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BAGG Job No: STEVE-18-03

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REPORT
Engineering Geologic and
Geotechnical Investigation
New Settling Pond
Stevens Creek Quarry
12100 Stevens Canyon Road
Cupertino, California 94117

Dear Mr. Voss:

Bay Area Geotechnical Group (BAGG Engineers) is pleased to present the results of our engineering geologic and geotechnical evaluation performed for the proposed New Settling Pond (NSP) planned within the active Stevens Creek Quarry (SCQ) in Cupertino, Santa Clara County, California. The attached Plate 1, Vicinity Map, delineates the general location of the proposed New Settling Pond within the quarry while Plate 2, Site Plan Existing Topography, shows the area of the pond where we advanced our borings and extended three structural cross section lines. Plate 3, Site Plan Proposed Topography, depicts the proposed cut slopes and New Settling Pond outline in addition to delineating the location of our borings, cross section lines, Upper, Middle and Lower Settling Basins, adjacent Property line, surface disturbance boundary marking the limit of the planned cut, the Pacific Gas and Electric Company (PG&E) adjacent easement, and the Development Access Road (DAR).

This engineering geologic/geotechnical investigation and slope stability analysis was performed in general accordance with the scope of work described in our proposal No. 18-406, dated October 25, 2018.

SITE LOCATION AND PROJECT DESCRIPTION

The proposed NSP is planned along the east side of the DAR generally opposite the existing Lower Settling Basin (LSB) within the active SCQ at a location that is nearly 2,300 feet to the southeast of the active mining pit at the quarry. The area of the NSP is currently occupied by a topographic knob that extends about 120 feet in height above the adjacent DAR. The topographic knob is comprised of a southwest-facing slope that will be cut to accommodate the NSP and the cut will be extended upslope to near the property line. Nearly immediately beyond the property line, the southwest-facing slope breaks and descends facing to the northeast. The western side of the noted existing topographic knob abutting the DAR along its northeastern side has been cut previously to a relatively steep slope (1H:1V [Horizontal to Vertical] or steeper) exposing sandy/gravelly sediments belonging to the late Pliocene/early Pleistocene terrestrial sedimentary Santa Clara Formation, to permit the extension and construction of the DAR and access to the mining pit. A 100-foot wide PG&E overhead high voltage transmission easement is present just beyond the quarry's property line to the north. Two steel lattice towers supporting the high voltage power lines are present to the northwest and northeast of the site area just beyond the property line. An overflow structure will be constructed as part of NSP development to prevent the water level in the pond from overtopping the DAR, which will function as a dam once raised by 10 feet opposite the NSP.

The topographic knob will be cut starting at near the prominent bend in the property line and carried downslope towards the southwest to create south- and southwest-facing slopes to permit the construction of the NSP as depicted on Plate 3. The NSP slope cuts were initially proposed at an approximate gradient of 1.5H:1V. However, our stability analyses results indicated that the noted 1.5H:1V NSP cut slope gradient was not considered stable under seismic loading. We understand that the portion of the DAR to abut the planned NSP along its western side will be raised about 10 feet in height to help achieve a desirable pond capacity, which will not reach or exceed the 15-acre-foot jurisdictional threshold capacity. It is important to note that the level area traversed by the DAR used to be occupied by a tributary creek channel to the main Stevens Creek channel, which has been infilled and dammed in few places to create the Upper, Middle and Lower Settling Basins and extend the DAR shown on Plates 2 and 3.

PURPOSE AND SCOPE OF SERVICES

The purpose of our services was to investigate and characterize the subsurface conditions at the location of the NSP and evaluate the stability of the proposed cut slopes. Furthermore, once we established a stable cut slope configuration under static and seismic loading, we estimated the Acre-foot capacity with the DAR raised by 10 feet as noted above. Specifically, our scope of work included the following elements:

- Review pertinent published geologic and seismic reports and maps prepared by the California Geological Survey (CGS) and the U.S. Geological Survey (USGS) in addition to site-specific geotechnical/geologic reports and studies prepared by consultants such as Norfleet Consultants (Norfleet) in 2008 and BAGG Engineers in 2019;
- Perform slope reconnaissance of the site area by our Certified Engineering Geologist (CEG);
- Explore and investigate the subsurface conditions by advancing six (6) borings to depths ranging between 29 and 84 feet. Borings B-1 through B-3 drilled along the DAR varied in depth between 29 and 30.5 feet below ground surface (bgs) while Borings B-4 through B-6 drilled atop the topographic knob ranged between about 74.5 and 84 feet in depth bgs;

- Perform geotechnical laboratory testing on some selected samples;
- Generate three geologic structural cross sections: A-A' through C-C';
- Evaluate the collected data and perform slope stability analyses under static and pseudo-static (seismic) loading conditions depicting several slope gradient scenarios;
- Meeting attendance and consultation with the quarry manager;
- Calculate the NSP capacity once a stable cut slope configuration was established; and
- Prepare this letter report summarizing our findings, conclusions, and recommendations to attain satisfactory factors of safety based on our analysis of the three geologic cross sections (A-A' through C-C') that were extended in a roughly perpendicular fashion to the planned cut slope along the east and north sides of the proposed NSP. This report includes a vicinity map, two site plans, an area geologic map, laboratory testing results, geologic cross sections, and stability analysis plots.

PROJECT BACKGROUND

Initially, the cut slopes along the east and north sides of the proposed NSP were to be cut at a slope gradient of 1.5H:1V. However, our stability analysis indicated that such gradients were not considered stable under seismic loading although acceptable Factors of Safety (FOS) exceeding 1.5 were obtained under static conditions. No intermediate drainage terraces/benches were planned as part of the original design.

Based on the obtained stability analysis results discussed above for the initially-planned 1.5H:1V gradient, we also analyzed 1.75H:1V and 2H:1V slope configurations with a mid-slope height drainage terrace/bench. In addition, we analyzed the cut slope stability under the assumption that they would be over-excavated 20-30 feet (measured perpendicular from the slope face) and then rebuilt as engineered fill reinforced with geogrid and even utilizing aggregate base for the keyway excavation at an approximate 1.5H:1V gradient. Acceptable FOS were only attained utilizing the 2H:1V cut gradient under seismic loading, however. The 2H:1V configuration would result in shifting the toe of the proposed cut slopes to the west and southward, which would alter the layout of the NSP and decrease the pond's capacity. To address the pond's capacity reduction, we understand that the DAR will be raised by 10 feet where it abuts the planned NSP.

GEOLOGY AND SEISMICITY

Area and Site Geology

The site area has been mapped by several mappers including Dibblee (1966), Rogers (1972), Rogers and Armstrong (1973), Rogers and Williams (1974), Sorg and McLaughlin (1975), Brabb et al. (1998), Brabb et al. (2000), Norfleet Consultants (2008), Dibblee and Minch (2007), and BAGG Engineers (2019). The topographic knob which will be cut to create a location for the NSP is underlain by lower Quaternary (Pleistocene) and upper Tertiary (Pliocene), non-marine sedimentary bedrock belonging to the Santa Clara

Formation, which is described by Sorg and McClaughlin (1975) as: *semi-consolidated, poorly to moderately lithified, pebble to boulder conglomerate, fine- to coarse-grained poorly sorted sandstone, siltstone, and clayey mudstone of fluvial and lacustrine origin. Upper half of formation predominantly conglomerate and interbedded medium- to coarse-grained sandstone. Lower half of formation composed of about equal percentages of pebble conglomerate and interbedded medium- to fine-grained sandstone, siltstone, and clayey mudstone and locally contains peat-rich layers with well-preserved plant remains and carbonized wood fragments up to 6 feet long.*

Brabb et al. (1998) noted that the formation consists of irregular and lenticular beds and that its thickness is variable but reaches a maximum of about 500 meters (about 1,650 feet). The Santa Clara Formation in this area is separated from the Cretaceous and Jurassic age Franciscan Complex greenstone bedrock to the west by the Berrocal fault, which is a high-angle reverse fault dipping between 50 to 70 degrees to the west. The Franciscan Complex greenstone bedrock to the west of the fault appears to have been thrusted over the terrestrial and younger Santa Clara Formation sedimentary units along the faulted contact rendering the older marine Franciscan units atop the younger Santa Clara Formation sediments. Beyond the fault zone and the NSP site area to the northwest, the SCQ main active mining pit and surrounding slopes expose Franciscan greenstone bedrock exclusively that is closely and highly fractured, sheared, and foliated. Norfleet (2008) indicated that it is unlikely that a specific fault plane is present along the contact separating the two rock types and that the fault is represented by a shear zone measuring between 50 to 100 feet in width and which extends along the east side of the quarry's main mining pit. The fault zone extends northeastward between the NSP site and the quarry's active mining pit before making a prominent bend to the northwest. The upper approximately 40 to 60 feet of the greenstone bedrock appeared weathered and colored yellowish brown due to oxidation while the greenstone bedrock exposed on the lower mined slopes generally appeared greenish gray due to reduction below the upper oxidized zone.

Sorg and McClaughlin (1975), Brabb et al. (1998), Norfleet (2008) and BAGG Engineers (2019) mapped a prominent fault-related shear zone that bifurcates off the main fault trace immediately to the northwest of the NSP site and extends in a northwest trend extending diagonally across Parcel B of the quarry where the active mining pit is located. Our CEG observed the diagonal shear zone along the north end of the Western Rim Slope (near the northwestern corner of the quarry mining pit) where it consisted of several steep shear planes some of which were lined with plastic greenish clayey gouge. The noted shears extended the entire height of the approximately 400-foot high mined slope and several of the shear planes appeared to strike east/west and dip steeply to the south with one prominent shear plane trending northwestward and dipping steeply to the southwest. Norfleet (2008) shows the shear zone as a band of serpentine that extended through the greenstone bedrock and although our CEG observed the shear zone on the initial cut near the northwestern corner of the active mining pit, our CEG did not observe the serpentine rock band delineated by Norfleet in 2008 as the area was underlain by greenstone entirely. As noted above, the main trace of the Berrocal fault is shown by most of the mappers to extend along the east side of the active mining pit after making a prominent northeast bend immediately to the northwest of the subject site. The portion of Brabb et al. (1998) geologic map that covers the site area is included as Plate 4, Area Geologic Map.

Landslides

None of the referenced mappers delineated landslide deposits in the area of the topographic knob where the NSP is planned. However, most mappers show large-scale landslide deposits, which have occurred in Franciscan Complex greenstone and sheared Franciscan mélange rocks across and beyond the infilled creek channel and LSB to the west. However, these mapped landslides do not extend across the DAR and do not appear to impact the NSP site.

The western portion of the topographic knob where the slope has been cut steeply to accommodate the extension of the DAR is shown by the CGS on their regulatory Seismic Hazard Zone maps (2002a) to be within a Seismic Hazard Zone associated with earthquake-induced landslides. Plate 2.1 (Landslide Inventory Map) of the Seismic Hazard Zone Report 068 (SHZR 068) prepared by the CGS (2002b) for the 7.5-Minute Cupertino quadrangle shows the area of the site to have been graded significantly but no landslides are shown at or in the vicinity of the site. In agreement with previous mappers, the CGS (2002b) also shows the same large-scale landslides across the infilled creek channel/DAR and LSB to the west. The site area was not shown to be within a Seismic Hazard Zone associated with soil liquefaction, however.

Faulting and Seismicity

The main trace of the Berrocal fault has been mapped by Sorg and McLaughlin (1975), Brabb et al. (1998), and Dibblee and Minch (2007) to extend roughly in a northwest trend along the west side of the now infilled creek channel and the LSB and it does not encroach onto the site limits. The referenced mappers show the main fault trace to extend beneath the landslide deposits mapped to the west of the former and now infilled creek channel and the LSB.

The Berrocal fault has not been zoned as active by the Division of Mines and Geology (DMG, 1974 and 2000) because it does not meet their zonation criteria. However, while the fault is within a County of Santa Clara Fault Rupture Hazard Zone (SCC, 2012), the fault trace and the associated hazard zone delineated by the County of Santa Clara do not encroach onto the site of the NSP.

The San Andreas fault is mapped about 2 miles to the southwest and the Monte Vista-Shannon fault is mapped about 1.3 miles to the northeast of the site area. Norfleet (2008) indicated that while the quarry was active during the Loma Prieta Earthquake of October 17, 1989, the quarry personnel reported that the quake did not cause rockfalls or slope failures and only a single water glass fell off a counter in a nearby house. Furthermore, Norfleet (2008) indicated that a study of aftershocks from the 1989 earthquake in the Santa Cruz Mountains performed by Lindley and Archuleta (1994) found that Franciscan ridgetops had little ridgetop amplification and shatter and that the average amplification at Franciscan Complex sites was 3 times less than amplification at sites underlain by Tertiary (Miocene and Pliocene) bedrock.

FIELD EXPLORATION AND LABORATORY TESTING

Subsurface conditions at the site were explored between December 17 and 20, 2018 by drilling six borings designated as Borings B-1 through B-6 to depths varying between about 29 and 84 feet bgs at the approximate locations shown on the attached Plates 2 and 3. The borings were advanced utilizing a truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. An access route was pioneered by the quarry operator immediately to the northwest of the site generally opposite the existing Middle Settling Basin so that the drill rig is able to access the top of the knob. Furthermore, the quarry operator also provided a bulldozer to pull the drill rig up the cut access road and across dips and soft spots. Borings B-1 (29 feet deep) and B-2 (30.5 feet deep) were drilled along the DAR to assess the feasibility of placing fill to raise the DAR in the vicinity of the proposed NSP. Boring B-3 (30.5 feet deep) was advanced in the level area just beyond the topographic knob to the southeast. Borings B-4 (74.5 feet deep), B-5 (79 feet deep) and B-6 (84 feet deep) were drilled atop the topographic knob where equipment access was feasible. The intent of drilling atop the knob to the noted depths was to assess the condition of the formation where the planned cut slope face is projected to be encountered/exposed and to evaluate the bedrock rippability down to near the maximum planned cut planned.

A professional geologist with our firm technically directed the exploration, maintained a continuous log of the borings, and obtained disturbed bulk and Standard Penetration Test samples in addition to relatively undisturbed ring samples utilizing Modified California Sampler for laboratory testing and subsequent visual examination.

The obtained subsurface materials were visually classified in the field and the classifications were then checked against the results of the laboratory testing program. In addition to sample classification, the boring logs contain interpretation of where stratum changes or gradational changes occur between samples and also the obtained laboratory test results. The boring logs depict BAGG's interpretations of subsurface conditions only at the locations indicated on Plates 2 and 3 and are intended for use by SCQ only in conjunction with this report, and only for the purposes outlined by this report.

Selected undisturbed samples were tested in direct shear to evaluate the strength characteristics of the subsurface materials. Direct shear tests were performed under natural moisture and artificially increased moisture contents, while under various surcharge pressures. Atterberg Limits tests were performed on clayey site samples to help define the plasticity characteristics and aid in the soil classification. Washes over a #200 sieve were also conducted to assist in the classification of fine-grained soil samples and moisture content and dry density measurements were also performed on undisturbed samples to aid in correlating their engineering properties. The results of our laboratory strength tests, Atterberg Limits tests, classification tests, and moisture/density measurements are summarized on the boring logs and/or plates identified below.

SITE CONDITIONS

Surface Conditions

The topographic knob, which will be cut to accommodate the construction of the proposed NSP, exceeds 100 feet in height and, as noted above, its southwestern sloping side abutting the DAR has been cut to an approximate 1H:1V steep gradient exposing sandy/gravelly sediments belonging to the Santa Clara Formation. Farther upslope beyond the noted side cut, the topographic knob's surface and side slopes are irregular and covered with heavy brush and tree growth.

