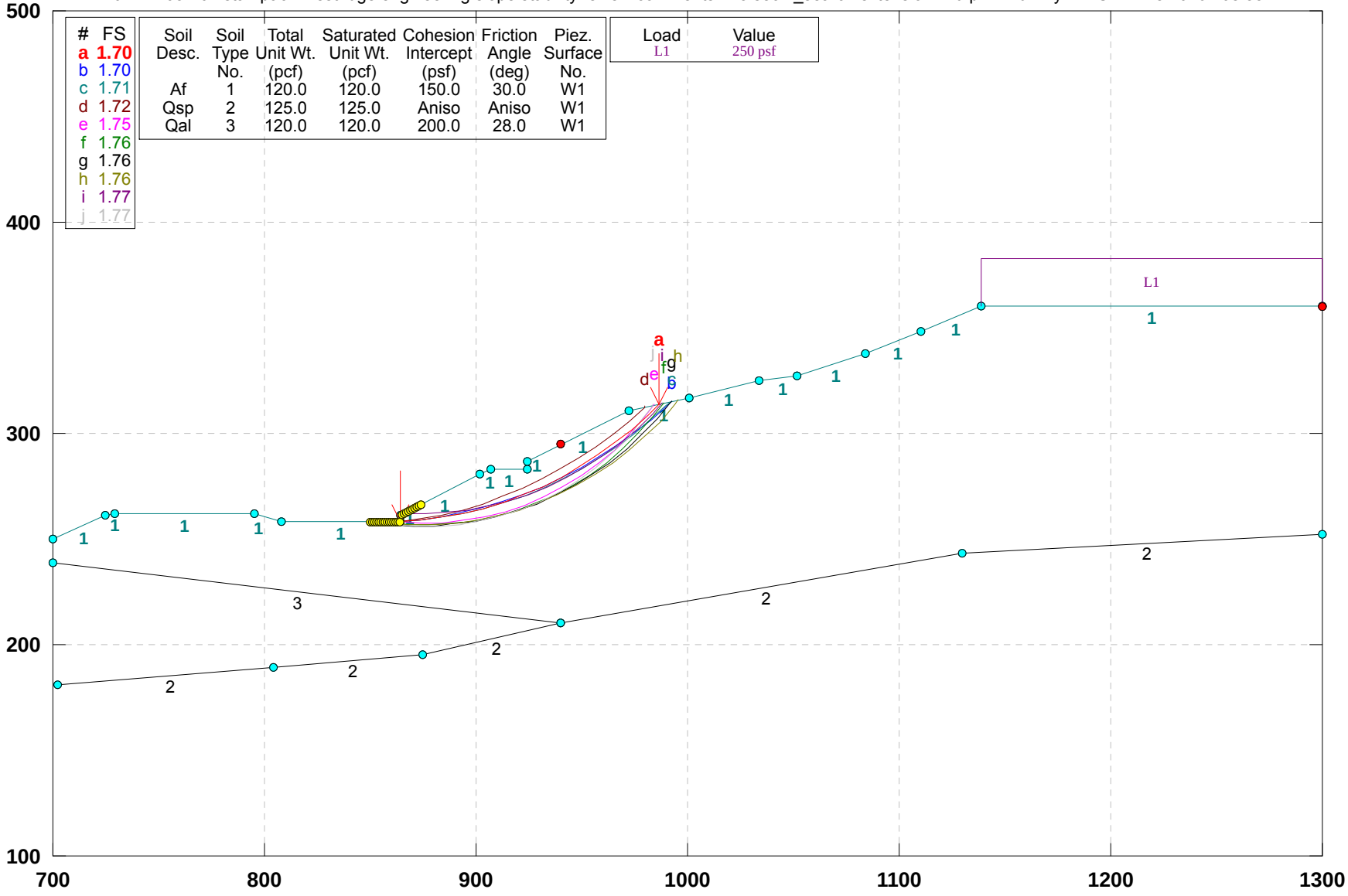
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3065(g)
Calculated Newmark Seismic Displacement = 0.003(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

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

#25 Extend search

# Westridge/14057-01/Sec 4-4'/ 4-4-16 Design - Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#25 sec 4_search extension\x4u.pl2 Run By: KMS 11/18/2016 08:55AM




**GSTABL7 v.2 FSmin=1.70**

**Safety Factors Are Calculated By The Modified Bishop Method**

```
                                  ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
          ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
              Modified Bishop, Simplified Janbu, or GLE Method of Slices.
              (Includes Spencer & Morgenstern-Price Type Analysis)
              Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
              Nonlinear Undrained Shear Strength, Curved Phi Envelope,
              Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
              Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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    Analysis Run Date:        11/18/2016
    Time of Run:              08:55AM
    Run By:                   KMS
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#25 Sec 4_Search extension\x4u.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#25 Sec 4_Search extension\x4u.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#25 Sec 4_Search extension\x4u.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 4-4'/ 4-4-16 Desi
                          gn - Upper Slope - Static
    BOUNDARY COORDINATES
       18 Top   Boundaries
       24 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        700.00     250.00     725.00     261.00        1
        2        725.00     261.00     729.00     262.00        1
        3        729.00     262.00     795.00     262.00        1
        4        795.00     262.00     808.00     258.00        1
        5        808.00     258.00     864.00     258.00        1
        6        864.00     258.00     864.10     261.00        1
        7        864.10     261.00     902.00     281.00        1
        8        902.00     281.00     907.00     283.00        1
        9        907.00     283.00     924.00     283.00        1
       10        924.00     283.00     924.10     287.00        1
       11        924.10     287.00     972.00     311.00        1
       12        972.00     311.00    1001.00     317.00        1
       13       1001.00     317.00    1034.00     325.00        1
       14       1034.00     325.00    1052.00     327.00        1
       15       1052.00     327.00    1084.00     338.00        1
       16       1084.00     338.00    1110.00     348.00        1
       17       1110.00     348.00    1139.00     360.00        1
       18       1139.00     360.00    1300.00     360.00        1
       19        700.00     239.00     940.00     210.00        3
       20        940.00     210.00    1130.00     243.00        2
       21       1130.00     243.00    1300.00     252.00        2
       22        702.00     181.00     804.00     189.00        2
       23        804.00     189.00     875.00     195.00        2
       24        875.00     195.00     940.00     210.00        2
    User Specified Y-Origin =       100.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
       1   120.0    120.0     150.0     30.0    0.00       0.0      1
       2   125.0    125.0     300.0     32.0    0.00       0.0      1
       3   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
```



```
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             300.00         32.00
        2             14.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)          (deg)
       1       1139.00      1300.00       250.0           0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Circular Surfaces, Has Been Specified.
     5000 Trial Surfaces Have Been Generated.
      200 Surface(s) Initiate(s) From Each Of    25 Points Equally Spaced
     Along The Ground Surface Between  X = 850.00(ft)
                                  and  X = 874.00(ft)
     Each Surface Terminates Between   X = 940.00(ft)
                                   and   X =1300.00(ft)
     Unless Further Limitations Were Imposed, The Minimum Elevation
     At Which A Surface Extends Is  Y =      0.00(ft)
     10.00(ft) Line Segments Define Each Trial Failure Surface.
     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 =  5000
           Number of Trial Surfaces With Valid FS = 5000
           Statistical Data On All Valid FS Values:
              FS Max =   4.466   FS Min =   1.703   FS Ave =   2.815
              Standard Deviation =    0.650   Coefficient of Variation =   23.08 %
           Failure Surface Specified By 15 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1        864.000     258.000
               2        873.963     258.860
               3        883.866     260.252
               4        893.680     262.172
               5        903.377     264.615
               6        912.929     267.573
               7        922.310     271.037
               8        931.492     274.999
               9        940.448     279.447
              10        949.154     284.367
              11        957.584     289.746
              12        965.714     295.568
              13        973.521     301.817
              14        980.983     308.475
              15        986.555     314.011
           Circle Center At X =   852.917 ; Y =   444.485 ; and Radius =   186.814
                 Factor of Safety
                ***    1.703   ***
                Individual data on the    20  slices
                          Water  Water     Tie     Tie      Earthquake
                          Force  Force     Force   Force       Force   Surcharge
    Slice  Width   Weight    Top    Bot     Norm    Tan     Hor     Ver    Load
     No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
      1      0.1      17.9     0.0    0.0       0.      0.     0.0     0.0     0.0
      2      9.9    6116.6     0.0    0.0       0.      0.     0.0     0.0     0.0
      3      9.9   11005.3     0.0    0.0       0.      0.     0.0     0.0     0.0
      4      9.8   15083.0     0.0    0.0       0.      0.     0.0     0.0     0.0
      5      8.3   15560.3     0.0    0.0       0.      0.     0.0     0.0     0.0
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 1.4 | 2781.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.6 | 7434.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 5.9 | 11629.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 9.4 | 15416.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 1.7 | 2352.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 0.1 | 158.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 7.4 | 13701.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 9.0 | 16900.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 8.7 | 16156.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 8.4 | 14778.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 8.1 | 12835.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 6.3 | 8554.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 1.5 | 1816.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 7.5 | 6214.0 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 5.6 | 1465.5 | 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 | 864.000 | 258.000 |
| 2 | 873.943 | 259.063 |
| 3 | 883.826 | 260.589 |
| 4 | 893.627 | 262.573 |
| 5 | 903.325 | 265.013 |
| 6 | 912.899 | 267.902 |
| 7 | 922.327 | 271.234 |
| 8 | 931.590 | 275.002 |
| 9 | 940.668 | 279.197 |
| 10 | 949.540 | 283.811 |
| 11 | 958.187 | 288.834 |
| 12 | 966.590 | 294.255 |
| 13 | 974.732 | 300.061 |
| 14 | 982.594 | 306.240 |
| 15 | 990.160 | 312.780 |
| 16 | 992.823 | 315.308 |

Circle Center At X = 846.294 ; Y = 471.247 ; and Radius = 213.981

Factor of Safety

*** 1.704 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.964 | 258.843 |
| 3 | 883.874 | 260.184 |
| 4 | 893.704 | 262.020 |
| 5 | 903.430 | 264.346 |
| 6 | 913.027 | 267.157 |
| 7 | 922.470 | 270.445 |
| 8 | 931.738 | 274.203 |
| 9 | 940.805 | 278.420 |
| 10 | 949.649 | 283.086 |
| 11 | 958.249 | 288.190 |
| 12 | 966.582 | 293.718 |
| 13 | 974.627 | 299.657 |
| 14 | 982.365 | 305.992 |
| 15 | 989.776 | 312.706 |
| 16 | 992.256 | 315.191 |

Circle Center At X = 852.280 ; Y = 456.692 ; and Radius = 199.037

Factor of Safety

*** 1.705 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.890 | 259.479 |
| 3 | 883.697 | 261.435 |
| 4 | 893.397 | 263.863 |
| 5 | 902.969 | 266.760 |
| 6 | 912.389 | 270.116 |
| 7 | 921.635 | 273.925 |
| 8 | 930.686 | 278.178 |



| | | |
|---|---|---|
| 9 | 939.520 | 282.864 |
| 10 | 948.116 | 287.972 |
| 11 | 956.455 | 293.491 |
| 12 | 964.517 | 299.408 |
| 13 | 972.283 | 305.709 |
| 14 | 979.734 | 312.378 |
| 15 | 980.019 | 312.659 |

Circle Center At X = 838.450 ; Y = 462.727 ; and Radius = 206.315

Factor of Safety

*** 1.721 ***

Failure Surface Specified By 15 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 864.000 | 258.000 |
| 2 | 873.986 | 257.473 |
| 3 | 883.983 | 257.701 |
| 4 | 893.935 | 258.683 |
| 5 | 903.784 | 260.413 |
| 6 | 913.475 | 262.882 |
| 7 | 922.951 | 266.076 |
| 8 | 932.159 | 269.976 |
| 9 | 941.047 | 274.560 |
| 10 | 949.563 | 279.801 |
| 11 | 957.659 | 285.671 |
| 12 | 965.289 | 292.135 |
| 13 | 972.409 | 299.157 |
| 14 | 978.979 | 306.696 |
| 15 | 984.053 | 313.494 |

Circle Center At X = 875.969 ; Y = 389.828 ; and Radius = 132.370

Factor of Safety

*** 1.750 ***

Failure Surface Specified By 16 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 858.000 | 258.000 |
| 2 | 867.951 | 257.013 |
| 3 | 877.948 | 256.749 |
| 4 | 887.937 | 257.212 |
| 5 | 897.866 | 258.397 |
| 6 | 907.684 | 260.299 |
| 7 | 917.338 | 262.908 |
| 8 | 926.777 | 266.210 |
| 9 | 935.952 | 270.187 |
| 10 | 944.814 | 274.820 |
| 11 | 953.317 | 280.082 |
| 12 | 961.416 | 285.948 |
| 13 | 969.069 | 292.385 |
| 14 | 976.235 | 299.360 |
| 15 | 982.876 | 306.836 |
| 16 | 988.716 | 314.458 |

Circle Center At X = 876.581 ; Y = 394.531 ; and Radius = 137.789

Factor of Safety

*** 1.758 ***

Failure Surface Specified By 18 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 850.000 | 258.000 |
| 2 | 859.926 | 256.786 |
| 3 | 869.911 | 256.236 |
| 4 | 879.910 | 256.352 |
| 5 | 889.880 | 257.134 |
| 6 | 899.775 | 258.578 |
| 7 | 909.552 | 260.679 |
| 8 | 919.167 | 263.425 |
| 9 | 928.578 | 266.806 |
| 10 | 937.743 | 270.806 |
| 11 | 946.622 | 275.408 |
| 12 | 955.174 | 280.591 |
| 13 | 963.361 | 286.332 |
| 14 | 971.149 | 292.606 |

```
   15        978.501      299.384
   16        985.385      306.637
   17        991.771      314.333
   18        992.415      315.224
Circle Center At X =   873.181 ; Y =   406.138 ; and Radius =   149.941
      Factor of Safety
     ***    1.761   ***
Failure Surface Specified By 18 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        851.000      258.000
    2        860.937      256.876
    3        870.925      256.393
    4        880.924      256.554
    5        890.891      257.358
    6        900.787      258.802
    7        910.568      260.879
    8        920.196      263.582
    9        929.630      266.898
   10        938.831      270.815
   11        947.761      275.315
   12        956.383      280.381
   13        964.661      285.991
   14        972.561      292.122
   15        980.050      298.749
   16        987.098      305.844
   17        993.674      313.378
   18        995.589      315.880
Circle Center At X =   873.455 ; Y =   411.443 ; and Radius =   155.077
      Factor of Safety
     ***    1.762   ***
Failure Surface Specified By 15 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        866.000      262.003
    2        876.000      261.957
    3        885.982      262.554
    4        895.905      263.791
    5        905.729      265.663
    6        915.411      268.162
    7        924.913      271.278
    8        934.196      274.998
    9        943.220      279.306
   10        951.949      284.186
   11        960.346      289.616
   12        968.377      295.574
   13        976.009      302.036
   14        983.209      308.975
   15        988.095      314.330
Circle Center At X =   871.709 ; Y =   417.477 ; and Radius =   155.580
      Factor of Safety
     ***    1.768   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        853.000      258.000
    2        862.903      256.609
    3        872.883      255.986
    4        882.882      256.132
    5        892.840      257.048
    6        902.698      258.729
    7        912.397      261.163
    8        921.880      264.338
    9        931.090      268.233
   10        939.973      272.826
   11        948.476      278.089
   12        956.548      283.992
   13        964.142      290.498
   14        971.212      297.570
   15        977.716      305.166
```

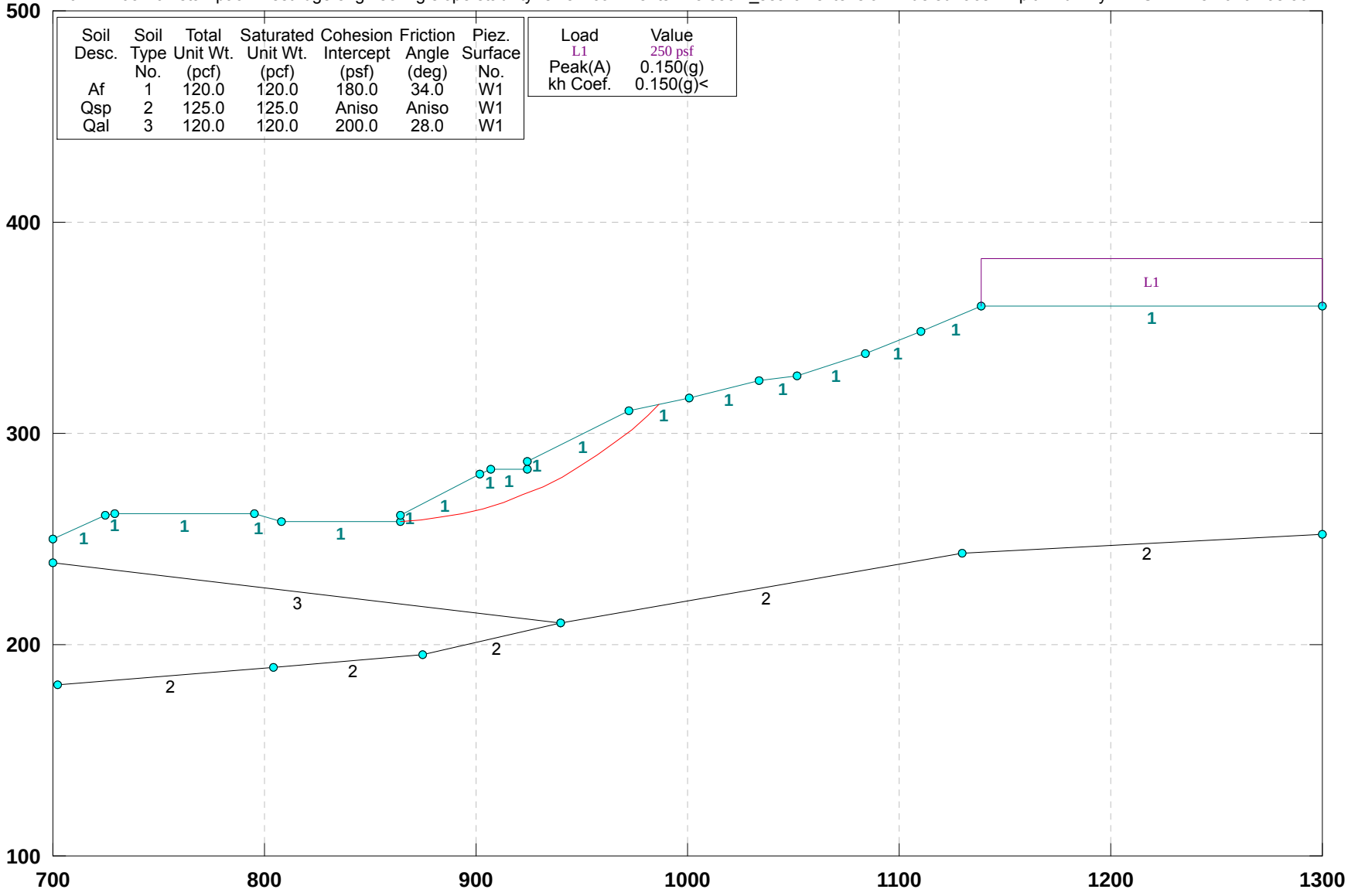


```
   16        983.616      313.240
   17        983.732      313.427
Circle Center At X =   875.982 ; Y =   385.701 ; and Radius =   129.753
      Factor of Safety
     ***    1.770   ***
         **** END OF GSTABL7 OUTPUT ****
```

#25 Extend search

# Westridge/14057-01/Sec 4-4'/ 4-4-16 Design - Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#25 sec 4_search extension\x4ue surface #1.plt Run By: KMS 11/18/2016 08:56AM




**GSTABL7 v.2 FSmin=1.42**

**Factor Of Safety Is Calculated By The Modified Bishop Method**

```
                              ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                         SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#25 Sec 4_Search extension\x4ue Surface #1.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#25 Sec 4_Search extension\x4ue Surface #1.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 4-4'/ 4-4-16 Desi
                          gn - Upper Slope - Seismic
    BOUNDARY COORDINATES
       18 Top   Boundaries
       24 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)    Below Bnd
        1        700.00     250.00     725.00     261.00        1
        2        725.00     261.00     729.00     262.00        1
        3        729.00     262.00     795.00     262.00        1
        4        795.00     262.00     808.00     258.00        1
        5        808.00     258.00     864.00     258.00        1
        6        864.00     258.00     864.10     261.00        1
        7        864.10     261.00     902.00     281.00        1
        8        902.00     281.00     907.00     283.00        1
        9        907.00     283.00     924.00     283.00        1
       10        924.00     283.00     924.10     287.00        1
       11        924.10     287.00     972.00     311.00        1
       12        972.00     311.00    1001.00     317.00        1
       13       1001.00     317.00    1034.00     325.00        1
       14       1034.00     325.00    1052.00     327.00        1
       15       1052.00     327.00    1084.00     338.00        1
       16       1084.00     338.00    1110.00     348.00        1
       17       1110.00     348.00    1139.00     360.00        1
       18       1139.00     360.00    1300.00     360.00        1
       19        700.00     239.00     940.00     210.00        3
       20        940.00     210.00    1130.00     243.00        2
       21       1130.00     243.00    1300.00     252.00        2
       22        702.00     181.00     804.00     189.00        2
       23        804.00     189.00     875.00     195.00        2
       24        875.00     195.00     940.00     210.00        2
    User Specified Y-Origin =       100.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)   Param.   (psf)     No.
       1   120.0    120.0     180.0     34.0    0.00       0.0      1
       2   125.0    125.0     500.0     34.0    0.00       0.0      1
       3   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
```



