GROUP DELTA

73713

Riley Realty, LTD
11601 Wilshire Boulevard, Suite 1650
Los Angeles, CA 90025

February 12, 2015
GDC Project LA-1183E

Attention: Mr. Greg Beck

Subject: RESPONSE TO CITY OF LOS ANGELES GEOLOGY CORRECTION LETTER #85579
Reference: Fault Activity Investigation
Yucca-Argyle Apartments - Champion Site
SE Corner of Yucca Street and Argyle Avenue
1756 and 1760 Argyle Avenue
Hollywood District, City of Los Angeles, California

Dear Mr. Beck:

GROUP DELTA CONSULTANTS, INC. (GDC) is pleased to respond to the 11 items in the City of Los Angeles Department of Building and Safety (**LADBS**) Geology Report Correction Letter dated September 7, 2014, for the 1756 and 1760 Argyle Avenue site (copy attached). For this response, GDC completed supplemental field exploration. GDC briefly describes the additional field work, followed by a specific response to the to each item listed in the Correction Letter.

SUPPLEMENTAL FIELD INVESTIGATION

GDC logged three bucket auger borings, three coreholes and one fault trench in the eastern part of the Champion site (Plate 1, attached) to confirm the presence, character, and activity level of small-displacement, anticline-related faults found in the Champion West Trench (Plates 1 and 10) and in a trench north of Yucca Street (Plate 1). GDC now demonstrates that the faults are bending-moment and small-scale shear faults associated with the folding of the Yucca Street Anticline, which ceased prior to middle to late Pleistocene time.

Locations of the explorations are shown on Plate 1 and the logs of the three bucket auger borings (BA-1, BA-2, and BA-3) and three coreholes (B-6 through B-8) are attached in Appendix A. To assess local fault activity, GDC graphically logged BA-3 (Plate 8A). The east wall of the supplemental trench (Champion East Trench), approximately 30 feet long and up to 10 feet deep, was graphically logged at a scale of 1 inch equals 2 feet (Plate 8A; Photograph 1). Dr. R.J. Shlemon, (Appendix B, attached) logged a representative soil-stratigraphic section at Station 19 of the trench, using soil stratigraphy techniques and obtained a minimal age of approximately 135ka for unbroken upper older alluvium [Qaol(u) in Figure 10] overlying the anticline-related faults.

GDC informally describes the "upper older alluvium" as rubified, poorly sorted sand, silt and clay supporting angular to sub-angular gravel. The deposit is similar to the regionally extensive mud flow (Qm) identified in and near the west adjacent Yucca site (GDC, 2014a).

Two GDC bucket auger borings (BA-1 and BA-2) in the eastern part of Champion encountered only Holocene alluvium ostensibly laid down in the east-adjacent Beechwood Canyon. In contrast, the Champion East Trench and the third bucket auger boring (BA-3), about 5 feet west of the trench, provided the geological information to assess that the anticline-related faults are pre-Holocene, and thus validated previous GDC geologic interpretations of local fault activity levels (GDC, 2014a, 2014b, 2014c). BA-3 was placed near the divide between Beechwood and Argyle Canyons where the oldest remnant alluvium and soils were most likely preserved.

BA-3 exposed about eight feet of upper Pleistocene, upper older alluvium (>~135ka) overlying lower older alluvium (>~300ka). A fault trending east-northeast intercepts the boring at about seventeen feet and is truncated by upper older alluvium (Photograph 2; Plate 8A). It trends N76E and dips about 74SE, and thus trends toward the Champion East Trench, where it passes beneath unfaulted upper older colluvium.

The Champion East Trench and Boring BA-3, together exposed folded and faulted lower older alluvium overlain by intact upper Pleistocene upper older alluvium and colluvium deposits (Figure 10). Because the faulted lower older alluvium is now demonstrabley overlain by unbroken approximately 135ka soils and overlying sediments, last displacement occurred before the Holocene time and such faults are therefore "not active".

CORRECTION LETTER RESPONSES

The following lists the LADBS Correction Letter items with each followed by the GDC response:

Item 1:
Provide a detailed geologic map for the site and immediate vicinity at a sufficient scale to clearly show the following features:

a. *The approximate contacts all of the geologic units just below the fill cap.*
b. *The extent of the faults to where they are estimated to be buried or truncated by Pleistocene deposits.*
c. *Geologic attitudes (bedding, faults, other features), including those from the eastern trench of Site 2. Clarify the structural symbols shown from the trench on Site 4 and differentiate between joints and faults. Symbols typically used for foliation are shown.*
d. *Borings, CPT's and trenches.*
e. *Groundwater depths (with dates of reading).*

Response:
Regarding Items 1a through 1e, Plate 1 and Figure 12 (in pocket) include the information requested, including the latest supplemental geological information. The geologic contacts are shown on Figure 12. The borings, CPT's, trenches and ground water depths are also displayed on Figure 12.

Item 2:
Provide a separate updated fault map of the site area, based on the data obtained from this and the nearby investigations. It is recognized that the possible locations of offsite faults can only be approximately shown.

Response:
Figure 13 (attached) is a "Local Fault Map." The map is compiled from information obtained by GDC (2014a, 2014b, 20014c, and this study), local proprietary reports, and relevant published geological literature. It is realized that the map is generalized and is also subject to change as new geologic information is developed.

Item 3:
Include core run numbers and percent recovery on the boring logs. Describe the inclinations of the various lithologic contacts, bedding planes, and other structural features observed. Discuss how the angle of the contacts and bedding planes may relate to the folding documented onsite.

Response:

The boring logs show the run numbers for each borehole. The percent recovered from each boring is on average 80 – 100 %.

The retrieved cores, remembering that the cores are not oriented with respect to north, do yield some useful structural clues. Also, particularly when dealing with the Pleistocene lower older alluvium, upper older alluvium and mudflow units, structural analysis depends to a great degree on the identification of physical characteristics of the various strata (e.g., texture, color, clay/gravel content, and weathering).

Internal stratification of the three Pleistocene units varies from moderately-very distinct (particularly in the lower older alluvium) to indistinct. Typically, the internal stratigraphic boundaries within the mudflow and upper older alluvium are neither planar nor do they part easily. Their active alluvial/fluvial depositional environments gave rise to abundant cut-fill and other erosion-related structures, inclined initial dips, and a large number of beds of sands and gravels that do not bear distinctive lithology useful for internal stratigraphic correlation. The internal bedding is best observed in the GDC trenches. Nonetheless, in some CPT-core hole cross-sections, internal bedding is recognizable enough that CPT signatures, combined with borehole information, strongly infer individual strata within the upper Pleistocene deposits that can be followed some distances.

In contrast, owing to internal compositional and textural differences, the unconformable contacts separating the mudflow, upper older alluvium and lower older alluvium and the Modelo Formation are usually quite distinct and recognizable in the core samples and CPT-soundings, permitting analysis of the local structural regime. For example, in the GDC cross-sections the mudflow and upper older alluvium units are in mild angular unconformity with the underlying lower older alluvium. In turn, these are usually in moderate to strong angular unconformity with the Miocene Modelo Formation. The *lower* older alluvium and Modelo Formation are warped upward and faulted along the Yucca Street Anticline, whereas the *upper* older alluvium and mudflow deposits are not deformed, as portrayed in the CPT-borehole transects.

The Modelo Formation along Argyle Avenue is in distinct angular conformity with the overlying less steeply dipping Pleistocene older alluvium and mudflow deposits. Much of the Modelo deformation thus occurred long before deposition of the Pleistocene units. The lower older alluvium, although gently to moderately warped, is not deformed to the degree of the underlying Modelo Formation that lies near vertical north of Yucca Street, as shown by GDC (2014a). Recent tectonic-geomorphic and soil-stratigraphic analyses indicate that warping of the older alluvium began sometime (~300ka) after its deposition and consolidation, and ceased prior to deposition of the superjacent upper older alluvium and mudflow sediments. Using the soil-stratigraphic and geomorphic analyses, the folding ceased prior to, minimally, 135ka, and likely much earlier.

The Dibblee and Ehrenspeck (1991) map of the Hollywood fault shows steep and even overturned bedding near the intersection of Vine Street and Franklin Avenue, near their Hollywood fault. Similarly, the GDC interpretation of the Argyle Avenue-Green-Champion geological information does permit a north-side up left oblique fault to the north as inferred from the steeply dipping Modelo Formation and the trend and style of the of the Yucca Street Anticline (GDC, 2014c).

It is thus inferred that the traditionally mapped trace of the Hollywood fault lies north of the study site. Its precise location awaits further regional exploration by others. In sum, Figure 12 shows the GDC geologic interpretations based on the literature, tectonic-geomorphic assessment and recent detailed subsurface investigations.

CPT/core hole transects do indicate a strong stratigraphic discontinuity near Vine Street about due west of Carlos Avenue that is south of the study site. This is inferred to be a concealed, pre-Holocene fault that seemingly extends to the east and passes near the base of the south-facing slope south of the Champion site. See the response to Item 8 for further discussion.

Item 4:
Show the location of B-4, where bedrock was encountered at 20 feet.

Response:
B-4 was refused at 36 feet owing to cobbles/rocks. Also, the older alluvium was misidentified as Modelo Formation. The recovered core samples of B-4 are clearly older alluvium, while Modelo

Formation was logged at 20 feet. B-4A was then drilled adjacent to B-4 and encountered Modelo Formation at 38 feet.

Cross-Section G-G' used the log of B-4A. The map and cross-section show the correct boring numbers.