Subsurface Conditions

The Santa Clara Formation is relatively young geologically and its various comprising interbedded sedimentary units are lenticular in shape and somewhat discontinuous laterally. And although it is considered by geologists to be formational bedrock, it is generally unconsolidated, weakly lithified and poorly cemented. The formation's composition varies significantly laterally and with depth and its physical characteristics and engineering properties resemble soil-like materials rather than coherent bedrock. Depending on the geographical locality around the San Francisco Bay, the formation's sand/gravel content varies significantly with the upper sections of the formation containing more sand and gravel while its lower section is comprised mostly of silt and clay.

Borings B-1 through B-3 drilled along the DAR and the base of the topographic knob generally encountered up to about 7.5 feet of old fill that was most likely placed there as part of the DAR extension and construction. Borings B-4 through B-6 were drilled along the top of the knob and they revealed between 2 and 3 feet of residual soils that have developed in-place into lean clays through the chemical decomposition of the minerals comprising the formation. Beneath the fill in Borings B-1 through B-3 and below the residual soil section encountered in Borings B-4 through B-6, the borings generally revealed dense to very dense silty and clayey sand layers with varying mixtures of gravel that are interbedded with hard layers of lean and minor fat clays. Nearly all the borings met practical refusal where 50 blows were recorded for 6 inches or less of sampler penetration.

Our interpretations of the subsurface conditions as extrapolated from the information obtained during our site reconnaissance, subsurface exploration and published geologic literature, are presented on Cross Sections A-A', B-B' and C-C' presented as Plate 5, Geologic Cross Sections. More detail pertaining to the subsurface conditions is presented of the boring logs

Groundwater

Groundwater was not encountered in any of our borings although perched free water was detected in Boring B-3 between about 8 and 9 feet bgs. Based on input from the quarry operator, groundwater has not been encountered at the quarry area for as long as it has been functional. In addition, the quarry operator reported that a well drilled at a residence within the immediate area of the quarry did not encounter a groundwater phreatic level. Isolated seepages were observed along the mined slope faces surrounding the active quarry pit to the north and free water seems to always be present within the main mining pit and also within the Upper, Middle, and Lower Settling Basins. However, this noted free water is detained storm water runoff and not groundwater. It is important to note that groundwater levels can vary seasonally due to inclement weather and irrigation activities. As the DAR is raised by approximately 10 feet higher in the immediate area of the NSP, we understand that water detained within the NSP will be about 2-3 feet lower than the road crest after it has been raised.

The graphical representation of the materials encountered in the borings and the results of our laboratory tests, as well as explanatory/illustrative data, are attached to this report as follows:

- Plate 6, Unified Soil Classification System, illustrates the general features of the soil classification system used on the boring logs.

- Plate 6A, Soil Terminology, lists and describes the soil engineering terms used on the boring logs.

- Plate 7, Rock Terminology, lists and describes the engineering terms with respect to bedrock classification used on the boring logs.

- Plate 8, Boring Log Notes, describes general and specific conditions that apply to the boring logs.

- Plates 9 and 9B, Key to Symbols, describes and defines various symbols used on the boring logs.

- Plates 10-A through 15E, Boring Logs, provide detailed descriptions of the subsurface materials encountered, show sample depths and blow counts and summarize the results of the laboratory testing.

- Plates 16 and 17 present plotted laboratory test results for gradation and Atterberg Limits testing performed as part of our study.

- Plate 18 includes direct shear test plots and how we derived the selected strength parameters for the Santa Clara Formation.

- Plots 19 through 24 present results of the slope stability analyses.

SLOPE STABILITY ANALYSIS

Geologic Model

The initially-planned grading scheme indicated that 1.5H:1V cuts that originate near the property line and extend downslope generally facing southward along Cross Section A-A' and southwestward along Cross Sections B-B' and C-C' would be made. Our stability Cross Sections (A-A', B-B' and C-C'), which were extended upslope to near the top of slope where the subject slope crests before it breaks and descends facing northeastward, were extended nearly perpendicular to the proposed cut slope contour lines. The base of the proposed pond was set at about 10 feet below the existing DAR elevation. However, our slope stability analyses indicated that the 1.5H:1V and the 1.75H:1V slope gradient cut in Santa Clara Formation sediments would not be stable under seismic loading although satisfactory FOS were obtained for the noted gradients under static conditions. The capacity of the NSP at such gradients was not checked since the 1.5H:1V and 1.75H:1V gradients were not deemed stable under seismic loading.

As part of our analyses, we also assumed that a 30-foot wide band, measured perpendicular from the slope face, is cut and the generated earth materials is then placed back as geogrid-reinforced engineered fill (GF) buttress that is supported on a 30-foot wide and 15-foot deep base keyway. However, our analyses indicated that such a remedial grading scheme would also be unstable under seismic loading. To further assess the feasibility of the original 1.5H:1V slope gradient, we also assumed the lower keyway excavation would be filled with aggregate base (AB) instead of soil and even replaced the entire buttress with AB but the obtained results indicate that the 1.5H:1V configuration would only be stable under seismic loading if the keyway depth and width are increased to 30 feet and 100 feet, respectively.

Based on input from the quarry manager, we analyzed a flatter 2H:1V gradient for the cut slopes along all three cross sections with an 8-foot wide drainage terrace/bench at near mid-slope height. The results of our stability analyses indicated that the 2H:1V slope gradient for the planned cut slopes is stable under both static and seismic loading conditions for all three cross sections. We calculated the planned NSP capacity with the stable 2H:1V configuration to be around 2 acre-feet (AF), if the DAR remains at its current elevation. With additional input from the quarry manager and to increase the NSP capacity, we modeled placing engineered fill and raising the DAR about 10 feet higher than existing and extended the base of the 2H:1V excavation until the toes of the planned cut slopes along all sections converged with the opposing northeast-facing DAR slope noting that the DAR side slope would be deepened at a 1.5H:1V gradient. Under this grading scheme, we estimated the NSP capacity to be about 4.4 AF. A discussion pertaining to the selection of earth material strength parameters utilized in our analyses and the obtained stability analyses results are presented below in the following paragraphs.

Slope Modeling and Analysis Method

The stability of the cut slopes was evaluated with the conventional method of limit equilibrium stability analysis on two dimensional slope cross section with the aid of the computer program GeoStudio 2019 (Slope/W). Our analysis used the Morgenstern-Price Method, which considers both interslice shear and normal forces of the individual slices, into which the soil mass above the failure surface is divided, and includes both moment and force equilibrium. Various trial failure surfaces are analyzed in this manner until a minimum factor of safety is obtained.

Soil Strength Parameters

For stability analysis purposes, three (3) earth material types were established, which include Santa Clara Formation (QTsc), geogrid-reinforced fill (GF) and aggregate base (AB). As noted above, remedial grading schemes that included GF and AB were not deemed stable under seismic loading and although we discuss strength parameters we utilized for the GF and AB, we have selected not to include any stability analysis plots in this report where the GF and AB were utilized. We have only included stability analysis results and plots for 2H:1V cut slope gradients where acceptable FOS were achieved.

Strength tests on selected QTsc soil samples consisted of direct shear tests performed at both natural (field) and artificially-increased moisture contents, while under various surcharge pressures. The results of the direct shear tests are reflected on the boring logs and are presented on Plate 18, Direct Shear Test Plots. The strength parameters of the Santa Clara Formation, including the internal frictional angle and the cohesion, were derived from the obtained test results as is indicated on Plate 18. Conservative strength parameters for the GF and AB were selected based on experience and engineering judgement. The strength parameters for the various earth materials mentioned above are presented in the following table:

Soil Strenght Parameters

Material Type	Cohesion: C (psf)	Friction Angle: Phi-ϕ (degrees)	Unit Weight: (pcf)
Santa Clara Formation (QTsc)	1,000	25	130
Geogrid-Reinforced Fill (GF)	1,000	35	130
Aggregate Base (AB)	0	45	135

Static Slope Stability Analysis

Based on the noted strength parameters and the geometry of Cross Sections A-A' through C-C', the results of our slope stability analyses yielded static FOS ranging from about 1.66 to 1.74 for global conditions. We note that these analyses were based on slope configurations with 2H:1V gradients for the cut slopes coupled with an 8-foot wide drainage terrace/bench to be installed at near mid-slope height, and 1.5H:1V for the raised DAR northeast-facing eastern side slope.

Seismic Slope Stability Analysis

The seismic stability of the slopes was analyzed using a pseudo-static approach per the general guidelines included in CGS Special Publication 117A (2008) and the Southern California Earthquake Center (2002). Earthquake Engineering Research Institute has published a screening analysis procedure for seismic slope stability (Stewart et al., 2003), which takes into account local variations in the seismicity as presented by the earthquake magnitude, as well as the distance from the fault that most significantly contributes to the ground motion hazard at the site. The screening procedure is based on a statistical relationship previously developed by Bray et al. (1998) between seismic slope displacement (u), peak amplitude of shaking in the underlying bedrock (kmax), significant duration of shaking (D5-95), and the ratio of slope resistance to peak demand (ky/kmax), where ky is the yield acceleration, or the horizontal acceleration required to reduce the safety factor to unity. A tolerable seismic slope displacement (u) for residential range from 5 cm to 15 cm. A safety factor of 1 is the minimum required for passing the screening procedure.

Using the slope screening procedure, a pseudo-static coefficient of 0.29g was estimated for the analysis based on respective deformation of 15 cm. The minimum seismic FOS are approximately 1 for all the three cross sections studied.

The results of our static and seismic slope stability analysis are summarized in the table below. Individual plots of slope stability analyses for various scenarios are presented on the attached Plates 19 through 24.

Summary of Slope Stability Analyses Results

Section	Static FOS*	Seismic FOS (0.29g)
A-A'	1.74	0.97
B-B'	1.71	0.95
C-C'	1.66	0.94

*Utilizing 2H:1V slope gradients

It is important to note that we also analyzed the stability of the DAR 1.5H:1V eastern side slope, which is currently underlain by about 7 feet of fill (see log for Boring B-2) and where the DAR will be raised by about 10 feet utilizing engineered fill. We utilized a phi angles of 28 to 30 degrees and respective cohesion of zero and 500 psf and obtained satisfactory FOS exceeding 1.5 and 1 for static and pseudo-static conditions, respectively, although we selected not to include the noted stability results plots.

CONCLUSIONS AND RECOMMENDATIONS

General

1. The Santa Clara Formation has significant compositional variation laterally and with depth. The formation's comprising beds are reportedly lenticular in shape pinching and terminating laterally and their projection in the subsurface is unreliable. With this lithological variation, it is hard to predict what type of earth materials will be exposed along the final cut slope face and the potential for localized slope instabilities and/or significant erosion may prove to be high depending on what is exposed.

2. The Berrocal fault is a reverse fault that dips westward between 50 and 70 degrees separating the older Franciscan Complex greenstone bedrock to the west from the younger Santa Clara Formation sediments, which it has been thrusted over, to the east. Norfleet (2008) indicated that it is unlikely that a specific fault plane exists and that the fault appears to be represented by a zone of shearing that measures between 50 and 100 feet in width instead. Furthermore, Sorg and McClaughlin (1975) mapped several bedrock fault traces immediately to the east of the NSP site and our Boring B-4 encountered a shear plane between 45 and 47 feet bgs.

3. The noted lithological variation of the formation underlying the site area coupled with the potential presence of fault-related shearing and polished slip surfaces could lead to exposing unfavorable conditions along the final cut slope face. Although Dibblee and Minch (2007) show the formation to have favorable bedding that trends northwest and dips northeastward into the hillside between 27 and 50 degrees in the vicinity of the site, concentrations of silty/clayey sands and poorly cemented gravelly zones could also be encountered along the cut slope face, which could result in high potential for erosion and surficial sloughing.

4. Our slope stability analysis did not account for localized granular sandy/gravelly zones, shear planes and seams, bedding attitudes, degree of weathering and spacing of discontinuities. Based on the above discussion, we recommend that our CEG is presented the opportunity to observe and map the cut slope during and immediately after the completion of the planned cuts so that adverse conditions are detected and mitigated in a timely manner.

5. If unfavorable conditions become apparent during grading, consideration should be given to overexcavating an approximately 20-foot wide band measured perpendicular to the slope face and then be placed back as engineered fill with 2H:1V gradient that is keyed, subdrained, compacted properly and reinforced with geogrid fabric, if deemed needed.

6. Based on our assessment and analysis, 2H:1V slope gradients are considered feasible and stable under both static and seismic loading.

7. An 8-foot wide drainage terrace/bench should be constructed at about mid-slope height to conform to the current California Building Code pertaining to manufactured slopes that are steeper than 3H:1V (33 percent slopes).

8. We estimated the NSP capacity to be about 4.4 acre-feet if the pond's side slopes are cut at an approximate gradient of 2H:1V and the DAR is raised by 10 feet at an approximate 1.5H:1V gradient.

9. Fill soils should be moisture conditioned, deposited in 8-inch thick loose lifts, and compacted to a minimum of 90 percent of the maximum dry density at near the optimum moisture content in accordance with ASTM method D1557.

10. The fill should be benched and keyed into the backcut slope as the fill placement progresses upslope. The fill slope face should be overbuilt and then trimmed back so that a uniform and compacted slope face is exposed. This recommendation is made because it is difficult to compact soil along the outer edge of the fill prism, which is needed to help prevent the occurrence of subsequent shallow slope failures and localized slumps.

11. Any fill placement and compaction should be performed under the direct observation of the project Geotechnical Engineer and/or his field representatives. Field observation and compaction testing should be performed periodically so that the process of fill placement, moisture conditioning, and compaction effort (if any) is consistent.

Plan Review

We recommend that BAGG Engineers is retained to review the final grading plans. This review will assess general suitability of earthwork and drainage design elements and to verify the appropriate implementation of such elements into the project plans and specifications.

Grading Observation

We recommend that our CEG is presented the opportunity to observe the planned grading to assess the potential presence of adverse geologic conditions that could impact the stability of the final slope faces to be cut. This is intended to verify that adverse geologic conditions are detected and mitigated during and not after its completion. Timely grading observations are important to verify that subsurface conditions encountered during construction are similar to those anticipated during the design phase. Unanticipated soil conditions may warrant revised recommendations. Therefore, BAGG cannot accept responsibility for the recommendations contained in this report if we are not retained to provide observation services during construction.

CLOSURE

This report has been prepared in accordance with generally accepted engineering geology and geotechnical engineering practices for the strict use of Stevens Creek Quarry in Cupertino, and other professionals associated with the specific project described in this report. The recommendations presented in this report are based on our understanding of the proposed project as described herein and as shown on the provided site plans that show pre- and post-grading at the site of the New Settling Pond.

The conclusions and recommendations contained in this report are based on our review of available published geologic literature prepared by the USGS and CGS and site-specific studies prepared by other consultants, the observations of our CEG, subsurface exploration findings, limited laboratory testing, and stability analyses results. It is not uncommon for unanticipated conditions to be encountered during site grading and it is not possible for all such variations to be detected by our limited program for this type of project. The recommendations contained in this report are therefore contingent upon the review of the final grading and drainage plans by this office, and upon engineering geologic observation by our CEG of all pertinent aspects of site grading, including excavating and any slope rebuild.

Subsurface conditions and standards of practice change with time. Therefore, we should be consulted to update this report, if grading and construction does not commence within five years from the date this report provided that the site conditions, the building code and/or standard of practice in this area do not change significantly. Additionally, the recommendations of this report are only valid for the proposed project as described herein. If the proposed project is modified, our recommendations should be reviewed and approved or adjusted by this office in writing.

We trust this letter report provides you with the information required at this time. If you have any questions, please feel free to contact us.