```
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             500.00         34.00
        2             14.0             200.00         27.00
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)          (deg)
       1       1139.00      1300.00       250.0           0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
     Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
     Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
     Specified Seismic Pore-Pressure Factor =   0.000
     Trial Failure Surface Specified By 15 Coordinate Points
       Point      X-Surf      Y-Surf
        No.        (ft)        (ft)
         1        864.000     258.000
         2        873.963     258.860
         3        883.866     260.252
         4        893.680     262.172
         5        903.377     264.615
         6        912.929     267.573
         7        922.310     271.037
         8        931.492     274.999
         9        940.448     279.447
        10        949.154     284.367
        11        957.584     289.746
        12        965.714     295.568
        13        973.521     301.817
        14        980.983     308.475
        15        986.555     314.011
  DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)
     Angle/Segment No.   Deflection(Deg)   Segment Length(ft)
             1                 3.07              10.00
             2                 3.07              10.00
             3                 3.07              10.00
             4                 3.07              10.00
             5                 3.06              10.00
             6                 3.07              10.00
             7                 3.07              10.00
             8                 3.06              10.00
             9                 3.07              10.00
            10                 3.07              10.00
            11                 3.07              10.00
            12                 3.07              10.00
    Circle Center At X =   852.918(ft) ; Y =   444.483(ft); and Radius =   186.812(ft)
    * * Factor Of Safety Is Calculated By The Modified Bishop Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.421
         ***Table 1 - Individual Data on the   20 Slices***
                             Water  Water     Tie     Tie      Earthquake
                             Force  Force     Force   Force        Force   Surcharge
  Slice  Width   Weight      Top    Bot      Norm     Tan      Hor     Ver     Load
   No.    (ft)    (lbs)    (lbs)  (lbs)     (lbs)   (lbs)    (lbs)   (lbs)   (lbs)
    1      0.1     17.9      0.0     0.0       0.0     0.0      2.7     0.0      0.0
    2      9.9   6116.8      0.0     0.0       0.0     0.0    917.5     0.0      0.0
    3      9.9  11006.2      0.0     0.0       0.0     0.0   1650.9     0.0      0.0
    4      9.8  15083.8      0.0     0.0       0.0     0.0   2262.6     0.0      0.0
    5      8.3  15559.7      0.0     0.0       0.0     0.0   2334.0     0.0      0.0
    6      1.4   2781.7      0.0     0.0       0.0     0.0    417.2     0.0      0.0
    7      3.6   7434.1      0.0     0.0       0.0     0.0   1115.1     0.0      0.0
```

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 5.9 | 11629.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1744.4 | 0.0 | 0.0 |
| 9 | 9.4 | 15416.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2312.5 | 0.0 | 0.0 |
| 10 | 1.7 | 2352.2 | 0.0 | 0.0 | 0.0 | 0.0 | 352.8 | 0.0 | 0.0 |
| 11 | 0.1 | 158.5 | 0.0 | 0.0 | 0.0 | 0.0 | 23.8 | 0.0 | 0.0 |
| 12 | 7.4 | 13702.9 | 0.0 | 0.0 | 0.0 | 0.0 | 2055.4 | 0.0 | 0.0 |
| 13 | 9.0 | 16899.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2534.9 | 0.0 | 0.0 |
| 14 | 8.7 | 16156.7 | 0.0 | 0.0 | 0.0 | 0.0 | 2423.5 | 0.0 | 0.0 |
| 15 | 8.4 | 14778.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2216.7 | 0.0 | 0.0 |
| 16 | 8.1 | 12835.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1925.4 | 0.0 | 0.0 |
| 17 | 6.3 | 8555.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1283.3 | 0.0 | 0.0 |
| 18 | 1.5 | 1815.9 | 0.0 | 0.0 | 0.0 | 0.0 | 272.4 | 0.0 | 0.0 |
| 19 | 7.5 | 6214.9 | 0.0 | 0.0 | 0.0 | 0.0 | 932.2 | 0.0 | 0.0 |
| 20 | 5.6 | 1465.5 | 0.0 | 0.0 | 0.0 | 0.0 | 219.8 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 20 Slices***

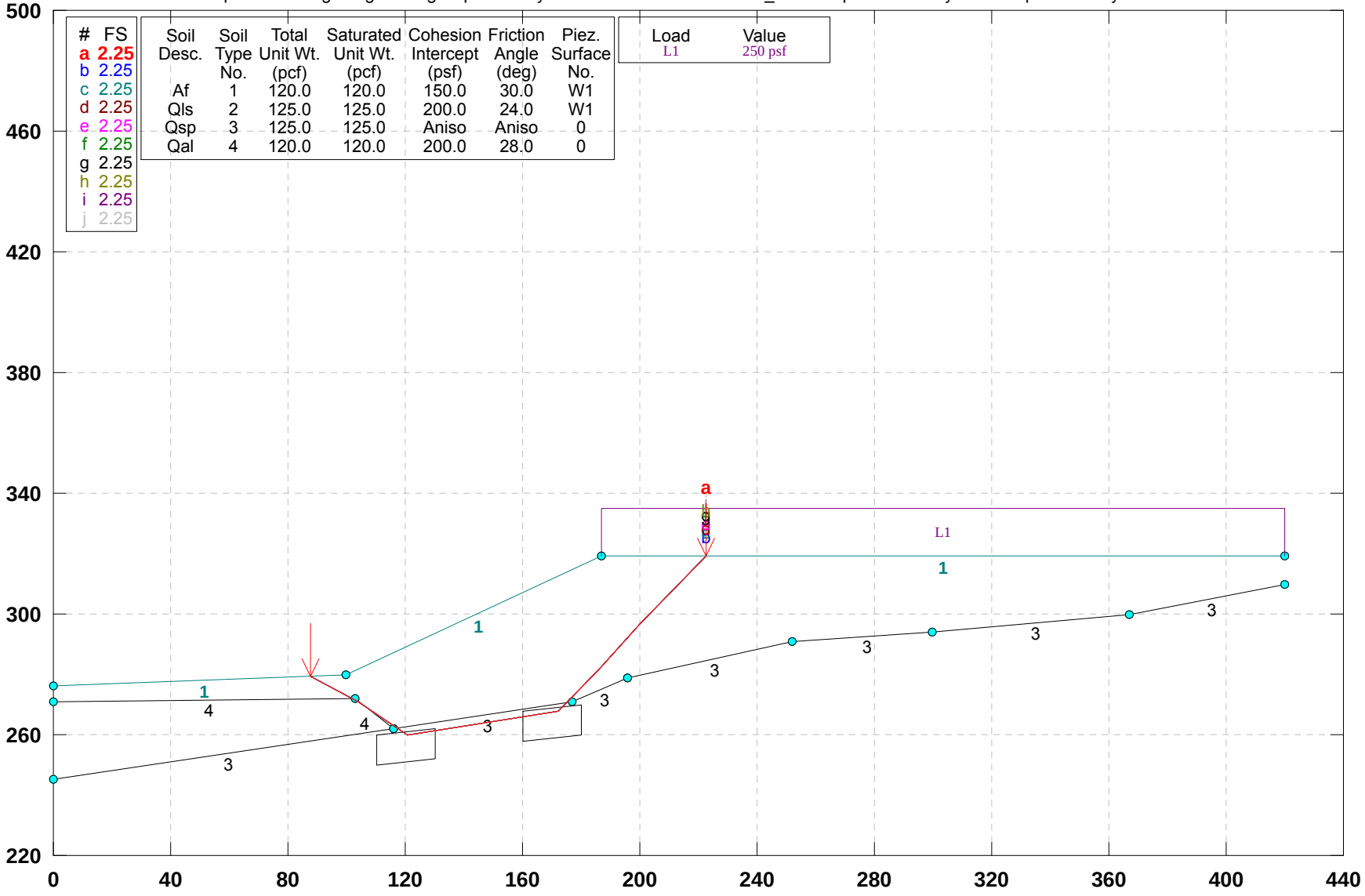
| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | 4.93 | 864.05 | 0.10 | 289.21 | 41.99 |
| 2 | 4.93 | 869.03 | 9.90 | 574.76 | 144.19 |
| 3 | 8.00 | 878.91 | 10.00 | 871.51 | 312.59 |
| 4 | 11.07 | 888.77 | 10.00 | 1113.32 | 503.90 |
| 5 | 14.14 | 897.84 | 8.58 | 1287.49 | 695.47 |
| 6 | 14.14 | 902.69 | 1.42 | 1377.80 | 750.23 |
| 7 | 17.21 | 905.19 | 3.79 | 1363.63 | 847.22 |
| 8 | 17.21 | 909.96 | 6.21 | 1310.39 | 810.41 |
| 9 | 20.27 | 917.62 | 10.00 | 1096.35 | 742.48 |
| 10 | 23.34 | 923.16 | 1.84 | 928.61 | 676.34 |
| 11 | 23.34 | 924.05 | 0.11 | 1037.03 | 769.51 |
| 12 | 23.34 | 927.80 | 8.05 | 1187.22 | 898.18 |
| 13 | 26.41 | 935.97 | 10.00 | 1175.63 | 968.10 |
| 14 | 29.47 | 944.80 | 10.00 | 1128.96 | 995.86 |
| 15 | 32.54 | 953.37 | 10.00 | 1045.74 | 973.13 |
| 16 | 35.61 | 961.65 | 10.00 | 929.13 | 897.11 |
| 17 | 38.68 | 968.86 | 8.05 | 795.71 | 783.56 |
| 18 | 38.68 | 972.76 | 1.95 | 714.03 | 687.88 |
| 19 | 41.74 | 977.25 | 10.00 | 521.11 | 481.57 |
| 20 | 44.82 | 983.77 | 7.85 | 242.87 | 151.19 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 131958.09 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 957.22(psf)
Sum of the Driving Forces = 92851.06 (lbs)
Average Mobilized Shear Stress = 673.54(psf)
Total length of the failure surface = 137.86(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3451(g)
Calculated Newmark Seismic Displacement = 0.003(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

#27 Qsp Search

# Westridge/14057-01/Sec 8-8'/ 4-4-16 Design - Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#27 sec 8_lower slope block analysis\x8dlb.pl2 Run By: KMS 11/18/2016 08:57AM



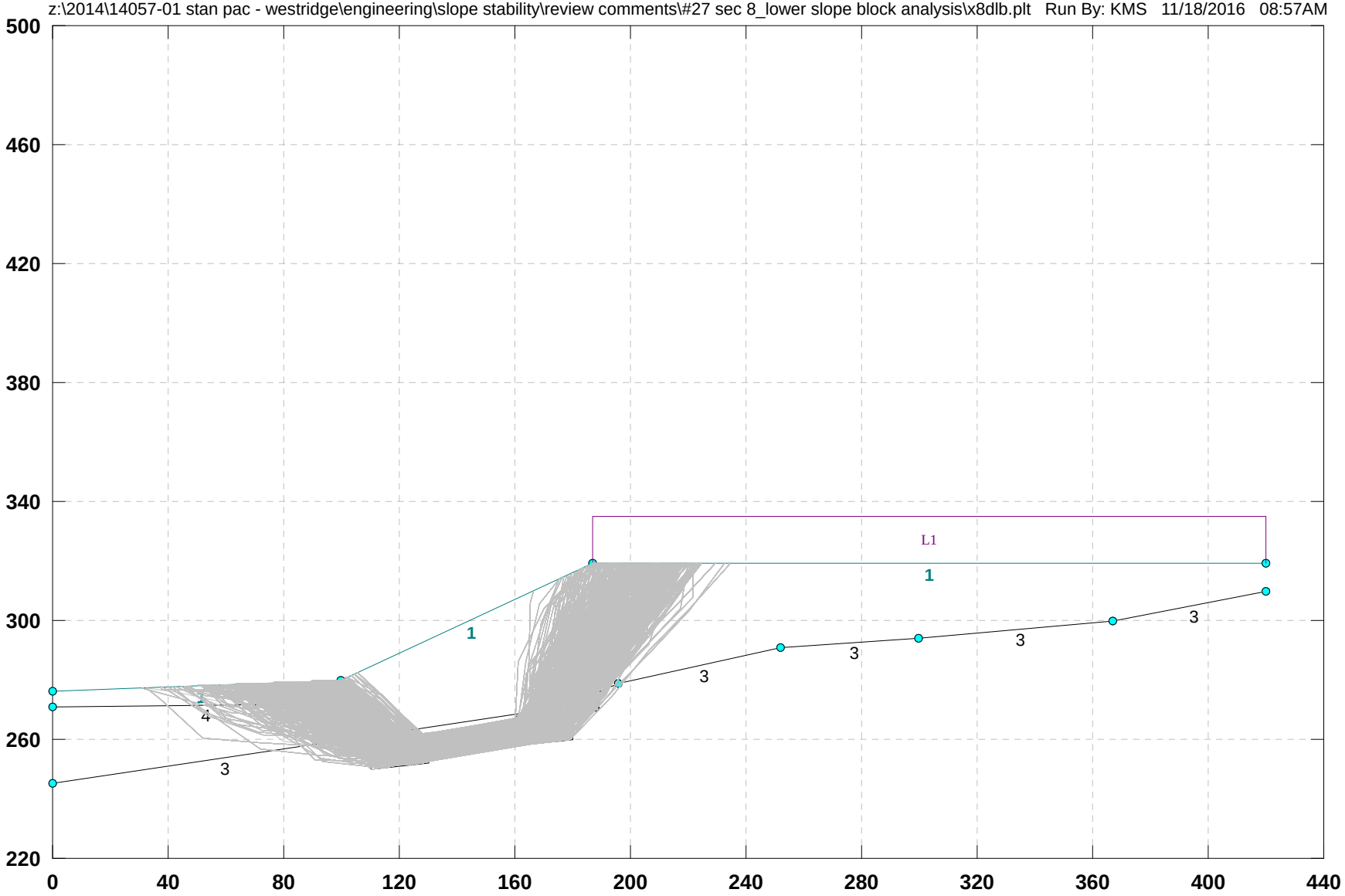

**GSTABL7 v.2 FSmin=2.25**

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

#27 Qsp Search

# Westridge/14057-01/Sec 8-8'/ 4-4-16 Design - Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#27 sec 8_lower slope block analysis\x8dlb.plt Run By: KMS 11/18/2016 08:57AM



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                              ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                         SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        11/18/2016
    Time of Run:              08:57AM
    Run By:                   KMS
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#27 Sec 8_lower slope block analysis\x8dlb.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#27 Sec 8_lower slope block analysis\x8dlb.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#27 Sec 8_lower slope block analysis\x8dlb.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 8-8'/ 4-4-16 Desi
                          gn - Lower Slope - Static
    BOUNDARY COORDINATES
        3 Top   Boundaries
       12 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1          0.00     276.00     100.00     280.00        1
        2        100.00     280.00     187.00     319.00        1
        3        187.00     319.00     420.00     319.00        1
        4          0.00     271.00     103.00     272.00        4
        5        103.00     272.00     116.00     262.00        4
        6        196.00     279.00     252.00     291.00        3
        7        252.00     291.00     300.00     294.00        3
        8        300.00     294.00     367.00     300.00        3
        9        367.00     300.00     420.00     310.00        3
       10          0.00     245.00     116.00     262.00        3
       11        116.00     262.00     177.00     271.00        3
       12        177.00     271.00     196.00     279.00        3
    User Specified Y-Origin =       220.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.           (deg)             (psf)         (deg)
        1             0.0              300.00         32.00
        2            12.0              200.00         27.00
        3            90.0              300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
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           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)        (ft)        (psf)         (deg)
       1        187.00      420.00       250.0          0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     Janbus Empirical Coef is being used for the case of  c & phi both > 0
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Sliding Block Surfaces, Has Been
     Specified.
     5000 Trial Surfaces Have Been Generated.
     2 Boxes Specified For Generation Of Central Block Base
     Length Of Line Segments For Active And Passive Portions Of
     Sliding Block Is  20.0
     Box        X-Left     Y-Left    X-Right    Y-Right      Height
     No.         (ft)       (ft)       (ft)       (ft)        (ft)
      1        110.00     255.00     130.00     257.00      10.00
      2        160.00     263.00     180.00     265.00      10.00
     Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  5000
           Number of Trial Surfaces With Valid FS = 5000
           Statistical Data On All Valid FS Values:
              FS Max =   6.857   FS Min =   2.249   FS Ave =   2.945
              Standard Deviation =    0.678   Coefficient of Variation =   23.02 %
           Failure Surface Specified By  8 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1         87.522      279.501
               2        103.793      270.708
               3        120.741      260.090
               4        172.333      267.814
               5        186.258      282.170
               6        200.243      296.468
               7        214.381      310.614
               8        222.607      319.000
                  Factor of Safety
                 ***    2.249   ***
                Individual data on the    14  slices
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
    Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver     Load
     No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
      1     12.5    5422.2     0.0     0.0       0.      0.     0.0     0.0      0.0
      2      1.4    1364.4     0.0     0.0       0.      0.     0.0     0.0      0.0
      3      1.6    1776.7     0.0     0.0       0.      0.     0.0     0.0      0.0
      4      0.8    1008.2     0.0     0.0       0.      0.     0.0     0.0      0.0
      5      4.8    7778.3     0.0     0.0       0.      0.     0.0     0.0      0.0
      6      8.8   22016.6     0.0     0.0       0.      0.     0.0     0.0      0.0
      7      3.4   11106.5     0.0     0.0       0.      0.     0.0     0.0      0.0
      8     51.6  229165.7     0.0     0.0       0.      0.     0.0     0.0      0.0
      9      2.8   14872.2     0.0     0.0       0.      0.     0.0     0.0      0.0
     10     11.1   52914.7     0.0     0.0       0.      0.     0.0     0.0      0.0
     11      0.7    3229.2     0.0     0.0       0.      0.     0.0     0.0      0.0
     12     13.2   46565.1     0.0     0.0       0.      0.     0.0     0.0   3310.7
     13     14.1   26227.2     0.0     0.0       0.      0.     0.0     0.0   3534.5
     14      8.2    4139.2     0.0     0.0       0.      0.     0.0     0.0   2056.6
           Failure Surface Specified By  8 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1         87.522      279.501
               2        103.793      270.708
               3        120.741      260.090
               4        172.333      267.814
               5        186.258      282.170
               6        200.243      296.468
```

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     7        214.381      310.614
     8        222.607      319.000
        Factor of Safety
       ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
```

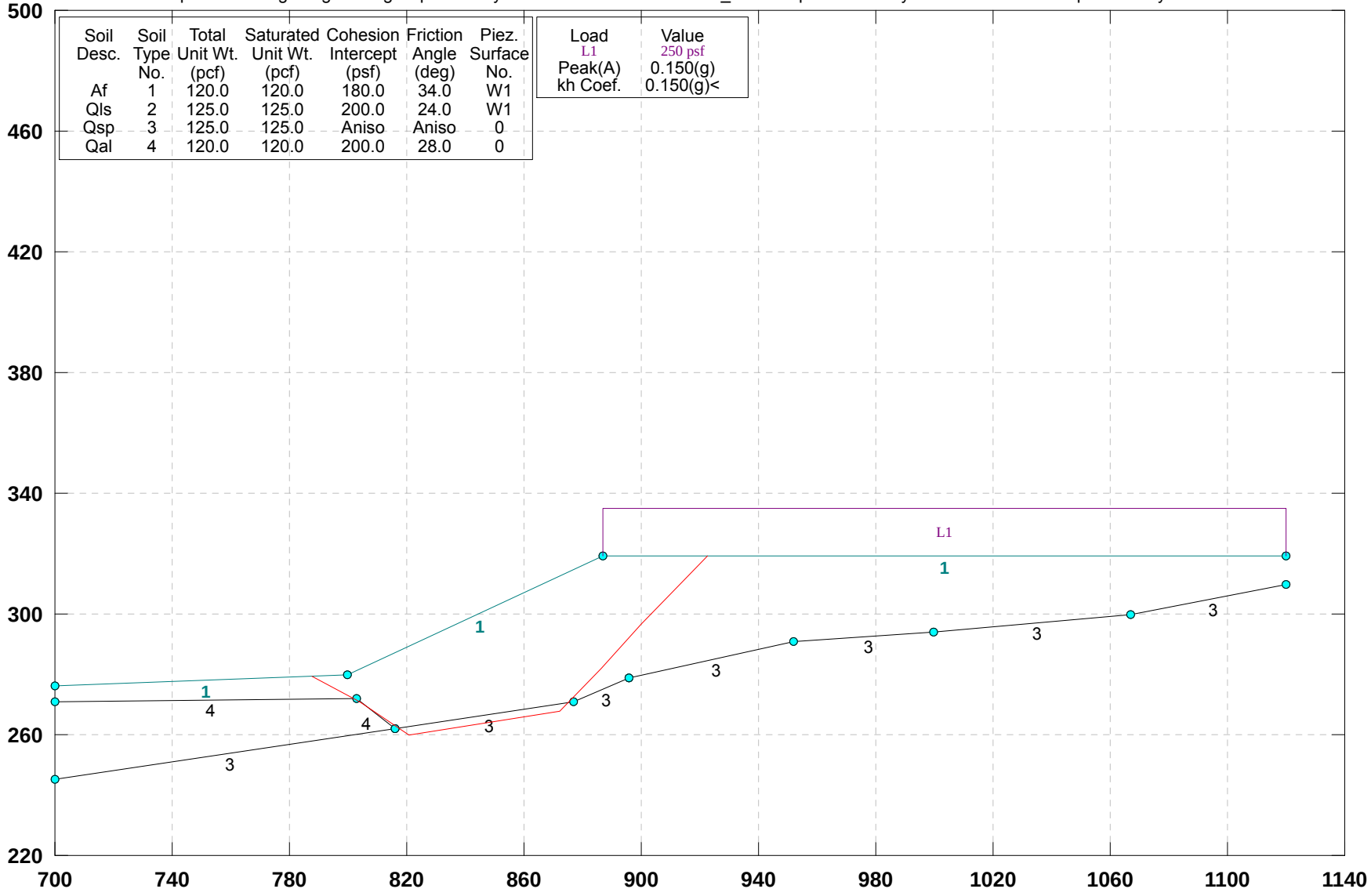


```
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
Failure Surface Specified By  8 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.522      279.501
    2        103.793      270.708
    3        120.741      260.090
    4        172.333      267.814
    5        186.258      282.170
    6        200.243      296.468
    7        214.381      310.614
    8        222.607      319.000
       Factor of Safety
      ***    2.249   ***
          **** END OF GSTABL7 OUTPUT ****
```

#27 Qsp Search

# Westridge/14057-01/Sec 8-8'/ 4-4-16 Design - Lower Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#27 sec 8_lower slope block analysis\x8dlbe surface #1.plt Run By: KMS 11/18/2016 08:57AM




**GSTABL7 v.2 FSmin=1.59**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

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                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
     ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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:        11/18/2016
 Time of Run:              08:57AM
 Run By:                   KMS
 Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#27 Sec 8_lower slope block analysis\x8dlbe Surface #1.in
 Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#27 Sec 8_lower slope block analysis\x8dlbe Surface #1.OUT
 Unit System:              English
 Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#27 Sec 8_lower slope block analysis\x8dlbe Surface #1.PLT
 PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 8-8'/ 4-4-16 Desi
                       gn - Lower Slope - Seismic
 BOUNDARY COORDINATES
     3 Top   Boundaries
    12 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1          0.00     276.00     100.00     280.00        1
     2        100.00     280.00     187.00     319.00        1
     3        187.00     319.00     420.00     319.00        1
     4          0.00     271.00     103.00     272.00        4
     5        103.00     272.00     116.00     262.00        4
     6        196.00     279.00     252.00     291.00        3
     7        252.00     291.00     300.00     294.00        3
     8        300.00     294.00     367.00     300.00        3
     9        367.00     300.00     420.00     310.00        3
    10          0.00     245.00     116.00     262.00        3
    11        116.00     262.00     177.00     271.00        3
    12        177.00     271.00     196.00     279.00        3
 User Specified Y-Origin =       220.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  4 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   120.0    120.0     180.0     34.0    0.00       0.0      1
   2   125.0    125.0     200.0     24.0    0.00       0.0      1
   3   125.0    125.0     500.0     34.0    0.00       0.0      0
   4   120.0    120.0     200.0     28.0    0.00       0.0      0
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept       Angle
    No.            (deg)           (psf)         (deg)
     1              0.0             500.00         34.00
     2             12.0             200.00         27.00
     3             90.0             500.00         34.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
```



```
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 BOUNDARY LOAD(S)
     1 Load(s) Specified
  Load        X-Left      X-Right     Intensity     Deflection
   No.         (ft)        (ft)        (psf)          (deg)
    1         187.00      420.00       250.0          0.0
  NOTE - Intensity Is Specified As A Uniformly Distributed
         Force Acting On A Horizontally Projected Surface.
  Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
  Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
  Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
  Specified Seismic Pore-Pressure Factor =   0.000
  Trial Failure Surface Specified By  8 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
      1         87.522      279.501
      2        103.793      270.708
      3        120.741      260.090
      4        172.333      267.814
      5        186.258      282.170
      6        200.243      296.468
      7        214.381      310.614
      8        222.607      319.000
  * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
  Factor Of Safety For The Preceding Specified Surface =  1.586
      ***Table 1 - Individual Data on the   14 Slices***
                        Water  Water     Tie     Tie     Earthquake
                        Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver     Load
 No.    (ft)    (lbs)   (lbs)  (lbs)   (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1    12.5    5422.1     0.0    0.0     0.0     0.0    813.3     0.0      0.0
  2     1.4    1364.5     0.0    0.0     0.0     0.0    204.7     0.0      0.0
  3     1.6    1776.6     0.0    0.0     0.0     0.0    266.5     0.0      0.0
  4     0.8    1008.7     0.0    0.0     0.0     0.0    151.3     0.0      0.0
  5     4.8    7775.5     0.0    0.0     0.0     0.0   1166.3     0.0      0.0
  6     8.8   22020.1     0.0    0.0     0.0     0.0   3303.0     0.0      0.0
  7     3.4   11105.0     0.0    0.0     0.0     0.0   1665.8     0.0      0.0
  8    51.6  229166.5     0.0    0.0     0.0     0.0  34375.0     0.0      0.0
  9     2.8   14872.3     0.0    0.0     0.0     0.0   2230.8     0.0      0.0
 10    11.1   52911.5     0.0    0.0     0.0     0.0   7936.7     0.0      0.0
 11     0.7    3230.8     0.0    0.0     0.0     0.0    484.6     0.0      0.0
 12    13.2   46565.1     0.0    0.0     0.0     0.0   6984.8     0.0   3310.7
 13    14.1   26227.1     0.0    0.0     0.0     0.0   3934.1     0.0   3534.5
 14     8.2    4139.0     0.0    0.0     0.0     0.0    620.8     0.0   2056.5
      ***Table 2 - Base Stress Data on the   14 Slices***
Slice   Alpha     X-Coord.      Base          Available             Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)        (ft)          (psf)                 (psf)
  1    -28.39       93.76       14.18          698.27               -149.24
  2    -28.39      100.72        1.63         1215.34               -327.63
  3    -28.39      102.22        1.78         1113.13               -388.76
  4    -28.39      103.40        0.90         1216.58               -436.89
  5    -32.07      106.18        5.64         1591.28               -657.08
  6    -32.07      112.97       10.38         3005.38              -1010.61
  7    -32.07      119.06        3.98         4378.85              -1330.14
  8      8.51      146.54       52.17         2376.39               1316.62
  9     45.87      173.75        4.06         4042.05               4325.58
 10     45.87      180.71       15.94         3390.50               3920.16
 11     45.63      186.63        1.06         3106.56               3569.40
 12     45.63      193.62       18.94         2711.32               3061.21
 13     45.02      207.31       20.00         1587.56               1685.64
 14     45.55      218.49       11.75          685.32                590.52
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =  361419.59 (lbs)
    Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
    Soil Nail, and Applied Forces if applicable) =   2225.37(psf)
    Sum of the Driving Forces =   227921.25 (lbs)
    Average Mobilized Shear Stress =    1403.38(psf)
    Total length of the failure surface =     162.41(ft)
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       *** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.4378(g)
Calculated Newmark Seismic Displacement =    0.002(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
              **** END OF GSTABL7 OUTPUT ****
```