Item 5:
The report indicates that the faults observed have normal displacement (hanging wall down) and are likely to be local "bending moment" structures that are typically not through-going, relatively shallow, and non-seismogenic. However, observations documented on the trench log indicate the bedding thicknesses and patterns do not match that well across all of the faults. This suggests a significant amount of lateral slip that could have occurred. In addition, the angle of some faults seem low for shallow normal faults (see stations 81 to 88 of Plate 8). Provide additional discussion regarding the fault origins and tectonic setting base on these observations.

Response:
GDC (2014a, 2014b) first modeled the local Yucca Street Anticline as a possible shear fold caused by stress along a left-oblique fault, perhaps north of the study site. The steepening of the Modelo Formation to the north that is consistent with the Dibblee and Ehrenspeck (1991) interpretation of a major fault near Franklin Avenue and from the work of others (e.g., Dolan and Rockwell, 2000) supports that interpretation.

The bending-moment faults exposed at the Champion and Green sites characteristically indicate fold-crest dilation as a prime causation. The City of Los Angeles (2014) subsequently pointed to some stratigraphic mismatches across faults that strongly suggest lateral slip. GDC concurs with these observations as noted below.

Such faults with small-scale lateral components are permitted in the GDC model. For example, the Yucca Street Anticline is in a generally left-oblique transpressional stress field, as exemplified by the Hollywood fault. Also, its trend is consistent with the much-cited classical strain ellipsoid of a left-lateral system (Figure A, referenced report). Thus, one alternative of causation is that the anticline stems from left-lateral shear, perhaps related to the Hollywood fault that historically has been mapped north of the study site. In sum, both lateral and bending-moment components are consistent with its now-ceased tectonic movement. These are thus shear faults resultant from past stress responsible for the now-inactive Yucca Street Anticline.

Additionally, as a *local* structural model, the GDC interpretation is viable, because when tested at this site and at the Green site north of Yucca Street (study in progress) results were predictable and repeatable. For example, based on the model, GDC recently placed one trench and three borings at the Champion site and two trenches at the Green site. Exposed at the Champion site near the crest of the Yucca Street Anticline were a predicable north-dipping fault and very gently

south-dipping beds of lower older alluvium. At the Green site, south-dipping faults and gently north-dipping beds were encountered. The faults on both sites were clearly capped by *unbroken* Pleistocene upper older alluviums, as predicted by the GDC model. Again, this is an interpretation applicable to a small area, as detailed regional geological information is sparse.

Although GDC currently interprets the anticline to be a shear fold related to transpression along a left-oblique fault, another viable alternative based on the regional compressional structural pattern (for example, Dolan and others, 1997), is that the anticline and the fault discussed in Item 8, below, are pre-Holocene elements of a perhaps regional south-vergent thrust system. Nonetheless, either alternative allows the GDC interpretation.

The appearance of low dips on Cross-Section H-H' (Plate 10 of referenced report) in part reflects apparent dip in the line of section. The orientation of the fault at Station 0+88 is also likely influenced by the direction of local shear and the shear characteristics of the rock itself.

Item 6:
The exploration was conducted only in the western portion of the site. Additional data used from other Group Delta investigations were located to the west and north. The geologic conditions of the eastern part of the site are poorly defined. In addition, the 1926 topography (USGS 1926 topographic map of the Burbank Quadrangle; available online) shows the highest part of the ridge on which the site is located trends north-south along Argyle Avenue at the western edge of the site. The natural topography descends toward the east. Therefore, it may be possible to obtain valuable information regarding overlying sediments of potentially intermediate age, similar to the Quds and Qm of the Site 2 investigation.

The Department recognizes the difficulty of thoroughly exploring an urban site that is essentially covered by existing structures and surrounded by streets and buried utilities. As such, the exploration conducted so far on all of the combined Group Delta investigations is considered a very high standard and an extraordinary effort to assess the faults in the area. However, the site has been found to be located on potentially complex neotectonic structure. As discussed in Comment 5, at least some of the faults on the site display evidence of having significant lateral slip. Previous study by Dolan (2000) as referenced in the report, indicates lateral slip as the predominant behavior of the Hollywood fault. Offsite data indicate these fault do not extend to the west. Given the typical complexity of strike-slip fault zones, including en echelon *patterns, folds related to step-overs of major splays, etc.; and lack of direct observation of where these faults terminate, further investigation to the east appears warranted.*

Response:
GDC (this study) undertook a supplemental investigation of the east part of the Champion site. The investigation included three bucket-auger borings and one fault trench placed as shown on Plate 1. Siting of the excavations was based on the GDC structural interpretation of the presence of an east-southeast-trending anticline crest and associated shear and bending-moment faults. The bucket auger borings were primarily excavated to locate sections of uppermost Pleistocene deposits that would be useful for dating the last slip of the anticline-associated faults in the eastern part of the study site. After identifying such deposits, GDC placed a north-trending trench (Champion East Trench) roughly perpendicular to the faults trends extrapolated from the Champion West Trench as shown on Plate 12 with the purpose of intercepting such faults and documenting their existence and activity level.

The trench, about thirty feet long and up to nine feet deep, exposed a well-stratified section of upper older alluvium replete with relict and buried paleosols. Using soil-stratigraphic techniques, R.J. Shlemon (Appendix B) identified a buried paleosol that he judged to represent ~35k capping a section of the mudlfow deposits within the upper older alluvium, and a relict paleosol estimated to represent ~100k years mantling deposits above the buried paleosol. In sum, Shlemon judged the approximately nine feet of sediments exposed in the Champion East Trench to be a minimum of ~135ka based solely on pedogenic development, not including the time span for accumulating the parent deposits.

The well-stratified trench deposits are intact (not broken by faults). BA-3, about five feet west of the trench, provided the geological information regarding age of the anticline-related faults. That boring (approximately 44 feet deep), penetrated both the upper older alluvium and the subjacent folded upper Pleistocene lower older alluvium. Water was encountered at about 36 feet and equilibrated to that depth. The upper 36 feet were downhole observed and logged by geologists with GDC and by the City Technical Reviewers. An easily identifiable, mainly normal fault entered the boring at approximately 17 feet and is truncated by unbroken older colluvium at about 10 feet (Plate 8A; Photograph 2). The fault trends N76E and dips 74SE. Reasonable projections of the anticline-related fault intercept the East Champion Trench as shown on Plates 1 and 14, yet the ~135ka (minimum) sediments are not broken. Thus, the boring and the trench combine to bear witness to the absence of Holocene slip along the anticline-related faults.

In Boring BA-3, the fault vertically separates (normal slip) beds of lower older alluvium 1.8 feet at 13-17 feet with minor lateral slip as evidenced by the slight stratigraphic mismatch. A bed at about 10 feet is vertically separated by about 2 inches. Thus, at least two Pleistocene slip events are recorded with the last imparting about 2 inches of separation.

In sum, the fault in BA-3 passes beneath the unfaulted upper older alluvium of the Champion East Trench judged to be minimally 135ka. Both the boring and the trench provide good evidence that the fault is not active according to City policies. GDC obtained similar results from a trench study north of Yucca Street that demonstrated that similar anticline-related faults of the same system are not active.

The recent investigation of activity levels of the anticline-related faults show them to be pre-Holocene and greater than 135 to 150ka. This agrees with earlier studies (GDC, 2014b, 2014c) which indicate that if step-over structures are extant at Champion, they are pre-Holocene. Available information indicates that if the Argyle and Yucca strands of the Hollywood fault do exist, they are clearly pre-Holocene and thus not indicators of an active step-over zone. *Further, the recent GDC investigations strongly suggest that the fault mapped by this firm and others (for example California Geological Survey, 2014) near the base of the slope between Champion and Carlos Avenue (Figure 12), though not active, extends well west of Argyle Avenue and thus likely precludes a step-over near Argyle Avenue (see Item #8, below).*

In sum, this test of the GDC (2014c) interpretation validates the inactive shear anticline-fault model of this area. The anticline and the associated faults are not active according to Alquist-Priolo definitions.

Item 7:
Figure 5 of the report shows a lineament of truncated ridges north of the site. As indicated in the comment above, the original 1926 map provides a good resource to assess the natural topography of the site area. This topographic map shows several other truncated ridges outside of the lineament. Revise the figure at a more detailed scale that shows all of the truncated ridges in the area, as well other significant geomorphic features. Based on Comment 6, the geomorphology to the east and northeast should be assessed in detail. Show the alluvial fans surrounding the site as well as their source canyons.

Response:
An updated Figure 5, first submitted in the GDC response to City comments on the GDC (2014c) "Yucca" Site report, is attached. Inspection of the figure reveals that the truncations, regardless of causation, are risers within a flight of terraces carved on a rising (relatively) slope. Notice the dissected treads that cap the terrace risers.

Item 8:
Cross section G-G' shows the contact between the Qoal and the underlying Modelo Formation deepening to the south toward the "truncated ridge" which is purported to have an erosion l origin. The bedrock contact and the bedding shown within the Qoal on the cross section suggests

folding. There does not appear to be obvious evidence of an east-west trending drainage that would have produced the resulting lineament. Provide further discussion if this geomorphic feature. Extend Cross Section G-G' further to the south towards Hollywood Boulevard. Research existing geotechnical reports in the area that may provide information on the geologic units present south of the ridge.

Response:
GDC extended Cross-Section G-G' south of the site onto the 6200 project (Plate 1). Reviewing the geological information developed by Geotechnologies (2006) and Lettis and Associates (2006) proved moot. Most of the Geotechnologies borings penetrated only Holocene alluvium likely debouched from Beechwood and/or Argyle Canyons. One boring, their B-1, seemingly encountered rubified clay at about 70 feet that is probably pre-Holocene. Further, LIDAR study by Lettis and Associates, Inc. for the 6200 project was based solely on topography without near-site geological support.