Very truly years,
BAGG Engineers

Sadek M. Derrega, PG, CEG #2175
Principal Engineering Geologist

Jason Van Zwol, PE, GE #854
Chief Geotechnical Engineer

SMD/JL/JVZ

Attachments:

Plates

Plate 1	Vicinity Map
Plate 2	Site Plan Existing Topography
Plate 3	Site Plan Proposed Topography
Plate 4	Area Geologic Map
Plate 5	Geologic Cross Sections
Plate 6	Unified Soil Classification System
Plate 6A	Soil Terminology

Plate 7	Rock Terminology
Plate 8	Boring Log Notes
Plates 9A & 9B	Key To Symbols
Plates 10A-15E	Boring Logs
Plate 16	Gradation Test Data
Plate 17	Atterberg Limits
Plate 18	Direct Shear Test Plots
Plates 19-24	Slope Stability Analyses Plots

ASFE document titled "Important Information About Your Geotechnical Engineering Report"

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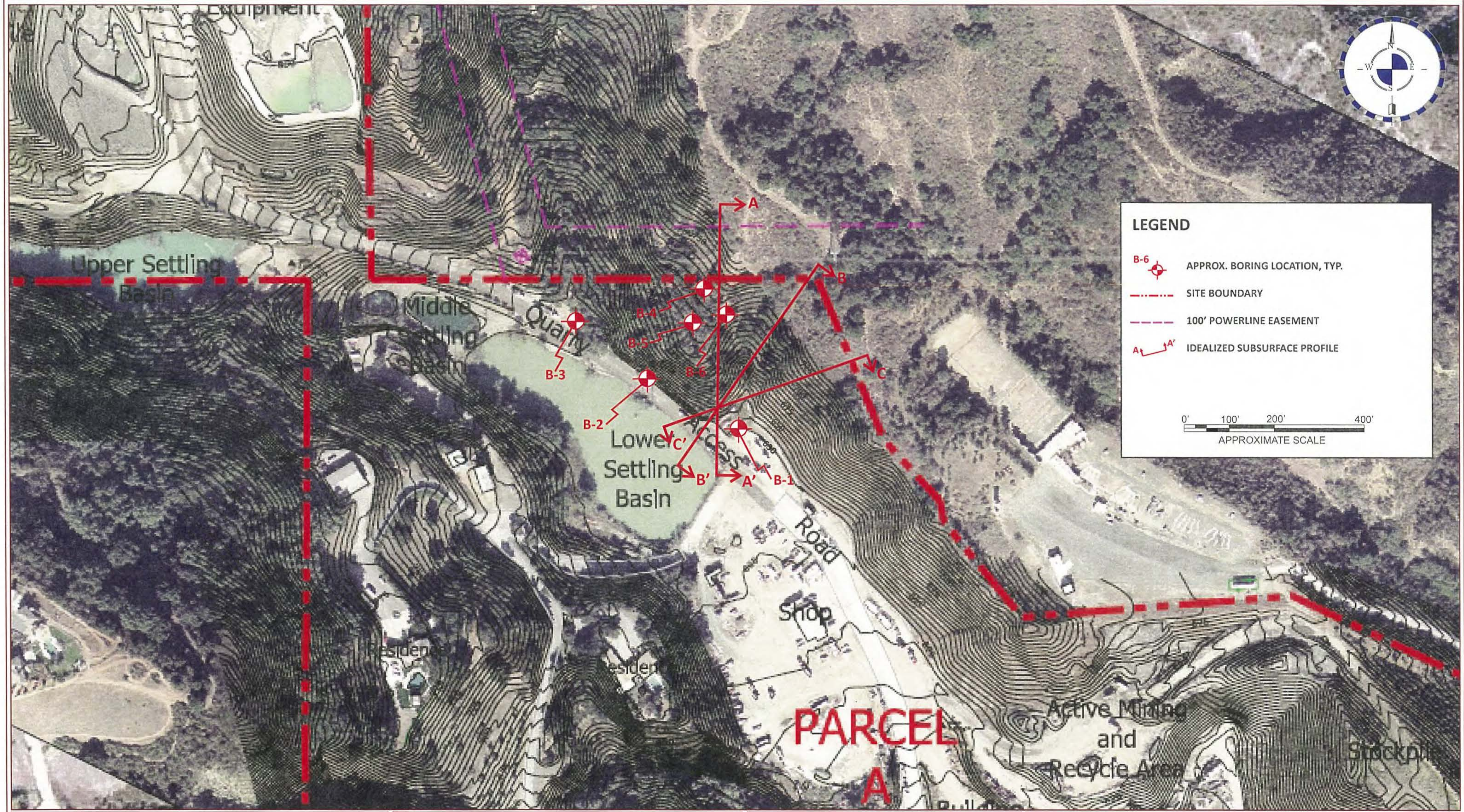
Base Map: Google Earth

ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION NEW SETTLING POND STEVENS CREEK QUARRY 12100 STEVENS CANYON ROAD CUPERTINO, CALIFORNIA	VICINITY MAP		
	DATE: April 2019	JOB NUMBER: STEVE-18-03	PLATE 1

BAGG ENGINEERS



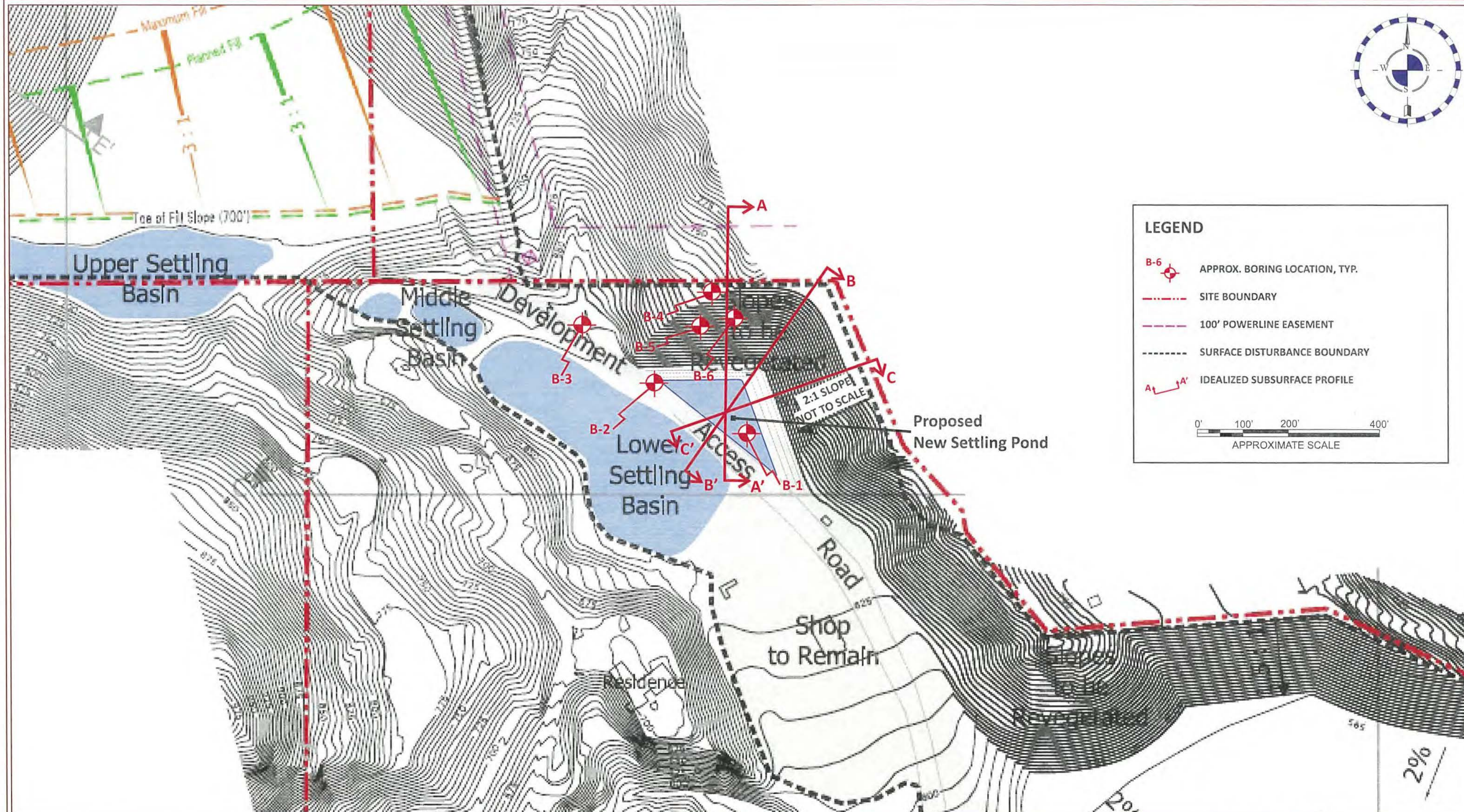
Base: "Sheet 1, Existing Conditions Aerial Photograph, Stevens Creek Quarry", prepared by Resource Design Technology, Inc., dated January, 2008.

ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
NEW SETTLING POND
STEVENS CREEK QUARRY
12100 STEVENS CANYON ROAD
CUPERTINO, CALIFORNIA

BAGG ENGINEERS

SITE PLAN
EXISTING TOPOGRAPHY

JOB NUMBER:	SCALE:	DATE:	PLATE:
STEVE-18-03	1" ≈ 200'	April 2019	2



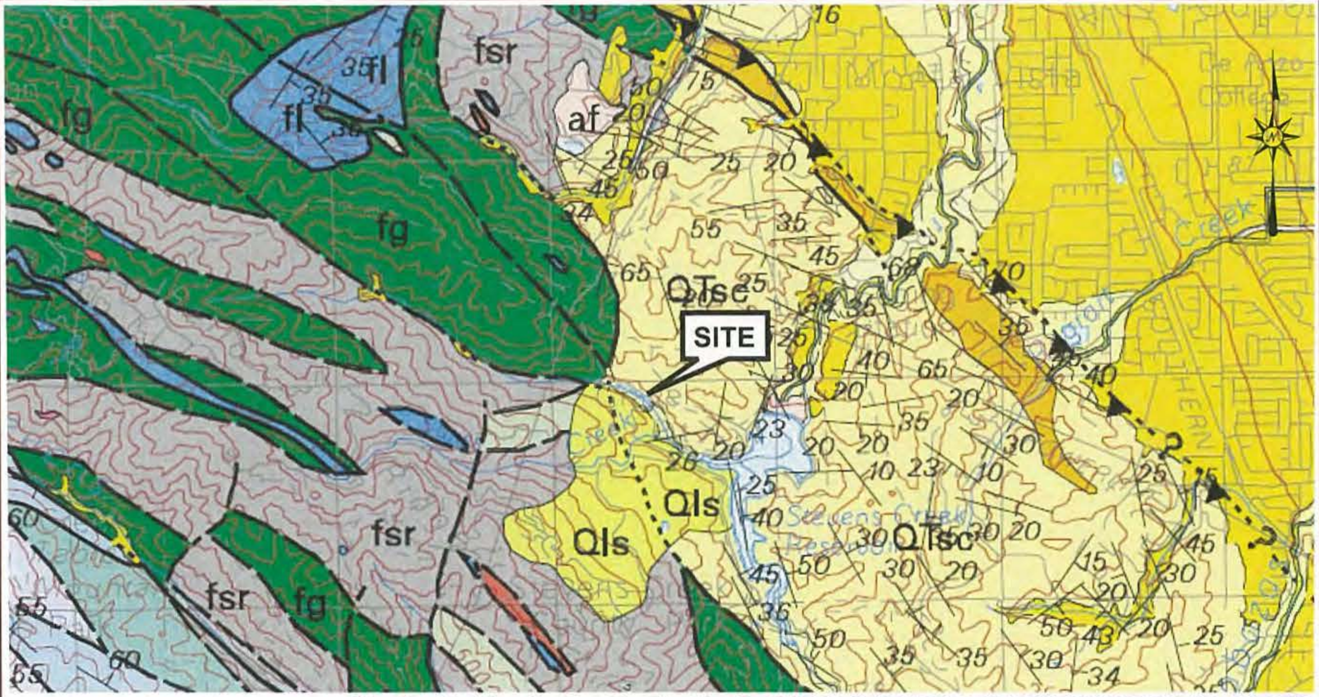
Base: "Sheet 3, Reclamation Plan and Cross-Sections, Stevens Creek Quarry", prepared by Resource Design Technology, Inc., dated January, 2008.

ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
NEW SETTLING POND
STEVENS CREEK QUARRY
12100 STEVENS CANYON ROAD
CUPERTINO, CALIFORNIA

BAGG ENGINEERS

SITE PLAN
PROPOSED TOPOGRAPHY

JOB NUMBER:	SCALE:	DATE:	PLATE:
STEVE-18-03	1" ≈ 200'	April 2019	3



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 THOUSAND FEET

LEGEND

af **Artificial Fill (Historic) --** Loose to very well consolidated gravel, silt, sand, clay, rock fragments, organic matter, and man-made debris in various combinations. Thickness is variable and may exceed 30 meters in places. Some is compacted and quite firm, but fill made before 1965 is nearly everywhere not compacted and consists simply of dumped materials.

Qls **Landslide Deposits (Pleistocene and/or Holocene) --** Poorly sorted clay, silt, sand and gravel. Only a few very large landslides have been mapped. For a more complete map of landslide deposits, see Nilsen and other (1979).

QTsc **Santa Clara Formation (lower Pleistocene and upper Pliocene) --** Gray to red brown poorly indurated conglomerate, sandstone, and mudstone in irregular and lenticular beds. Conglomerate consists mainly of subangular to subrounded cobbles in a sandy matrix but locally includes pebbles and boulders. On Coal Mine Ridge, south of Portola Valley, conglomerate contains boulders of an older conglomerate as long as one meter. Gray to buff claystone and siltstone beds on Coal Mine Ridge, contain carbonized wood fragments as large as 60 cm in diameter. Included in Santa Clara Formation are similar coarse-grained clastic deposits near Burlingame. Sarna-Wojcicki (1976) found a tuff bed in Santa Clara Formation near Woodside, and correlated it with a similar tuff in the Merced Formation. Later work indicated that the tuff correlates with the 435 ka Rockland ash (Sarna-Wojcicki, oral comm., 1997). Thickness is variable but reaches a maximum of about 500 meters along Coal Mine Ridge.

fg **Greenstone of Franciscan Complex (Cretaceous and Jurrasic) --** Dark green to red altered basaltic rocks, including flows, pillow lavas, breccias, tuff breccias, tuffs, and minor related intrusive rocks, in unknownj proportions. Unit includes some Franciscan chert and limestone bodies that are too small to show on map. Greenstone crops out in lenticular bodies varying in thickness from a few meters to many hundreds of meters.

fs **Greenstone of Franciscan Complex (Cretaceous and Jurrasic) --** Dark green to red altered basaltic rocks, including flows, pillow lavas, breccias, tuff breccias, tuffs, and minor related intrusive rocks, in unknownj proportions. Unit includes some Franciscan chert and limestone bodies that are too small to show on map. Greenstone crops out in lenticular bodies varying in thickness from a few meters to many hundreds of meters.