#28 Lower Slope

# Westridge/14057-01/Sec 10-10'/ 4-4-16 Design - Static

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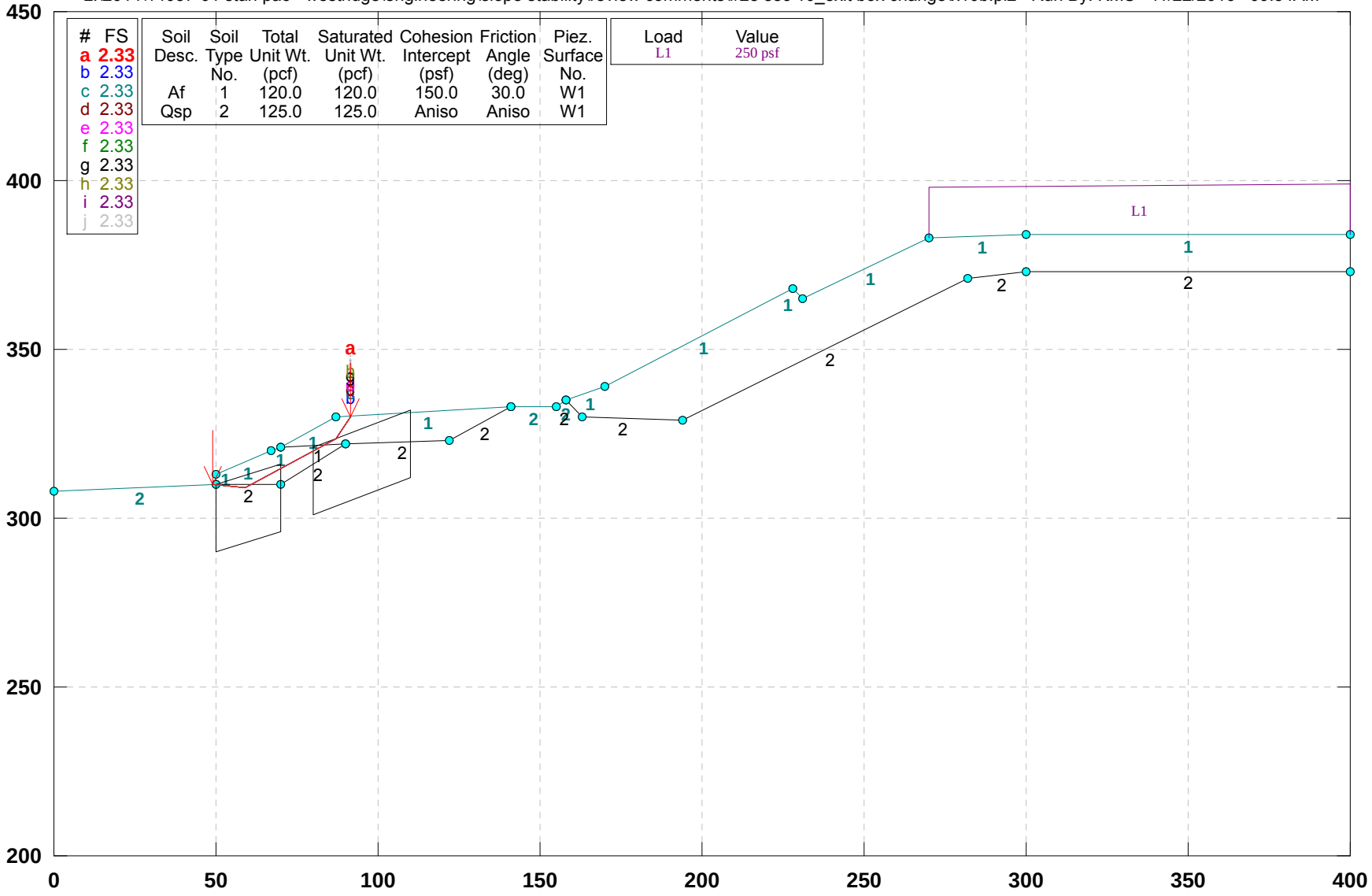


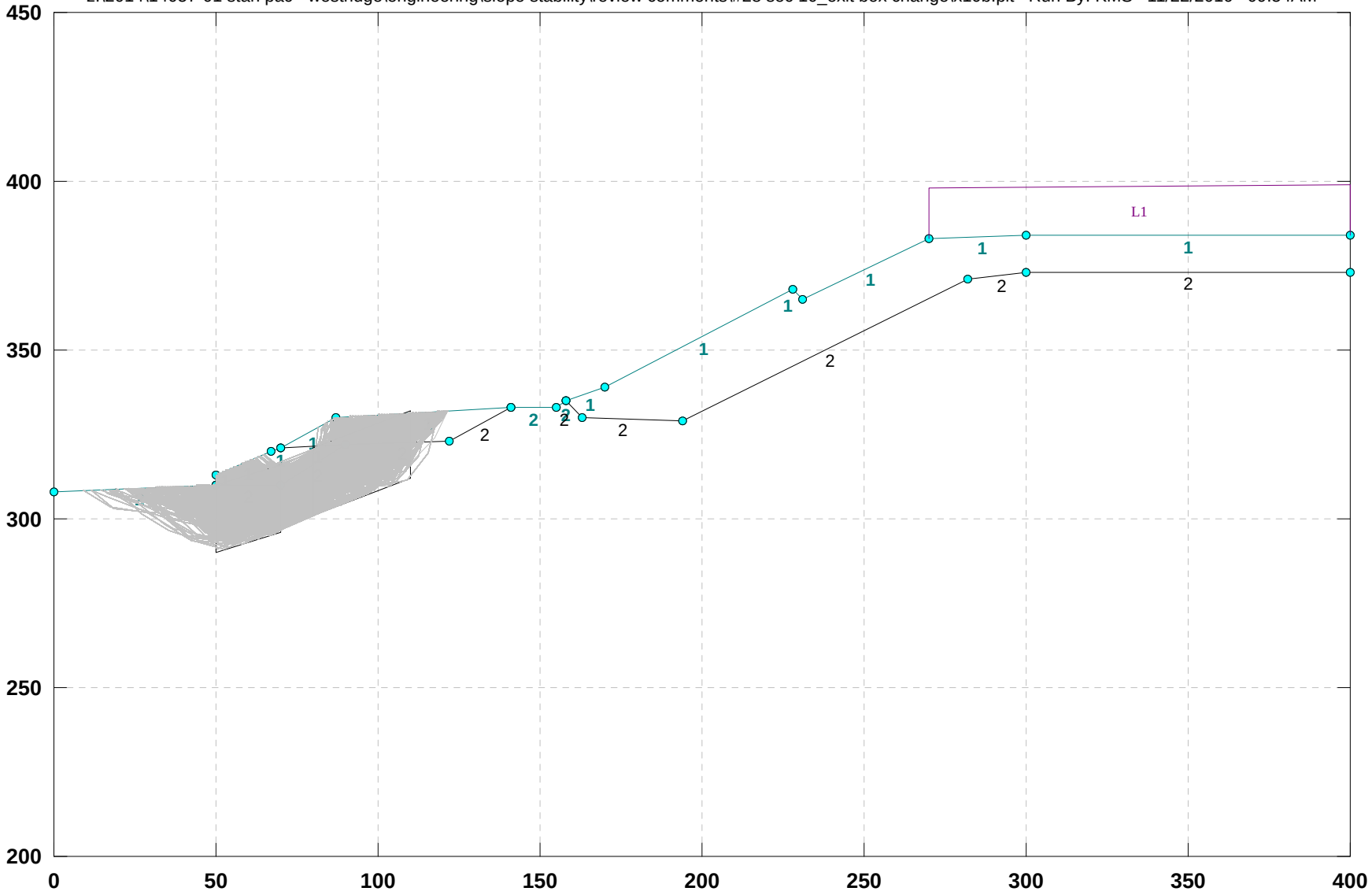

**GSTABL7 v.2 FSmin=2.33**

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

#28 Lower Slope

# Westridge/14057-01/Sec 10-10'/ 4-4-16 Design - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#28 sec 10_exit box change\x10b.plt Run By: KMS 11/22/2016 09:54AM



*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 11/22/2016
Time of Run: 09:54AM
**Run By:** **KMS**
Input Data Filename: z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#28 Sec 10_exit box change\x10b.in
Output Filename: z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#28 Sec 10_exit box change\x10b.OUT
Unit System: English
Plotted Output Filename: z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#28 Sec 10_exit box change\x10b.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 10-10'/ 4-4-16 De
sign - Static

BOUNDARY COORDINATES
14 Top Boundaries
24 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 308.00 | 50.00 | 310.00 | 2 |
| 2 | 50.00 | 310.00 | 50.10 | 313.00 | 1 |
| 3 | 50.10 | 313.00 | 67.00 | 320.00 | 1 |
| 4 | 67.00 | 320.00 | 70.00 | 321.00 | 1 |
| 5 | 70.00 | 321.00 | 87.00 | 330.00 | 1 |
| 6 | 87.00 | 330.00 | 141.00 | 333.00 | 1 |
| 7 | 141.00 | 333.00 | 155.00 | 333.00 | 2 |
| 8 | 155.00 | 333.00 | 158.00 | 335.00 | 2 |
| 9 | 158.00 | 335.00 | 170.00 | 339.00 | 1 |
| 10 | 170.00 | 339.00 | 228.00 | 368.00 | 1 |
| 11 | 228.00 | 368.00 | 231.00 | 365.00 | 1 |
| 12 | 231.00 | 365.00 | 270.00 | 383.00 | 1 |
| 13 | 270.00 | 383.00 | 300.00 | 384.00 | 1 |
| 14 | 300.00 | 384.00 | 400.00 | 384.00 | 1 |
| 15 | 70.00 | 321.00 | 90.00 | 322.00 | 1 |
| 16 | 90.00 | 322.00 | 122.00 | 323.00 | 2 |
| 17 | 122.00 | 323.00 | 141.00 | 333.00 | 2 |
| 18 | 158.00 | 335.00 | 163.00 | 330.00 | 2 |
| 19 | 163.00 | 330.00 | 194.00 | 329.00 | 2 |
| 20 | 194.00 | 329.00 | 282.00 | 371.00 | 2 |
| 21 | 282.00 | 371.00 | 300.00 | 373.00 | 2 |
| 22 | 300.00 | 373.00 | 400.00 | 373.00 | 2 |
| 23 | 50.00 | 310.00 | 70.00 | 310.00 | 2 |
| 24 | 70.00 | 310.00 | 90.00 | 322.00 | 2 |

User Specified Y-Origin = 200.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
2 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 150.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 300.0 | 32.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | -4.0 | 300.00 | 32.00 |
| 2 | 4.0 | 200.00 | 27.00 |
| 3 | 90.0 | 300.00 | 32.00 |



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

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 270.00 | 400.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Janbus Empirical Coef is being used for the case of c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.
9999 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 10.0

| Box No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Height (ft) |
|---|---|---|---|---|---|
| 1 | 50.00 | 300.00 | 70.00 | 306.00 | 20.00 |
| 2 | 80.00 | 311.00 | 110.00 | 322.00 | 20.00 |

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 9999
Number of Trial Failure Surfaces is Greater Than 5000.
Statistical Data on FS Values are Not Generated.
To Generate Stastical Data, Reduce Number of Trial Failure Surfaces to 5000 or less.
Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |
| 3 | 59.008 | 308.980 |
| 4 | 87.051 | 323.565 |
| 5 | 91.303 | 330.239 |

Factor of Safety
*** 2.329 ***

Individual data on the 11 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 0.9 | 11.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 0.1 | 20.1 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 8.9 | 5842.2 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 2.0 | 1794.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 6.0 | 5198.7 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.0 | 2369.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 13.4 | 10242.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 3.6 | 2777.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 0.1 | 39.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 4.3 | 1642.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 5 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 49.004 | 309.960 |
| 2 | 49.053 | 309.927 |

```
     3         59.008      308.980
     4         87.051      323.565
     5         91.303      330.239
        Factor of Safety
       ***    2.329   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         49.004      309.960
    2         49.053      309.927
    3         59.008      308.980
    4         87.051      323.565
    5         91.303      330.239
       Factor of Safety
      ***    2.329   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         49.004      309.960
    2         49.053      309.927
    3         59.008      308.980
    4         87.051      323.565
    5         91.303      330.239
       Factor of Safety
      ***    2.329   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         49.004      309.960
    2         49.053      309.927
    3         59.008      308.980
    4         87.051      323.565
    5         91.303      330.239
       Factor of Safety
      ***    2.329   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         49.004      309.960
    2         49.053      309.927
    3         59.008      308.980
    4         87.051      323.565
    5         91.303      330.239
       Factor of Safety
      ***    2.329   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         49.004      309.960
    2         49.053      309.927
    3         59.008      308.980
    4         87.051      323.565
    5         91.303      330.239
       Factor of Safety
      ***    2.329   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         49.004      309.960
    2         49.053      309.927
```



```
     3         59.008      308.980
     4         87.051      323.565
     5         91.303      330.239
        Factor of Safety
       ***    2.329   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         49.004      309.960
    2         49.053      309.927
    3         59.008      308.980
    4         87.051      323.565
    5         91.303      330.239
       Factor of Safety
      ***    2.329   ***
          **** END OF GSTABL7 OUTPUT ****
```

#28 Lower Slope

# Westridge/14057-01/Sec 10-10'/ 4-4-16 Design - Seismic

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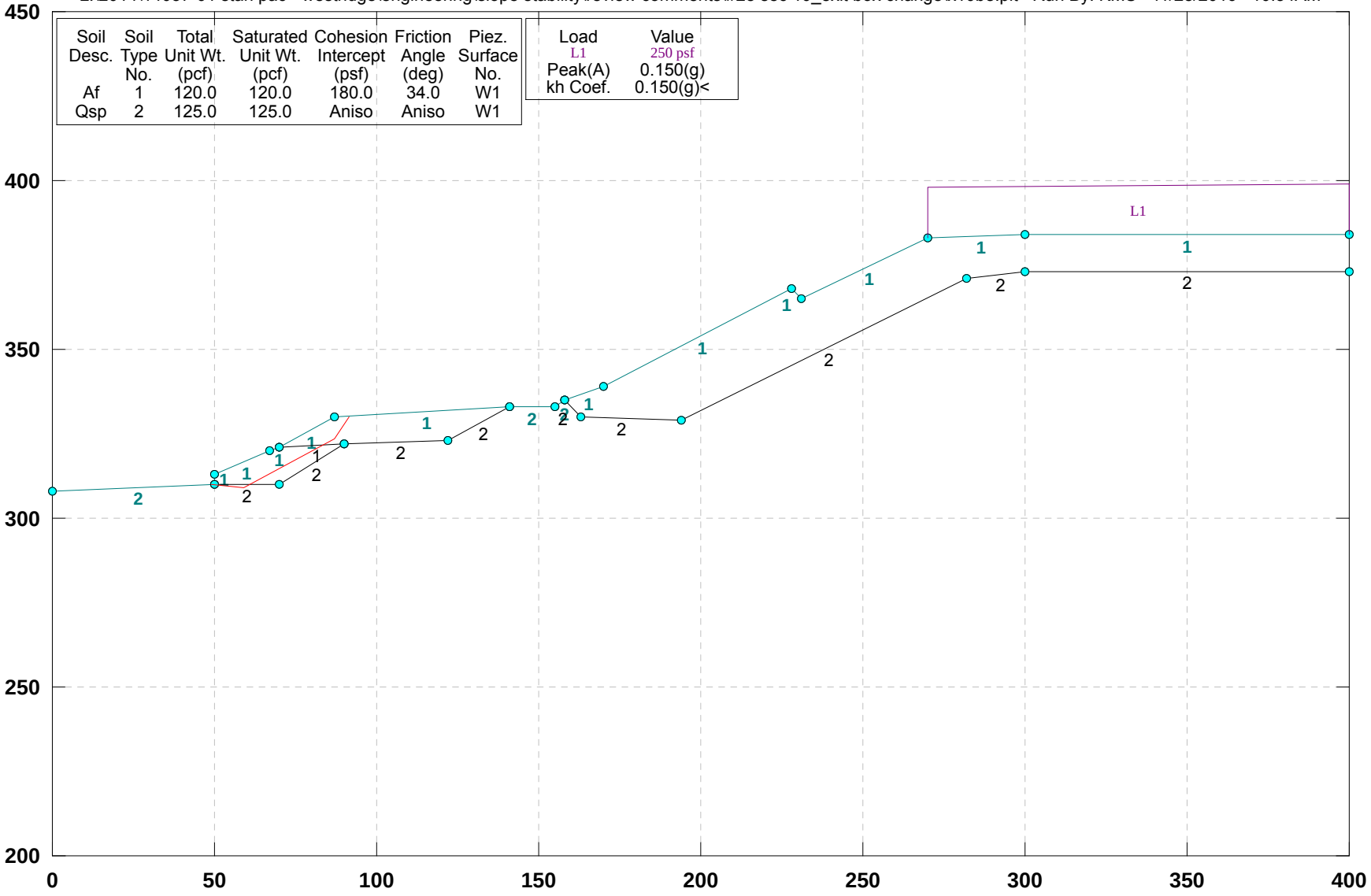


**GSTABL7 v.2 FSmin=2.08**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

```
                              ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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    ********************************************************************************
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           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:        11/28/2016
    Time of Run:              10:54AM
    Run By:                   KMS
    Input Data Filename:      z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#28 Sec 10_exit box change\x10be.in
    Output Filename:          z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#28 Sec 10_exit box change\x10be.OUT
    Unit System:              English
    Plotted Output Filename:  z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#28 Sec 10_exit box change\x10be.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 10-10'/ 4-4-16 De
                          sign - Seismic
    BOUNDARY COORDINATES
       14 Top   Boundaries
       24 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)    Below Bnd
        1         0.00     308.00      50.00     310.00        2
        2        50.00     310.00      50.10     313.00        1
        3        50.10     313.00      67.00     320.00        1
        4        67.00     320.00      70.00     321.00        1
        5        70.00     321.00      87.00     330.00        1
        6        87.00     330.00     141.00     333.00        1
        7       141.00     333.00     155.00     333.00        2
        8       155.00     333.00     158.00     335.00        2
        9       158.00     335.00     170.00     339.00        1
       10       170.00     339.00     228.00     368.00        1
       11       228.00     368.00     231.00     365.00        1
       12       231.00     365.00     270.00     383.00        1
       13       270.00     383.00     300.00     384.00        1
       14       300.00     384.00     400.00     384.00        1
       15        70.00     321.00      90.00     322.00        1
       16        90.00     322.00     122.00     323.00        2
       17       122.00     323.00     141.00     333.00        2
       18       158.00     335.00     163.00     330.00        2
       19       163.00     330.00     194.00     329.00        2
       20       194.00     329.00     282.00     371.00        2
       21       282.00     371.00     300.00     373.00        2
       22       300.00     373.00     400.00     373.00        2
       23        50.00     310.00      70.00     310.00        2
       24        70.00     310.00      90.00     322.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
       1   120.0    120.0     180.0     34.0    0.00       0.0      1
       2   125.0    125.0     500.0     34.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
```



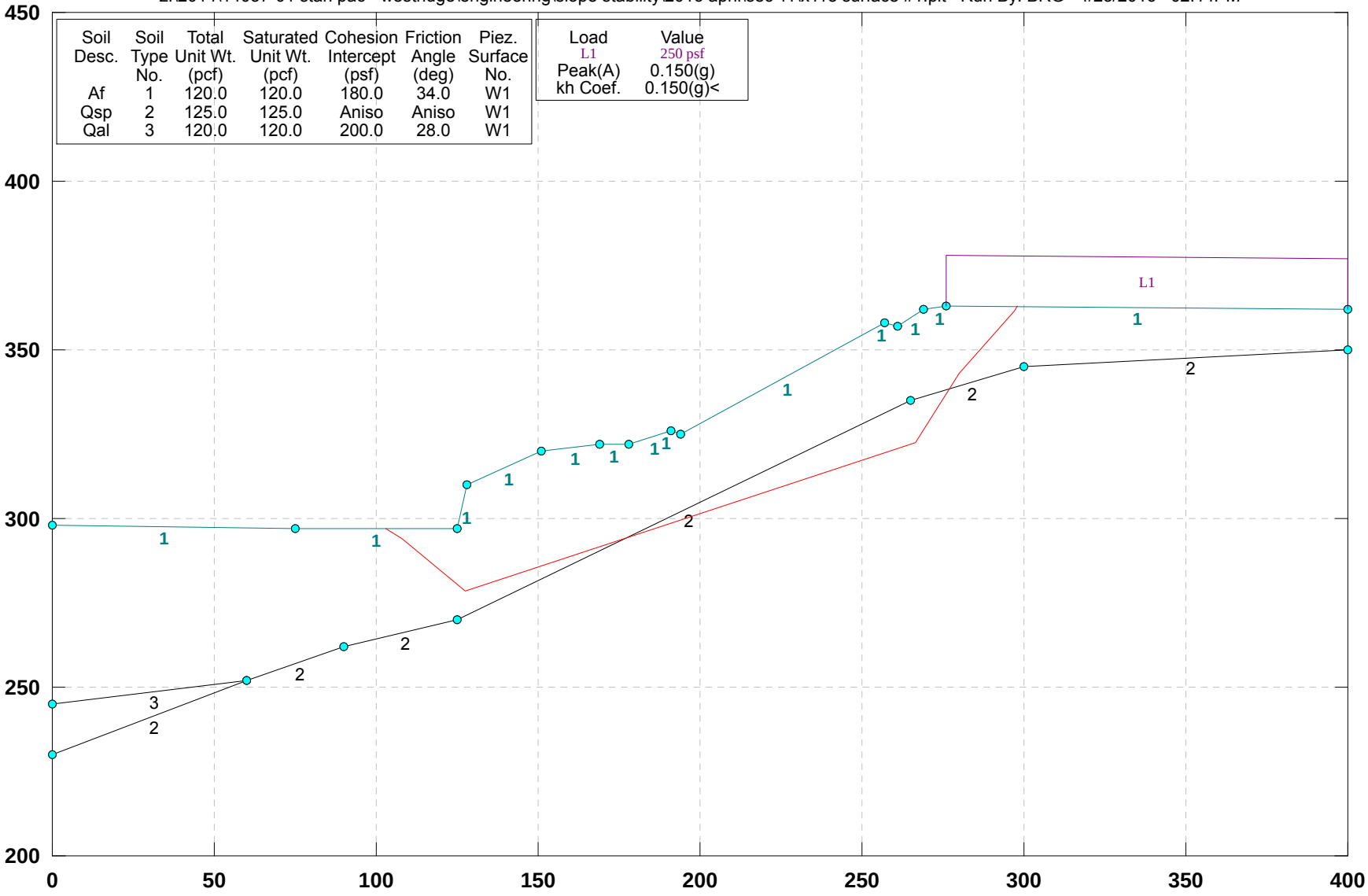
```
     Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1              -4.0             500.00         34.00
       2               4.0             200.00         27.00
       3              90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)          (deg)
       1        270.00       400.00       250.0          0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
     Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
     Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
     Specified Seismic Pore-Pressure Factor =   0.000
     Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
     Trial Failure Surface Specified By  5 Coordinate Points
       Point      X-Surf      Y-Surf
        No.        (ft)        (ft)
         1        49.004      309.960
         2        49.053      309.927
         3        59.008      308.980
         4        87.051      323.565
         5        91.303      330.239
     Janbu's Empirical Coefficient (fo) =  1.047
     * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
     Factor Of Safety For The Preceding Specified Surface =  2.077
          ***Table 1 - Individual Data on the   11 Slices***
                           Water  Water     Tie     Tie     Earthquake
                           Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight      Top    Bot     Norm     Tan     Hor     Ver     Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      0.0       0.1     0.0    0.0      0.0     0.0     0.0     0.0      0.0
  2      0.9      11.7     0.0    0.0      0.0     0.0     1.8     0.0      0.0
  3      0.1      20.1     0.0    0.0      0.0     0.0     3.0     0.0      0.0
  4      8.9    5842.9     0.0    0.0      0.0     0.0   876.4     0.0      0.0
  5      2.0    1795.0     0.0    0.0      0.0     0.0   269.3     0.0      0.0
  6      6.0    5198.1     0.0    0.0      0.0     0.0   779.7     0.0      0.0
  7      3.0    2370.0     0.0    0.0      0.0     0.0   355.5     0.0      0.0
  8     13.4   10242.1     0.0    0.0      0.0     0.0  1536.3     0.0      0.0
  9      3.6    2777.8     0.0    0.0      0.0     0.0   416.7     0.0      0.0
 10      0.1      39.5     0.0    0.0      0.0     0.0     5.9     0.0      0.0
 11      4.3    1642.4     0.0    0.0      0.0     0.0   246.4     0.0      0.0
          ***Table 2 - Base Stress Data on the   11 Slices***
Slice   Alpha     X-Coord.      Base          Available              Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)        (ft)          (psf)                 (psf)
  1     -34.12       49.03        0.06          776.72                -0.96
  2      -5.43       49.53        0.95          526.93                 0.68
  3      -5.43       50.05        0.10          658.79                10.98
  4      -5.43       54.55        8.95          976.86                35.83
  5      27.48       59.99        2.21         1077.45               544.12
  6      27.48       63.98        6.80          734.19               512.41
  7      27.48       68.50        3.38          687.40               469.65
  8      27.48       76.70       15.11          670.41               454.12
  9      27.48       85.20        4.05          676.59               459.77
 10      27.48       87.03        0.06          676.98               460.12
 11      57.50       89.18        7.91          543.07               356.90
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =   36052.39 (lbs)
    Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
    Soil Nail, and Applied Forces if applicable) =    727.13(psf)
```

```
Sum of the Driving Forces =    18171.83 (lbs)
Average Mobilized Shear Stress =     366.50(psf)
Total length of the failure surface =      49.58(ft)
       *** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.6669(g)
Calculated Newmark Seismic Displacement =   0.001(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
              **** END OF GSTABL7 OUTPUT ****
```