The very tentative and speculative contact between the Holocene and pre-Holocene sediments south of the Carlos Avenue slope is not sufficiently constrained by the Geotechnologies geotechnical data to conclude whether the elevation differences of stratigraphy across the slope stem from fault displacement or reflect transgressive basin edge deposition. Further, as depicted on Cross-Section G-G'-G", the slope has been severely altered by grading through the years, so that its natural morphology is absent, and it is thus not particularly suited to geomorphic analysis.

An investigation of the Millennium project about 650 feet west of Argyle Avenue indicates the possible presence of a fault-like discontinuity that seemingly aligns with the Carlos Avenue escarpment The interpreted fault juxtaposes coarse-grained older alluvium against fine-grained older alluvium on the south. The true stratigraphic separation is not clear nor is direction of slip. Nonetheless, unbroken Pleistocene sediments cap the fault. The fault is thus not active according to Alquist-Priolo requirements.

The transect lines and trenches to 35 feet deep on the east-adjacent Yucca site revealed a thick section of Pleistocene sediments unaffected by the fault. This indicates that slip on the fault occurred prior to deposition of the upper Pleistocene sediments, demonstrating that the fault is not active according to State definitions.

Flow from Argyle Channel has defeated the Carlos scarp southwest of the Champion site. Removal of the scarp further implies inactivity in the Holocene.

The enigmatic bluff south of Champion could be a riser of one of a superjacent flight of terraces carved into the south-facing slope of the interfluve between Argyle and Beechwood Canyons. This flight is most likely a product of climatic sea level and climate change superimposed on a rising block. During stages of high sealevels, the bluffs were carved and subsequently uplifted during the tectonic rise of the Hollywood Hills. Alternatively, but unlikely, the bluff is a fault-line scarp stemming from the subject fault.

Item 9
Revise all Plates to reflect a standard "engineer" scale. This would be very helpful in comparing the interpretive plates and figures with field data.

Response:
The Plates submitted with this transmittal are modified to reflect a standard engineering scale.

Item 10
Correct Cross Section E-E' to reflect the observation from where it intersects the eastern trench of Site 2 (Yucca) and extend it to include the eastern part of the site. Show the typical faulting observed in the Champion trench on the cross-section.

Response:
The cross-section now shows the western area, including the Yucca East Trench, and has been extended east to intercept Boring B-8. Because Cross-Section G-G' lacked control to the east, GDC cut Cross-Section G"-G"' north of Cross-Section G-G' that intercepts and includes the geologic information obtained during the supplemental investigation.

Item 11
Revise the conclusions and recommendations based on the above corrections, if necessary, recommendations are listed in the revised report.

Response:

1. GDC concludes that the recent supplemental investigation adds valuable geological information that supports the conclusions given in the referenced report. That investigation and a supplemental investigation (in progress) of the property ("Green") across Yucca Street from Champion show that the current GDC working model of the local geologic structures is valid, as the results of the two investigation were predictable and replicated. Bedding within the older alluvium south of the Yucca Street Anticline axis dips south and the fault encountered at Champion dips north toward the axis. Conversely, north of Yucca Street, the beds dip north and the faults dip south into the axis. *Most importantly*, at both the Champion and Green sites, the faults are demonstrably capped by unbroken Pleistocene strata at least 135ka to 150ka, and thus are not active according to Alquist-Priolo definitions.
2. The recent work reinforces the earlier GDC conclusion that the site is devoid of Alquist-Priolo-defined active faults
3. GDC thus imposes no constraints on the site owing to the potential for tectonic fault surface rupture.

GDC appreciates the opportunity to provide geotechnical and geological services for this project. Should you have any questions, please call at 310-320-5100.

Yours Sincerely,
GROUP DELTA CONSULTANTS, INC.

Michael F. Mills, CEG, 994
Engineering Geologist Consultant

Michael D. Reader, P.E., GE
CEO, Principal Engineer

Steven H. Kolthoff, CEG, 1965, exp. 8/31/15
Engineering Geologist Consultant

Distribution: Addressee (1), LADBS (3, 1CD)

REFERENCES

California Geological Survey., 2003, "Geology map of the Los Angeles 30x60 degree Quadrangle,"

City of Los Angeles, 2014, Geology report correction letter, Log #85579: Department of Building and Safety, September 17, 2014.

Dibblee, T.W., and Ehrenspeck, H.E., 1991, Geologic map of the Hollywood and Burbank (south 1/2) quadrangles, Los Angeles, California: Dibblee Geological Foundation, Map DF-30, scale, 1:24000.

Dolan, J.F., Sieh, K., and Rockwell, T.K., 2000, "Late Quaternary activity and seismic potential of the Santa Monica fault system, Los Angeles, California," *Geol. Soc. Am. Bull.*, 112, 1559-1581.

Dolan, J. F., Stevens, D., and Rockwell, T. K., 2000a, "Paleoseismologic Evidence for an Early to Mid-Holocene Age of the Most Recent Surface Fault Rupture on the Hollywood Fault, Los Angeles, California," *Bulletin of the Seismological Society of America*, April 2000.

Dolan, J.F., and Pratt, T.L.., 1997, "High-Resolution Seismic Reflection Profiling Of the Santa Monica Fault Zone, West Los Angeles, California," *Geophysical Research Letters*, Vol. 24, No. 16, pp. 2051- 2054.

Dolan, J.F., Sieh, K.E., Rockwell, T.K., Guptil, P., and Miller, G., 1997, "Active Tectonics, Paleoseismology, and Seismic Hazards of the Hollywood Fault, Northern Los Angeles Basin, California," *Geological Society of America Bulletin*, Vol. 109, No. 12.

Dolan, J.F., Sieh, K., Rockwell, T.K., Yeats, R.S., Shaw J., Suppe, J., Huftile, G., and Gath, E., 1995, "Prospects for Larger or More Frequent Earthquakes in the Los Angeles Metropolitan Region, California," *Science*, Vol. 267, pp. 199-205.

Dolan, J.F., and Sieh K., 1992, "Tectonic Geomorphology of the Northern Los Angeles Basin: Seismic Hazards and Kinematics of Young Fault Movement," in Ehlig, P.L., and Steiner, E.A., eds., Engineering Geology Field Trips: Orange County, Santa Monica Mountains, and Malibu, Guidebook and Volume: Berkeley, California, Association of Engineering Geologists, p. B-20-26.

Dolan, J. F., and Sieh, K., 1992, "Paleoseismology and Geomorphology of the Northern Los Angeles Basin: Evidence for Holocene Activity on the Santa Monica Fault and Identification of New Strike-Slip Faults through Downtown Los Angeles," *EOS, Transactions of the American Geophysical Union*, Vol. 73, p. 589.

Geotechnologies., Inc., 2006, "Geotechnical Engineering Investigation, Proposed BLVD6200 Development, 6200 Hollywood Boulevard, Hollywood, CA, File No. 18969," dated August 14, 2006.

Group Delta Consultants, Inc., 2014a, "Fault Activity Investigation," Yucca-Argyle Apartments, 1756 and 1760 Argyle Avenue, Hollywood Area, City of Los Angeles, CA, GDC Project no. LA-1175 A.

Group Delta Consultants, Inc., 2014b, "Fault Activity Investigation," 1756 to 1760 Argyle Avenue, Hollywood Area, City of Los Angeles, CA, GDC Project no. LA-1183 A.

Group Delta Consultants, Inc., 2014c, "Fault Activity Investigation," 1800 Argyle Avenue, Hollywood Area, City of Los Angeles, CA, (Supersedes Previous Version 9/3/14) GDC Project no. LA-1175 A.

Group Delta Consultants, Inc., 2006, "Preliminary Geotechnical Report, Proposed High Rise Residential Development, 6230 Yucca, Street, Hollywood, Ca."

Hernandez, J., Treiman, J., 2014a, "Supplemental, Fault Evaluation Report, FER 253," The Hollywood Fault in the Hollywood 7.5' Quadrangle, Los Angeles County, California: California Geological Survey.

Hernandez, J., Treiman, J., 2014B, "Fault Evaluation Report, FER 253," The Hollywood Fault in the Hollywood 7.5' Quadrangle, Los Angeles County, California: California Geological Survey.

Hoots, H.W., and Kew, 1931, "Geology of the eastern part of the Santa Monica Mountains, Los Angeles County," U.S. Geological Survey map scale 1:24,000.

Lettis and Associates, Inc.,

Sylvester, A.G., 1988, "Strike-slip faults," *Geological Society of America Bulletin*, 100, 1666-1703.

Zolnai, G., 1988, "Continental wrench-tectonic and hydrocarbon habitat: American Association of Petroleum Geologists," Continuing Education Course Note Series, # 30, Nice, France.

CITY OF LOS ANGELES
CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

RAYMOND S. CHAN, C.E., S.E.
GENERAL MANAGER

FRANK BUSH
EXECUTIVE OFFICER

GEOLOGY REPORT CORRECTION LETTER

September 17, 2014

LOG # 85579
SOILS/GEOLOGY FILE - 2
AP

Champion Realty
11601 Wilshire Boulevard, Suite 1650
Los Angeles, CA 90025

TRACT: 10149
LOT(S): 1 and 3
LOCATION: 1756 and 1760 Argyle Avenue

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Geology Report	LA-1183A	09/07/2014	Group Delta
Oversized Doc(s).	"	"	"

The Grading Division of the Department of Building and Safety has reviewed the referenced report that presents a fault rupture investigation at 1756 and 1760 Argyle Avenue for the future devolvement of the property. The site was is currently occupied by 2-story apartment buildings. According to the report, Group Delta is conducting a total of four fault investigations in the site area. The subject site has been designated as "Site 3".