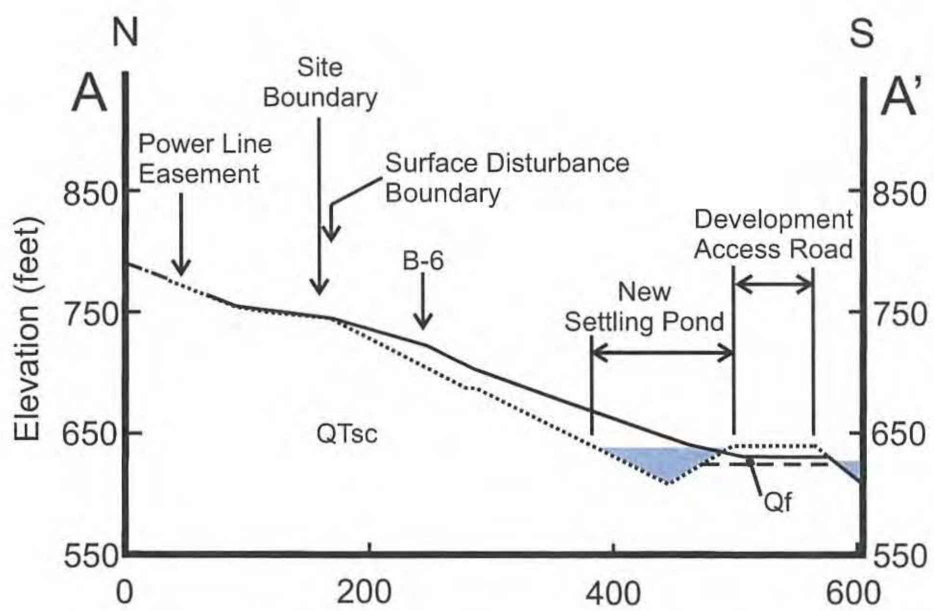
fl **Limestone of Franciscan Complex (Cretaceous and Jurrasic) --** Light gray, finely to coarsely crystalline limestone. In places limestone is unbedded, in other places it is distinctly bedded between beds of black chert. Limestone crops out in lenticular bodies up to 120 meters thick, in most places surrounded by Franciscan greenstone.

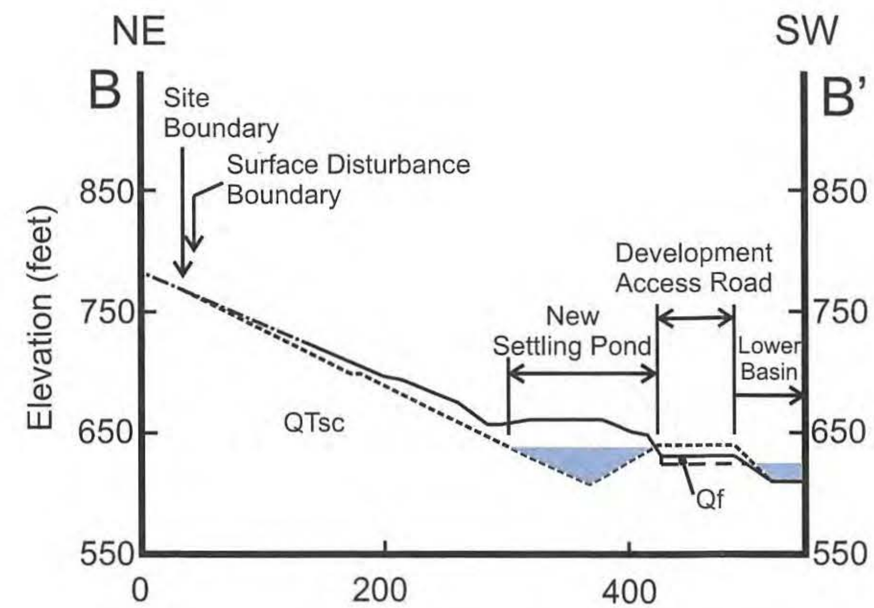
fsr **Sheared Rock (melange) of Franciscan Complex (Cretaceous and Jurrasic) --** Predominantly graywacke, siltstone, and shale, substantial portions of which have been sheared, but includes hard blocks of all other Franciscan rock types. Total thickness of unit is unknown, but is probably at least several tens of meters.

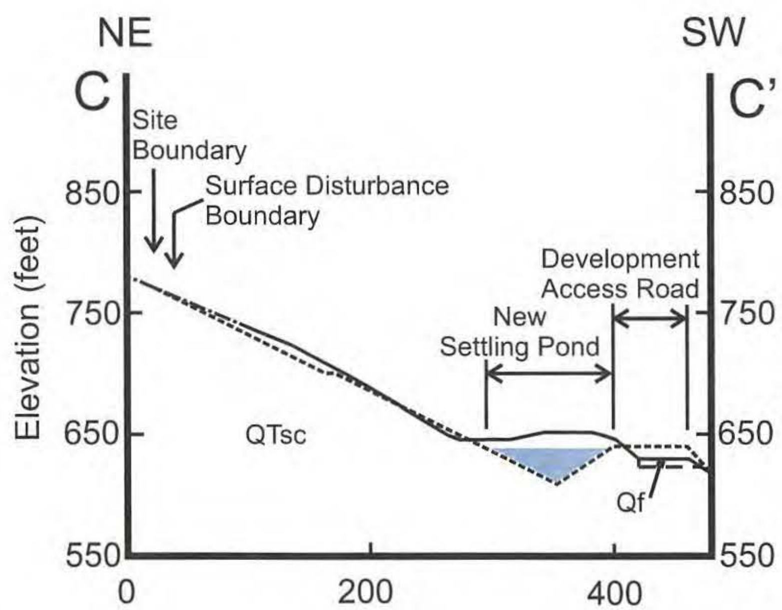
Reference: Geology of Palot Alto 30x60 Minute Quadrangle, California: A Digital Database by E.E. Brabb, R.W. Graymer, and D.L. Jones, Pamphlet Dervied From Digital Open-File Report 98-348

ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION NEW SETTLING POND STEVENS CREEK QUARRY 12100 STEVENS CANYON ROAD CUPERTINO, CALIFORNIA	AREA GEOLOGIC MAP		
	DATE: April 2019	JOB NUMBER: STEVE-18-03	PLATE 4

BVGG ENGINEERS







LEGEND

- EXISTING GROUND SURFACE, APPROXIMATE.
- PROPOSED GROUND SURFACE AT 2:1 SLOPE W/ 8 FEET BENCH, APPROXIMATE.
- INFERRED GROUND SURFACE
- GEOLOGIC CONTACT, APPROXIMATE
- B-6 APPROX. BORING LOCATION, TYP.
- QTsc SANTA CLARA FORMATION
- Qf EXISTING FILL

0' 100' 200' 400'
APPROXIMATE SCALE

ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
NEW SETTLING POND
STEVENS CREEK QUARRY
12100 STEVENS CANYON ROAD
CUPERTINO, CALIFORNIA

BAGG ENGINEERS

GEOLOGIC CROSS SECTIONS
2H:1V SLOPE WITH 8' BENCH AND RAISED ROAD

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	5

COARSE-GRAINED SOILS
LESS THAN 50% FINES*

GROUP SYMBOLS	ILLUSTRATIVE GROUP NAMES	MAJOR DIVISIONS
GW	Well graded gravel Well graded gravel with sand	**GRAVELS** More than half of coarse fraction is larger than No. 4 sieve size
GP	Poorly graded gravel Poorly graded gravel with sand	
GM	Silty gravel Silty gravel with sand	
GC	Clayey gravel Clayey gravel with sand	
SW	Well graded sand Well graded sand with gravel	**SANDS** More than half of coarse fraction is smaller than No. 4 sieve size
SP	Poorly graded sand Poorly graded sand with gravel	
SM	Silty sand Silty sand with gravel	
SC	Clayey sand Clayey sand with gravel	

NOTE: Coarse-grained soils receive dual symbols if:
(1) their fines are CL-ML (e.g. SC-SM or GC-GM) or
(2) they contain 5-12% fines (e.g. SW-SM, GP-GC, etc.)

FINE-GRAINED SOILS
MORE THAN 50% FINES*

GROUP SYMBOLS	ILLUSTRATIVE GROUP NAMES	MAJOR DIVISIONS
CL	Lean clay Sandy lean clay with gravel	**SILTS AND CLAYS** liquid limit less than 50
ML	Silt Sandy silt with gravel	
OL	Organic clay Sandy organic clay with gravel	
CH	Fat clay Sandy fat clay with gravel	**SILTS AND CLAYS** liquid limit more than 50
MH	Elastic silt Sandy elastic silt with gravel	
OH	Organic clay Sandy organic clay with gravel	
PT	Peat Highly organic silt	**HIGHLY ORGANIC SOIL**

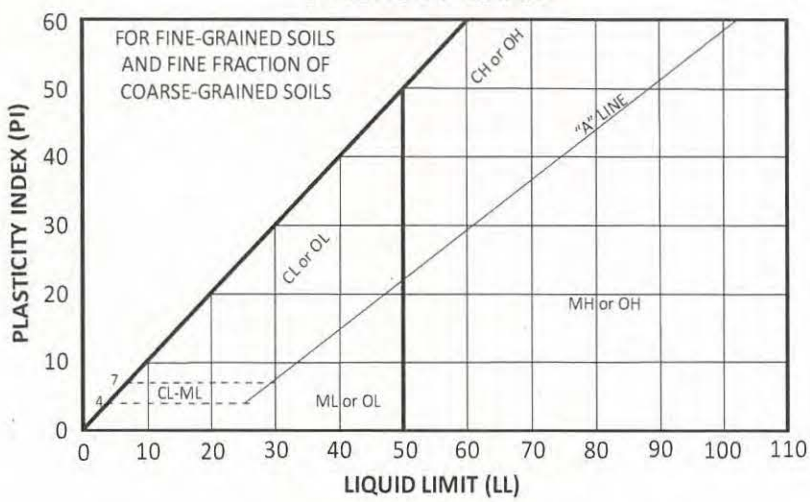
NOTE: Fine-grained soils receive dual symbols if their limits in the hatched zone on the Plasticity Chart(L-M)

SOIL SIZES

COMPONENT	SIZE RANGE
BOULDERS	ABOVE 12 in.
COBBLES	3 in. to 12 in.
GRAVEL	No. 4 to 3 in.
Coarse	¾ in to 3 in.
Fine	No. 4 to ¾ in.
SAND	No. 200 to No.4
Coarse	No. 10 to No. 4
Medium	No. 40 to No. 10
Fine	No. 200 to No. 40
*FINES:	BELOW No. 200

NOTE: Classification is based on the portion of a sample that passes the 3-inch sieve.

PLASTICITY CHART



Reference: ASTM D 2487-06, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

GENERAL NOTES: The tables list 30 out of a possible 110 Group Names, all of which are assigned to unique proportions of constituent soils. Flow charts in ASTM D 2487-06 aid assignment of the Group Names. Some general rules for fine grained soils are: less than 15% sand or gravel is not mentioned; 15% to 25% sand or gravel is termed "with sand" or "with gravel", and 30% to 49% sand or gravel is termed "sandy" or "gravelly". Some general rules for coarse-grained soils are: uniformly-graded or gap-graded soils are "Poorly" graded (SP or GP); 15% or more sand or gravel is termed "with sand" or "with gravel", 15% to 25% clay and silt is termed clayey and silty and any cobbles or boulders are termed "with cobbles" or "with boulders".

UNIFIED SOIL CLASSIFICATION SYSTEM

BYGG ENGINEERS

SOIL TYPES (Ref 1)

Boulders: particles of rock that will not pass a 12-inch screen.

Cobbles: particles of rock that will pass a 12-inch screen, but not a 3-inch sieve.

Gravel: particles of rock that will pass a 3-inch sieve, but not a #4 sieve.

Sand: particles of rock that will pass a #4 sieve, but not a #200 sieve.

Silt: soil that will pass a #200 sieve, that is non-plastic or very slightly plastic, and that exhibits little or no strength when dry.

Clay: soil that will pass a #200 sieve, that can be made to exhibit plasticity (putty-like properties) within a range of water contents, and that exhibits considerable strength when dry.

MOISTURE AND DENSITY

Moisture Condition: an observational term; dry, moist, wet, or saturated.

Moisture Content: the weight of water in a sample divided by the weight of dry soil in the soil sample, expressed as a percentage.

Dry Density: the pounds of dry soil in a cubic foot of soil.

DESCRIPTORS OF CONSISTENCY (Ref 3)

Liquid Limit: the water content at which a soil that will pass a #40 sieve is on the boundary between exhibiting liquid and plastic characteristics. The consistency feels like soft butter.

Plastic Limit: the water content at which a soil that will pass a #40 sieve is on the boundary between exhibiting plastic and semi-solid characteristics. The consistency feels like stiff putty.

Plasticity Index: the difference between the liquid limit and the plastic limit, i.e. the range in water contents over which the soil is in a plastic state.

MEASURES OF CONSISTENCY OF COHESIVE SOILS (CLAYS) (Ref's 2 & 3)

Very Soft	N=0-1*	C=0-250 psf	Squeezes between fingers
Soft	N=2-4	C=250-500 psf	Easily molded by finger pressure
Medium Stiff	N=5-8	C=500-1000 psf	Molded by strong finger pressure
Stiff	N=9-15	C=1000-2000 psf	Dented by strong finger pressure
Very stiff	N=16-30	C=2000-4000 psf	Dented slightly by finger pressure
Hard	N>30	C>4000 psf	Dented slightly by a pencil point

*N=blows per foot in the Standard Penetration Test. In cohesive soils, with the 3-inch-diameter ring sampler, 140-pound weight, divide the blow count by 1.2 to get N (Ref 4).

MEASURES OF RELATIVE DENSITY OF GRANULAR SOILS (GRAVELS, SANDS, AND SILTS) (Ref's 2 & 3)

Very Loose	N=0-4**	RD=0-30	Easily push a ½-inch reinforcing rod by hand
Loose	N=5-10	RD=30-50	Push a ½-inch reinforcing rod by hand
Medium Dense	N=11-30	RD=50-70	Easily drive a ½-inch reinforcing rod
Dense	N=31-50	RD=70-90	Drive a ½-inch reinforcing rod 1 foot
Very Dense	N>50	RD=90-100	Drive a ½-inch reinforcing rod a few inches

**N=Blows per foot in the Standard Penetration Test. In granular soils, with the 3-inch-diameter ring sampler, 140-pound weight, divide the blow count by 2 to get N (Ref 4).

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Ref 1: ASTM Designation: D 2487-06, **Standard Classification of Soils for Engineering Purposes** (Unified Soil Classification System).

Ref 2: Terzaghi, Karl, and Peck, Ralph B., **Soil Mechanics in Engineering Practice,** John Wiley & Sons, New York, 2nd Ed., 1967, pp. 30, 341, and 347.

Ref 3: Sowers, George F., **Introductory Soil Mechanics and Foundations: Geotechnical Engineering,** Macmillan Publishing Company, New York, 4th Ed., 1979, pp. 80, 81, and 312.

Ref 4: Lowe, John III, and Zaccheo, Phillip F., **Subsurface Explorations and Sampling,** Chapter 1 in "Foundation Engineering Handbook," Hsai-Yang Fang, Editor, Van Nostrand Reinhold Company, New York, 2nd Ed, 1991, p. 39.

SOIL TERMINOLOGY

WEATHERING DESCRIPTORS

Fresh — No discoloration, not oxidized, no separation, hammer rings when crystalline rocks are struck.

Slight — Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull, no visible separation, hammer rings when crystalline rocks are struck, body of rock not weakened.

Moderate — Discoloration extends from fractures, usually throughout ;Fe-Mg materials are "rusty", feldspar crystals are "cloudy", all fractures are discolored or oxidized, partial separation of boundaries visible, texture generally preserved, hammer dose not ring when rock is struck, body of rock is slightly weakened.

Intense — Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation, all fracture surfaces are discolored or oxidized, surfaces friable, partial separation, texture altered by chemical disintegration, dull sound when struck with hammer, rock is significantly weakened.

Decomposed — Discolored or oxidized throughout, but resistant mineral such as quartz may be unaltered, all feldspars and Fe-Mg minerals are completely altered to clay, complete separation of grain boundaries, resembles a soil, partial or complete remnant of rock structure may be preserved, can be granulated by hand, resistant minerals such as quartz may be present as "stringers" or "dykes".