#29 Seismic Run

# Westridge/14057-01/Sec 11-11'/ 4-4-16 Design - Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2016 april\sec 11\x11e surface #1.plt Run By: BRG 4/25/2016 02:14PM




**GSTABL7 v.2 FSmin=1.49**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
    ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
 ************************************************************************
                   SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
 ************************************************************************
    Analysis Run Date:        4/25/2016
    Time of Run:              02:14PM
    Run By:                   BRG
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2016 April\Sec 11\x11e Surface #1.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2016 April\Sec 11\x11e Surface #1.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2016 April\Sec 11\x11e Surface #1.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 11-11'/ 4-4-16 De
                          sign - Upper Slope - Seismic
    BOUNDARY COORDINATES
       13 Top   Boundaries
       20 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.         (ft)       (ft)       (ft)       (ft)    Below Bnd
        1          0.00     298.00      75.00     297.00        1
        2         75.00     297.00     125.00     297.00        1
        3        125.00     297.00     128.00     310.00        1
        4        128.00     310.00     151.00     320.00        1
        5        151.00     320.00     169.00     322.00        1
        6        169.00     322.00     178.00     322.00        1
        7        178.00     322.00     191.00     326.00        1
        8        191.00     326.00     194.00     325.00        1
        9        194.00     325.00     257.00     358.00        1
       10        257.00     358.00     261.00     357.00        1
       11        261.00     357.00     269.00     362.00        1
       12        269.00     362.00     276.00     363.00        1
       13        276.00     363.00     400.00     362.00        1
       14          0.00     245.00      60.00     252.00        3
       15         60.00     252.00      90.00     262.00        2
       16         90.00     262.00     125.00     270.00        2
       17        125.00     270.00     265.00     335.00        2
       18        265.00     335.00     300.00     345.00        2
       19        300.00     345.00     400.00     350.00        2
       20          0.00     230.00      60.00     252.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)   Param.   (psf)     No.
       1   120.0    120.0     180.0     34.0    0.00      0.0      1
       2   125.0    125.0     500.0     34.0    0.00      0.0      1
       3   120.0    120.0     200.0     28.0    0.00      0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit     Intercept      Angle
       No.            (deg)            (psf)         (deg)
        1              5.0             500.00         34.00
        2             20.0             200.00         27.00
```



```
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.          (ft)        (ft)        (psf)         (deg)
      1         276.00      400.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.150(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  7 Coordinate Points
      Point      X-Surf      Y-Surf
       No.         (ft)        (ft)
        1        103.104     297.000
        2        107.760     293.973
        3        127.415     278.523
        4        266.362     322.306
        5        280.116     343.183
        6        297.043     361.581
        7        297.832     362.824
    Janbu's Empirical Coefficient (fo) =  1.056
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.485
         ***Table 1 - Individual Data on the   20 Slices***
                          Water  Water     Tie      Tie      Earthquake
                          Force  Force     Force    Force        Force    Surcharge
Slice  Width    Weight     Top    Bot      Norm     Tan      Hor      Ver      Load
 No.    (ft)     (lbs)    (lbs)  (lbs)    (lbs)    (lbs)    (lbs)    (lbs)    (lbs)
  1     4.7      845.6     0.0    0.0      0.0      0.0      126.8     0.0      0.0
  2    17.2    20280.2     0.0    0.0      0.0      0.0     3042.0     0.0      0.0
  3     2.4     6596.0     0.0    0.0      0.0      0.0      989.4     0.0      0.0
  4     0.6     2114.2     0.0    0.0      0.0      0.0      317.1     0.0      0.0
  5    23.0    90166.4     0.0    0.0      0.0      0.0    13525.0     0.0      0.0
  6    18.0    69572.1     0.0    0.0      0.0      0.0    10435.8     0.0      0.0
  7     8.0    28052.5     0.0    0.0      0.0      0.0     4207.9     0.0      0.0
  8     1.0     3219.6     0.0    0.0      0.0      0.0      482.9     0.0      0.0
  9    13.0    42955.6     0.0    0.0      0.0      0.0     6443.3     0.0      0.0
 10     3.0     9563.2     0.0    0.0      0.0      0.0     1434.5     0.0      0.0
 11    63.0   244725.7     0.0    0.0      0.0      0.0    36708.9     0.0      0.0
 12     4.0    18251.2     0.0    0.0      0.0      0.0     2737.7     0.0      0.0
 13     4.0    18018.1     0.0    0.0      0.0      0.0     2702.7     0.0      0.0
 14     1.4     6272.9     0.0    0.0      0.0      0.0      940.9     0.0      0.0
 15     2.6    11821.9     0.0    0.0      0.0      0.0     1773.3     0.0      0.0
 16     7.0    26130.1     0.0    0.0      0.0      0.0     3919.5     0.0      0.0
 17     1.0     2980.2     0.0    0.0      0.0      0.0      447.0     0.0    245.0
 18     3.1     8345.6     0.0    0.0      0.0      0.0     1251.8     0.0    784.0
 19    16.9    21361.6     0.0    0.0      0.0      0.0     3204.2     0.0   4231.7
 20     0.8       59.1     0.0    0.0      0.0      0.0        8.9     0.0    197.3
         ***Table 2 - Base Stress Data on the   20 Slices***
Slice   Alpha     X-Coord.      Base          Available              Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)        (ft)          (psf)                  (psf)
  1    -33.03      105.43        5.55          512.06                -76.15
  2    -38.17      116.38       21.93         1926.03               -588.24
  3    -38.17      126.21        3.07         4001.13              -1365.79
  4     17.49      127.71        0.61         2400.90               1603.22
  5     17.49      139.50       24.11         2590.33               1739.05
  6     17.49      160.00       18.87         2556.20               1714.58
  7     17.49      173.02        8.42         2325.97               1549.49
  8     17.49      177.52        1.02         1791.29               1474.17
```

| | | | | | |
|---|---|---|---|---|---|
| 9 | 17.49 | 184.50 | 13.63 | 1782.18 | 1465.79 |
| 10 | 17.49 | 192.50 | 3.15 | 1726.00 | 1414.09 |
| 11 | 17.49 | 225.50 | 66.05 | 2061.92 | 1723.20 |
| 12 | 17.49 | 259.00 | 4.19 | 2388.90 | 2024.08 |
| 13 | 17.49 | 263.00 | 4.19 | 2360.81 | 1998.23 |
| 14 | 17.49 | 265.68 | 1.43 | 2409.55 | 2043.07 |
| 15 | 56.62 | 267.68 | 4.80 | 3789.76 | 4112.07 |
| 16 | 56.62 | 272.50 | 12.72 | 3246.61 | 3425.24 |
| 17 | 56.62 | 276.49 | 1.78 | 2926.01 | 2999.20 |
| 18 | 56.62 | 278.55 | 5.70 | 2306.11 | 2650.64 |
| 19 | 47.38 | 288.58 | 25.00 | 1186.30 | 1240.86 |
| 20 | 57.59 | 297.44 | 1.47 | 434.14 | 280.38 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) =  485976.84 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   2134.20(psf)
Sum of the Driving Forces =   345528.53 (lbs)
Average Mobilized Shear Stress =    1517.41(psf)
Total length of the failure surface =     227.71(ft)
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.3995(g)
Calculated Newmark Seismic Displacement =   0.002(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

#30 Entire length

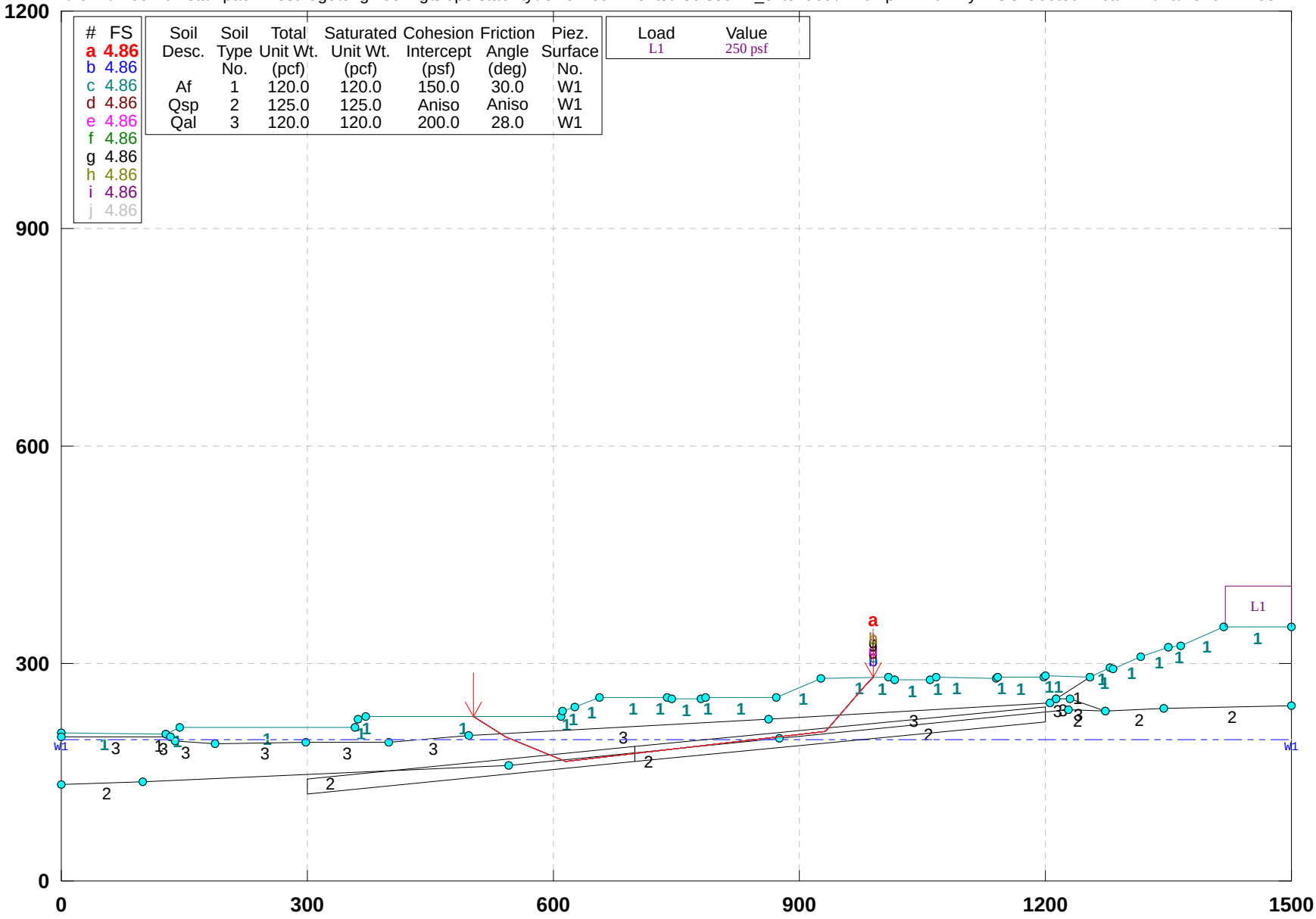
# Westridge/14057-01/Sec 12-12"/ Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#30 sec 12_extended\x12tlx.pl2 Run By: LGC Geotechnical 12/20/2016 12:58PM

| # | FS |
|---|---|
| a | 4.86 |
| b | 4.86 |
| c | 4.86 |
| d | 4.86 |
| e | 4.86 |
| f | 4.86 |
| g | 4.86 |
| h | 4.86 |
| i | 4.86 |
| j | 4.86 |

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 150.0 | 30.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |



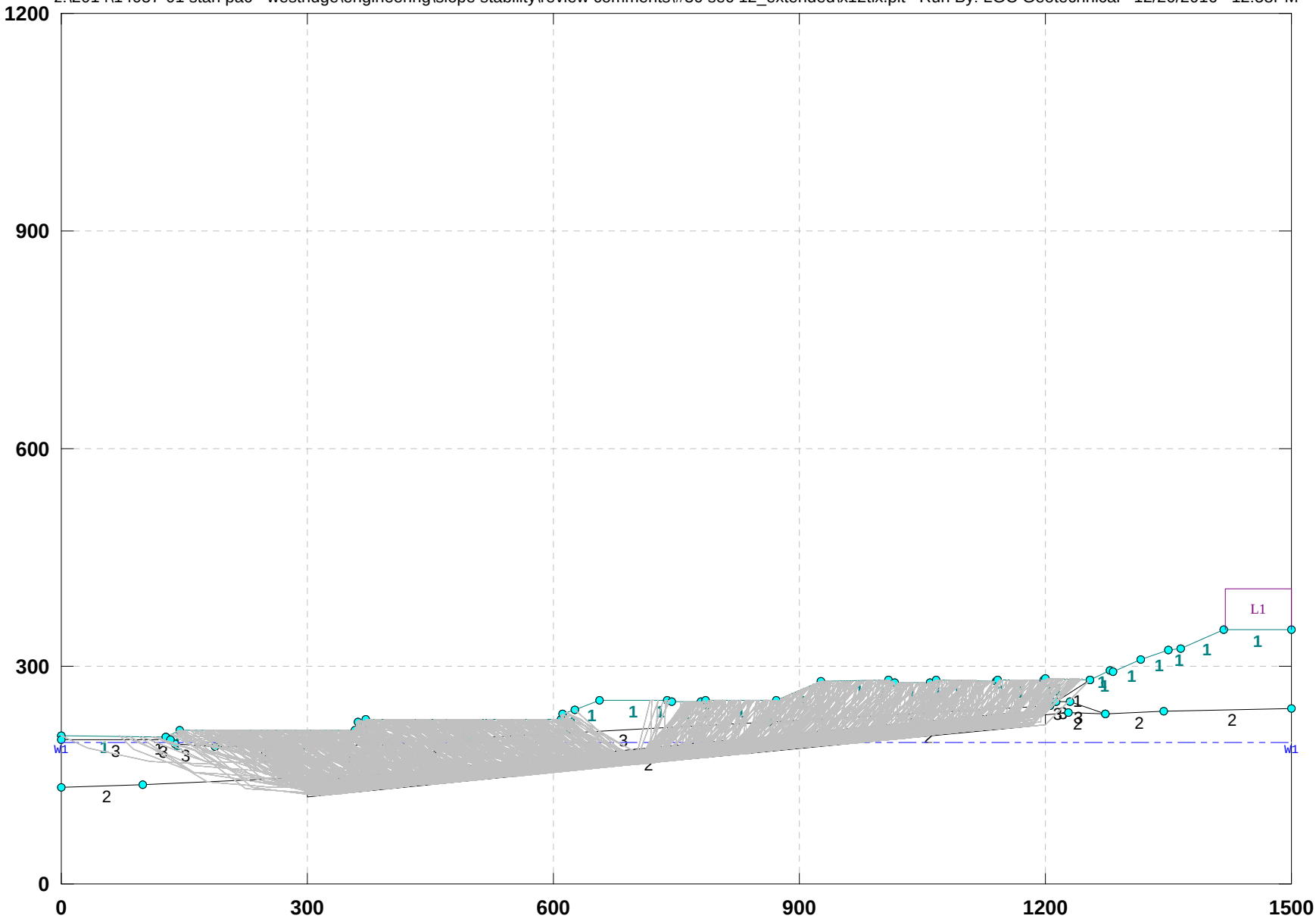

**GSTABL7 v.2 FSmin=4.86**

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

#30 Entire length

# Westridge/14057-01/Sec 12-12"/ Entire Length / Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#30 sec 12_extended\x12tlx.plt Run By: LGC Geotechnical 12/20/2016 12:58PM



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                              ***  GSTABL7  ***
                ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                    (All Rights Reserved-Unauthorized Use Prohibited)
    ********************************************************************************
                        SLOPE STABILITY ANALYSIS SYSTEM
           Modified Bishop, Simplified Janbu, or GLE Method of Slices.
           (Includes Spencer & Morgenstern-Price Type Analysis)
           Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
           Nonlinear Undrained Shear Strength, Curved Phi Envelope,
           Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
           Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ********************************************************************************
    Analysis Run Date:        12/20/2016
    Time of Run:              12:58PM
    Run By:                   LGC Geotechnical
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#30 Sec 12_Extended\x12tlx.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#30 Sec 12_Extended\x12tlx.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\Review Comments\#30 Sec 12_Extended\x12tlx.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 12-12"/ Entire
                          Length / Static
    BOUNDARY COORDINATES
       31 Top   Boundaries
       51 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.         (ft)       (ft)       (ft)       (ft)    Below Bnd
        1          0.00     204.00     128.00     203.00        1
        2        128.00     203.00     145.00     212.00        1
        3        145.00     212.00     358.00     211.00        1
        4        358.00     211.00     361.00     224.00        1
        5        361.00     224.00     371.00     226.00        1
        6        371.00     226.00     609.00     227.00        1
        7        609.00     227.00     611.00     235.00        1
        8        611.00     235.00     626.00     240.00        1
        9        626.00     240.00     656.00     254.00        1
       10        656.00     254.00     738.00     254.00        1
       11        738.00     254.00     744.00     251.00        1
       12        744.00     251.00     780.00     251.00        1
       13        780.00     251.00     786.00     253.00        1
       14        786.00     253.00     872.00     253.00        1
       15        872.00     253.00     926.00     279.00        1
       16        926.00     279.00    1009.00     281.00        1
       17       1009.00     281.00    1016.00     278.00        1
       18       1016.00     278.00    1059.00     278.00        1
       19       1059.00     278.00    1067.00     281.00        1
       20       1067.00     281.00    1140.00     280.00        1
       21       1140.00     280.00    1141.00     281.00        1
       22       1141.00     281.00    1199.00     282.00        1
       23       1199.00     282.00    1200.00     283.00        1
       24       1200.00     283.00    1255.00     282.00        1
       25       1255.00     282.00    1279.00     294.00        1
       26       1279.00     294.00    1282.00     293.00        1
       27       1282.00     293.00    1316.00     310.00        1
       28       1316.00     310.00    1350.00     323.00        1
       29       1350.00     323.00    1365.00     325.00        1
       30       1365.00     325.00    1417.00     350.00        1
       31       1417.00     350.00    1500.00     350.00        1
       32        128.00     203.00     133.00     199.00        1
       33        133.00     199.00     138.00     194.00        3
       34        138.00     194.00     187.00     190.00        3
       35        187.00     190.00     298.00     191.00        3
       36        298.00     191.00     400.00     192.00        3
       37        400.00     192.00     496.00     200.00        3
       38        496.00     200.00     862.00     224.00        3
       39        862.00     224.00    1205.00     246.00        3
```



```
       40       1205.00     246.00    1213.00     252.00        3
       41       1213.00     252.00    1255.00     282.00        1
       42          0.00     199.00     133.00     199.00        3
       43       1213.00     252.00    1230.00     252.00        3
       44       1230.00     252.00    1273.00     235.00        3
       45          0.00     134.00     100.00     137.00        2
       46        100.00     137.00     546.00     160.00        2
       47        546.00     160.00     875.00     197.00        2
       48        875.00     197.00    1228.00     237.00        2
       49       1228.00     237.00    1273.00     235.00        2
       50       1273.00     235.00    1345.00     238.00        2
       51       1345.00     238.00    1500.00     242.00        2
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
      3   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              5.0             300.00         32.00
        2             20.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    1 PIEZOMETRIC SURFACE(S) SPECIFIED
    Unit Weight of Water =  62.40 (pcf)
    Piezometric Surface No.  1 Specified by  2 Coordinate Points
    Pore Pressure Inclination Factor =  0.50
      Point      X-Water     Y-Water
       No.         (ft)        (ft)
        1          0.00      195.00
        2       1500.00      195.00
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)         (deg)
      1        1420.00      1500.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    5000 Trial Surfaces Have Been Generated.
    2 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  80.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1         300.00     130.00     700.00     175.00      20.00
     2         700.10     175.00    1200.00     230.00      20.00
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
```

* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Attempted = 5000
Number of Trial Surfaces With Valid FS = 5000
Statistical Data On All Valid FS Values:
FS Max = 27.236 FS Min = 4.857 FS Ave = 7.426
Standard Deviation = 2.306 Coefficient of Variation = 31.05 %
Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

Factor of Safety
*** 4.857 ***

Individual data on the 22 slices

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 34.6 | 49872.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 2 | 6.0 | 18806.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 3 | 7.8 | 28127.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 4 | 58.9 | 318427.4 | 0.0 | 53009.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 5 | 2.0 | 15066.3 | 0.0 | 3660.2 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 6 | 0.8 | 6764.6 | 0.0 | 1563.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 7 | 3.5 | 28869.5 | 0.0 | 6734.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 8 | 10.7 | 92078.6 | 0.0 | 19147.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 9 | 30.0 | 280595.5 | 0.0 | 48834.7 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 10 | 82.0 | 765364.8 | 0.0 | 96716.4 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 11 | 6.0 | 50870.5 | 0.0 | 4963.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 12 | 2.4 | 19893.1 | 0.0 | 1917.1 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 13 | 33.6 | 267289.0 | 0.0 | 21808.9 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 14 | 6.0 | 46659.2 | 0.0 | 2945.5 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 15 | 58.3 | 431858.2 | 0.0 | 13614.3 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 16 | 17.7 | 120685.6 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 17 | 10.0 | 66135.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 18 | 54.0 | 414978.9 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 19 | 5.8 | 51323.3 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 20 | 17.9 | 132334.8 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 21 | 30.6 | 111199.4 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |
| 22 | 10.2 | 6454.5 | 0.0 | 0.0 | 0. | 0. | 0.0 | 0.0 | 0.0 |

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

Factor of Safety
*** 4.857 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

Factor of Safety
*** 4.857 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |



| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

Factor of Safety
*** 4.857 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

Factor of Safety
*** 4.857 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

Factor of Safety
*** 4.857 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

Factor of Safety
*** 4.857 ***

Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |

```
6        990.546      280.555
   Factor of Safety
  ***    4.857   ***
      **** END OF GSTABL7 OUTPUT ****
```

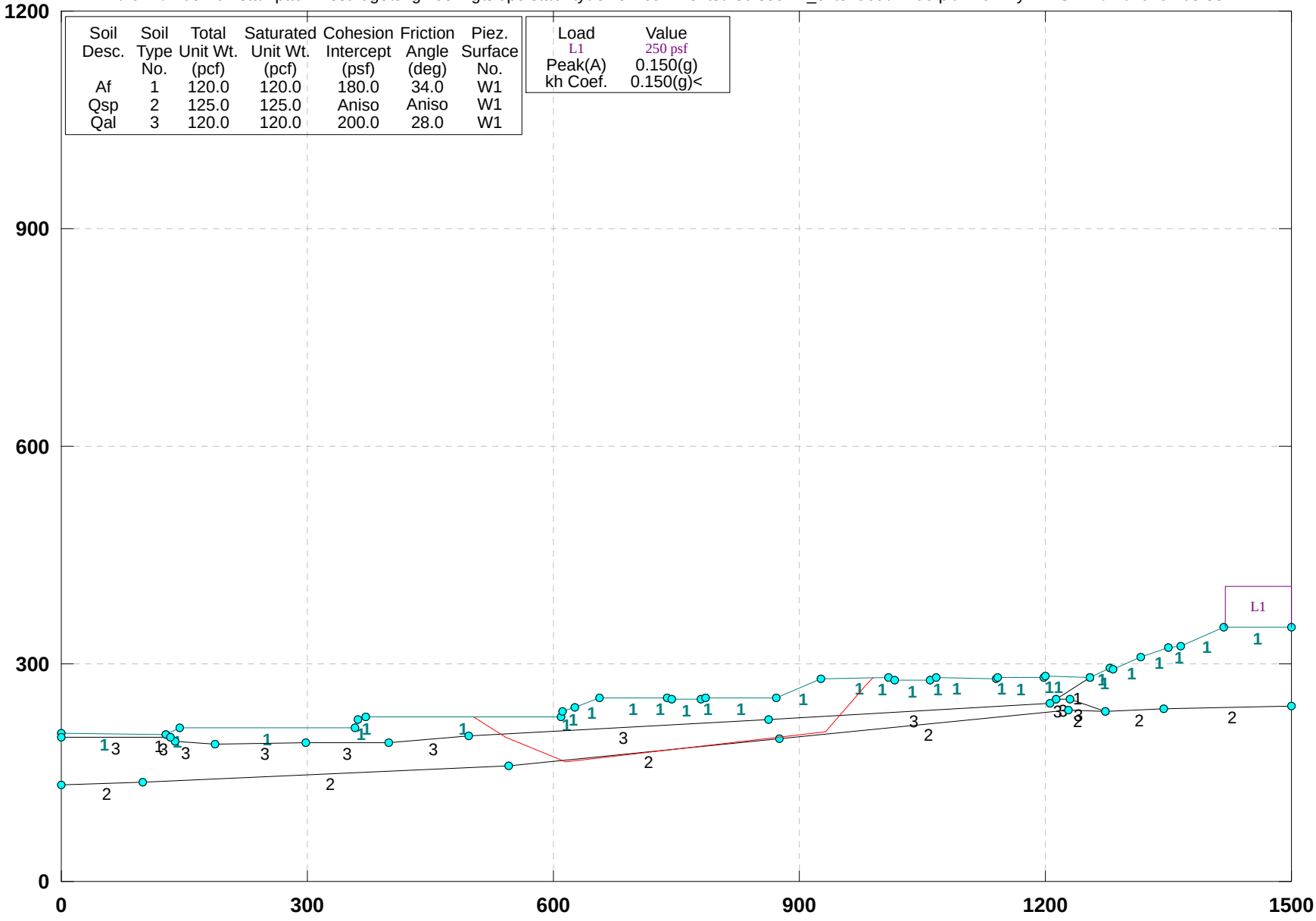
#30 Entire length

# Westridge/14057-01/Sec 12'-12"/Entire Length/Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#30 sec 12_extended\x12tle.plt Run By: KMS 12/21/2016 08:33AM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 34.0 | W1 |
| Qsp | 2 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 3 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

| Load | Value |
|---|---|
| L1 | 250 psf |
| Peak(A) | 0.150(g) |
| kh Coef. | 0.150(g)< |