The property is located within a Preliminary Earthquake Fault Zone that was established (January 8, 2012) by the California Geological Survey for the Hollywood fault (on the USGS 7.5 minute Hollywood Quadrangle). A strand of the Hollywood fault ("Argyle Strand") is shown on the State's map to be located just west and south of the property.

The investigation included a transect of CPT soundings and continuous core borings in the west portion of the site and an exploration trench along the western edge. Data from offsite projects (Sites 2 and 4) were also used for the geologic analysis of the site.

The review of the subject report can not be completed at this time and will be continued upon submittal of an addendum to the report which shall include, but not be limited to, the following:

1. Provide a detailed geologic map for the site and immediate vicinity at a sufficient scale to clearly show the following features:

   a. The approximate contacts all of the geologic units just below the fill cap.

b. The extent of the faults to where they are estimated to be buried or truncated by Pleistocene deposits.

c. Geologic attitudes (bedding, faults, other features), including those from the eastern trench of Site 2. Clarify the structural symbols shown from the trench on Site 4 and differentiate between joints and faults. Symbols typically used for foliation are shown.

d. Borings, CPT's, and trenches.

e. Groundwater depths (with date of reading).

2. Provide a separate updated fault map of the site area, based on the data obtained from this and the nearby investigations. It is recognized that the possible locations of offsite faults can only be approximately shown.

3. Include the core run numbers and percent recovery on the boring logs. Describe the inclinations of the various lithologic contacts, bedding planes, and other structural features observed. Discuss how the angle of the contacts and bedding planes may relate to the folding documented at the site.

4. Show the location of B-4, where bedrock was encountered at a depth of 20 feet.

5. The report indicates that the faults observed have normal displacement (hanging wall down) and are likely to be local "bending moment" structures that are typically not through-going, relatively shallow, and non-seismogenic. However, observations documented on the trench log indicate the bedding thicknesses and patterns do not match that well across all of the faults. This suggests a significant amount of lateral slip could have occurred. In addition, the angle of some of the faults seem low for shallow normal faults (see stations 81 to 88 of Plate 8). Provide additional discussion regarding the fault origins and tectonic setting based on these observations.

6. The exploration was conducted only in the western portion of the site. Additional data used from the other Group Delta investigations were located to the west and north. The geologic conditions of the eastern part of the site are poorly defined. In addition, the 1926 topography (USGS 1926 topographic map of the Burbank Quadrangle: available online), shows the highest part of the ridge on which the site is located trends north-south along Argyle Avenue at the western edge of the site. The natural topography descends toward the east. Therefore, it may be possible to obtain valuable information regarding overlying sediments of potentially intermediate age, similar to the Qdf and Qm of the Site 2 investigation.

The Department recognizes the difficulty of thoroughly exploring an urban site that is essentially covered by existing structures and surrounded by streets and buried utilities. As such, the exploration conducted so far on all of the combined Group Delta investigations is considered a very high standard and an extraordinary effort to assess the faults in this area. However, the site has been found to be located on a potentially complex neotectonic structure. As discussed in Comment 5, at least some of the faults on the site display evidence of having significant lateral slip. Previous study by Dolan (2000), as referenced in the report, indicates lateral slip as the predominant behavior of the Hollywood fault. Offsite data indicate these fault do not extend to the west. Given the typical complexity of strike-slip fault zones, including en echelon patterns, folds related to step-overs of major splays, etc.; and lack of

direct observation of where these faults terminate, further investigation to the east appears warranted.

7. Figure 5 of the report shows a lineament of truncated ridges north of the site. As indicated in the comment above, the original 1926 map provides a good resource to assess the natural topography of the site area. This topographic map shows several other truncated ridges outside of the lineament. Revise the figure at a more detailed scale that shows all of the truncated ridges in the area, as well as other significant geomorphic features. Based on Comment 6, the geomorphology to the east and northeast should be assessed in detail. Show the alluvial fans surrounding the site as well as their source canyons.

8. Cross section G-G' shows the contact between the Qoal and the underlying Modelo Formation deepening to the south toward the "truncated ridge", which is purported to have an erosional origin. The bedrock contact and the bedding shown within the Qoal on the cross section suggests folding. There does not appear to be obvious evidence of an east-west trending drainage that would have produced the resulting lineament. Provide further discussion of this geomorphic feature. Extend Cross Section G-G' further to the south towards Hollywood Boulevard. Research existing geotechnical reports in the area that may provide information on the geologic units present south of the ridge.

9. Revise all Plates to reflect a standard "engineer" scale. This would be very helpful in comparing the interpretive plates and figures with the field data.

10. Correct Cross Section E-E' to reflect the observation from where it intersects the eastern trench of Site 2 and extend it to include the eastern part of the site. Show the typical faulting observed in the Champion trench on the cross section.

11. Revise the conclusions and recommendations based on the above corrections, if necessary.

The geologist shall prepare a report containing the corrections indicated in this letter. The report shall be in the form of an itemized response. It is recommended that once all correction items have been addressed in a response report, to contact the report review engineer and/or geologist to schedule a verification appointment to demonstrate compliance with all the corrections. Do not schedule an appointment until all corrections have been addressed. Bring three copies of the response report, including one unbound wet-signed original for microfilming in the event that the report is found to be acceptable.

Daniel C Schneidereit

DANIEL C. SCHNEIDEREIT
Engineering Geologist Associate II

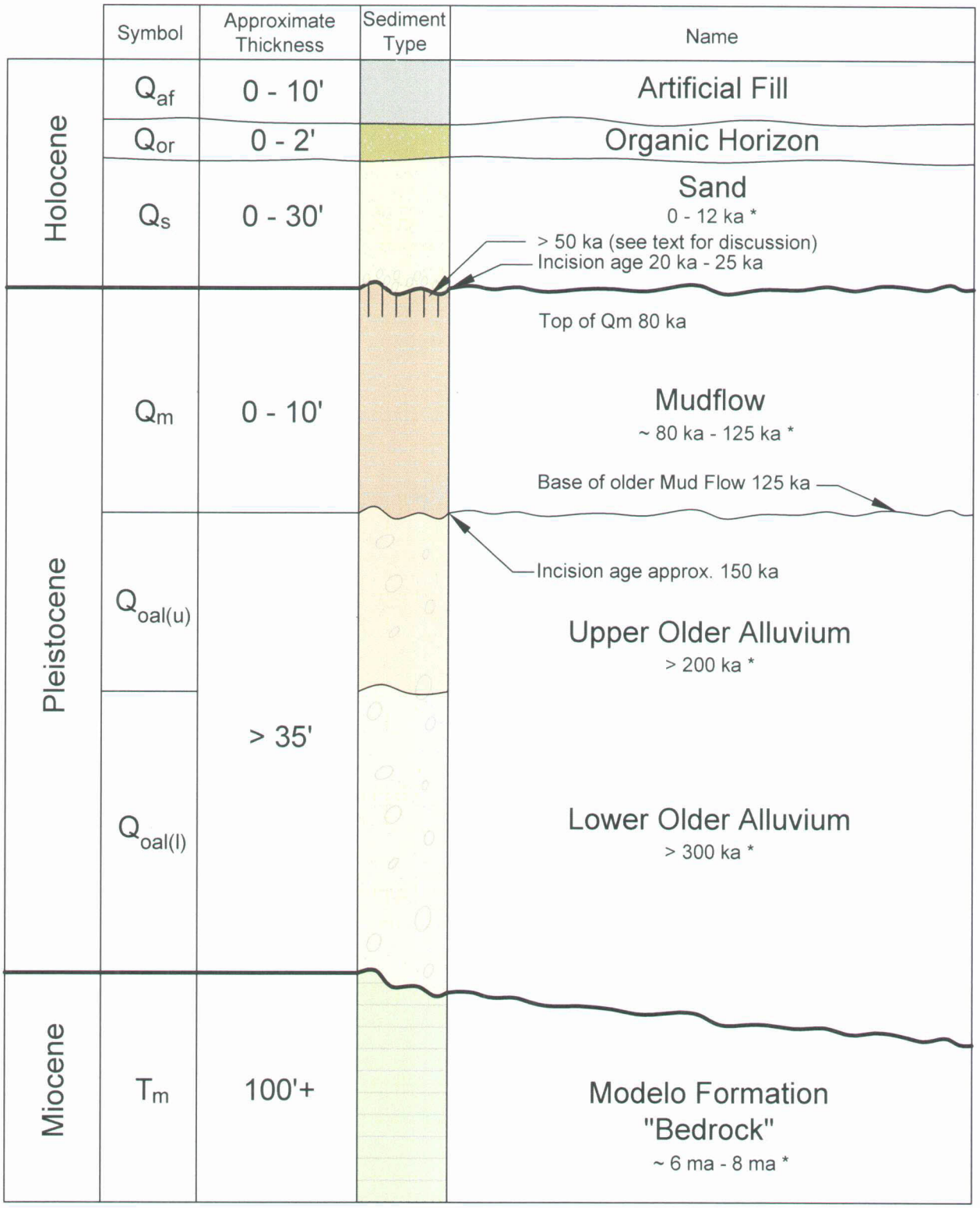
DCS/dcs
Log No. 84148
213-482-0480

cc: Group Delta , Project Consultant
LA District Office

FIGURES

DATE: 4/21/2014	DRAWN BY: KM	GROUP DELTA	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	MAP ILLUSTRATING GEOMORPHIC FEATURES NEAR THE CHAMPION SITE	PROJECT NUMBER: LA1183E
REVISION: 10/31/2014	APPROVED BY: SK				SCALE: NO SCALE
REVISION: 2/6/2015	Modified from GDC, 2014a			CHAMPION SITE	FIGURE NUMBER: 5