BEDDING FOLIATION AND FRACTURE SPACING DESCRIPTORS

Millimeters	Feet	Bedding	Fracture Spacing
>10	<0.03	Laminated	Very Close
10-30	0.03-0.1	Very Thin	Very Close
30-100	0.1-0.3	Thin	Close
100-300	0.3-1	Moderate	Moderate
300-1000	1-3	Thick	Wide
1000-3000	3-10	Very Thick	Very Wide
>3000	>10	Massive	Extremely Wide

ROCK HARDNESS/STRENGTH DESCRIPTORS*

Extremely Hard — Core, fragment, or exposure cannot be scratched with knife or sharp pick; can only be chipped with repeated heavy hammer blows.

Very Hard — Cannot be scratched with knife or sharp pick. Core or fragment breaks with repeated heavy hammer blows.

Hard — Can be scratched with knife or sharp pick with difficulty (heavy pressure). Heavy hammer blow required to break specimen.

Moderately Hard — Can be scratched with knife or sharp pick with light or moderate pressure. Core or fragment breaks with moderate hammer blow.

Moderately Soft — Can be grooved $^1/_{16}$ inch (2mm) deep by knife or sharp pick with moderate or heavy pressure. Core fragment breaks with light hammer blow or heavy manual pressure.

Soft — Can be grooved or gouged easily by knife or sharp pick with light pressure, can be scratched with fingernail. Breaks wit light to moderate manual pressure.

Very Soft — Can be readily indented, grooved, or gouged with fingernail, or carved with a knife. Breaks with light manual pressure.

*Note: Although "sharp pick" is included in those definitions, descriptions of ability to be scratched, grooved, or gouged by a knife is the preferred criteria.

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"Engineering Geology Field Manual, Second Edition, Volume 1, by U.S. Department of Interior, Bureau of Reclamation, 1998

ROCK TERMINOLOGY

BVGG ENGINEERS

GENERAL NOTES FOR BORING LOGS:

The boring logs are intended for use only in conjunction with the text, and for only the purposes the text outlines for our services. The Plate "Soil Terminology" defines common terms used on the boring logs.

The plate "Unified Soil Classification System," illustrates the method used to classify the soils. The soils were visually classified in the field; the classifications were modified by visual examination of samples in the laboratory, supported, where indicated on the logs, by tests of liquid limit, plasticity index, and/or gradation. In addition to the interpretations for sample classification, there are interpretations of where stratum changes occur between samples, where gradational changes substantively occur, and where minor changes within a stratum are significant enough to log.

There may be variations in subsurface conditions between borings. Soil characteristics change with variations in moisture content, with exchange of ions, with loosening and densifying, and for other reasons. Groundwater levels change with seasons, with pumping, from leaks, and for other reasons. Thus boring logs depict interpretations of subsurface conditions only at the locations indicated, and only on the date(s) noted.

SPECIAL FIELD NOTES FOR THIS REPORT:

1. The borings were drilled December 17 through December 20, 2018 with a truck mounted drilling rig using 8-inch diameter hollow stem augers. The borings were sealed with neat cement grout after the last soil sample was collected.

2. The boring locations were approximately located by pacing from known points on the site, as shown on Plate 2, Site Plan – Existing Topography and Plate 3, Site Plan – Proposed Topography.

3. The soils' Group Names [e.g. SANDY LEAN CLAY] and Group Symbols [e.g. (CL)] were determined or estimated per ASTM D 2487-06, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System, see Plate 6). Other soil engineering terms used on the boring log are defined on Plate 6A, Soil Terminology and Plate 7, Rock Terminology.

4. The "Blow Count" Column on the boring logs indicates the number of blows required to drive the sampler below the bottom of the boring, with the blow counts given for each 6 inches of sampler penetration.

5. Perched free water was encountered in Boring B-3 at approximately 9 feet bgs and was measured at 8 feet bgs upon completion of boring.

6. The tabulated strength values on the boring logs are peak strength values.

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KEY TO SYMBOLS

Symbol Description

Strata symbols

- Aggregate Base
- Clayey sand
- Silty sand
- Silty sand with gravel
- Clayey sand with gravel
- Sandy lean clay
- Well graded sand with clay
- Sandy lean clay with gravel
- Silty & clayey sand
- Lean clay with sand
- Lean clay with sand and gravel
- Lean clay with silt
- Lean Clay
- High plasticity (fat) clay
- Silty & clayey sand with gravel
- Sandstone

Misc. Symbols

- Boring continues
- Water first encountered during drilling
- Water level at completion of boring
- Drilling refusal

Soil Samplers

- Modified California Sampler: 24" long, 2.375" ID by 3" OD, split-barrel sampler driven w/ 140-pound hammer falling 30 inches (ASTM D3550)
- Standard Penetration Test: 24" long, 1.375" ID by 2" OD, split-spoon sampler driven w/ 140-pound hammer falling 30 inches (ASTM D 1586-11)

Line Types

- Solid line: Denotes a sudden, or well identified strata change
- Dashed line: Denotes a gradual, or poorly identified strata change

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KEY TO SYMBOLS

Symbol	Description
Laboratory Data	
DS	Direct shear test performed on a sample at natural or field moisture content (ASTM D3080)
DSX	Direct shear test performed after the sample was submerged in water until volume changes ceased (ASTM D3080).
PI	Plasticity Index established per ASTM D4318 Test Method.
LL	Liquid Limit established per ASTM D4318 Test Method.
%Gravel	Percent of soil particales coarser than a No. 4 sieve and finer than a 3" sieve (ASTM C117)
%Sand	Percent of soil particles coarser than a No. 200 sieve and finer than a No. 4 sieve (ASTM C117)
%Fines	Percent of soil particles finer than a No. 200 sieve (ASTM C117)
% Swell	Percent expansion of a submerged sample under a given surcharge pressure.
bgs	Below the ground surface
NAT	Natural or field water content
AB	Aggregate Base

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BORING LOG

JOB NAME: New Settling Pond at the SCQ
CLIENT: Stevens Creek Quarry, Inc.
LOCATION: 12100 Stevens Canyon Road, Cupertino, CA
DRILLER: Exploration Geoservices, Inc.
DRILL METHOD: Truck-Mounted Drilling Rig - 8" Diameter Hollow Stem Augers

JOB NO.: STEVE-18-03
DATE DRILLED: 12/17/2018
ELEVATION:
LOGGED BY: EW

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						0			AB	
							14	SC	CLAYEY SAND: red brown, medium dense to dense, moist, well-graded sand, few angular fine gravels, trace coarse gravel	Fill
				9.4	119		24 24	SM	SILTY SAND: olive gray, dense, moist, well-graded sand, few fine gravel, trace clay	Fill
						3	13 11 9			
									... decrease in gravel content	
						6				
								SM	SILTY SAND with GRAVEL: olive gray to olive brown, very dense, slightly moist, well-graded sand, little to some subangular to subrounded fine gravel, trace coarse gravel	Native: Highly Weathered Santa Clara Formation into soil-like material
						9	50/4"			
						12		SM	SILTY SAND: olive gray, slightly moist, fine to medium sand, trace coarse sand, trace clay	
							50/3"	SM	SILTY SAND with GRAVEL: olive brown, very dense, slightly moist, well-graded sand, little angular to subrounded fine gravel, trace coarse gravel	%Gravel=27 %Sand=58 %Fines=15
						15				
						18	50/3"	SM	SILTY SAND: blue gray, very	

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
				5.1					dense, slightly moist, well-graded sand, trace subrounded fine gravel	
						21				
						24	50/5"		... fine to medium sand, trace coarse sand, trace fine gravel	
									... well-graded sand, trace fine gravel, trace coarse gravel, very dense	
						27				
							50/5"		... fine to medium sand, trace coarse sand, trace fine gravel	
						30			The boring was terminated at approximately 29 feet bgs. Goundwater was not encountered. Immediately after the last sample was retrieved, the borehole was backfilled with neat cement grout.	
						33				
						36				
						39				

BVGG ENGINEERS

BORING LOG

Boring No. B-2
Page 1 of 2

JOB NAME: New Settling Pond at the SCQ
CLIENT: Stevens Creek Quarry, Inc.
LOCATION: 12100 Stevens Canyon Road, Cupertino, CA
DRILLER: Exploration Geoservices, Inc.
DRILL METHOD: Truck-Mounted Drilling Rig - 8" Diameter Hollow Stem Augers

JOB NO.: STEVE-18-03
DATE DRILLED: 12/17/2018
ELEVATION:
LOGGED BY: EW

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						0			Approx. 9" AB, olive gray to gray	
							50/5"	SM	SILTY SAND with GRAVEL: brown, very dense, slightly moist, well-graded sand, little fine gravel, trace coarse gravel	Fill
						3	29 50/6"		... gray brown and olive brown, moist, trace glass fragment	
						6				
DSX DSX	1500 1100	14.1 14.5	3200 1520	8.2 10.9	113 116	9	20 50/6"	SM	SILTY SAND: intensely weathered sandstone, brown to yellowish brown, very dense, moist, fine to medium sand, trace coarse sand, trace to few gravel, trace rootlets	Native: Highly Weathered Santa Clara Formation into soil-like material
DSX	1600	12.7	2570	9.2	122	12	50/6"	SC	CLAYEY SAND with GRAVEL: brown to yellowish brown, very dense, moist, well-graded sand, few fine gravels, trace coarse gravel	
						15				
						18	40			

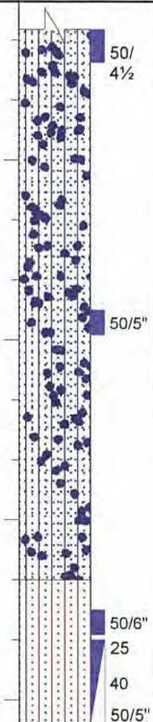
BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						21	50/ 4½		... brown to yellow brown with trace olive brown and orange brown, contains blue gray cobble-size rock fragment (sandstone) ... trace cobbles	
				7.8	117	24	50/5"		... silty and clayey sand, olive gray and orangish brown, trace to few fine gravel, very dense	
						27				
DSX DSX DSX	1000 3000 6000	11.6 11.0 13.7	1600 4090 4120	8.9 9.6 8.9	125 129 115	30	50/6" 25 40 50/5"	SM	SILTY SAND: blue gray, very dense, moist, fine sand, trace gravel-size sandstone fragment	
						33			The boring was terminated at approximately 30.5 feet bgs. Goundwater was not encountered. Immediately after the last sample was retrieved, the borehole was backfilled with neat cement grout.	
						36				
						39				



BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ
CLIENT: Stevens Creek Quarry, Inc.
LOCATION: 12100 Stevens Canyon Road, Cupertino, CA
DRILLER: Exploration Geoservices, Inc.
DRILL METHOD: Truck-Mounted Drilling Rig - 8" Diameter Hollow Stem Augers

JOB NO.: STEVE-18-03
DATE DRILLED: 12/17/2018
ELEVATION:
LOGGED BY: EW

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						0			AB	
						3	50/5" 50/6"	SC	CLAYEY SAND with GRAVEL: gray brown and brown, very dense, moist, well-graded sand, few to little fine gravel, trace coarse gravel ... brown, slightly moist, trace cobbles, contains light blue-gray sandstone fragment	Fill
DSX	1200	32.9	830	33.4	91	6 9	12 9 5	CL	SANDY LEAN CLAY: brown and olive gray, stiff, moist, fine sand, trace organics	Native: Highly Weathered Santa Clara Formation into soil-like material LL=39, PI=20
								SW-SC	WELL-GRADED SAND with CLAY: blue gray, loose to medium dense, wet, well-graded sand, trace gravel	
DSX	1750	14.9	1580	14.3	116	12	10 14 14	CL	SANDY LEAN CLAY with GRAVEL: brown to olive brown, very stiff, moist to very moist, fine sand, trace coarse gravels	
						15		SC-SM	SILTY and CLAYEY SAND: brown and gray brown, medium dense, moist, fine to medium sand, trace coarse sand, trace fine gravel	
						18	14	SC	CLAYEY SAND: brown and yellow brown, very dense, very moist, fine to medium sand,	

BVGG ENGINEERS

BORING LOG

Boring No. B-3

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
DSX	2500	14.1	2280	13.2	116		40 40		trace coarse sand, trace to few subangular gravel	
						21		SM	SILTY SAND: brown and yellow brown, very dense, very moist, fine to medium sand, trace coarse sand, trace to few subangular gravel	
DS DSX	2800 3000	NAT 22.3	3250 2200	12.8 22.3	125 104	24	14 20 32		... brown with yellow brown mottling, dense, moist to very moist, trace subrounded to rounded gravel, minor clay	
						27		CL	LEAN CLAY with SAND: brown to orange brown with gray mottling, hard, moist, fine sand, trace medium sand	
						30	50/5" 21 28 26	SC	CLAYEY SAND: yellow brown, dark gray, and gray brown, very dense, moist, well-graded sand, trace fine gravel	%Gravel=11 %Sand=49 %Fines=40 LL=28, PI=14
						33 36 39			The boring was terminated at approximately 30.5 feet bgs. Perched free water was encountered at approximately 9 feet bgs and measured at approximately 8 feet bgs upon completion of the boring. Immediately after the last sample was retrieved, the borehole was backfilled with neat cement grout.	

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ
CLIENT: Stevens Creek Quarry, Inc.
LOCATION: 12100 Stevens Canyon Road, Cupertino, CA
DRILLER: Exploration Geoservices, Inc.
DRILL METHOD: Truck-Mounted Drilling Rig - 8" Diameter Hollow Stem Augers

JOB NO.: STEVE-18-03
DATE DRILLED: 12/19/2018
ELEVATION:
LOGGED BY: EW

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						0		CL	SANDY LEAN CLAY: brown to dark brown, fine sand, trace medium to coarse sand	Native Residual Soil
						3	10 18 36	SC	CLAYEY SAND: yellow brown and brown, dense, dry to slightly moist, well-graded sand	Highly Weathered Santa Clara Formation into soil-like material
						6			... very dense	
						9	50/5½			LL=26, PI=12
						12				
				5.4			50/6"		... yellow brown, trace fine gravel, slight increase in clay content, decrease in sand content, very dense	
						15				
						18				

BVGG ENGINEERS

BORING LOG

Boring No. B-4

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
							50/6"			
						21				
DS	3000	NAT	6000	9.0	127	24	28 50/5"		... yellow brown clayey sand mottling ... brown and yellow brown with trace red brown and gray brown, very dense, slightly moist, trace fine gravel (predominantly weathered sandstone)	
						27		CL	SANDY LEAN CLAY: brown, hard, slightly moist, fine to medium sand, trace rounded to subrounded fine gravel	
DSX	4000	12.5	3250	8.6	122		50/6"			
								SM	SILTY SAND: yellow brown, very dense, slightly moist, well-graded sand, trace coarse gravel	
						30		CL	LEAN CLAY with SAND: orange brown with yellow brown and gray brown mottling, very stiff to hard, moist, fine sand	
						33				
DS	4200	NAT	6530	9.5	126		16 31 41			LL=33, PI=18
						36		CL	SANDY LEAN CLAY: yellow brown and brown, hard, moist, fine to medium sand, trace coarse sand	
						39	22 26	SC	CLAYEY SAND: brown and yellow brown, dense, moist, well-graded sand, trace fine gravel, scattered coarse gravel	