**GSTABL7 v.2 FSmin=2.29**

**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 12/21/2016
Time of Run: 08:33AM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#30 Sec 12_Extended\x12tle Surface #1.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#30 Sec 12_Extended\x12tle Surface #1.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#30 Sec 12_Extended\x12tle Surface #1.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 12'-12"/Entire Length/Seismic

**BOUNDARY COORDINATES**

31 Top Boundaries
51 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 204.00 | 128.00 | 203.00 | 1 |
| 2 | 128.00 | 203.00 | 145.00 | 212.00 | 1 |
| 3 | 145.00 | 212.00 | 358.00 | 211.00 | 1 |
| 4 | 358.00 | 211.00 | 361.00 | 224.00 | 1 |
| 5 | 361.00 | 224.00 | 371.00 | 226.00 | 1 |
| 6 | 371.00 | 226.00 | 609.00 | 227.00 | 1 |
| 7 | 609.00 | 227.00 | 611.00 | 235.00 | 1 |
| 8 | 611.00 | 235.00 | 626.00 | 240.00 | 1 |
| 9 | 626.00 | 240.00 | 656.00 | 254.00 | 1 |
| 10 | 656.00 | 254.00 | 738.00 | 254.00 | 1 |
| 11 | 738.00 | 254.00 | 744.00 | 251.00 | 1 |
| 12 | 744.00 | 251.00 | 780.00 | 251.00 | 1 |
| 13 | 780.00 | 251.00 | 786.00 | 253.00 | 1 |
| 14 | 786.00 | 253.00 | 872.00 | 253.00 | 1 |
| 15 | 872.00 | 253.00 | 926.00 | 279.00 | 1 |
| 16 | 926.00 | 279.00 | 1009.00 | 281.00 | 1 |
| 17 | 1009.00 | 281.00 | 1016.00 | 278.00 | 1 |
| 18 | 1016.00 | 278.00 | 1059.00 | 278.00 | 1 |
| 19 | 1059.00 | 278.00 | 1067.00 | 281.00 | 1 |
| 20 | 1067.00 | 281.00 | 1140.00 | 280.00 | 1 |
| 21 | 1140.00 | 280.00 | 1141.00 | 281.00 | 1 |
| 22 | 1141.00 | 281.00 | 1199.00 | 282.00 | 1 |
| 23 | 1199.00 | 282.00 | 1200.00 | 283.00 | 1 |
| 24 | 1200.00 | 283.00 | 1255.00 | 282.00 | 1 |
| 25 | 1255.00 | 282.00 | 1279.00 | 294.00 | 1 |
| 26 | 1279.00 | 294.00 | 1282.00 | 293.00 | 1 |
| 27 | 1282.00 | 293.00 | 1316.00 | 310.00 | 1 |
| 28 | 1316.00 | 310.00 | 1350.00 | 323.00 | 1 |
| 29 | 1350.00 | 323.00 | 1365.00 | 325.00 | 1 |
| 30 | 1365.00 | 325.00 | 1417.00 | 350.00 | 1 |
| 31 | 1417.00 | 350.00 | 1500.00 | 350.00 | 1 |
| 32 | 128.00 | 203.00 | 133.00 | 199.00 | 1 |
| 33 | 133.00 | 199.00 | 138.00 | 194.00 | 3 |
| 34 | 138.00 | 194.00 | 187.00 | 190.00 | 3 |
| 35 | 187.00 | 190.00 | 298.00 | 191.00 | 3 |
| 36 | 298.00 | 191.00 | 400.00 | 192.00 | 3 |
| 37 | 400.00 | 192.00 | 496.00 | 200.00 | 3 |
| 38 | 496.00 | 200.00 | 862.00 | 224.00 | 3 |
| 39 | 862.00 | 224.00 | 1205.00 | 246.00 | 3 |
| 40 | 1205.00 | 246.00 | 1213.00 | 252.00 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| 41 | 1213.00 | 252.00 | 1255.00 | 282.00 | 1 |
| 42 | 0.00 | 199.00 | 133.00 | 199.00 | 3 |
| 43 | 1213.00 | 252.00 | 1230.00 | 252.00 | 3 |
| 44 | 1230.00 | 252.00 | 1273.00 | 235.00 | 3 |
| 45 | 0.00 | 134.00 | 100.00 | 137.00 | 2 |
| 46 | 100.00 | 137.00 | 546.00 | 160.00 | 2 |
| 47 | 546.00 | 160.00 | 875.00 | 197.00 | 2 |
| 48 | 875.00 | 197.00 | 1228.00 | 237.00 | 2 |
| 49 | 1228.00 | 237.00 | 1273.00 | 235.00 | 2 |
| 50 | 1273.00 | 235.00 | 1345.00 | 238.00 | 2 |
| 51 | 1345.00 | 238.00 | 1500.00 | 242.00 | 2 |

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

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

| Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param. | Pressure Constant (psf) | Piez. Surface No. |
|---|---|---|---|---|---|---|---|
| 1 | 120.0 | 120.0 | 180.0 | 34.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 500.0 | 34.0 | 0.00 | 0.0 | 1 |
| 3 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 2 Is Anisotropic
Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 5.0 | 500.00 | 34.00 |
| 2 | 20.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 34.00 |

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

BOUNDARY LOAD(S)
1 Load(s) Specified

| Load No. | X-Left (ft) | X-Right (ft) | Intensity (psf) | Deflection (deg) |
|---|---|---|---|---|
| 1 | 1420.00 | 1500.00 | 250.0 | 0.0 |

NOTE - Intensity Is Specified As A Uniformly Distributed Force Acting On A Horizontally Projected Surface.
Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Trial Failure Surface Specified By 6 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 501.717 | 226.549 |
| 2 | 542.270 | 198.493 |
| 3 | 615.308 | 165.852 |
| 4 | 931.835 | 206.139 |
| 5 | 980.390 | 269.719 |
| 6 | 990.546 | 280.555 |

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 2.288

***Table 1 - Individual Data on the 20 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 34.6 | 49873.5 | 0.0 | 0.0 | 0.0 | 0.0 | 7481.0 | 0.0 | 0.0 |
| 2 | 6.0 | 18806.8 | 0.0 | 0.0 | 0.0 | 0.0 | 2821.0 | 0.0 | 0.0 |
| 3 | 66.7 | 346551.1 | 0.0 | 0.0 | 0.0 | 0.0 | 51982.7 | 0.0 | 0.0 |
| 4 | 2.0 | 15066.2 | 0.0 | 0.0 | 0.0 | 0.0 | 2259.9 | 0.0 | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 0.8 | 6770.5 | 0.0 | 0.0 | 0.0 | 0.0 | 1015.6 | 0.0 | 0.0 |
| 6 | 3.5 | 28866.5 | 0.0 | 0.0 | 0.0 | 0.0 | 4330.0 | 0.0 | 0.0 |
| 7 | 10.7 | 92075.2 | 0.0 | 0.0 | 0.0 | 0.0 | 13811.3 | 0.0 | 0.0 |
| 8 | 30.0 | 280594.9 | 0.0 | 0.0 | 0.0 | 0.0 | 42089.2 | 0.0 | 0.0 |
| 9 | 82.0 | 765363.9 | 0.0 | 0.0 | 0.0 | 0.0 | ******* | 0.0 | 0.0 |
| 10 | 6.0 | 50870.5 | 0.0 | 0.0 | 0.0 | 0.0 | 7630.6 | 0.0 | 0.0 |
| 11 | 2.4 | 19884.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2982.6 | 0.0 | 0.0 |
| 12 | 33.6 | 267298.1 | 0.0 | 0.0 | 0.0 | 0.0 | 40094.7 | 0.0 | 0.0 |
| 13 | 6.0 | 46659.2 | 0.0 | 0.0 | 0.0 | 0.0 | 6998.9 | 0.0 | 0.0 |
| 14 | 76.0 | 552544.8 | 0.0 | 0.0 | 0.0 | 0.0 | 82881.7 | 0.0 | 0.0 |
| 15 | 10.0 | 66135.7 | 0.0 | 0.0 | 0.0 | 0.0 | 9920.4 | 0.0 | 0.0 |
| 16 | 54.0 | 414980.3 | 0.0 | 0.0 | 0.0 | 0.0 | 62247.1 | 0.0 | 0.0 |
| 17 | 5.8 | 51326.7 | 0.0 | 0.0 | 0.0 | 0.0 | 7699.0 | 0.0 | 0.0 |
| 18 | 17.9 | 132334.5 | 0.0 | 0.0 | 0.0 | 0.0 | 19850.2 | 0.0 | 0.0 |
| 19 | 30.6 | 111197.6 | 0.0 | 0.0 | 0.0 | 0.0 | 16679.6 | 0.0 | 0.0 |
| 20 | 10.2 | 6454.0 | 0.0 | 0.0 | 0.0 | 0.0 | 968.1 | 0.0 | 0.0 |

***Table 2 - Base Stress Data on the 20 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -34.68 | 519.00 | 42.02 | 1761.88 | -643.08 |
| 2 | -34.68 | 539.27 | 7.29 | 2706.37 | -1397.74 |
| 3 | -24.08 | 575.64 | 73.09 | 3619.46 | -1407.74 |
| 4 | -24.08 | 610.00 | 2.19 | 5140.01 | -2041.97 |
| 5 | -24.08 | 611.42 | 0.91 | 5512.21 | -2197.22 |
| 6 | -24.08 | 613.57 | 3.80 | 7703.62 | -2253.21 |
| 7 | 7.25 | 620.65 | 10.78 | 4497.38 | 2368.70 |
| 8 | 7.25 | 641.00 | 30.24 | 4867.78 | 2572.67 |
| 9 | 7.25 | 697.00 | 82.66 | 4858.06 | 2567.32 |
| 10 | 7.25 | 741.00 | 6.05 | 4430.86 | 2332.07 |
| 11 | 7.25 | 745.21 | 2.43 | 4308.71 | 2264.80 |
| 12 | 7.25 | 763.21 | 33.86 | 4339.21 | 2189.15 |
| 13 | 7.25 | 783.00 | 6.05 | 4244.31 | 2139.01 |
| 14 | 7.25 | 824.00 | 76.61 | 3980.78 | 1999.77 |
| 15 | 7.25 | 867.00 | 10.08 | 3638.87 | 1819.12 |
| 16 | 7.25 | 899.00 | 54.44 | 4196.56 | 2113.78 |
| 17 | 7.25 | 928.92 | 5.88 | 4775.21 | 2419.51 |
| 18 | 52.63 | 940.80 | 29.56 | 5207.50 | 6534.19 |
| 19 | 52.63 | 965.08 | 50.44 | 3126.36 | 3217.26 |
| 20 | 46.86 | 985.47 | 14.85 | 677.10 | 528.86 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 2130902.25 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 3922.55(psf)
Sum of the Driving Forces = 931183.12 (lbs)
Average Mobilized Shear Stress = 1714.11(psf)
Total length of the failure surface = 543.24(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.5019(g)
Calculated Newmark Seismic Displacement = 0.001(ft)
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

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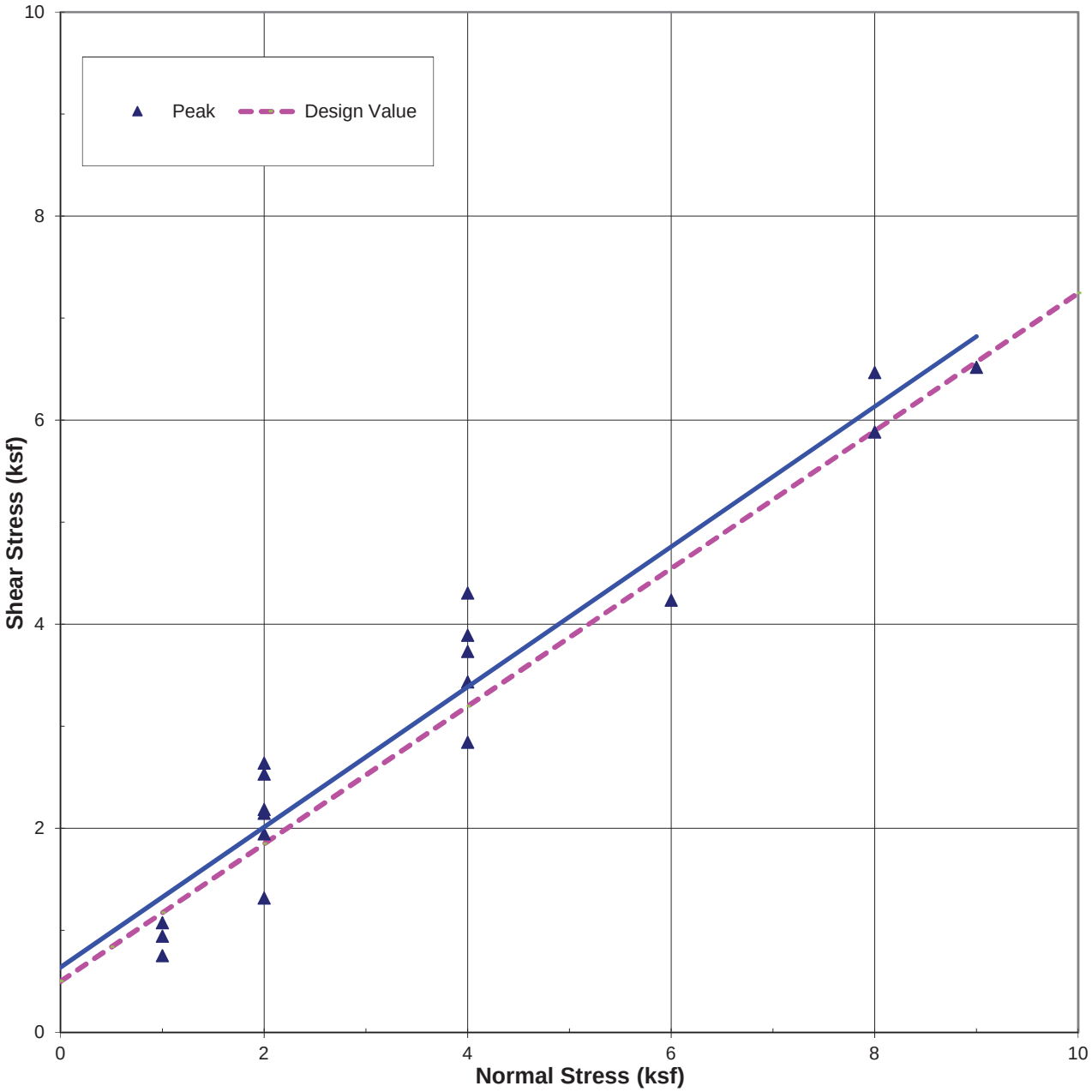
# *Appendix F*
# *Seismic Soil Shear Strengths*




Tested Samples:

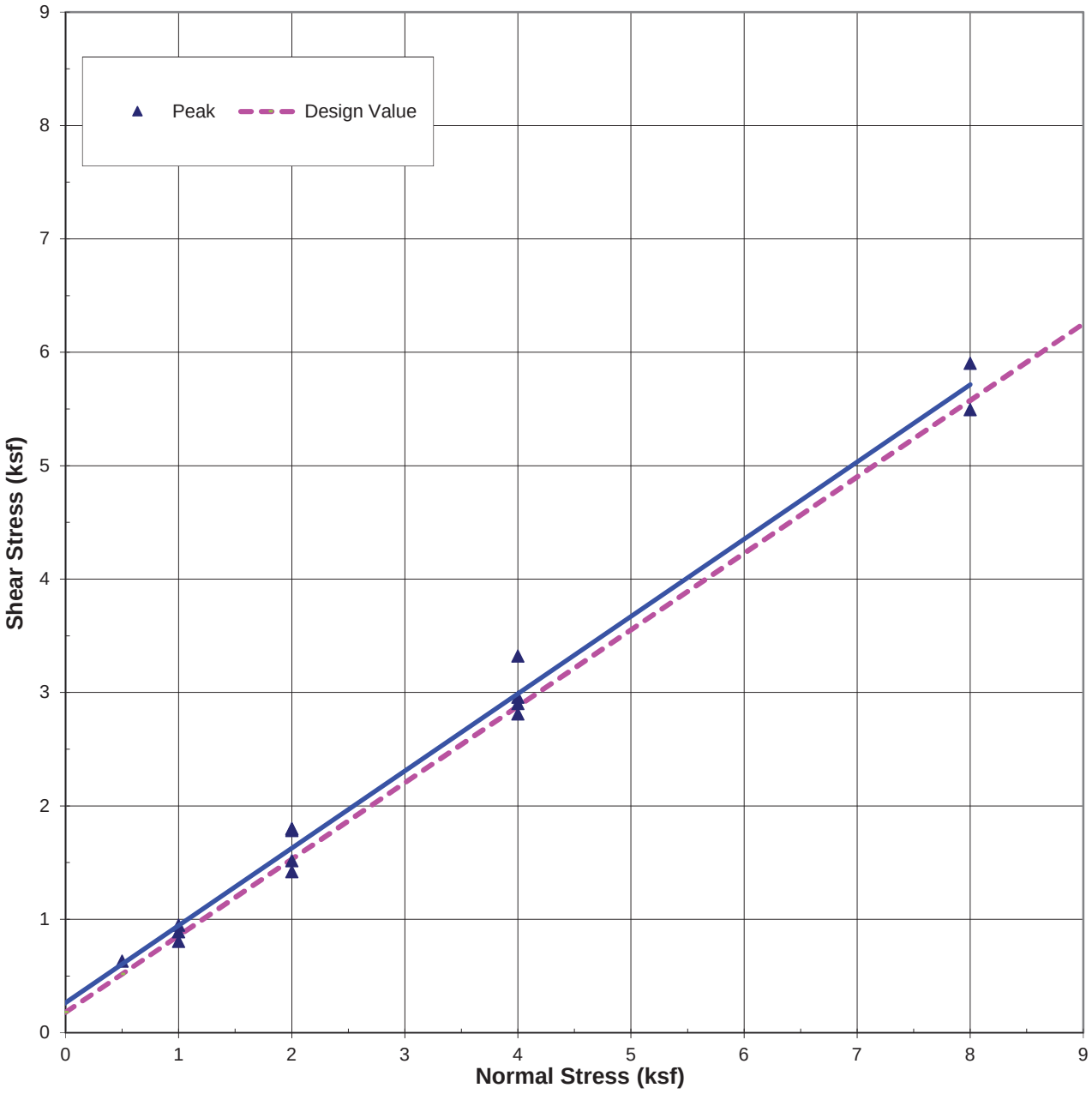
| | |
|---|---|
| B-1 at 20 ft (Qsp) | Peak: |
| B-1 at 30 ft (Qsp) | 34.5 Degrees |
| B-1 at 40 ft (Qsp) | 0.64 ksf |
| B-4 at 40 ft (Qsp) | Design: |
| B-4 at 60 ft (Qsp) | 34.0 Degrees |
| B-4 at 70 ft (Qsp) | 0.5 ksf |

LGC Geotechnical, Inc.

**COMPOSITE DIRECT SHEAR PLOT**

**Project Number:** 14057-01
**Date:** Mar-15

**Westridge / La Habra**




Tested Samples:

HS-1 at 40-45 ft (Af)
HS-3 at 15-20 ft (Af)
HS-17 at 5-7 ft (Af)
B-3 at 30-33 ft (Af)
B-4 at 35-40 ft (Af)

Samples Remolded to 90% R.C.

Peak:
34.3 Degrees
0.26 ksf

Seismic Design:
34.0 Degrees
0.18 ksf

LGC Geotechnical, Inc.

**COMPOSITE DIRECT SHEAR PLOT**

**Project Number:** 14057-01
**Date:** Mar-15

**Westridge / La Habra**

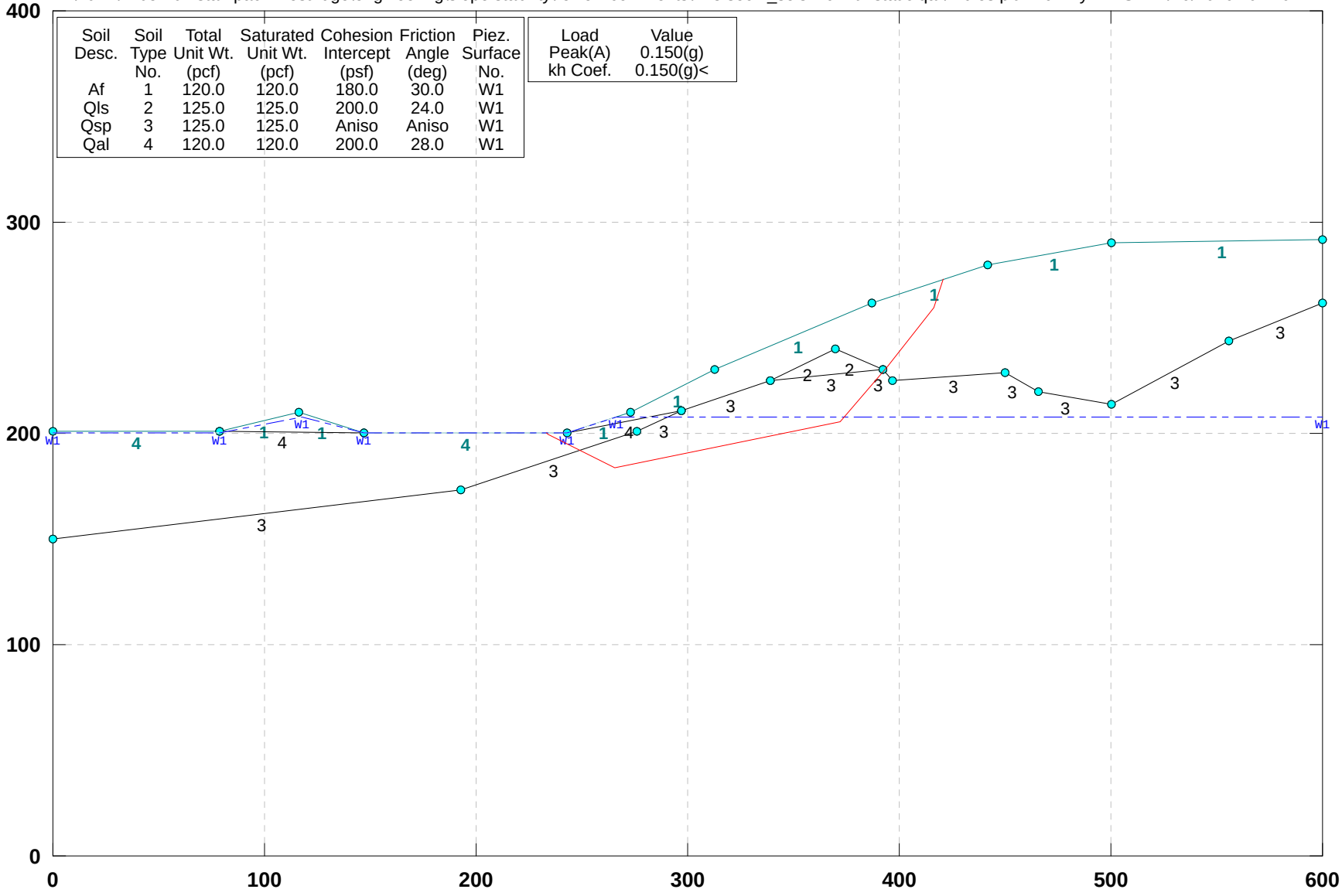
#13 Compared to, FS = 1.22
from previous report

# Westridge/14057-01/Sec 1-1'/ 4-4-16 Design - Lower Basin Cut Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\review comments\#13 sec 1_seismic with static qal\x1dles.plt Run By: KMS 12/19/2016 01:10PM

| Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. |
|---|---|---|---|---|---|---|
| Af | 1 | 120.0 | 120.0 | 180.0 | 30.0 | W1 |
| Qls | 2 | 125.0 | 125.0 | 200.0 | 24.0 | W1 |
| Qsp | 3 | 125.0 | 125.0 | Aniso | Aniso | W1 |
| Qal | 4 | 120.0 | 120.0 | 200.0 | 28.0 | W1 |