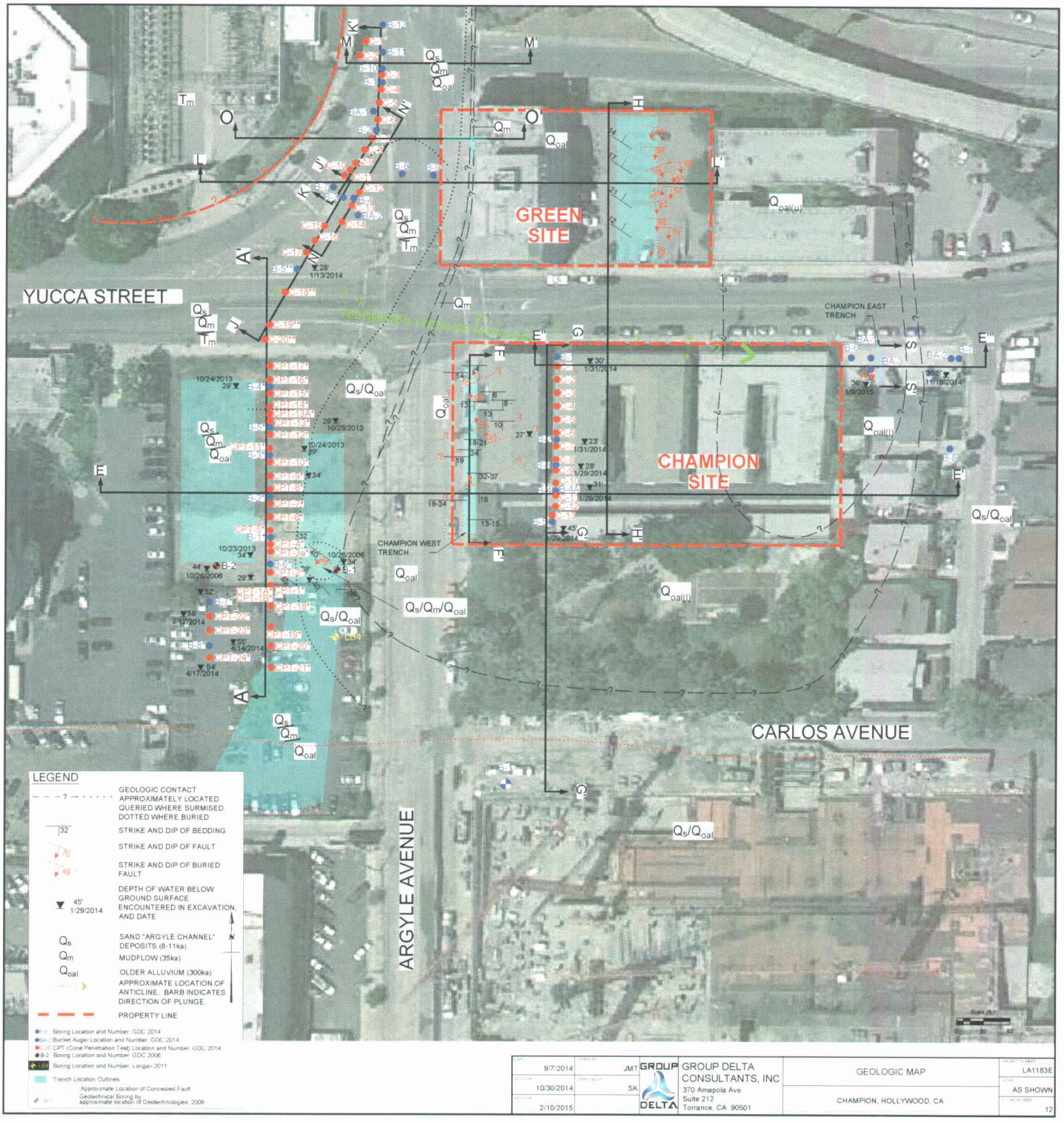
GENERALIZED AERIAL STRATIGRAPHIC SECTION



* *Estimated Geologic Age of Deposits*

Figure 10

Modified from GDC, 2014a

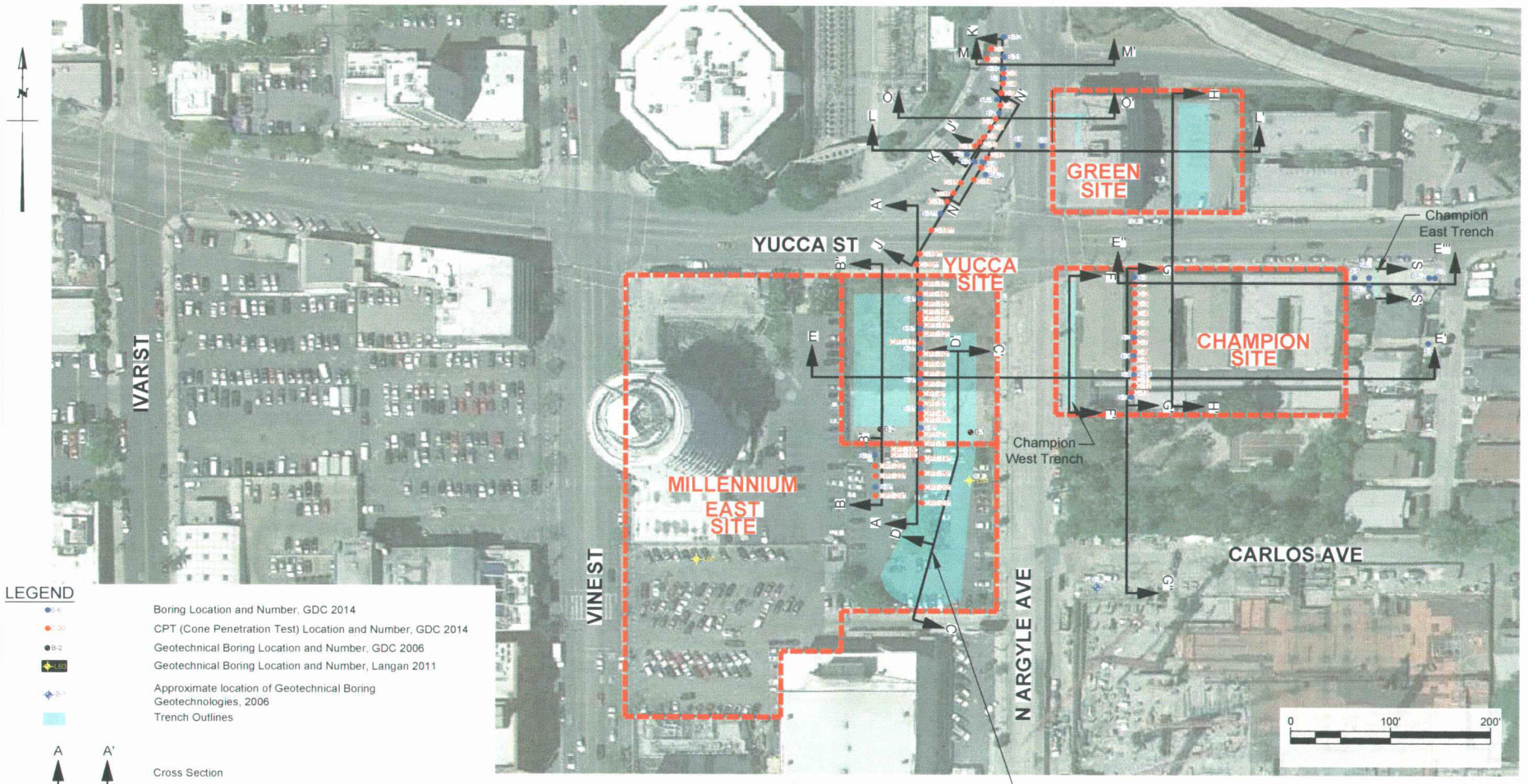


9/7/2014	JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA 90501	GEOLOGIC MAP	LA1183E
10/30/2014	SK			AS SHOWN
2/10/2015			CHAMPION, HOLLYWOOD, CA	12

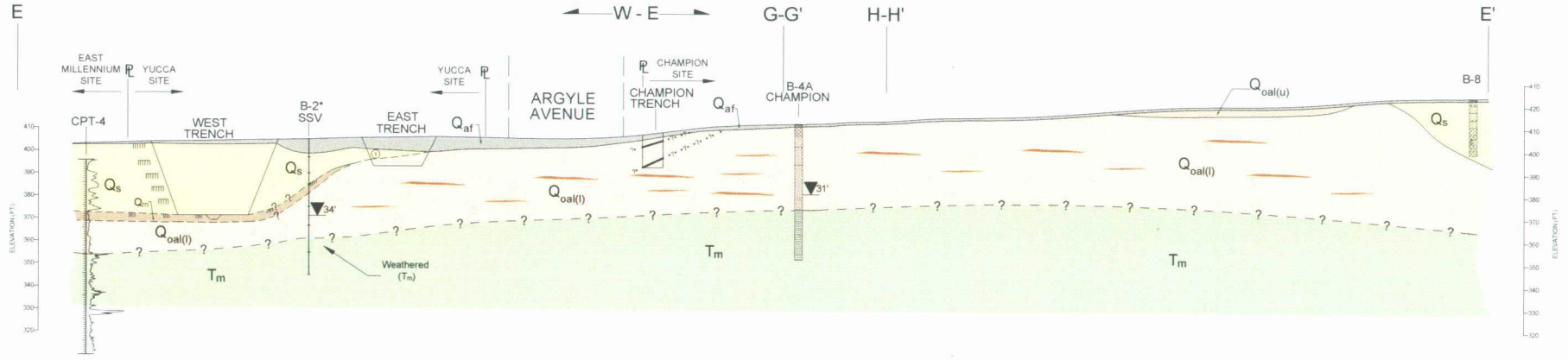
DATE: 4/21/2014	DRAWN BY: JMT	GROUP DELTA	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	LOCAL FAULT MAP	PROJECT NUMBER: LA1183E
REVISION: 10/31/2014	APPROVED BY: SK				SCALE: NO SCALE
REVISION: 2/7/2015				CHAMPION SITE	FIGURE NUMBER: 13