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ *JOB NO.:* STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
DS	5000	NAT	5700	9.3	123		33		... fine sand with trace subrounded fine gravel	
						42		CL	LEAN CLAY with SAND: brown to yellow brown, hard, moist, fine sand, trace medium to coarse sand, trace subrounded fine gravel	
DSX	5500	10.7	4660	8.5 10.7	126		18 27 35			
						45		CL	SANDY LEAN CLAY with GRAVEL: brown to yellow brown, hard, moist, fine sand, trace medium to coarse sand, trace subangular to subrounded fine gravel, trace subrounded coarse gravel ... at approx. 45': dark gray sheared clay ... at approx. 47': gray to olive gray clay mottling	
				5.5		48	50/6"	SC	CLAYEY SAND with GRAVEL: olive gray with medium gray, very dense, moist, well-graded sand, trace fine gravel, trace coarse gravel ... at approx. 49': coarse gravel-size blue gray sandstone fragment encountered	
						51		SM	SILTY SAND: olive gray and gray, very dense, slightly moist to moist, well-graded sand	
						54	50/6"			
						57		CL	LEAN CLAY with SAND and GRAVEL: dark blue gray to dark olive gray, very stiff, moist, fine to medium sand, trace coarse sand, trace to few fine gravel	
DS	7500	NAT	1940	13.2	122		16 15			
DSX	7500	11.7	3340	12.6	122		35			
						60		SC	CLAYEY SAND with GRAVEL: olive gray with	

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
									medium gray, dense, moist, well-graded sand, trace fine gravel, trace coarse gravel	
								SC	... at approx. 61': trace blue lean clay/clayey sand	
						63			CLAYEY SAND: olive gray, very dense, moist, well-graded sand, few fine gravel, trace coarse gravel	
				6.8	138		25 50/6"			
						66				
DSX DSX	1000 6000	12.8 10.8	890 3700	6.6 6.2	118 114	69	50/6"			
						72				
				7.5	135		38 50/6"			
						75			The boring was terminated at approximately 74.5 feet bgs. Goundwater was not encountered. Immediately after the last sample was retrieved, the borehole was backfilled with neat cement grout.	
						78				
						81				

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ
CLIENT: Stevens Creek Quarry, Inc.
LOCATION: 12100 Stevens Canyon Road, Cupertino, CA
DRILLER: Exploration Geoservices, Inc.
DRILL METHOD: Truck-Mounted Drilling Rig - 8" Diameter Hollow Stem Augers

JOB NO.: STEVE-18-03
DATE DRILLED: 12/18/2018
ELEVATION:
LOGGED BY: EW

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						0	4, 5, 12	CL	LEAN CLAY with SAND: dark brown, medium stiff, very moist, well-graded sand, few gravels ... brown, slightly increase in sand content, trace gravel	Native Residual Soil
						3	36, 50/4"	CL	SANDY CLAY: yellow brown, hard, dry to slightly moist, fine sand, trace medium to coarse sand, trace fine gravel	Highly Weathered Santa Clara Formation into soil-like material
						6		SM	SILTY SAND: dark yellow brown, very dense, dry to slightly moist, fine to medium sand, few coarse sand, trace gravel	
				8.1	124	9	50/6"			
						12	46, 50/3"	CL	LEAN CLAY with SAND: yellow brown with brown to gray brown and trace orange brown, hard, fine sand, trace medium to coarse sand	LL=37, PI=22
						15				
						18				

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ *JOB NO.:* STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
				11.4	117		50/6"		... yellow brown with trace brown to gray brown, hard	
						21				
								SC	CLAYEY SAND: yellow brown with trace brown to gray brown and orange brown, very dense, dry to slightly moist, fine to medium sand, few coarse sand, trace fine gravel	
				10.0	119	24	40 50/5"			
								SC-SM	SILTY and CLAYEY SAND with GRAVEL: yellow brown with trace brown to gray brown and orange brown, very dense, dry to slightly moist, well-graded sand, trace fine gravel, trace angular to subangular coarse gravel	
						27		SM	SILTY SAND: yellow brown, very dense, dry to slightly moist, well-graded sand, few subangular to subrounded fine gravel, trace to few angular to subangular coarse gravel, trace clay	
							50/5"			
						30				
						33				
				6.8	110		40 50/5"		... yellow brown to brown, slightly moist	
						36				
						39	50/5½		... orange brown with trace yellow brown and gray brown, slightly moist, fine to medium	

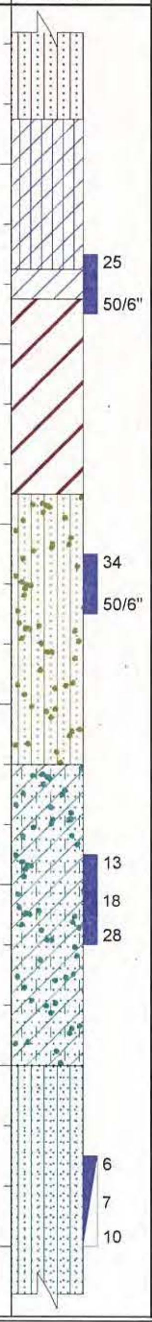
BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
									sand	
						42		CL	LEAN CLAY with SILT: dark yellow brown, very stiff, moist, trace fine sand	
DS	5500	NAT	2740	23.2	104	45	25, 50/6"	CL CH	LEAN CLAY: yellow brown with brown to dark brown mottling, hard, moist, trace fine sand, moderate plasticity fines	LL=46, PI=24
									FAT CLAY: dark gray with light to medium gray, hard, slightly moist to moist, trace blue gray silty sand at approx. 44.5'	
				6.1	121	48, 51	34, 50/6"	SM	SILTY SAND with GRAVEL: blue gray to olive gray with trace red and yellow brown weathered rock fragment, very dense, slightly moist to moist, well-graded sand, few subangular to subrounded gravel	
DS	7000	NAT	4990	6.8	122	54	13, 18, 28	SC-SM	SILTY and CLAYEY SAND with GRAVEL: blue gray and olive gray, dense, moist, well-graded sand, trace fine gravel	
				8.5		57, 60	6, 7, 10	SC	CLAYEY SAND: blue gray to olive gray, medium dense, moist, fine to medium sand, trace coarse sand, trace gravel	LL=23, PI=11 %Fines=29



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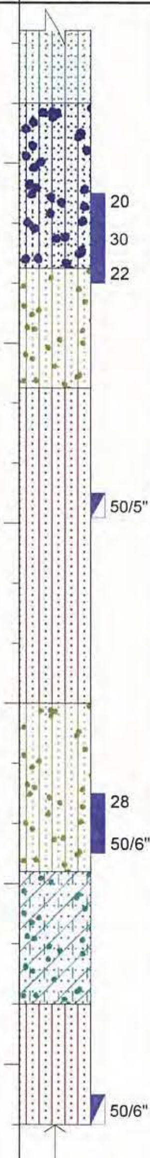
BORING LOG

Boring No. B-5

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						63	20 / 30 / 22	SC	CLAYEY SAND with GRAVEL: blue gray, dense, moist, well-graded sand, few subangular to angular fine gravel, trace subangular to angular coarse gravel, trace subangular cobbles	
						66		SM	SILTY SAND with GRAVEL: blue gray to dark gray and olive gray, dense, slightly moist to moist, well-graded sand, few gravel	
						69	50/5"	SM	SILTY SAND: olive gray with few dark gray mottles, very dense, moist, well-graded sand, trace to few gravel	
						72	28 / 50/6"	SM	SILTY SAND with GRAVEL: blue gray and olive gray, dense to very dense, few fine gravel, trace coarse gravel, trace cobbles	
DSX DSX DSX	1000 4000 8000	11.3 10.6 10.1	1290 2980 5240	8.8 7.5 6.6 7.3	122 126 121 128					
						75		SC-SM	SILTY and CLAYEY SAND with GRAVEL: blue gray and olive gray, dense to very dense, few fine gravel, trace coarse gravel, trace cobbles, with noticeable clay content	
						78	50/6"	SM	SILTY SAND: blue gray, very dense, slightly moist to moist, well-graded sand, trace fine gravel	Drilling Refusal
						81			The boring was terminated at approximately 79 feet bgs. Goundwater was not encountered.	The borehole was backfilled with neat cement grout.



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BORING LOG

JOB NAME: New Settling Pond at the SCQ
CLIENT: Stevens Creek Quarry, Inc.
LOCATION: 12100 Stevens Canyon Road, Cupertino, CA
DRILLER: Exploration Geoservices, Inc.
DRILL METHOD: Truck-Mounted Drilling Rig - 8" Diameter Hollow Stem Augers

JOB NO.: STEVE-18-03
DATE DRILLED: 12/20/2018
ELEVATION:
LOGGED BY: EW

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						0		CL	LEAN CLAY with SAND: brown, medium stiff to stiff, moist to very moist	Native Residual Soil
								SC	CLAYEY SAND with GRAVEL: orangish brown and yellow brown with trace gray, gray brown, and olive gray, very dense, slightly moist, well-graded sand, few to little subangular to subrounded fine gravel, trace coarse gravel	Highly Weathered Santa Clara Formation into soil-like material
						3	25			
				7.5	126		50/5"			
						6				
							50/3"		... cobbles encountered	
						9				
									... very dense	
						12				
							50/5"		... mottled orange brown, yellow brown, and olive with trace gray to gray brown, appreciable silt content	
						15				
								SC	CLAYEY SAND: olive gray with yellow brown mottling, very dense, well-graded sand,	
						18	50/5"			

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BORING LOG

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
				6.0	112				few subangular fine gravel	
						21				
								SM	SILTY SAND: olive gray to slightly bluish gray with trace to few light gray to dark gray, very desne, slightly moist, well-graded sand, trace to few subangular to subrounded fine gravel (predominantly sandstone and greenstone)	
						24	50/4"			
						27				
				6.1	116		50/5½		... olive gray with few light to dark gray mottling, few subangular to subrounded gravels, increased gravel content, decreased silt content	
						30				
						33				
DSX	4000	10.5	3200	4.3	116		50/4"			
						36				
				4.5		39	50/4"		... olive gray and dark gray to dark blue gray, trace to few fine gravel	

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						42				
									... contains blue silty sand, decrease in gravel content	
						45				
						48				
				4.7			50/4"		... olive gray to bluish gray with dark gray	
						51				
								SM	SILTY SAND with GRAVEL: gray to dark blue gray and olive gray, very dense, slightly moist, well-graded sand, few fine gravel, trace coarse gravel	
						54				
						57				
				4.8			50/3"			%Gravel=38 %Sand=47 %Fines=15
						60				

BVGG ENGINEERS

BORING LOG

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
						63				
								ROCK	SANDSTONE: blue gray, fresh to slightly weathered, moderately hard, poorly-graded sand with silt, slightly moist	
						66				
				9.0	114	69	50/4"			
						72				
								SM	SILTY SAND: olive gray, very dense, slightly moist, fine to medium sand, trace coarse sand, trace fine gravel	
						75				
						78				
				5.6	123		50/4"			
						81			... contains blue gray clayey	

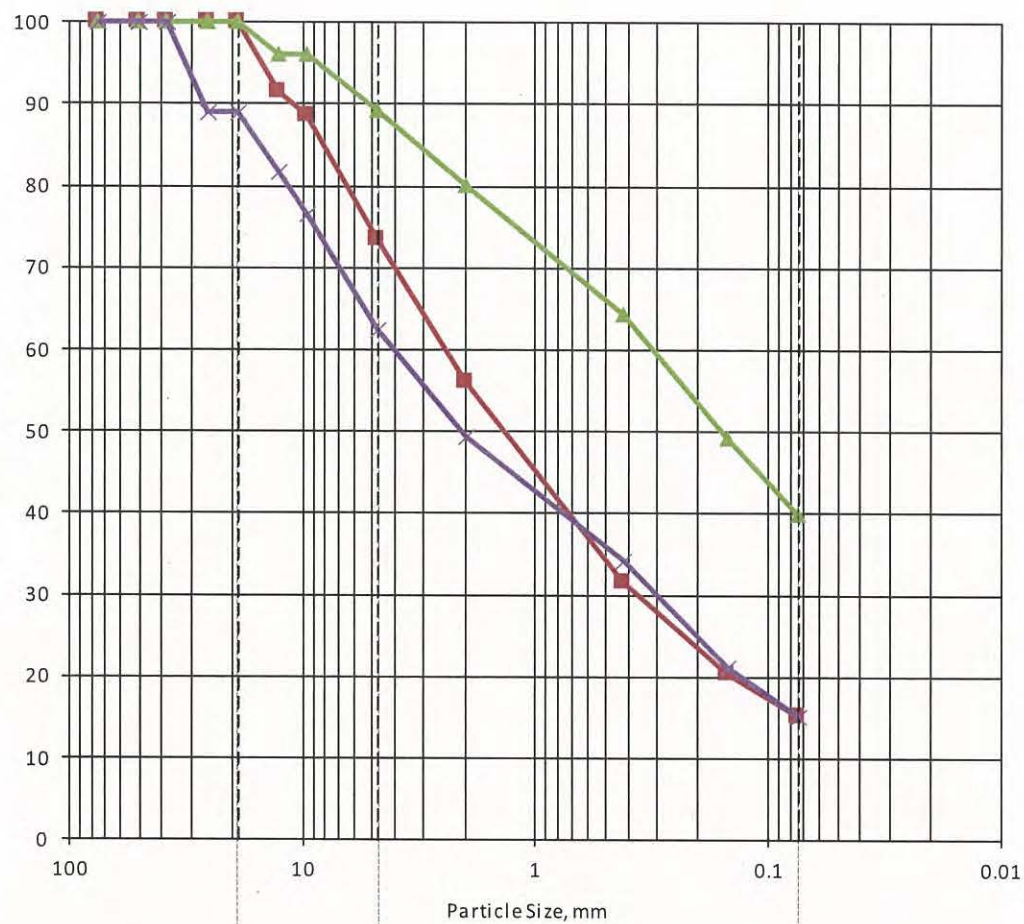
BORING LOG

Boring No. B-6

JOB NAME: New Settling Pond at the SCQ

JOB NO.: STEVE-18-03

Type of Strength Test	Test Surcharge Pressure, psf	Test Water Content, %	Shear Strength, psf	In-Situ Water Content, %	In-Situ Dry Unit Weight, pcf	Depth, ft.	Soil Symbols, Samplers and Blow Counts	USCS	Description	Remarks
									sand	
						84	50/½		The boring was terminated at approximately 84 feet bgs. Goundwater was not encountered. Immediately after the last sample was retrieved, the borehole was backfilled with neat cement grout.	Drilling Refusal
						87				
						90				
						93				
						96				
						99				
						102				



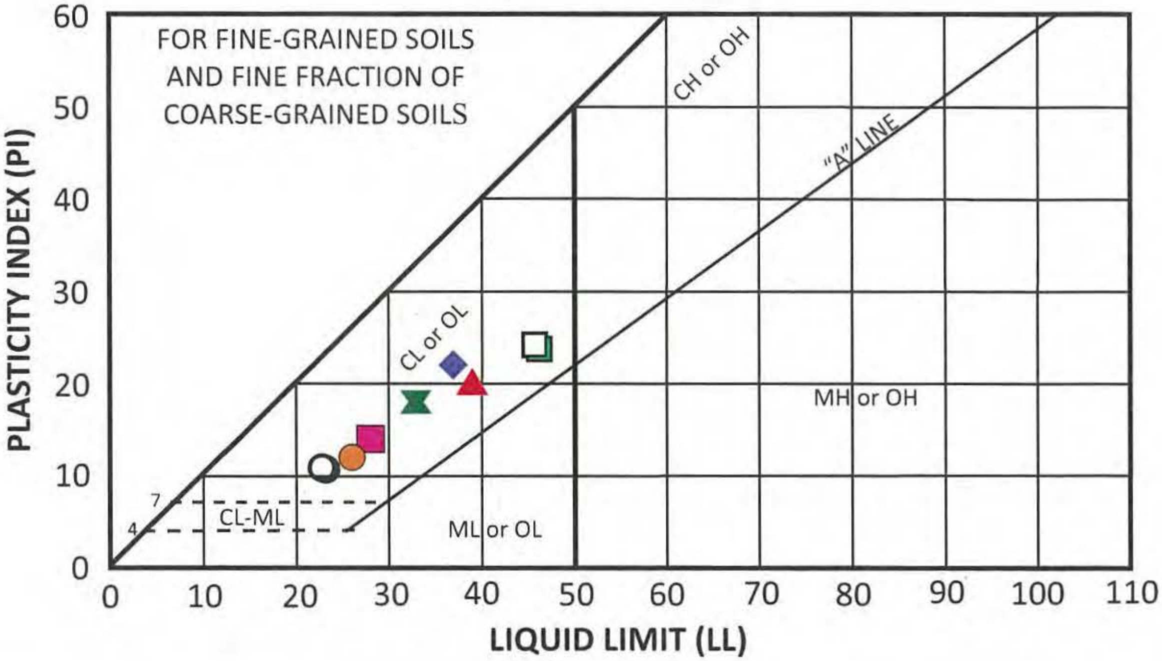
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