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




**GSTABL7 v.2 FSmin=1.18**
**Factor Of Safety Is Calculated By The Simplified Janbu Method**

*****  GSTABL7  *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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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: 12/19/2016
Time of Run: 01:10PM
Run By: KMS
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#13 Sec 1_Seismic with static Qal\x1dles.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#13 Sec 1_Seismic with static Qal\x1dles.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\Review Comments\#13 Sec 1_Seismic with static Qal\x1dles.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 1-1'/ 4-4-16 Design - Lower Basin Cut Slope - Seismic

BOUNDARY COORDINATES
10 Top Boundaries
25 Total Boundaries

| Boundary No. | X-Left (ft) | Y-Left (ft) | X-Right (ft) | Y-Right (ft) | Soil Type Below Bnd |
|---|---|---|---|---|---|
| 1 | 0.00 | 201.00 | 79.00 | 201.00 | 4 |
| 2 | 79.00 | 201.00 | 116.00 | 210.00 | 1 |
| 3 | 116.00 | 210.00 | 147.00 | 200.00 | 1 |
| 4 | 147.00 | 200.00 | 243.00 | 200.00 | 4 |
| 5 | 243.00 | 200.00 | 273.00 | 210.00 | 1 |
| 6 | 273.00 | 210.00 | 313.00 | 230.00 | 1 |
| 7 | 313.00 | 230.00 | 387.00 | 262.00 | 1 |
| 8 | 387.00 | 262.00 | 442.00 | 280.00 | 1 |
| 9 | 442.00 | 280.00 | 500.00 | 290.00 | 1 |
| 10 | 500.00 | 290.00 | 600.00 | 292.00 | 1 |
| 11 | 79.00 | 201.00 | 147.00 | 200.00 | 4 |
| 12 | 243.00 | 200.00 | 297.00 | 211.00 | 4 |
| 13 | 0.00 | 150.00 | 193.00 | 173.00 | 3 |
| 14 | 193.00 | 173.00 | 276.00 | 201.00 | 3 |
| 15 | 276.00 | 201.00 | 297.00 | 211.00 | 3 |
| 16 | 297.00 | 211.00 | 339.00 | 225.00 | 3 |
| 17 | 339.00 | 225.00 | 370.00 | 240.00 | 2 |
| 18 | 370.00 | 240.00 | 392.00 | 230.00 | 2 |
| 19 | 392.00 | 230.00 | 397.00 | 225.00 | 3 |
| 20 | 397.00 | 225.00 | 450.00 | 229.00 | 3 |
| 21 | 450.00 | 229.00 | 466.00 | 220.00 | 3 |
| 22 | 466.00 | 220.00 | 500.00 | 214.00 | 3 |
| 23 | 500.00 | 214.00 | 556.00 | 244.00 | 3 |
| 24 | 556.00 | 244.00 | 600.00 | 262.00 | 3 |
| 25 | 339.00 | 225.00 | 392.00 | 230.00 | 3 |

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

ISOTROPIC SOIL PARAMETERS
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 | 120.0 | 120.0 | 180.0 | 30.0 | 0.00 | 0.0 | 1 |
| 2 | 125.0 | 125.0 | 200.0 | 24.0 | 0.00 | 0.0 | 1 |
| 3 | 125.0 | 125.0 | 500.0 | 32.0 | 0.00 | 0.0 | 1 |
| 4 | 120.0 | 120.0 | 200.0 | 28.0 | 0.00 | 0.0 | 1 |

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 3 Is Anisotropic



Number Of Direction Ranges Specified = 3

| Direction Range No. | Counterclockwise Direction Limit (deg) | Cohesion Intercept (psf) | Friction Angle (deg) |
|---|---|---|---|
| 1 | 7.0 | 500.00 | 32.00 |
| 2 | 12.0 | 200.00 | 27.00 |
| 3 | 90.0 | 500.00 | 32.00 |

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

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 7 Coordinate Points
Pore Pressure Inclination Factor = 0.50

| Point No. | X-Water (ft) | Y-Water (ft) |
|---|---|---|
| 1 | 0.00 | 200.00 |
| 2 | 79.00 | 200.00 |
| 3 | 118.00 | 208.00 |
| 4 | 147.00 | 200.00 |
| 5 | 243.00 | 200.00 |
| 6 | 266.00 | 208.00 |
| 7 | 600.00 | 208.00 |

Specified Peak Ground Acceleration Coefficient (A) = 0.150(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 7 Coordinate Points

| Point No. | X-Surf (ft) | Y-Surf (ft) |
|---|---|---|
| 1 | 233.564 | 200.000 |
| 2 | 234.115 | 199.720 |
| 3 | 265.302 | 183.832 |
| 4 | 371.636 | 205.530 |
| 5 | 394.624 | 231.923 |
| 6 | 416.565 | 259.192 |
| 7 | 420.909 | 273.098 |

Janbu's Empirical Coefficient (fo) = 1.077
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 1.183

***Table 1 - Individual Data on the 21 Slices***

| Slice No. | Width (ft) | Weight (lbs) | Water Force Top (lbs) | Water Force Bot (lbs) | Tie Force Norm (lbs) | Tie Force Tan (lbs) | Earthquake Force Hor (lbs) | Earthquake Force Ver (lbs) | Surcharge Load (lbs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.6 | 9.3 | 0.0 | 5.4 | 0.0 | 0.0 | 1.4 | 0.0 | 0.0 |
| 2 | 8.9 | 2711.6 | 0.0 | 1582.4 | 0.0 | 0.0 | 406.7 | 0.0 | 0.0 |
| 3 | 6.3 | 5628.2 | 0.0 | 3126.3 | 0.0 | 0.0 | 844.2 | 0.0 | 0.0 |
| 4 | 16.0 | 32928.4 | 0.0 | 18099.8 | 0.0 | 0.0 | 4939.3 | 0.0 | 0.0 |
| 5 | 0.7 | 2028.2 | 0.0 | 1008.3 | 0.0 | 0.0 | 304.2 | 0.0 | 0.0 |
| 6 | 7.0 | 20775.7 | 0.0 | 10392.2 | 0.0 | 0.0 | 3116.4 | 0.0 | 0.0 |
| 7 | 3.0 | 9236.6 | 0.0 | 4258.9 | 0.0 | 0.0 | 1385.5 | 0.0 | 0.0 |
| 8 | 6.3 | 20378.7 | 0.0 | 8527.0 | 0.0 | 0.0 | 3056.8 | 0.0 | 0.0 |
| 9 | 8.4 | 29662.4 | 0.0 | 10650.9 | 0.0 | 0.0 | 4449.4 | 0.0 | 0.0 |
| 10 | 6.3 | 23885.3 | 0.0 | 7359.4 | 0.0 | 0.0 | 3582.8 | 0.0 | 0.0 |
| 11 | 16.0 | 67148.2 | 0.0 | 16372.3 | 0.0 | 0.0 | 10072.2 | 0.0 | 0.0 |
| 12 | 26.0 | 126118.5 | 0.0 | 19509.4 | 0.0 | 0.0 | 18917.8 | 0.0 | 0.0 |
| 13 | 31.0 | 175517.4 | 0.0 | 11779.8 | 0.0 | 0.0 | 26327.6 | 0.0 | 0.0 |
| 14 | 1.6 | 10025.6 | 0.0 | 274.7 | 0.0 | 0.0 | 1503.8 | 0.0 | 0.0 |
| 15 | 2.2 | 13008.6 | 0.0 | 252.4 | 0.0 | 0.0 | 1951.3 | 0.0 | 0.0 |
| 16 | 13.2 | 70363.4 | 0.0 | 0.0 | 0.0 | 0.0 | 10554.5 | 0.0 | 0.0 |
| 17 | 5.0 | 22194.3 | 0.0 | 0.0 | 0.0 | 0.0 | 3329.1 | 0.0 | 0.0 |
| 18 | 0.5 | 2102.5 | 0.0 | 0.0 | 0.0 | 0.0 | 315.4 | 0.0 | 0.0 |
| 19 | 2.1 | 8494.2 | 0.0 | 0.0 | 0.0 | 0.0 | 1274.1 | 0.0 | 0.0 |
| 20 | 21.9 | 59314.4 | 0.0 | 0.0 | 0.0 | 0.0 | 8897.2 | 0.0 | 0.0 |

21  4.3  3253.8  0.0  0.0  0.0  0.0  488.1  0.0  0.0

***Table 2 - Base Stress Data on the 21 Slices***

| Slice No. * | Alpha (deg) | X-Coord. Slice Cntr (ft) | Base Leng. (ft) | Available Shear Strength (psf) | Mobilized Shear Stress (psf) |
|---|---|---|---|---|---|
| 1 | -26.94 | 233.84 | 0.62 | 296.95 | -5.36 |
| 2 | -27.00 | 238.56 | 9.97 | 404.45 | -97.74 |
| 3 | -27.00 | 246.14 | 7.06 | 640.83 | -286.59 |
| 4 | -27.00 | 257.30 | 17.97 | 1774.26 | -658.63 |
| 5 | 11.53 | 265.65 | 0.71 | 900.06 | 1008.00 |
| 6 | 11.53 | 269.50 | 7.14 | 911.04 | 1029.60 |
| 7 | 11.53 | 274.50 | 3.06 | 994.49 | 1068.08 |
| 8 | 11.53 | 279.14 | 6.40 | 1103.94 | 1127.02 |
| 9 | 11.53 | 286.49 | 8.60 | 1278.23 | 1221.04 |
| 10 | 11.53 | 293.85 | 6.43 | 1452.85 | 1315.24 |
| 11 | 11.53 | 305.00 | 16.33 | 1714.52 | 1455.88 |
| 12 | 11.53 | 326.00 | 26.54 | 2154.95 | 1682.74 |
| 13 | 11.53 | 354.50 | 31.64 | 2716.17 | 1964.13 |
| 14 | 11.53 | 370.82 | 1.67 | 3038.34 | 2125.86 |
| 15 | 48.94 | 372.71 | 3.28 | 4009.84 | 5155.43 |
| 16 | 48.94 | 380.39 | 20.12 | 3628.25 | 4540.44 |
| 17 | 48.94 | 389.50 | 7.61 | 3103.11 | 3784.54 |
| 18 | 48.94 | 392.25 | 0.77 | 2928.98 | 3533.88 |
| 19 | 48.94 | 393.57 | 3.22 | 2436.68 | 3421.37 |
| 20 | 51.18 | 405.59 | 35.00 | 1728.67 | 2360.42 |
| 21 | 72.65 | 418.74 | 14.57 | 801.76 | 748.45 |

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 440780.97 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 1927.22(psf)

Sum of the Driving Forces = 401113.22 (lbs)

Average Mobilized Shear Stress = 1753.78(psf)

Total length of the failure surface = 228.71(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***

(Note: kv is set = zero for displacement calculations)

Seismic Yield Coefficient (ky) = 0.2347(g)

Calculated Newmark Seismic Displacement = 0.006(ft)

Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

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

# *Appendix G*
# *Settlement Calculations*

**SUMMARY OF LABORATORY CONSOLIDATION DATA**

| Boring | Depth (ft) | (ksf) po | (ksf) Pc | Cc$\varepsilon$ | Cr$\varepsilon$ | USCS Soil Type | Field Moisture | PI | LL | PL | Liquidity Index | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HS-3 | 10 | 1.25 | 5.0 | 0.04 | 0.009 | CL | 11.6 | 13 | 27 | 14 | -0.18 | Qal |
| HS-3 | 15 | 1.88 | 4.5 | 0.03 | 0.005 | CL | 9.7 | 10 | 25 | 15 | -0.53 | Qal |
| HS-3 | 25 | 3.13 | 5.0 | 0.10 | 0.02 | CL | 21.3 | 23 | 39 | 16 | 0.23 | Qal |
| HS-12 | 40 | 5.00 | 5.0 | 0.04 | 0.015 | CL | 14.8 | 23 | 37 | 14 | 0.03 | Qal |
| HS-12 | 50 | 6.25 | 9.0 | 0.12 | 0.018 | CL | 25.7 | 22 | 42 | 20 | 0.26 | Qal |
| HS-14 | 20 | 2.50 | 6.0 | 0.04 | 0.005 | SC | 9.1 | 10 | 25 | 15 | -0.59 | Qal |
| HS-15 | 25 | 3.13 | 7.0 | 0.06 | 0.009 | SC | 13.4 | 21 | 42 | 21 | -0.36 | Qal |
| HS-16 | 20 | 2.50 | 8.0 | 0.095 | 0.008 | CL | 16.4 | 17 | 36 | 19 | -0.15 | Qal |
| HS-17 | 20 | 2.50 | 3.5 | 0.095 | 0.017 | CL | 26.3 | 22 | 42 | 20 | 0.29 | Qal |
| HS-17 | 25 | 3.13 | 6.0 | 0.06 | 0.006 | CL | 18.2 | 15 | 32 | 17 | 0.08 | Qal |
| | | Average | 5.9 | 0.068 | 0.011 | | | 17.6 | 34.7 | 17.1 | -0.09 | |

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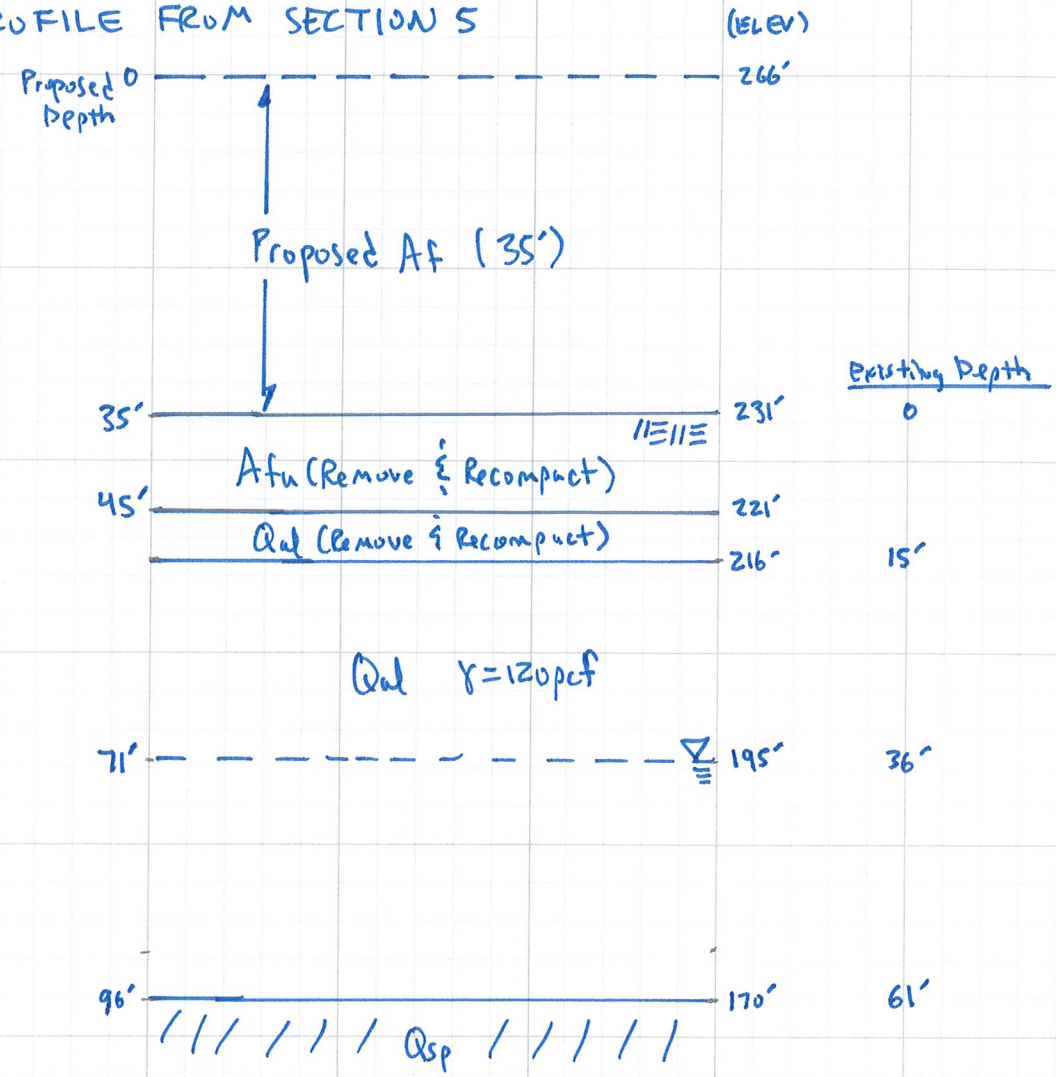
# SETTLEMENT OF Qal

IDEALIZED PROFILE FROM SECTION 5




$\Delta q = 120pcf\ (35') = 4.20\ ksf$

Project Name: Rancho La Habra
Project Number: 14057-01
Drawn By: BTZ
Date: 2/14/2017
Checked By:
Scale: N/A
Page: 1 of

## SETTLEMENT OF Qal (CONT.)

Using $P_c = 5.9$ ksf $C_{c\varepsilon} = 0.068$ $C_{r\varepsilon} = 0.011$ $\Delta q = 4.20$ ksf

Layer ① 10' thick layer (15' to 25' below EG)

$\sigma_{v_i\,Avg}' = 120\,pcf(20') = 2{,}400\,psf = 2.40\,ksf$

$$\Delta S = H\left[C_{r\varepsilon}\log\left(\frac{P_c}{\sigma_{v_i}'}\right) + C_{c\varepsilon}\log\left(\frac{\sigma_{v_i}' + \Delta q}{P_c}\right)\right]$$

$$\Delta S = 10'(12''/ft)\left[0.011\log\left(\frac{5.9}{2.40}\right) + 0.068\log\left(\frac{2.4+4.20}{5.9}\right)\right] = 0.913''$$

Layer ② 11' thick layer (25' to 36' below EG)

$\sigma_{v\,Avg}' = 120\,pcf(30.5') = 3.66\,ksf$

$$\Delta S = 11'(12''/ft)\left[0.011\log\left(\frac{5.9}{3.66}\right) + 0.068\log\left(\frac{3.66+4.20}{5.9}\right)\right] = 1.419''$$

Layer ③ 12' thick layer (36' to 48' below EG)

$\sigma_{v\,Avg}' = 120\,pcf(36') + (120-62.4\,pcf)(6') = 4{,}666\,psf = 4.67\,ksf$

$$\Delta S = 12'(12''/ft)\left[0.011\log\left(\frac{5.9}{4.67}\right) + 0.068\log\left(\frac{4.67+4.2}{5.9}\right)\right] = 1.895''$$

Layer ④ 13' thick layer (48' to 61' below EG)

$\sigma_{v\,Avg}' = 120\,pcf(36') + (120-62.4\,psf)(18.5') = 5{,}386\,psf = 5.39\,ksf$

$$\Delta S = 13'(12''/ft)\left[0.011\log\left(\frac{5.9}{5.39}\right) + 0.068\log\left(\frac{5.39+4.2}{5.9}\right)\right] = 2.305''$$

$\delta_T = 0.913'' + 1.419'' + 1.895'' + 2.305'' = \underline{6.53''}$



131 Calle Iglesia, Suite 200, San Clemente, CA 92672 (949) 369-6141 www.lgcgeotechnical.com

**SETTLEMENT CALCULATION**
**FOR FILL SURCHARGE**

| | | | |
|---|---|---|---|
| Soil Unit Weight | 120.0 pcf | Surcharge | 4,200 psf |
| Water Unit Weight | 62.4 pcf | Af Unit Wt | 120.0 pcf |
| Buoyant Unit Weight | 57.6 pcf | Fill Depth | 35.0 ft |
| Groundwater Depth | 36 feet | | |
| Pc' | 5,900.0 psf | | |