PLATES

Plate 1	Site Plan
Plate 7	Cross Section E-E'
Plate 7a	Cross Section E'-E"
Plate 8a	Cross Section S-S'
Plate 9	Cross Section G-G'-G"



DATE 8/5/2014	DRAWN BY KM	GROUP DELTA	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	BORING, CPT, CROOS SECTION AND TRENCH LOCATIONS	PROJECT NUMBER LA1183E
REVISION 9/4/2014	APPROVED BY MR				SCALE AS SHOWN
REVISION 2/11/2015				CHAMPION SITE	PLATE NUMBER 1



LEGEND

HOLOCENE	Artificial Fill	Q_{af}	
HOLOCENE	Argyle Sand	Q_s	0 -12 ka
HOLOCENE	Mud Flow	Q_m	> 50 ka (see text for discussion) ~ 80 ka -125 ka
PLEISTOCENE	Upper Older Alluvium	$Q_{oal(U)}$	> 200 ka
PLEISTOCENE	Lower Older Alluvium	$Q_{oal(L)}$	> 300 ka
MIOCENE	Modelo Formation "Bedrock"	T_m	~ 6 ma - 8 ma

Geologic contact, dashed where inferred, ? where queried

Representative Faults "Pre-Holocene" dotted where buried

Buried Paleosol

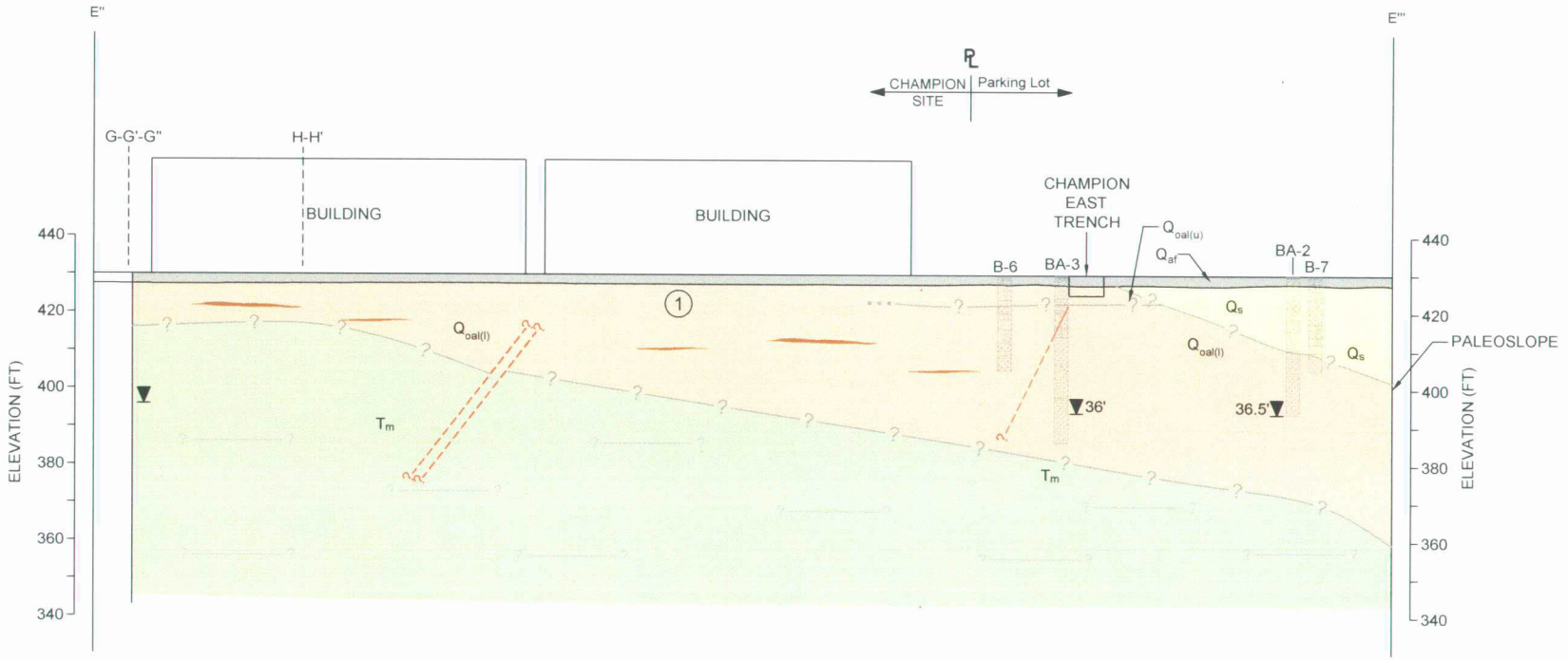
Data interpreted from off site borings and CPT logs to project cross section to the north

① Qm eroded before deposition of Qs, see Plate 4a and Plate 4b

Bedding dips to south

V
30'
15'
SCALE (FT)
0' 15' 30'
H

DATE 8/5/2014	DRAWN KM	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA 90501	CROSS SECTION E-E' (EAST-WEST GENERALIZED)	PROJECT NUMBER LA1183E
REVISION 9/4/2014	APPROVED BY SK			SCALE AS SHOWN
REVISION 2/12/2015	Modified from GDC 2014a		CHAMPION SITE	PLATE NUMBER 7



LEGEND

HOLOCENE	Artificial Fill	Q_{af}	
HOLOCENE	Sand	Q_s	0 - 12 ka
PLEISTOCENE	Upper Older Alluvium	$Q_{oal(u)}$	> 50 ka (See text for discussion)
PLEISTOCENE	Lower Older Alluvium	$Q_{oal(l)}$	> 300 ka
MIOCENE	Modelo Formation "Bedrock"	T_m	~ 6 ma -8 ma