LEGEND	B-1 (red, square markers)	B-3 (green, triangle markers)	B-6 (purple, x markers)	
BORING NUMBER	B-1	B-3	B-6	
DEPTH (FEET)	13.5	28.5	58.5	
SOIL DESCRIPTION	Silty Sand with Gravel (SM)	Clayey Sand (SC)	Silty Sand with Gravel (SM)	

ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION NEW SETTLING POND STEVENS CREEK QUARRY 12100 STEVENS CANYON ROAD CUPERTINO, CALIFORNIA	GRADATION TEST DATA		
	DATE: April 2019	JOB NUMBER: STEVE-18-03	PLATE: 16

BVGG ENGINEERS

PLASTICITY CHART



SYMBOL	SAMPLE SOURCE	DEPTH (FEET)	NATURAL WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION
▲	Boring B-3	9½	33.4	39	19	20	Sandy lean clay (CL)
■	Boring B-3	29	–	28	14	14	Yellow brown clayey sand (SC)
●	Boring B-4	8½	–	26	14	12	Yellow brown clayey sand (SC)
⧗	Boring B-4	34¼	9.5	33	15	18	Orange brown lean clay with sand (CL)
◆	Boring B-5	13¾	–	37	15	22	Yellow brown lean clay with sand (CL)
□	Boring B-5	44	23.2	46	22	24	Yellow brown lean clay (CL)
○	Boring B-5	58½	8.5	23	12	11	Blue gray clayey sand (SC)

ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
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STEVENS CREEK QUARRY
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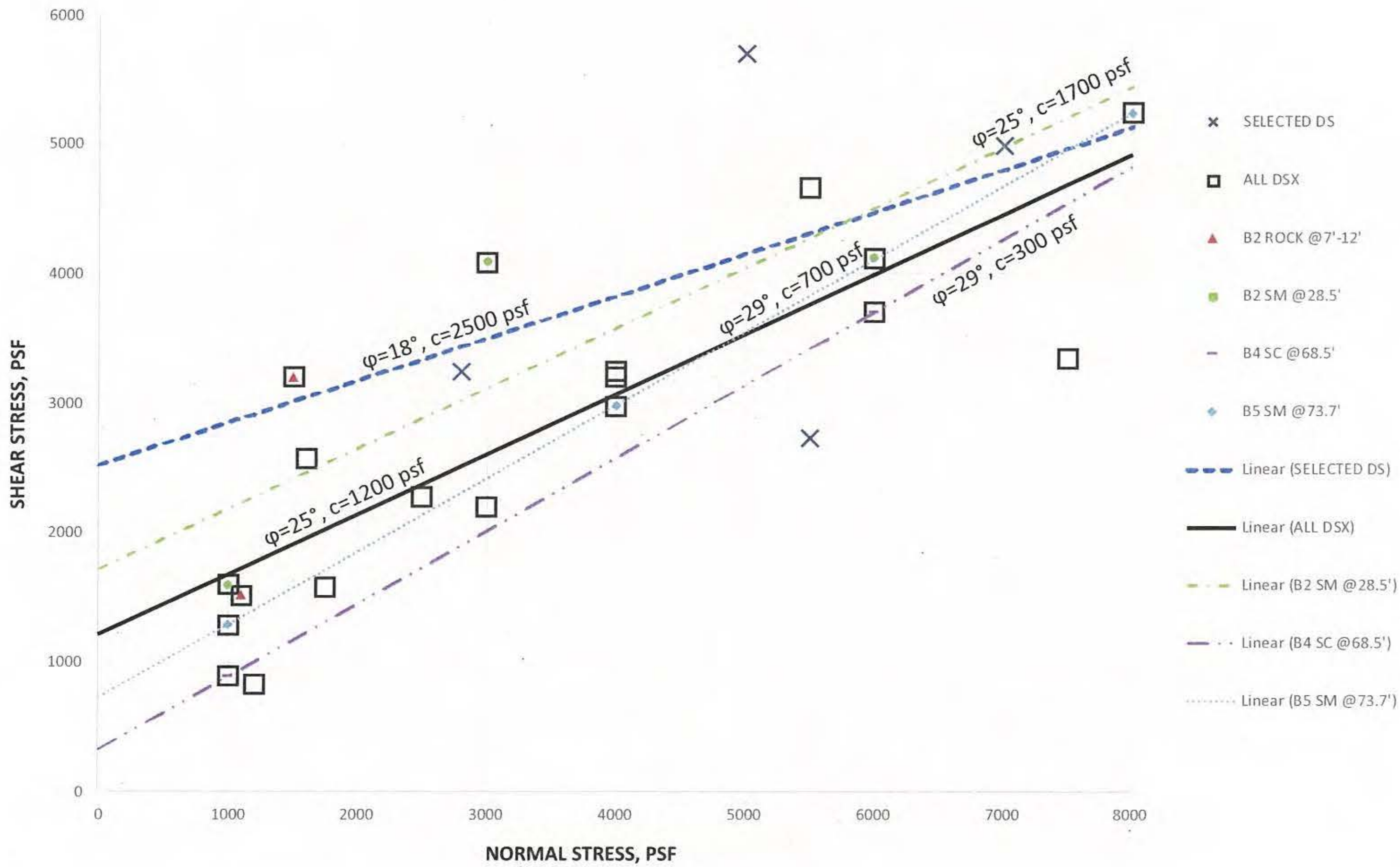
ATTERBERG LIMITS

DATE: April 2019

JOB NUMBER: STEVE-18-03

PLATE 17

BAGG ENGINEERS



ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
NEW SETTLING POND
STEVENS CREEK QUARRY
12100 STEVENS CANYON ROAD
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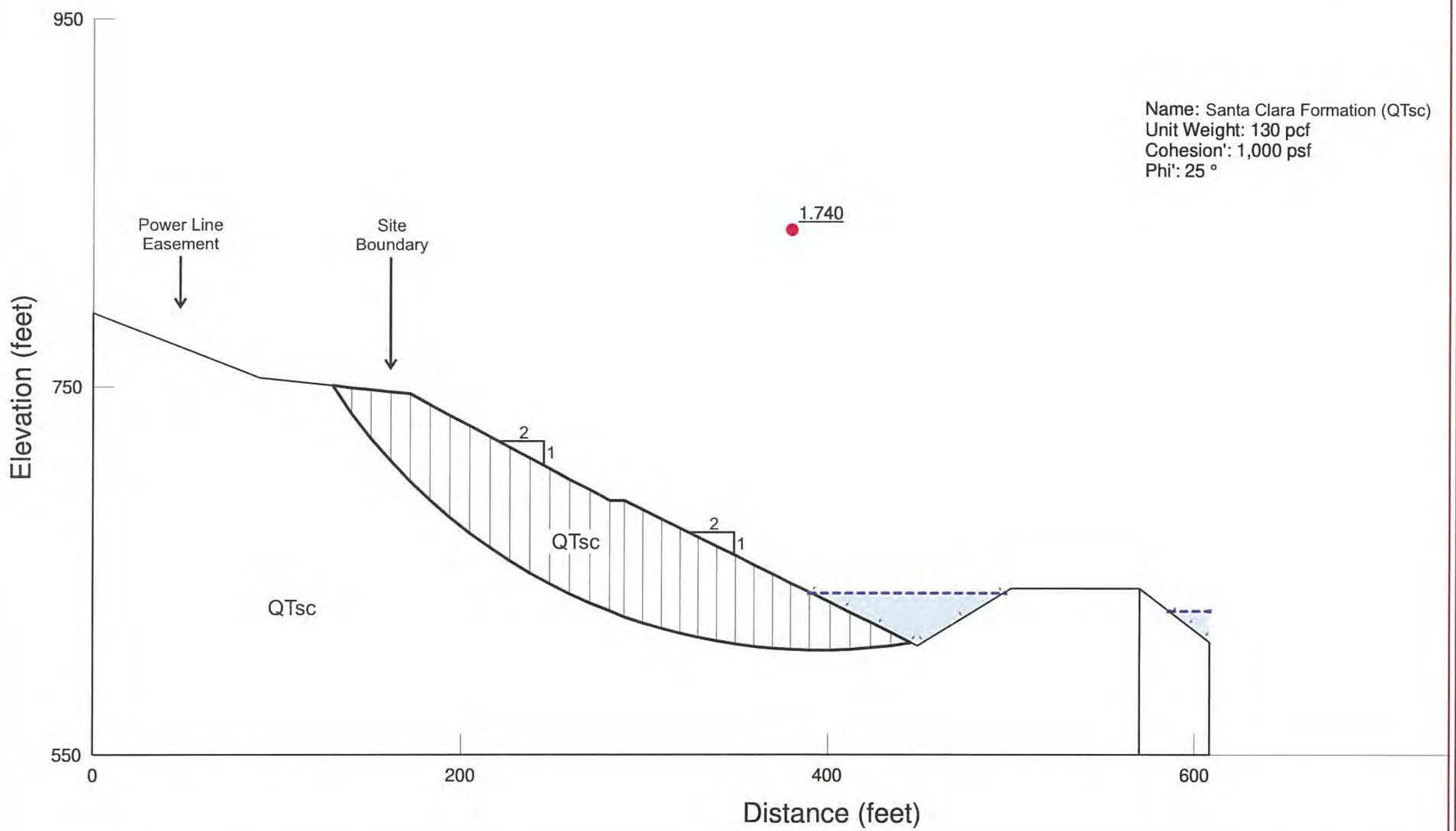
BAGG ENGINEERS

DIRECT SHEAR TEST PLOTS

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	18

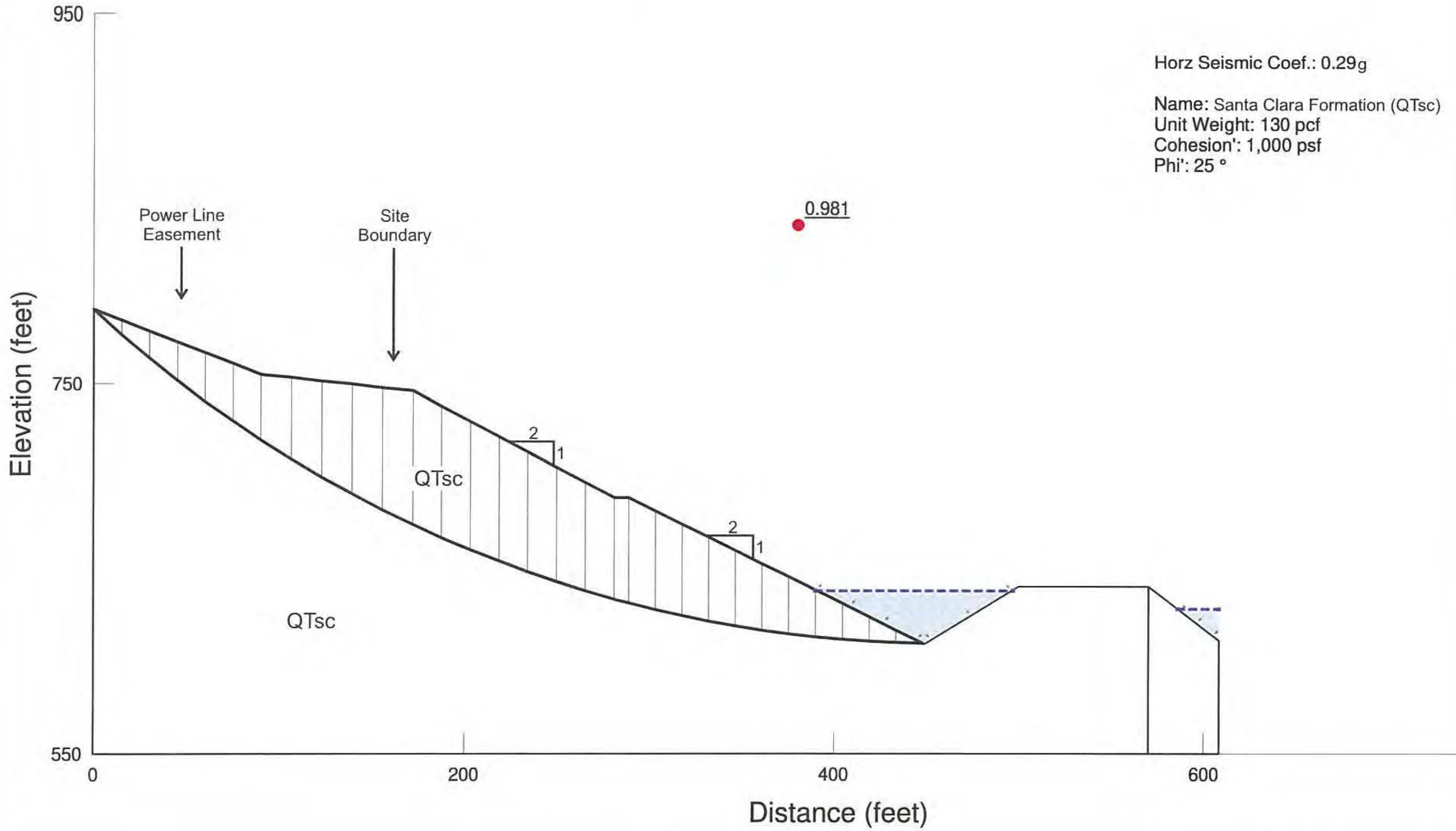


ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
NEW SETTLING POND
STEVENS CREEK QUARRY
12100 STEVENS CANYON ROAD
CUPERTINO, CALIFORNIA