Description: Idealized Profile from Section 5

| | | Stress at Layer Bottom | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Unit Weight γ (pcf) | Total Stress (psf) | Pore Water (psf) | Effective Stress, po (psf) | Δp | Ccε | Crε | po + Δp | Δ s (feet) | Δ s (inch) | Depth (ft) |
| 0 | 120.0 | 0.0 | 0.0 | 0.0 | 4200.0 | 0 | 0 | 4200.0 | 0.000 | 0 | 0.0 |
| 1 | 120.0 | 120.0 | 0.0 | 120.0 | 4200.0 | 0 | 0 | 4320.0 | 0.000 | 0.000 | 1.0 |
| 2 | 120.0 | 240.0 | 0.0 | 240.0 | 4200.0 | 0 | 0 | 4440.0 | 0.000 | 0.000 | 2.0 |
| 3 | 120.0 | 360.0 | 0.0 | 360.0 | 4200.0 | 0 | 0 | 4560.0 | 0.000 | 0.000 | 3.0 |
| 4 | 120.0 | 480.0 | 0.0 | 480.0 | 4200.0 | 0 | 0 | 4680.0 | 0.000 | 0.000 | 4.0 |
| 5 | 120.0 | 600.0 | 0.0 | 600.0 | 4200.0 | 0 | 0 | 4800.0 | 0.000 | 0.000 | 5.0 |
| 6 | 120.0 | 720.0 | 0.0 | 720.0 | 4200.0 | 0 | 0 | 4920.0 | 0.000 | 0.000 | 6.0 |
| **7** | 120.0 | 840.0 | 0.0 | 840.0 | 4200.0 | 0 | 0 | 5040.0 | 0.000 | 0.000 | 7.0 |
| 8 | 120.0 | 960.0 | 0.0 | 960.0 | 4200.0 | 0 | 0 | 5160.0 | 0.000 | 0.000 | 8.0 |
| 9 | 120.0 | 1080.0 | 0.0 | 1080.0 | 4200.0 | 0 | 0 | 5280.0 | 0.000 | 0.000 | 9.0 |
| 10 | 120.0 | 1200.0 | 0.0 | 1200.0 | 4200.0 | 0 | 0 | 5400.0 | 0.000 | 0.000 | 10.0 |
| 11 | 120.0 | 1320.0 | 0.0 | 1320.0 | 4200.0 | 0 | 0 | 5520.0 | 0.000 | 0.000 | 11.0 |
| 12 | 120.0 | 1440.0 | 0.0 | 1440.0 | 4200.0 | 0 | 0 | 5640.0 | 0.000 | 0.000 | 12.0 |
| 13 | 120.0 | 1560.0 | 0.0 | 1560.0 | 4200.0 | 0 | 0 | 5760.0 | 0.000 | 0.000 | 13.0 |
| 14 | 120.0 | 1680.0 | 0.0 | 1680.0 | 4200.0 | 0 | 0 | 5880.0 | 0.000 | 0.000 | 14.0 |
| 15 | 120.0 | 1800.0 | 0.0 | 1800.0 | 4200.0 | 0 | 0 | 6000.0 | 0.000 | 0.000 | 15.0 |
| 16 | 120.0 | 1920.0 | 0.0 | 1920.0 | 4200.0 | 0.068 | 0.011 | 6120.0 | 0.006 | 0.077 | 16.0 |
| 17 | 120.0 | 2040.0 | 0.0 | 2040.0 | 4200.0 | 0.068 | 0.011 | 6240.0 | 0.007 | 0.081 | 17.0 |
| 18 | 120.0 | 2160.0 | 0.0 | 2160.0 | 4200.0 | 0.068 | 0.011 | 6360.0 | 0.007 | 0.084 | 18.0 |
| 19 | 120.0 | 2280.0 | 0.0 | 2280.0 | 4200.0 | 0.068 | 0.011 | 6480.0 | 0.007 | 0.088 | 19.0 |
| 20 | 120.0 | 2400.0 | 0.0 | 2400.0 | 4200.0 | 0.068 | 0.011 | 6600.0 | 0.008 | 0.091 | 20.0 |
| 21 | 120.0 | 2520.0 | 0.0 | 2520.0 | 4200.0 | 0.068 | 0.011 | 6720.0 | 0.008 | 0.095 | 21.0 |
| 22 | 120.0 | 2640.0 | 0.0 | 2640.0 | 4200.0 | 0.068 | 0.011 | 6840.0 | 0.008 | 0.098 | 22.0 |
| 23 | 120.0 | 2760.0 | 0.0 | 2760.0 | 4200.0 | 0.068 | 0.011 | 6960.0 | 0.009 | 0.102 | 23.0 |
| 24 | 120.0 | 2880.0 | 0.0 | 2880.0 | 4200.0 | 0.068 | 0.011 | 7080.0 | 0.009 | 0.106 | 24.0 |
| 25 | 120.0 | 3000.0 | 0.0 | 3000.0 | 4200.0 | 0.068 | 0.011 | 7200.0 | 0.009 | 0.109 | 25.0 |
| 26 | 120.0 | 3120.0 | 0.0 | 3120.0 | 4200.0 | 0.068 | 0.011 | 7320.0 | 0.009 | 0.113 | 26.0 |
| 27 | 120.0 | 3240.0 | 0.0 | 3240.0 | 4200.0 | 0.068 | 0.011 | 7440.0 | 0.010 | 0.117 | 27.0 |
| 28 | 120.0 | 3360.0 | 0.0 | 3360.0 | 4200.0 | 0.068 | 0.011 | 7560.0 | 0.010 | 0.120 | 28.0 |
| 29 | 120.0 | 3480.0 | 0.0 | 3480.0 | 4200.0 | 0.068 | 0.011 | 7680.0 | 0.010 | 0.124 | 29.0 |
| 30 | 120.0 | 3600.0 | 0.0 | 3600.0 | 4200.0 | 0.068 | 0.011 | 7800.0 | 0.011 | 0.127 | 30.0 |
| 31 | 120.0 | 3720.0 | 0.0 | 3720.0 | 4200.0 | 0.068 | 0.011 | 7920.0 | 0.011 | 0.131 | 31.0 |
| 32 | 120.0 | 3840.0 | 0.0 | 3840.0 | 4200.0 | 0.068 | 0.011 | 8040.0 | 0.011 | 0.134 | 32.0 |
| 33 | 120.0 | 3960.0 | 0.0 | 3960.0 | 4200.0 | 0.068 | 0.011 | 8160.0 | 0.011 | 0.138 | 33.0 |
| 34 | 120.0 | 4080.0 | 0.0 | 4080.0 | 4200.0 | 0.068 | 0.011 | 8280.0 | 0.012 | 0.141 | 34.0 |
| 35 | 120.0 | 4200.0 | 0.0 | 4200.0 | 4200.0 | 0.068 | 0.011 | 8400.0 | 0.012 | 0.145 | 35.0 |
| 36 | 120.0 | 4320.0 | 0.0 | 4320.0 | 4200.0 | 0.068 | 0.011 | 8520.0 | 0.012 | 0.148 | 36.0 |
| 37 | 120.0 | 4440.0 | 62.4 | 4377.6 | 4200.0 | 0.068 | 0.011 | 8577.6 | 0.012 | 0.150 | 37.0 |
| 38 | 120.0 | 4560.0 | 124.8 | 4435.2 | 4200.0 | 0.068 | 0.011 | 8635.2 | 0.013 | 0.151 | 38.0 |
| 39 | 120.0 | 4680.0 | 187.2 | 4492.8 | 4200.0 | 0.068 | 0.011 | 8692.8 | 0.013 | 0.153 | 39.0 |
| 40 | 120.0 | 4800.0 | 249.6 | 4550.4 | 4200.0 | 0.068 | 0.011 | 8750.4 | 0.013 | 0.155 | 40.0 |
| 41 | 120.0 | 4920.0 | 312.0 | 4608.0 | 4200.0 | 0.068 | 0.011 | 8808.0 | 0.013 | 0.156 | 41.0 |
| 42 | 120.0 | 5040.0 | 374.4 | 4665.6 | 4200.0 | 0.068 | 0.011 | 8865.6 | 0.013 | 0.158 | 42.0 |
| 43 | 120.0 | 5160.0 | 436.8 | 4723.2 | 4200.0 | 0.068 | 0.011 | 8923.2 | 0.013 | 0.159 | 43.0 |
| 44 | 120.0 | 5280.0 | 499.2 | 4780.8 | 4200.0 | 0.068 | 0.011 | 8980.8 | 0.013 | 0.161 | 44.0 |
| 45 | 120.0 | 5400.0 | 561.6 | 4838.4 | 4200.0 | 0.068 | 0.011 | 9038.4 | 0.014 | 0.163 | 45.0 |
| 46 | 120.0 | 5520.0 | 624.0 | 4896.0 | 4200.0 | 0.068 | 0.011 | 9096.0 | 0.014 | 0.164 | 46.0 |
| 47 | 120.0 | 5640.0 | 686.4 | 4953.6 | 4200.0 | 0.068 | 0.011 | 9153.6 | 0.014 | 0.166 | 47.0 |
| 48 | 120.0 | 5760.0 | 748.8 | 5011.2 | 4200.0 | 0.068 | 0.011 | 9211.2 | 0.014 | 0.167 | 48.0 |
| 49 | 120.0 | 5880.0 | 811.2 | 5068.8 | 4200.0 | 0.068 | 0.011 | 9268.8 | 0.014 | 0.169 | 49.0 |
| 50 | 120.0 | 6000.0 | 873.6 | 5126.4 | 4200.0 | 0.068 | 0.011 | 9326.4 | 0.014 | 0.170 | 50.0 |
| 51 | 120.0 | 6120.0 | 936.0 | 5184.0 | 4200.0 | 0.068 | 0.011 | 9384.0 | 0.014 | 0.172 | 51.0 |
| 52 | 120.0 | 6240.0 | 998.4 | 5241.6 | 4200.0 | 0.068 | 0.011 | 9441.6 | 0.014 | 0.173 | 52.0 |
| 53 | 120.0 | 6360.0 | 1060.8 | 5299.2 | 4200.0 | 0.068 | 0.011 | 9499.2 | 0.015 | 0.175 | 53.0 |
| 54 | 120.0 | 6480.0 | 1123.2 | 5356.8 | 4200.0 | 0.068 | 0.011 | 9556.8 | 0.015 | 0.176 | 54.0 |
| 55 | 120.0 | 6600.0 | 1185.6 | 5414.4 | 4200.0 | 0.068 | 0.011 | 9614.4 | 0.015 | 0.178 | 55.0 |
| 56 | 120.0 | 6720.0 | 1248.0 | 5472.0 | 4200.0 | 0.068 | 0.011 | 9672.0 | 0.015 | 0.179 | 56.0 |
| 57 | 120.0 | 6840.0 | 1310.4 | 5529.6 | 4200.0 | 0.068 | 0.011 | 9729.6 | 0.015 | 0.181 | 57.0 |
| 58 | 120.0 | 6960.0 | 1372.8 | 5587.2 | 4200.0 | 0.068 | 0.011 | 9787.2 | 0.015 | 0.182 | 58.0 |
| 59 | 120.0 | 7080.0 | 1435.2 | 5644.8 | 4200.0 | 0.068 | 0.011 | 9844.8 | 0.015 | 0.184 | 59.0 |
| 60 | 120.0 | 7200.0 | 1497.6 | 5702.4 | 4200.0 | 0.068 | 0.011 | 9902.4 | 0.015 | 0.185 | 60.0 |
| 61 | 120.0 | 7320.0 | 1560.0 | 5760.0 | 4200.0 | 0.068 | 0.011 | 9960.0 | 0.016 | 0.187 | 61.0 |
| | | | | | | | | | **Total:** | **6.58** | **inches** |

**SETTLEMENT CALCULATION**
**FOR FILL SURCHARGE**

| | | | |
|---|---|---|---|
| Soil Unit Weight | 120.0 pcf | Surcharge | 4,200 psf |
| Water Unit Weight | 62.4 pcf | Af Unit Wt | 120.0 pcf |
| Buoyant Unit Weight | 57.6 pcf | Fill Depth | 35.0 ft |
| Groundwater Depth | 36 feet | | |

Description: Idealized Profile from Section 5

| | | Stress at Layer Bottom | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (ft) | Unit Weight γ (pcf) | Total Stress (psf) | Pore Water (psf) | Effective Stress, po (psf) | Δp | Crε | po + Δp | Δ s (feet) | Δ s (inch) | Depth (ft) | Comments |
| 0 | 120.0 | 0.0 | 0.0 | 0.0 | 4200.0 | 0 | 4200.0 | 0.000 | 0.000 | 0 | |
| 1 | 120.0 | 120.0 | 0.0 | 120.0 | 4200.0 | 0 | 4320.0 | 0.000 | 0.000 | 1 | |
| 2 | 120.0 | 240.0 | 0.0 | 240.0 | 4200.0 | 0 | 4440.0 | 0.000 | 0.000 | 2 | |
| 3 | 120.0 | 360.0 | 0.0 | 360.0 | 4200.0 | 0 | 4560.0 | 0.000 | 0.000 | 3 | |
| 4 | 120.0 | 480.0 | 0.0 | 480.0 | 4200.0 | 0 | 4680.0 | 0.000 | 0.000 | 4 | |
| 5 | 120.0 | 600.0 | 0.0 | 600.0 | 4200.0 | 0 | 4800.0 | 0.000 | 0.000 | 5 | |
| 6 | 120.0 | 720.0 | 0.0 | 720.0 | 4200.0 | 0 | 4920.0 | 0.000 | 0.000 | 6 | |
| 7 | 120.0 | 840.0 | 0.0 | 840.0 | 4200.0 | 0 | 5040.0 | 0.000 | 0.000 | 7 | |
| 8 | 120.0 | 960.0 | 0.0 | 960.0 | 4200.0 | 0 | 5160.0 | 0.000 | 0.000 | 8 | |
| 9 | 120.0 | 1080.0 | 0.0 | 1080.0 | 4200.0 | 0 | 5280.0 | 0.000 | 0.000 | 9 | |
| 10 | 120.0 | 1200.0 | 0.0 | 1200.0 | 4200.0 | 0 | 5400.0 | 0.000 | 0.000 | 10 | |
| 11 | 120.0 | 1320.0 | 0.0 | 1320.0 | 4200.0 | 0 | 5520.0 | 0.000 | 0.000 | 11 | |
| 12 | 120.0 | 1440.0 | 0.0 | 1440.0 | 4200.0 | 0 | 5640.0 | 0.000 | 0.000 | 12 | |
| 13 | 120.0 | 1560.0 | 0.0 | 1560.0 | 4200.0 | 0 | 5760.0 | 0.000 | 0.000 | 13 | |
| 14 | 120.0 | 1680.0 | 0.0 | 1680.0 | 4200.0 | 0 | 5880.0 | 0.000 | 0.000 | 14 | |
| 15 | 120.0 | 1800.0 | 0.0 | 1800.0 | 4200.0 | 0 | 6000.0 | 0.000 | 0.000 | 15 | |
| 16 | 120.0 | 1920.0 | 0.0 | 1920.0 | 4200.0 | 0.012 | 6120.0 | 0.006 | 0.072 | 16 | |
| 17 | 120.0 | 2040.0 | 0.0 | 2040.0 | 4200.0 | 0.012 | 6240.0 | 0.006 | 0.070 | 17 | |
| 18 | 120.0 | 2160.0 | 0.0 | 2160.0 | 4200.0 | 0.012 | 6360.0 | 0.006 | 0.068 | 18 | |
| 19 | 120.0 | 2280.0 | 0.0 | 2280.0 | 4200.0 | 0.012 | 6480.0 | 0.005 | 0.065 | 19 | |
| 20 | 120.0 | 2400.0 | 0.0 | 2400.0 | 4200.0 | 0.012 | 6600.0 | 0.005 | 0.063 | 20 | |
| 21 | 120.0 | 2520.0 | 0.0 | 2520.0 | 4200.0 | 0.012 | 6720.0 | 0.005 | 0.061 | 21 | |
| 22 | 120.0 | 2640.0 | 0.0 | 2640.0 | 4200.0 | 0.012 | 6840.0 | 0.005 | 0.060 | 22 | |
| 23 | 120.0 | 2760.0 | 0.0 | 2760.0 | 4200.0 | 0.012 | 6960.0 | 0.005 | 0.058 | 23 | |
| 24 | 120.0 | 2880.0 | 0.0 | 2880.0 | 4200.0 | 0.012 | 7080.0 | 0.005 | 0.056 | 24 | |
| 25 | 120.0 | 3000.0 | 0.0 | 3000.0 | 4200.0 | 0.012 | 7200.0 | 0.005 | 0.055 | 25 | |
| 26 | 120.0 | 3120.0 | 0.0 | 3120.0 | 4200.0 | 0.012 | 7320.0 | 0.004 | 0.053 | 26 | |
| 27 | 120.0 | 3240.0 | 0.0 | 3240.0 | 4200.0 | 0.012 | 7440.0 | 0.004 | 0.052 | 27 | |
| 28 | 120.0 | 3360.0 | 0.0 | 3360.0 | 4200.0 | 0.012 | 7560.0 | 0.004 | 0.051 | 28 | |
| 29 | 120.0 | 3480.0 | 0.0 | 3480.0 | 4200.0 | 0.012 | 7680.0 | 0.004 | 0.050 | 29 | |
| 30 | 120.0 | 3600.0 | 0.0 | 3600.0 | 4200.0 | 0.012 | 7800.0 | 0.004 | 0.048 | 30 | |
| 31 | 120.0 | 3720.0 | 0.0 | 3720.0 | 4200.0 | 0.012 | 7920.0 | 0.004 | 0.047 | 31 | |
| 32 | 120.0 | 3840.0 | 0.0 | 3840.0 | 4200.0 | 0.012 | 8040.0 | 0.004 | 0.046 | 32 | |
| 33 | 120.0 | 3960.0 | 0.0 | 3960.0 | 4200.0 | 0.012 | 8160.0 | 0.004 | 0.045 | 33 | |
| 34 | 120.0 | 4080.0 | 0.0 | 4080.0 | 4200.0 | 0.012 | 8280.0 | 0.004 | 0.044 | 34 | |
| 35 | 120.0 | 4200.0 | 0.0 | 4200.0 | 4200.0 | 0.012 | 8400.0 | 0.004 | 0.043 | 35 | |
| 36 | 120.0 | 4320.0 | 0.0 | 4320.0 | 4200.0 | 0.012 | 8520.0 | 0.004 | 0.042 | 36 | |
| 37 | 120.0 | 4440.0 | 62.4 | 4377.6 | 4200.0 | 0.012 | 8577.6 | 0.004 | 0.042 | 37 | |
| 38 | 120.0 | 4560.0 | 124.8 | 4435.2 | 4200.0 | 0.012 | 8635.2 | 0.003 | 0.042 | 38 | |
| 39 | 120.0 | 4680.0 | 187.2 | 4492.8 | 4200.0 | 0.012 | 8692.8 | 0.003 | 0.041 | 39 | |
| 40 | 120.0 | 4800.0 | 249.6 | 4550.4 | 4200.0 | 0.012 | 8750.4 | 0.003 | 0.041 | 40 | |
| 41 | 120.0 | 4920.0 | 312.0 | 4608.0 | 4200.0 | 0.012 | 8808.0 | 0.003 | 0.041 | 41 | |
| 42 | 120.0 | 5040.0 | 374.4 | 4665.6 | 4200.0 | 0.012 | 8865.6 | 0.003 | 0.040 | 42 | |
| 43 | 120.0 | 5160.0 | 436.8 | 4723.2 | 4200.0 | 0.012 | 8923.2 | 0.003 | 0.040 | 43 | |
| 44 | 120.0 | 5280.0 | 499.2 | 4780.8 | 4200.0 | 0.012 | 8980.8 | 0.003 | 0.039 | 44 | |
| 45 | 120.0 | 5400.0 | 561.6 | 4838.4 | 4200.0 | 0.012 | 9038.4 | 0.003 | 0.039 | 45 | |
| 46 | 120.0 | 5520.0 | 624.0 | 4896.0 | 4200.0 | 0.012 | 9096.0 | 0.003 | 0.039 | 46 | |
| 47 | 120.0 | 5640.0 | 686.4 | 4953.6 | 4200.0 | 0.012 | 9153.6 | 0.003 | 0.038 | 47 | |
| 48 | 120.0 | 5760.0 | 748.8 | 5011.2 | 4200.0 | 0.012 | 9211.2 | 0.003 | 0.038 | 48 | |
| 49 | 120.0 | 5880.0 | 811.2 | 5068.8 | 4200.0 | 0.012 | 9268.8 | 0.003 | 0.038 | 49 | |
| 50 | 120.0 | 6000.0 | 873.6 | 5126.4 | 4200.0 | 0.012 | 9326.4 | 0.003 | 0.037 | 50 | |
| 51 | 120.0 | 6120.0 | 936.0 | 5184.0 | 4200.0 | 0.012 | 9384.0 | 0.003 | 0.037 | 51 | |
| 52 | 120.0 | 6240.0 | 998.4 | 5241.6 | 4200.0 | 0.012 | 9441.6 | 0.003 | 0.037 | 52 | |
| 53 | 120.0 | 6360.0 | 1060.8 | 5299.2 | 4200.0 | 0.012 | 9499.2 | 0.003 | 0.037 | 53 | |
| 54 | 120.0 | 6480.0 | 1123.2 | 5356.8 | 4200.0 | 0.012 | 9556.8 | 0.003 | 0.036 | 54 | |
| 55 | 120.0 | 6600.0 | 1185.6 | 5414.4 | 4200.0 | 0.012 | 9614.4 | 0.003 | 0.036 | 55 | |
| 56 | 120.0 | 6720.0 | 1248.0 | 5472.0 | 4200.0 | 0.012 | 9672.0 | 0.003 | 0.036 | 56 | |
| 57 | 120.0 | 6840.0 | 1310.4 | 5529.6 | 4200.0 | 0.012 | 9729.6 | 0.003 | 0.035 | 57 | |
| 58 | 120.0 | 6960.0 | 1372.8 | 5587.2 | 4200.0 | 0.012 | 9787.2 | 0.003 | 0.035 | 58 | |
| 59 | 120.0 | 7080.0 | 1435.2 | 5644.8 | 4200.0 | 0.012 | 9844.8 | 0.003 | 0.035 | 59 | |
| 60 | 120.0 | 7200.0 | 1497.6 | 5702.4 | 4200.0 | 0.012 | 9902.4 | 0.003 | 0.035 | 60 | |
| 61 | 120.0 | 7320.0 | 1560.0 | 5760.0 | 4200.0 | 0.012 | 9960.0 | 0.003 | 0.034 | 61 | |

**Total:** **2.10** **inches**

LGC Geotechnical, Inc.

# TIME-RATE CONSOLIDATION ESTIMATE

$C_v = 0.004\ cm^2/sec = 0.37\ ft^2/day$ (Lower Bound)

$= 0.009\ cm^2/sec = 0.84\ ft^2/day$

} From Figure 4 of NAVFAC 7.1 (7.1-144)

Assume 20' layer with double drainage

$$t = \frac{T_v H^2}{C_v} = \frac{(0.848)(20'/2)^2}{0.37\ ft^2/day} = 229.19\ days = \underline{7.64\ months}$$

$$t = \frac{(0.848)(20'/2)^2}{0.84\ ft^2/day} = 100.95\ days = \underline{3.37\ months}$$

Project Name: Rancho La Habra | Drawn By: | Checked By:

Project Number: 14057-01 | Date: 2/10/17 | Scale: N/A | Page: 1 of 1

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# *Appendix H*
# *Albus-Keefe & Associates Peer Review*
# *Dated September 15, 2016*

ALBUS-KEEFE & ASSOCIATES, INC
GEOTECHNICAL CONSULTANTS

September 15, 2016
J.N.: 2503.00

Ms. Patricia Berryhill
Metis Environmental Group
437 Alcatraz Avenue
Oakland, California 94609

**Subject:** **Peer Review of Geotechnical Technical Study, Proposed Rancho La Habra Residential Development, VTTM 17845, City of La Habra, California.**

Reference: Preliminary Geotechnical Report for Proposed Rancho La Habra Residential Development, VTTM 17845, City of La Habra, California, prepared by LGC Geotechnical, Inc., revised date June 23, 2016 (Project No. 14057-01).

Dear Ms. Berryhill,

***Albus-Keefe & Associates, Inc***. (***AKA***) is pleased provide you this summary of our geotechnical peer review of the referenced geotechnical report prepared by LGC Geotechnical. We understand that Metis Environmental Group (Metis) has been retained by the law firm of Richards, Watson & Gershon, APC on behalf of the City of La Habra to provide environmental consulting services related to the Rancho La Habra Specific Plan Project (Project). Specifically, Metis will act as lead consultant to conduct peer review of the administrative draft Environmental Impact Report (EIR) prepared for the project, including the EIR's thresholds of significance, analysis, proposed mitigation measures and impact conclusions along with the related technical study documents submitted by the Project applicant. *Albus-Keefe & Associates, Inc*. has been retained by Metis to provide peer review pertaining to the geotechnical aspect of the proposed development.

We understand the referenced report has been submitted in support of a geotechnical feasibility assessment for planning purposes. Future exploration and geotechnical analyses may be warranted for final design considerations. The following presents a summary of our review comments relevant to the referenced geotechnical report.

1. Consultant should provide supporting data for the location and recommended set-back criteria for the Un-named West Coyote Hills fault. Consultant should confirm that sufficient continuous or overlapping exploratory trench excavations were completed and satisfactorily evaluated by others across the entire width of the Earthquake Fault Zone.

2. Consultant should address the potential for renewed fault activity and/or ground deformation associated with inactive faults and oil production operations in the future.

3. In Sections 2.5 and 4.0, the consultant recommends further geologic evaluation be conducted during grading and prior to construction of habitable structures for Lots 12, 28 and 29 to verify the lack of active faults. The consultant then states that due to previous grading that

has occurred within the limits of the Earthquake Fault Zone, it's likely that soil horizons typically utilized for dating faults (to determine whether it's active or not) have already been removed. Please clarify how an assessment of fault activity would be conducted if a fault is encountered and Holocene-age materials are no longer present.

4. Consultant should provide supporting data for the landside limit within the western portion of the site in the vicinity of the future basin. The buried landslide limit shown in Geologic Cross-Section 1-1' is not consistent with the Geotechnical Map. Exploratory boring HS-18 also does not identify the basal surface of the reported buried landslide. Please clarify how the geologic interpretation of the buried landslide shown in Cross-Section and plan view was determined. In addition, please discuss rupture surface characteristics and rational for previous landslide movement.

5. There is no mention of existing subdrains placed beneath the site during previous site development. If there are subdrains currently present, the consultant should show them on Geotechnical Map and provide recommendations for how they should be extended to daylight, if necessary.

6. The depths shown on the bedding attitudes for B-1 on the Geotechnical Map are not consistent with the boring log. The consultant should address this.

7. In Section 2.4, the consultant should discuss the potential for perched groundwater to form within the more permeable sandstone interbeds of the San Pedro Formation after site development. Such conditions could create pore pressure stresses on potential failure planes along the finer-grained bedding in the formation. The consultant should evaluate the potential for such conditions to form following site development and consider this effect in appropriate slope stability analyses.

8. In Section 2.4, the consultant indicates that perched groundwater conditions could develop following site development and that surface seepage may develop due to this condition. The consultant should provide appropriate methods of mitigation to address potential adverse effects from this condition.

9. In Section 2.5.1, the consultant has discussed results of liquefaction analyses. The consultant should provide supporting calculations of such analyses for review.

10. In Section 2.5.2, the consultant has indicated the potential for lateral spreading is considered very low due to the lack of a "free face" condition. However, development of the site will entail the creation of significant slopes supported by alluvial soils that are prone to liquefaction as well as large pad areas with overall sloping ground surface conditions. Both of these conditions could lead to lateral spreading. The consultant should provide appropriate analyses of lateral spreading that evaluate the effects of undrained, residual shear strengths during the design ground motion event under these conditions.

11. In Section 2.7, landslide slip surfaces have been assigned the friction strength of 24 degrees. Due to shearing from movement, these surfaces would be expected to exhibit lower shear strengths than those assumed. The consultant should re-evaluate the selection of the strength

associated with slip surfaces in Qls. The consultant may look to the work of Stark, T., Choi, H., and McCone, S., "Drained Shear Strength Parameters for Analysis of Landslides", ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol. 131, No.5, May 1, 2005. Using this method, Atterberg testing would suggest a frictional value of 17 to 18 degrees is more appropriate.

12. In Section 2.7, along bedding strength indicated for Qsp is appropriate for most siltstone units in the Qsp across the site. However, localized claystone units warrant consideration of lower along bedding strength parameters where present, such as in Cross Section 3. Please re-evaluate the selection of along bedding strength parameters to account for claystone units where potentially present and provide updated stability analyses accordingly.

13. In Section 2.7, the consultant indicates strengths were increased for seismic loading conditions. An increase in the apparent cohesion can be justified due to the dynamic loading that occurs during a strong ground motion event caused by increases in negative pore pressure. However, an increase in the friction angle cannot be equally justified. The consultant should provide a rationale for the use of increased friction capacity under seismic forces or revised the analyses to neglect the increase in friction angle.

14. In Section 2.8, the consultant discusses the analysis for a rapid draw down in the detention basin. However, the setup of the problem does not correctly model the pore pressures in the embankment in a rapid draw down condition. In a rapid draw down scenario, the soil pore pressures are assumed to have the same conditions after the basin empties as existed when the basin is full. The models have been set up to have a phreatic surface along the bottom of the basin which will under-estimate the pore pressure distribution of a rapid draw down condition and therefore, result in a higher factor of safety. Please revise all calculations of rapid drawdown to properly model pore pressure conditions.

15. In Section 2.8, please provide evaluation of temporary backcuts to confirm adequate temporary stability where offsite features or properties may be at risk to loss of support.

16. In Section 2.8, a new section should be drawn and evaluated for stability for the cut proposed below the existing shear key near current Cross Section 8. The new section should strike NW/SE to evaluate the highest portion of the proposed cut slope.