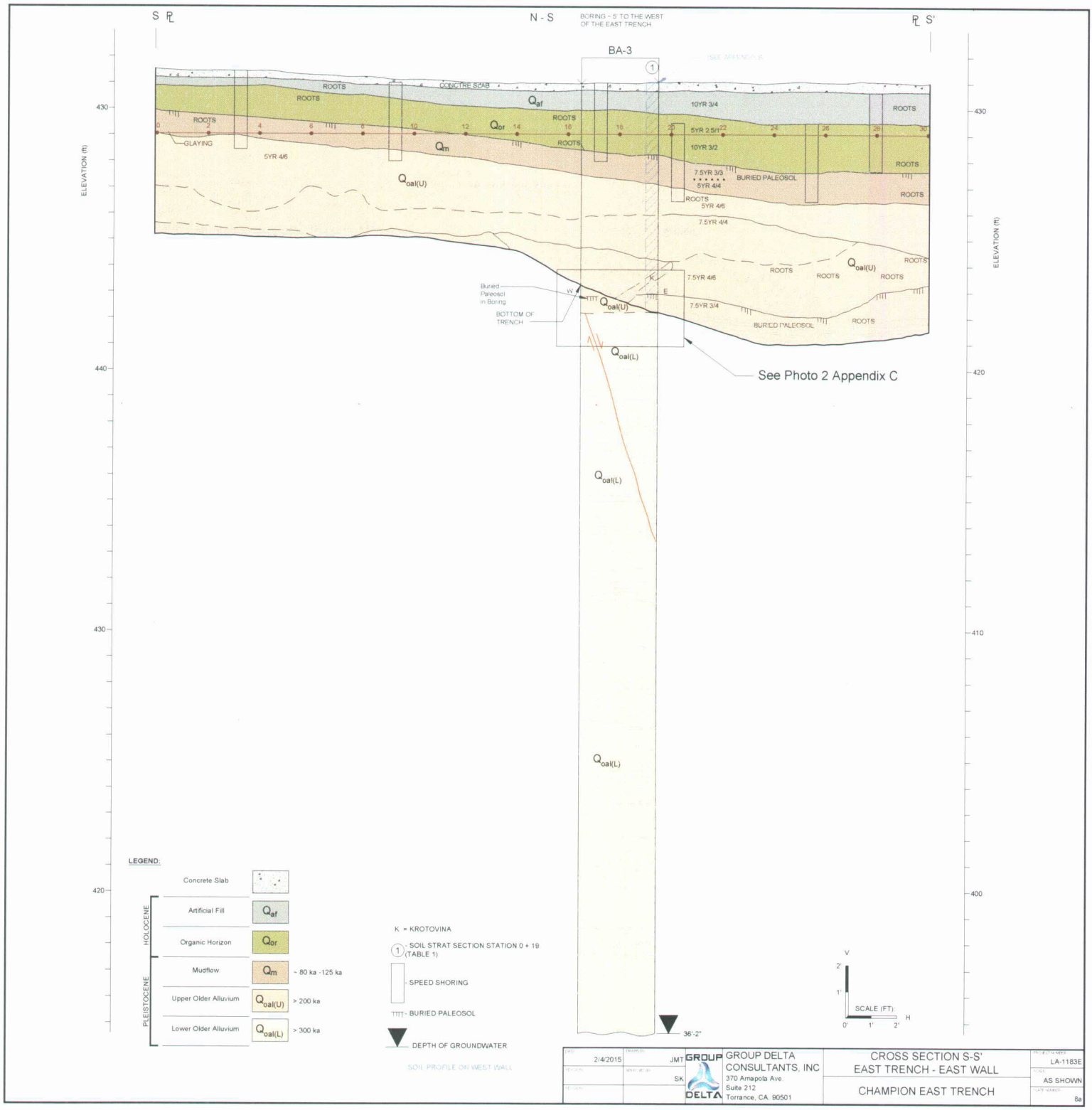
?— — — —? Fault

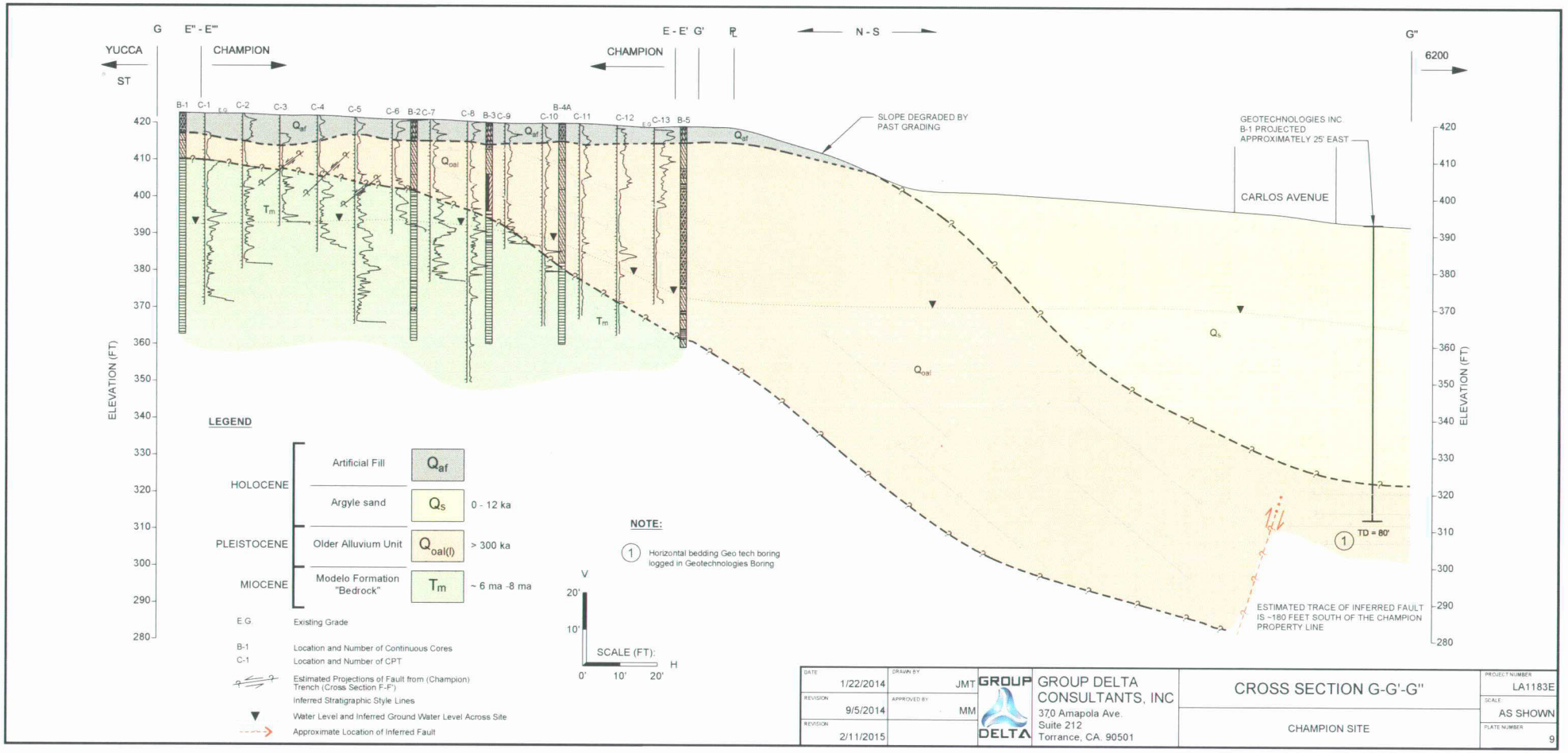
(1) west section of graded $Q_{oal(U)}$ removed

Bedding dips to south

V
30'
15'
SCALE (FT):
H
0' 15' 30'

DATE 2/11/2015	DRAWN BY KM	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	CROSS SECTION E''-E''' (EAST-WEST GENERALIZED)
REVISION --	APPROVED BY SK		CHAMPION SITE
REVISION --	Modified from GDC, 2014a		PROJECT NUMBER LA1183E SCALE AS SHOWN PLATE NUMBER 7a


S
N - S
BORING ~ 5' TO THE WEST OF THE EAST TRENCH
S'
BA-3
SEE APPENDIX B
CONCRETE SLAB
ROOTS
GLAYING
5YR 4/6
10YR 3/4
5YR 2.5/1
10YR 3/2
7.5YR 3/3
5YR 4/4
BURIED PALEOSOL
7.5YR 4/4
7.5YR 4/6
7.5YR 3/4
Buried Paleosol in Boring
BOTTOM OF TRENCH
K
W
E
See Photo 2 Appendix C
ELEVATION (ft)
430
440
430
420
410
400
LEGEND:
Concrete Slab
Artificial Fill
Organic Horizon
Mudflow
Upper Older Alluvium
Lower Older Alluvium
HOLOCENE
PLEISTOCENE
~ 80 ka -125 ka
> 200 ka
> 300 ka
K = KROTOVINA
SOIL STRAT SECTION STATION 0 + 19 (TABLE 1)
SPEED SHORING
BURIED PALEOSOL
DEPTH OF GROUNDWATER
36'-2"
SOIL PROFILE ON WEST WALL
SCALE (FT)
2/4/2015
JMT
SK
GROUP DELTA CONSULTANTS, INC
370 Arnapola Ave.
Suite 212
Torrance, CA. 90501
CROSS SECTION S-S'
EAST TRENCH - EAST WALL
CHAMPION EAST TRENCH
LA-1183E
AS SHOWN
8a



DATE 1/22/2014	DRAWN BY JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	CROSS SECTION G-G'-G"
REVISION 9/5/2014	APPROVED BY MM		CHAMPION SITE
REVISION 2/11/2015			PROJECT NUMBER LA1183E SCALE AS SHOWN PLATE NUMBER 9

APPENDIX A: FIELD EXPLORATION – CPT DATA AND CORE LOGS

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-1
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 1 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 423	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Approximately 3.5 inches of Asphalt **Artificial Fill (Qaf)** **Silty SAND to Clayey SAND**, 7.5 YR 6/8 (Reddish Brown) , dry, fine to medium grained sand, some fine to coarse gravel with cobbles.				
	420												
5		1	1	30/30					**Older Alluvium (Qoal)** **Clayey SAND**, 7.5 YR 5/6 (Strong Brown), humid to moist, fine to medium grained sand, some coarse sand, trace fine gravel and cobbles. **Sandy Clay to Clayey Sand** mottled 5 YR 7/1 (Yellowish red) and 5 YR 7/1 (Light Gray), humid to moist, some fine gravel and coarse sand, well developed soil.				
	415	2		30/30									
10		3	2	30/30									
	410	4		30/30					**Modelo Formation (TM)** **Sandstone, Siltstone, Claystone**, 10YR 6/1 (Strong brown) to 7.5YR 7/1 (light gray), thinly bedded, some oxidation, some caliche.				
15		5	3	30/30					**Poorly Graded Sand, Silt and Clay**, 10 YR 7/6 (Yellowish Brown) to 10 YR 6/1 (Light Gray) moist, mostly sand, cobbles and gravels throughout.				
	405	6		30/30									

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-1
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 2 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 423	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	400	7	4	60/60									
25		8	5	33/60									
	395												
30		9	6	54/60					**Sandstone, Siltstone, Claystone** 7.5YR 7/1 (light gray), wet, thinly bedded, some oxidation.				Water @ 30 Ft.
	390												
35		10	7	36/60									
	385												

GROUP GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-1
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 3 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 423	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		11	8	36/60									
	380												
45		12	9	40/60									
	375								**Interbedded Sandstone, Siltstone and Claystone** 7.5 YR 7/1 (Strong Brown) to 7.5 YR 7/1 (Light Gray), wet, fine grained sand, some oxidation.				
50		13	10	11/60									
	370												
55		14	11	58/60									
	365												

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE c

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-1
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 4 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 423	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	360								Total Depth: 60 Ft Groundwater: Encountered at 30 Ft Boring backfilled with tamped soil cuttings and asphalt patched.				
65													
	355												
70													
	350												
75													
	345												

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE d

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-2
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 1 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	420								**Asphalt**				
									Artificial Fill (Qaf)				
									Silty SAND, 7.5 YR 5/8 (Strong Brown) , moist, mostly medium to coarse sand, some fine sand, some fines, little fine to coarse gravel, trace cobbles.				
5		1	1	25/30									
	415								**Older Alluvium (Qoal)**				
		2		20/30					**Clayey SAND**, 7.5 YR 5/6 (Strong Brown) with grayish mottling, moist, fine sand.				
									-Trace fine gravel				
10		3	2	18/30									
	410								-Polished surfaces				
		4		25/30					**Sandy CLAY**, 5 YR 4/6 (Yellowish Red), dry to moist, fine sand.				
15		5	3	30/30					**Caliche** ,10 YR 7/6 (Yellow), layers of well deveoped carbonate.				
	405												
		6		29/30					**Modelo Formation (Tm)**				

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-2
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 2 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	400	7	4	30/30					**Sandstone**, 10YR 7/8 (Yellow), dry to moist, mostly fine to medium sand, abundant carbonate infilling. **Modelo Formation (TM)** cont.. **Clayey Sandstone**, 7.5 YR 8/1 (White) and 7.5 YR 6/8 (Reddish Yellow), dry to moist, mostly fine to medium sand, abundant carbonate.				
		8		30/30					**Sandstone**, 7.5 YR 6/8 (Reddish Yellow), moist to wet, mostly fine to medium sand, with some carbonate infilling in joints.				
25		9	5	22/30									Ground water @ 27'
	395								-Layer of Clayey Sandstone, 7.5 YR 5/8 with carbonate infilling -Wet, 7.5 YR 5/6 (Strong Brown)				
		10		25/30					-Mottled 10 YR 6/8 (Brownish Yellow) and 10 YR 8/1 (White)				
30		11	6	45/60					**Clayey Sandstone**, 7.5 YR 5/8 (Strong Brown), wet, fine to medium sand, minor white mottling.				
	390								**Sandstone**, mottled 7.5 YR 8/1 (White) and 7.5 YR 5/8 (Strong Brown), wet, fine to medium sand.				
35		12	7	38/60									
	385								-Becomes 10 YR 6/6 (Brownish Yellow) -Layer of Clayey Sandstone, 7.5 YR 6/8 (Reddish Yellow), carbonate infilling of fractures.				