BAGG ENGINEERS

SLOPE STABILITY ANALYSIS
CROSS SECTION A-A', STATIC

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	19

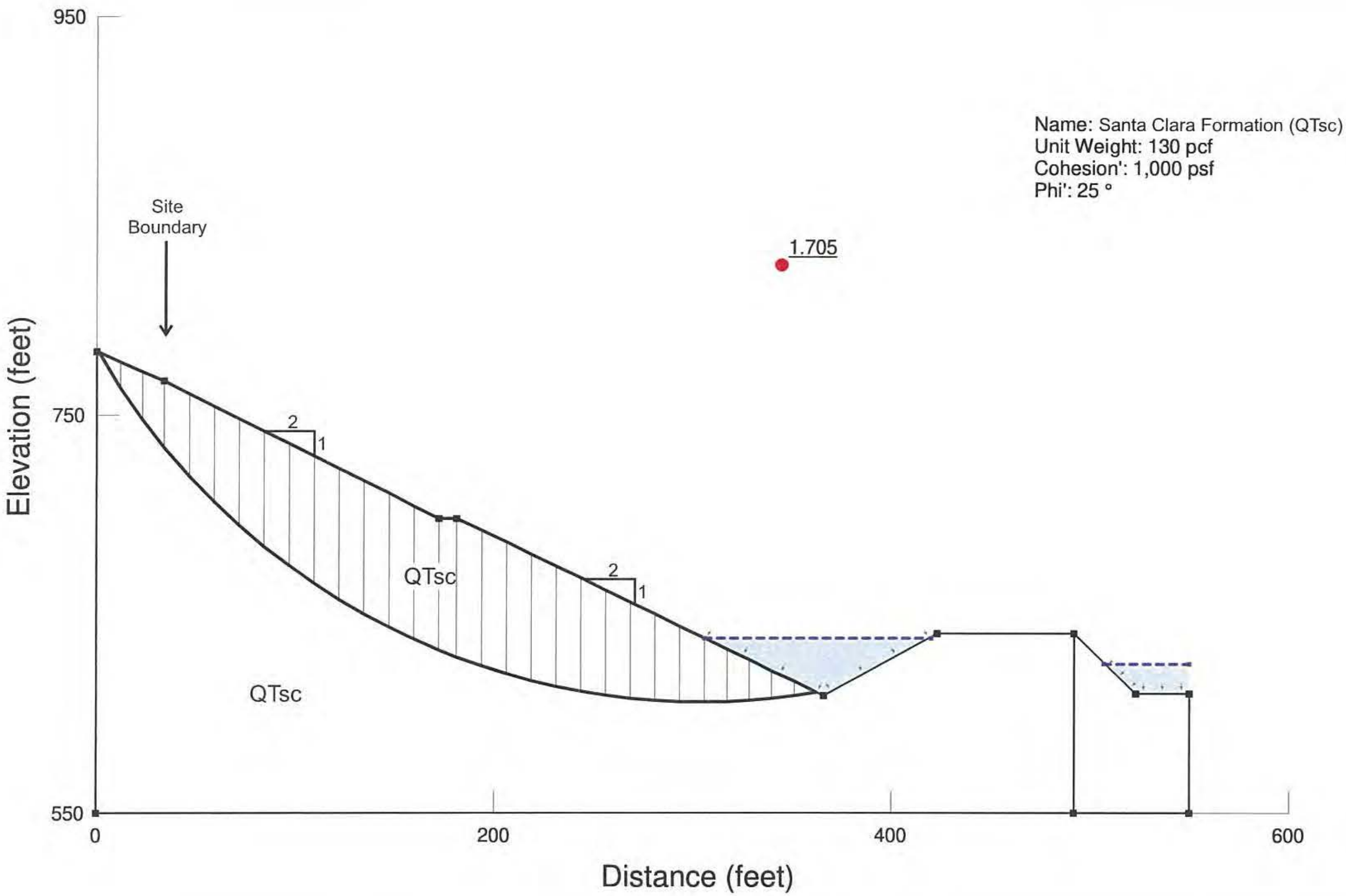


ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
NEW SETTLING POND
STEVENS CREEK QUARRY
12100 STEVENS CANYON ROAD
CUPERTINO, CALIFORNIA

BAGG ENGINEERS

SLOPE STABILITY ANALYSIS
CROSS SECTION A-A', PSEUDO-STATIC

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	20



ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
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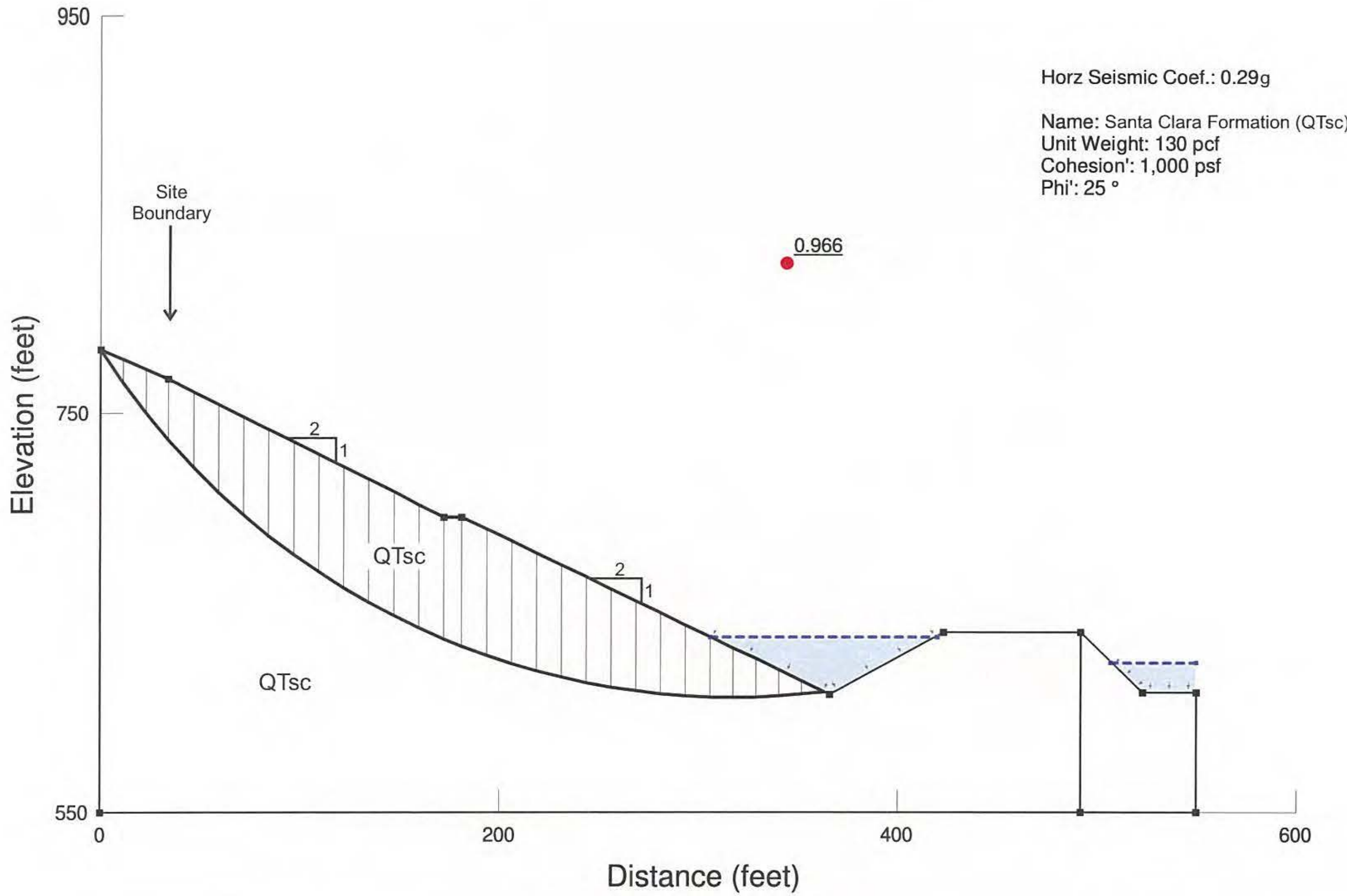
BAGG ENGINEERS

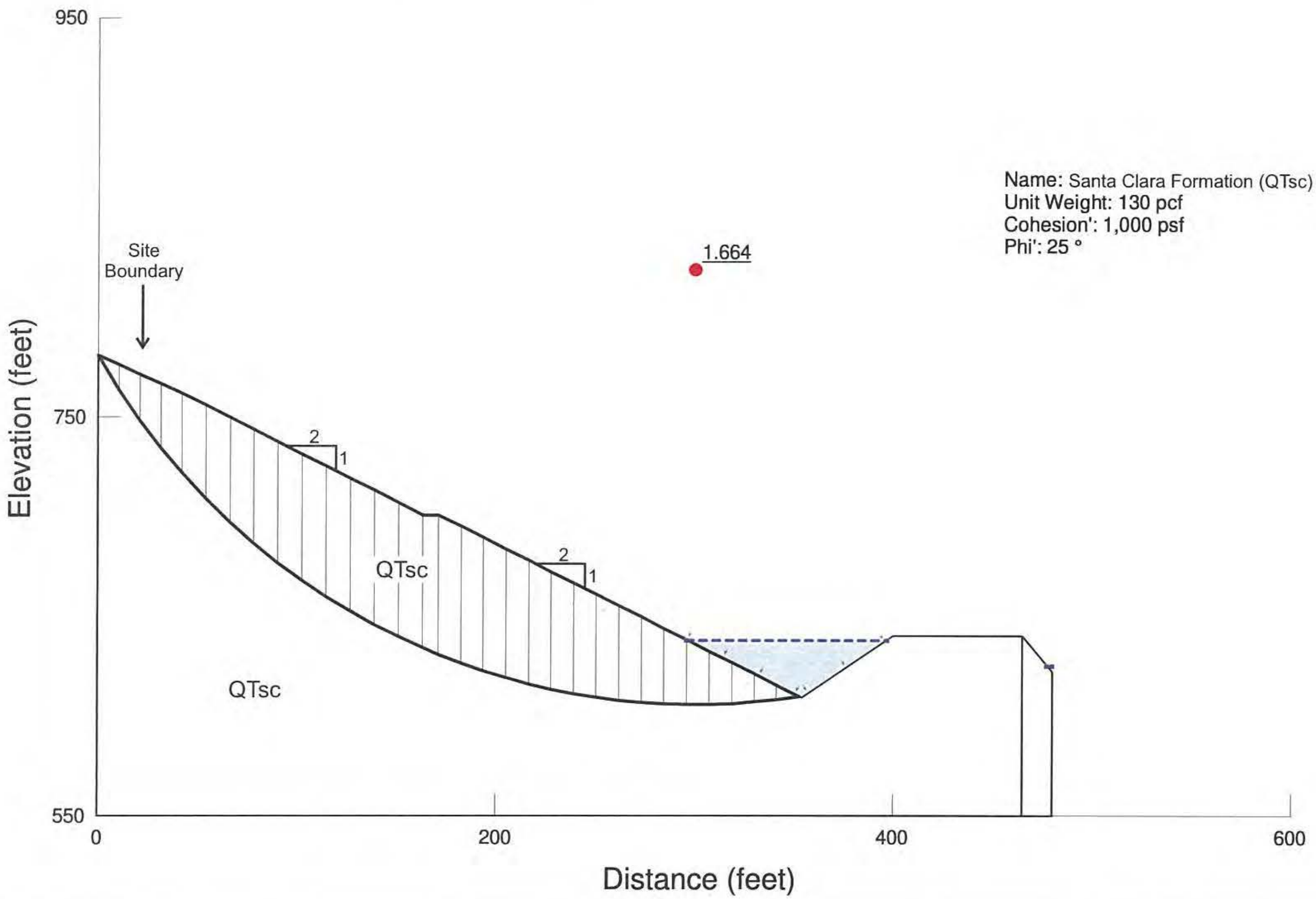
SLOPE STABILITY ANALYSIS
CROSS SECTION B-B', STATIC

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	21



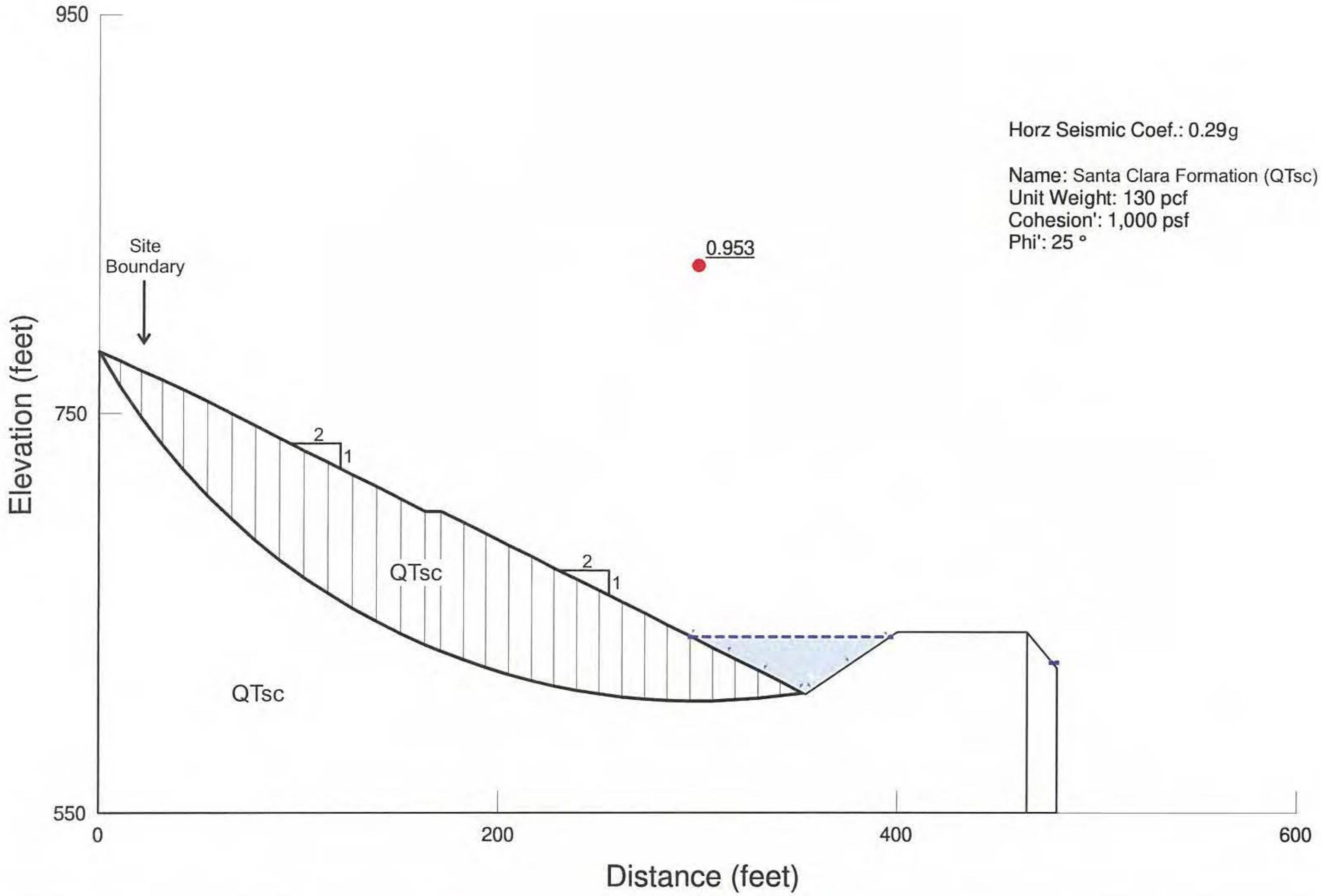
ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION NEW SETTLING POND STEVENS CREEK QUARRY 12100 STEVENS CANYON ROAD CUPERTINO, CALIFORNIA	BAGG ENGINEERS	SLOPE STABILITY ANALYSIS CROSS SECTION B-B', PSEUDO-STATIC

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	22



ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION NEW SETTLING POND STEVENS CREEK QUARRY 12100 STEVENS CANYON ROAD CUPERTINO, CALIFORNIA	BAGG ENGINEERS	**SLOPE STABILITY ANALYSIS CROSS SECTION C-C', STATIC**

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	23



ENGINEERING GEOLOGIC AND GEOTECHNICAL EVALUATION
NEW SETTLING POND
STEVENS CREEK QUARRY
12100 STEVENS CANYON ROAD
CUPERTINO, CALIFORNIA

BAGG ENGINEERS

SLOPE STABILITY ANALYSIS
CROSS SECTION C-C', PSEUDO-STATIC

DATE:	JOB NUMBER:	PLATE
April 2019	STEVE-18-03	24

Important Information about This

Geotechnical-Engineering Report

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

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

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

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

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

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

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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