17. In Section 2.8, please explain the purpose of entering an acceleration value in the program as well as a horizontal coefficient. Which of the two parameters is controlling the horizontal seismic force and if the acceleration is controlling, what is the effective horizontal factor. Also a peak value of 0.15g has been used in all seismic analyses, which is equal to the entered horizontal coefficient, but smaller than the peak ground acceleration (0.76g; Table 3 of the reviewed report). Please explain the reason for using this peak value.

18. In Section 2.11, the consultant has concluded that infiltration of storm water is not feasible at the site. While such a conclusion is reasonable in areas underlain by bedrock for the stated reasons, the consultant has not demonstrated that infiltration is not feasible in all portions of the site underlain by thick sections of granular alluvium. Data from CPT-1A, CPT-3, and HS-11 suggest that infiltration may be feasible by dry wells in the associated area. The

conclusion that infiltration is not feasible in this area should be substantiated by a more compelling rationale or the conclusions regarding infiltration feasibility should be modified accordingly.

19. In Section 3.0, the consultant has indicated that raising of grades in areas underlain by alluvium is estimated to induce up to 2.5 inches of settlement. They further indicate that this settlement will require 6 to 12 months to occur. Some portions of the site will require the addition of about 30 feet over existing grades and are underlain by about 60 feet of alluvium. Such conditions would be expected to undergo more than 2.5 inches of primary settlement. This condition will also lead to long-term secondary settlement. The consultant should provide calculations to support the estimate of primary settlement and the time-frame to complete primary settlement. The consultant should also provide calculations for estimating secondary, long-term settlement and the associated time-rate. Conclusions and methods of mitigation should be provided regarding primary and secondary settlement of alluvial soils.

20. In Section 3.0, the consultant indicates that native and cut slopes surrounding the development may be subject to surficial failures. The consultant should provide a discussion of potential adverse impacts from this condition and methods of mitigation to address potential adverse effects of this condition.

21. In Section 3.0, the consultant indicates improvements adjacent to slopes will be impacted by slope creep. The consultant should provide general methods of mitigation to address adverse effects of slope creep on improvements likely to be impacted by creep.

22. In Section 4.0, the consultant recommends that settlement monuments should be installed within fill areas greater than approximately 40 feet below finished grade where alluvium is left in place. The statement is confusing but appears to recommend the placement of monuments where more than 40 feet of fill will be placed over existing grade. Please clarify this recommendation and amend if necessary based on the response to Item #19.

23. Appendix D, Section 1- Please extend the geometry of the analysis and adjust search limits for the remainder of the section.

24. Appendix D, Section 2- Please evaluate stability of overall composite slopes by extending the section to include Cross Sections 2-2’ and 2’-2’’.

25. Appendix D, Section 4- Please revise the model to search before and beyond the toe, not just the toe.

26. Appendix D, Section 7- Please provide analysis of lower slope in consideration of the Qls.

27. Appendix D, Section 8- Please provide block analysis for lower slope to evaluate failures through Qsp.

28. Appendix D, Section 10- Please revise location of exit box to evaluate failures below key and out at toe. The key with material type Af has not been included in the model.

29. Appendix D, Section 11- Please apply the seismic load for the seismic case.

30. Appendix D, Section 12- Please evaluate stability of overall composite slopes by extending the section to include Cross Sections 12-12' and 12'-12''.

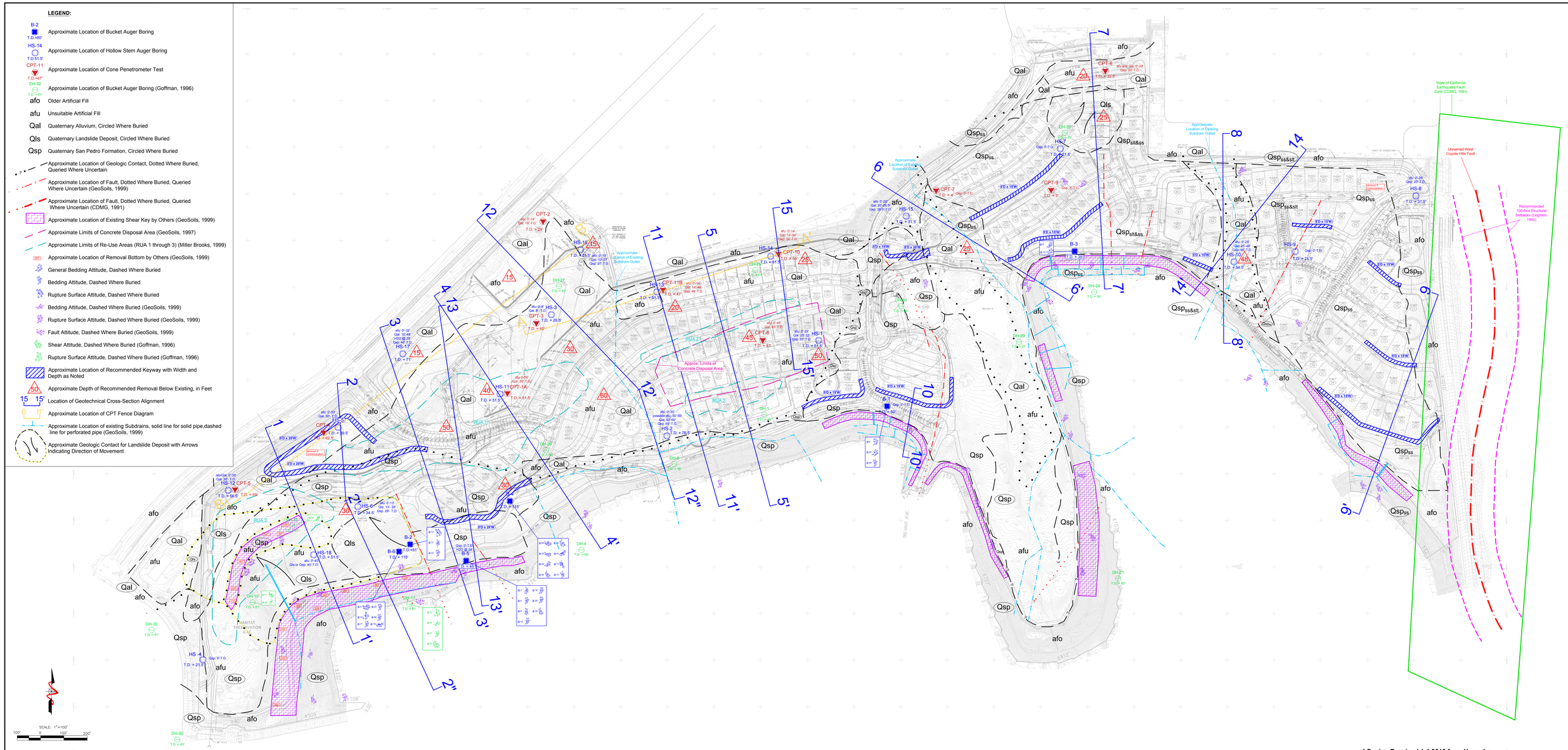
We hope this correspondence provides you the information required at this time. If there are any questions regarding the contents discussed herein, please feel free to contact the undersigned.

Respectfully submitted,

***Albus-Keefe & Associates, Inc.***

Patrick M. Keefe, C.E.G.
Principal Engineering Geologist
CEG 2021

David E. Albus
Principal Engineer
GE 2455




LGC Geotechnical, Inc.
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# Geotechnical Map

CLIENT:
CalAtlantic Homes
15360 Barranca Parkway
Irvine, CA 92618

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | 1" = 100' |
| DATE | February 2017 |

**Sheet 1 of 3**

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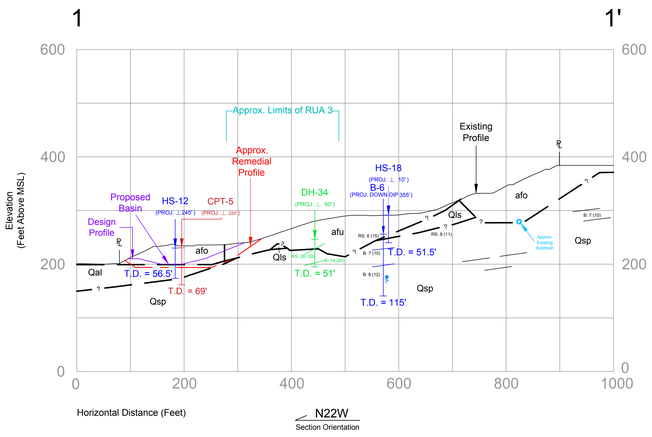


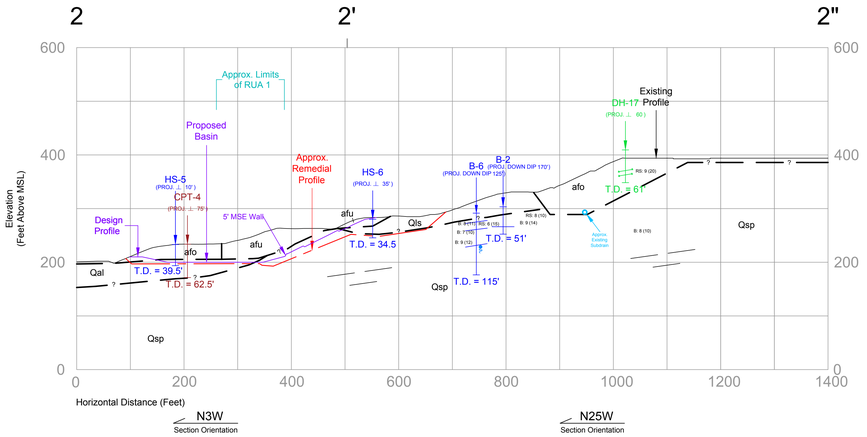


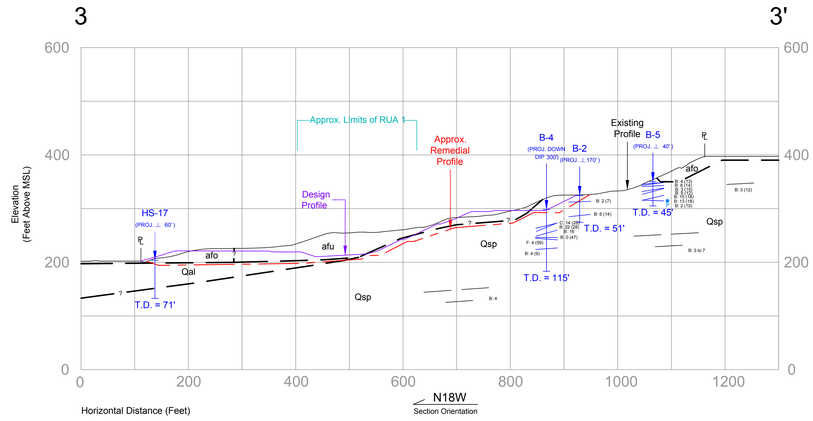


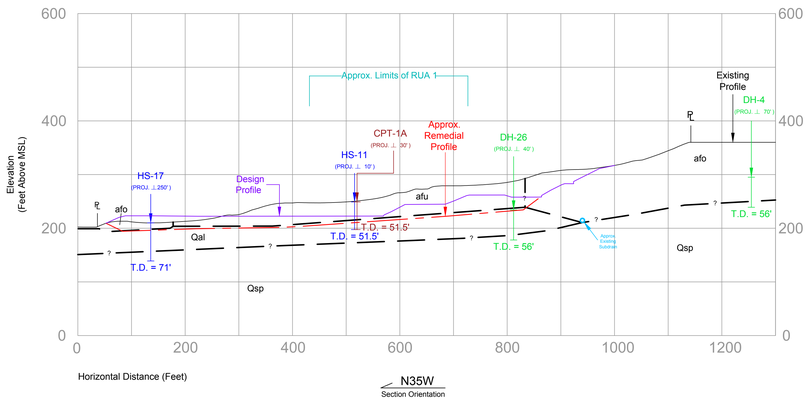


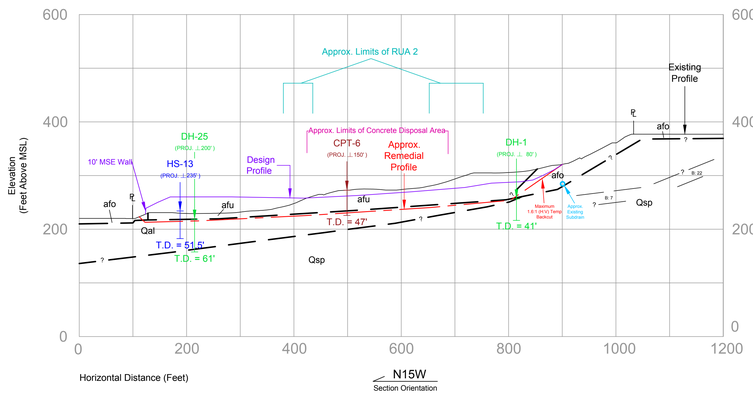


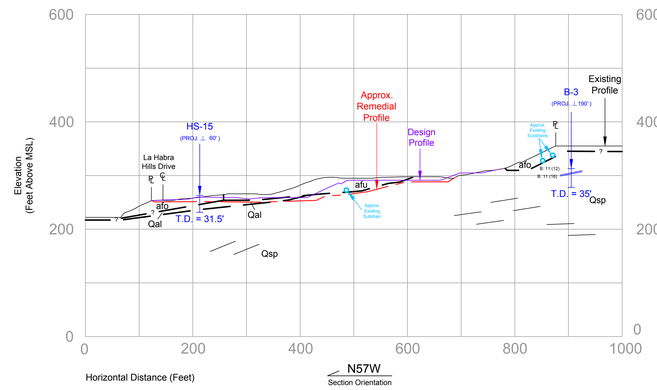


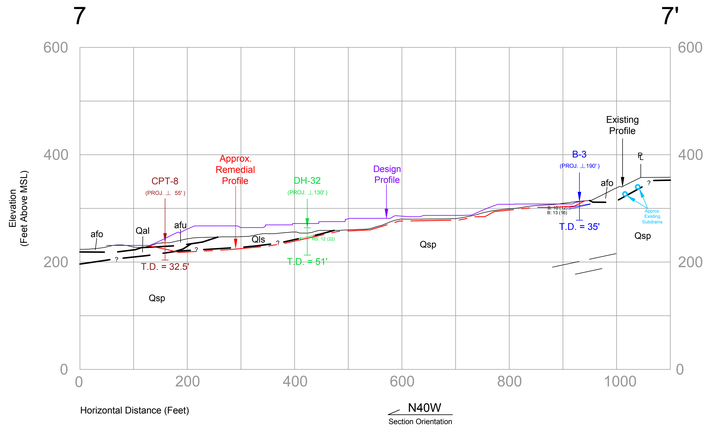


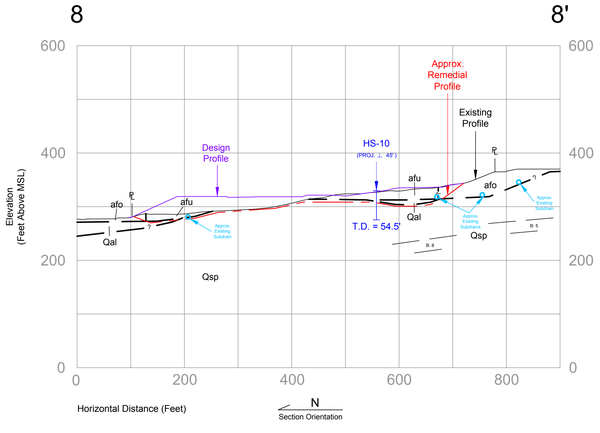


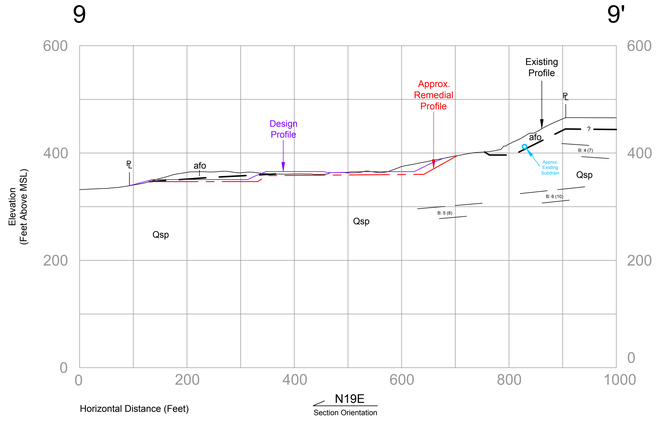


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San Clemente, CA 92672
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**Geotechnical Cross-Sections 1-1' through 9-9'**

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | 1" = 100' |
| DATE | February 2017 |

**SHEET 2 of 3**

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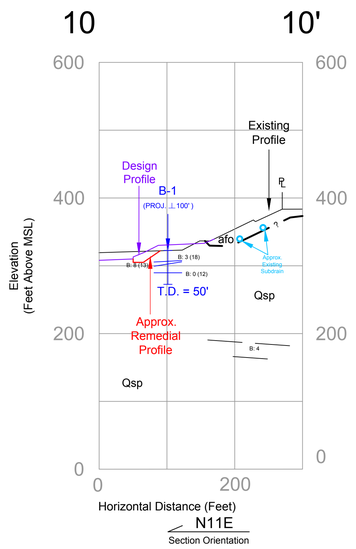


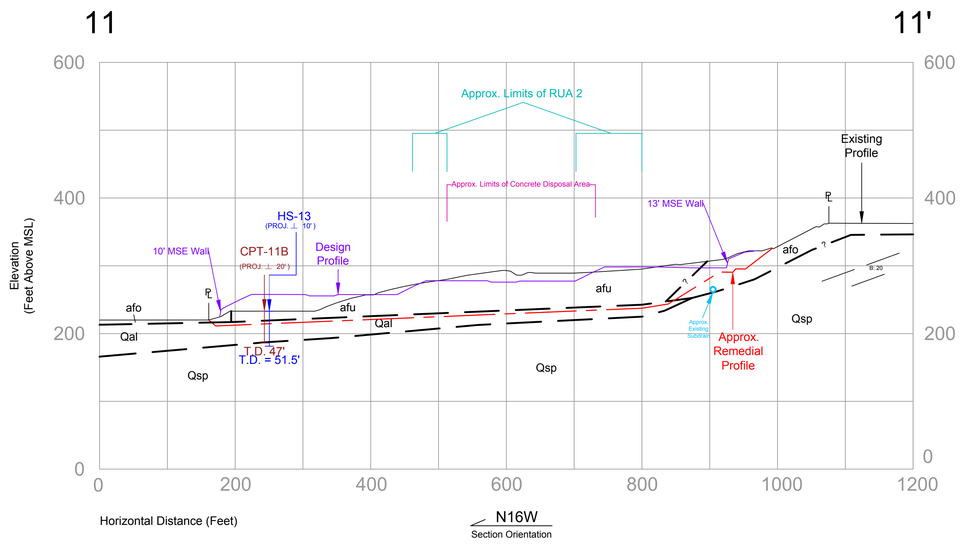


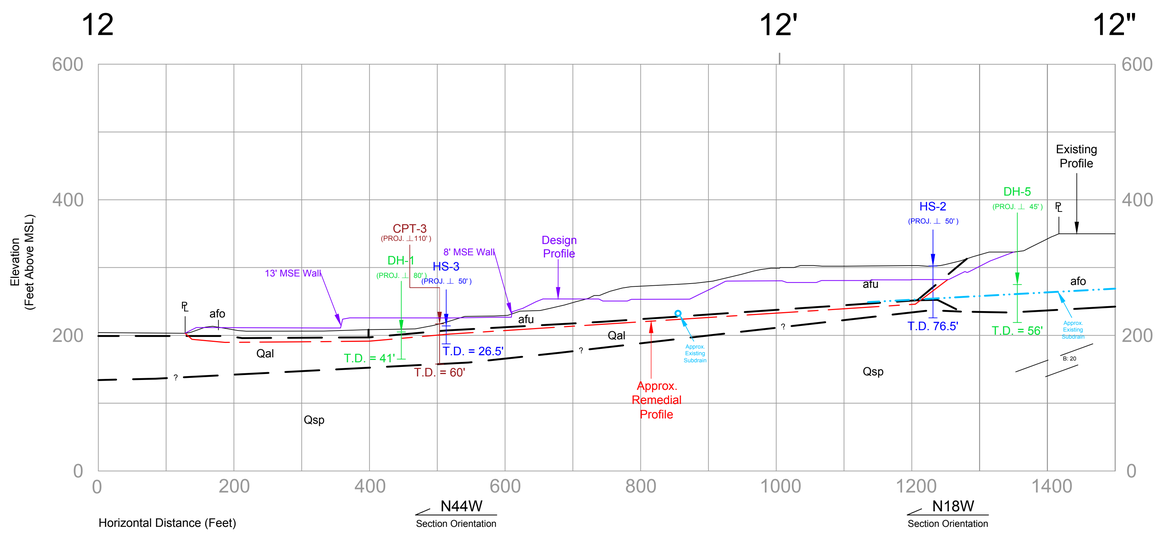


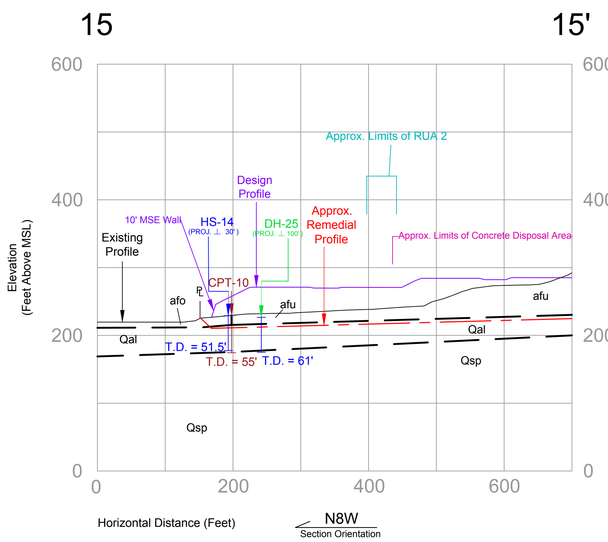


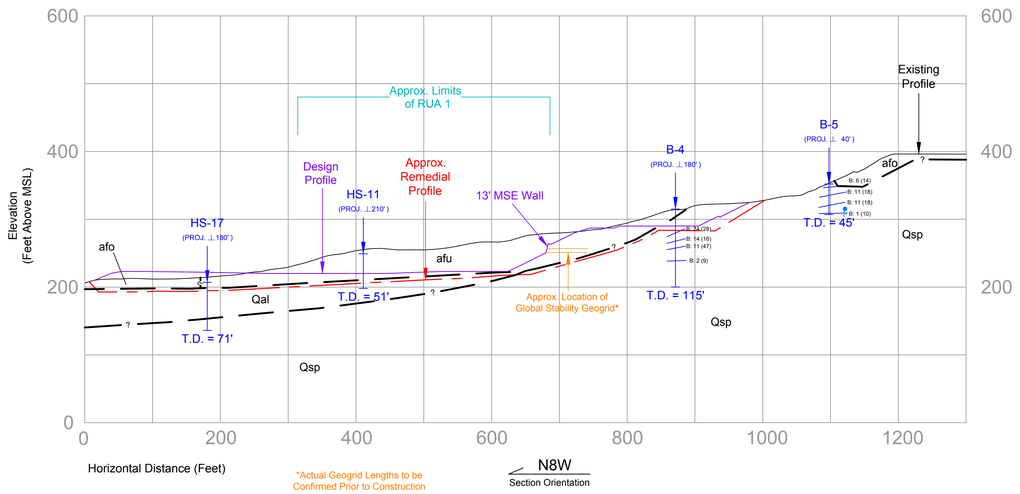


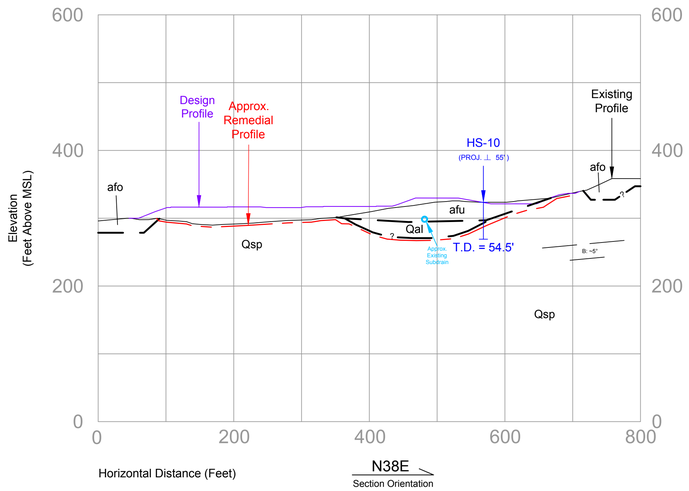


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San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

# Geotechnical Cross-Sections 10-10' through 15-15'

| | |
|---|---|
| PROJECT NAME | Rancho La Habra - VTTM 17845 |
| PROJECT NO. | 14057-01 |
| ENG. / GEOL. | DJB / KTM |
| SCALE | 1" = 100' |
| DATE | February 2017 |

**SHEET 3 of 3**

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