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-2
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 3 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	380	13	8	60/60					**Sandy Claystone**, mottled 7.5 YR 8/1 (White) and 7.5 YR 5/8 (Strong Brown), wet, fine sand.				
45	375	14	9	44/60					**Sandstone**, 7.5 YR 5/6 (Strong Brown), wet, fine sand. **Sandy Claystone to Clayey Sandstone** mottled 7.5 YR 8/1 (White) to 7.5 YR 5/8 (Strong Brown), wet, fine to medium sand.				
50	370	15	10	30/60					**Conglomerate Bed**				
									Sandy Claystone to Clayey Sandstone mottled 7.5 YR 4/1 (Dark Gray) and 7.5 YR 5/8 (Strong Brown), wet, mostly fine sand.				
55	365	16	11	30/60					-Sand lense with carbonate infilled fracture				

GROUP GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE c

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-2
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 4 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	360								Total Depth: 60 Ft Groundwater: Encountered at 27 Ft Boring backfilled with tamped cuttigns and asphalt patched.				
65													
	355												
70													
	350												
75													
	345												

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE d

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-3
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 1 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	420								**Asphalt**				
									Artificial Fill (Qaf) **Silty SAND**, 7.5 YR (Strong Brown), moist, mostly medium to coarse sand, some fine sand, few fine gravel, trace cobbles.				
5	415	1	1	32/30									
		2		19/30					**Older Alluvium (Qoal)** **Silty SAND**, 7.5 YR 5/8 (Strong Brown), moist, mostly fine sand. **Clayey SAND**, 7.5 YR 5/8 (Strong Brown), moist, mostly fine sand, trace fine gravel.				
10	410	3	2	19/30					-Few medium sand and trace coarse sand				
		4		29/30					**Sandy Clay**, mottled 7.5 YR 6/8 (Reddish yellow) to 7.5 YR 7/1 (Light Gray), moist, fine sand, oxide staining, polished surface along bedding, very weathered.				
15	405	5	3	21/30									
		6		30/30					-Carbonate infilled fractures				

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-3
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 2 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	400	7	4	29/30					-Coarsening sand, carbonate infilling fractures				
		8		22/30					**Modelo Formation (Tm)**				
25	395	9	5	30/30					**Sandstone**, mottled 7.5 YR 8/2 (Pinkish White) and 7.5 YR 6/8 (Reddish Yellow), moist to wet, mostly fine to medium sand. **Clayey Sandstone**, mottled 7.5 YR 5/6 (Strong Brown) with 7.5 YR 7/1 (Light Gray), moist to wet, mostly fine sand with some medium sand, trace black oxide staining.				
		10		25/30									
30	390	11	6	29/30					**Sandstone** mottled 7.5 YR 5/6 (Strong Brown) and 7.5 YR 7.1 (Light Gray), wet, mostly fine to medium sand, few fine to coarse gravel, trace cobbles, trace black peat.				
									Clayey Sandstone, 7.5 YR 5/8 (Strong Brown), wet, mostly fine to medium sand with a minor gravel and cobble layer and lamination of sandstone.				
		12		30/30					**Clayey Sandstone**, mottled 7.5 YR 5/8 (Strong Brown) and 7.5 YR 8/1 (Gray), wet, mostly fine to medium sand, abundant carbonate infilling.				
35	385	13	7	29/30					-Sandstone Layer				
		14		30/30					**Clayey Sandstone to Sandy Claystone** mottled 7.5 YR 5/8 (Strong Brown) and 7.5 YR 7/1 (Light Gray), wet, mostly fine to medium sandstone, carbonate infilling of fractures.				

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-3
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 3 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	380	15	8	12/30					-Well cemented zone				
		16		22/30									
45	375	17	9	54/60									
50	370	18	10	59/60									
55	365	19	11	60/60					-Gravel and Cobble Layer				

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE c

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-3
SITE LOCATION	**DATE(S) DRILLED** 1/30/14	**LOGGED BY** TO	**SHEET NO.** 4 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
65	360								Total Depth: 60 Ft Groundwater: Encountered at 28 Ft Boring backfilled with tamped cuttings and asphalt patched.				
	355												
70	350												
75	345												

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE d

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-4
SITE LOCATION	**DATE(S) DRILLED** 1/29/14	**LOGGED BY** TO	**SHEET NO.** 1 of 2
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 36
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt				
									Artificial Fill (Qaf)				
									Silty SAND, 7.5 YR 5/8 (Strong Brown), moist, fine to medium sand, little fine gravel, trace cobbles.				
5	415	1	1	21/30					**Clayey SAND**7.5 YR 4/6 (Strong Brown), moist, medium to coarse sand, some fine sand, few fine to coarse gravel, trace cobbles.				
		2		27/30									
									Older Alluvium (Qoal)				
10	410	3	2	27/30					**Clayey SAND**, 7.5 YR 5/8 (Strong Brown), moist, fine to medium sand, little coarse sand, some fine gravel, trace cobbles.				
									Silty SAND, 7.5 YR 5/8 (Strong Brown), moist, medium to coarse sand, some fine sand, trace fine gravel.				
		4		6/30					**Clayey SAND**, 7.5 YR 5/8 (Strong Brown), moist, medium to coarse sand, some fine sand, trace fine gravel.				
15	405	5	3	0/30					-No recovery				
		6		0/30									
	400												

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-4
SITE LOCATION	**DATE(S) DRILLED** 1/29/14	**LOGGED BY** TO	**SHEET NO.** 2 of 2
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 36
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		7	4	30/30					**Sandy CLAY**, mottled 7.5 YR 4/6 (Strong Brown) and 7.5 YR 6/1 (Gray), moist, fine to medium sand, trace coarse sand, trace cobbles.				
		8		30/30									
25	395	9	5	30/30									
		10		30/30									
30	390	11	6	60/60					-Thin layer of Sandstone, wet, medium to coarse sand				
35	385	12	7	12/12					-Very hard drilling Total Depth: Refusal at 36 ft Groundwater: Encountered at 31 Ft Boring backfilled with tamped cuttings and concrete patched.				
	380												

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-4A
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 1 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt				
									Artificial Fill (Qaf)				
									Silty SAND, 7.5 YR 5/8 (Strong Brown), moist, mostly fine to medium sand, little fine gravel, trace cobbles.				
5	415		1						**Older Alluvium (Qoal)**				
									Clayey SAND7.5 YR 4/6 (Strong Brown), moist, mostly medium to coarse sand, some fine sand, few fine to coarse gravel, trace cobbles.				
10	410	1	2	19/30					**Clayey SAND**, 7.5 YR 5/8 (Strong Brown), moist, mostly fine to medium sand, few coarse sand, trace fine gravel, trace cobbles.				
		2		0/30									
15	405	3	3	30/30					-Becomes 7.5 YR 4/4 (Reddish Brown)				
		4		30/30					**Clayey Sand to Sandy Clays**, mottled 7.5 YR 5/8 (Strong Brown) and 7.5 YR 7/1 (Light Gray), moist, mostly fine grained sand, few medium to coarse sand, trace fine gravel, some silt.				
	400												

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-4A
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 2 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		5	4	30/30									
		6		30/30					-5 YR 4/4 (Reddish Brown) and 5 YR 6/1 (Gray), with white carbonate infilling.				
25	395		5										
									Ground Water @ 31 ft.				
30	390		6										
									-Mottled 10 YR 6/6 (Brownish Yellow) and 10 YR 7/1 (Light Gray), abundant carbonate infilling				
35	385		7										
	380								**Modelo Formation (TM)** **Sandstone, Siltstone, Claystone** 10YR 6/1 (Strong brown) to 7.5YR 7/1 (light gray), thinly bedded, some oxidation.				

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-4A
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 3 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		7	8	60/60									
45	375	8	9	57/60									
50	370	9	10	59/60									
55	365	10	11	53/60									
	360												

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE c

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-4A
SITE LOCATION	**DATE(S) DRILLED** 1/31/14	**LOGGED BY** TO	**SHEET NO.** 4 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 420	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
65	355								Total Depth: 60 Ft Groundwater: Encountered at 31 Ft Boring backfilled with tamped cuttings and asphalt patched.				
70	350												
75	345												
	340												

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE d

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-5
SITE LOCATION	**DATE(S) DRILLED** 1/29/14	**LOGGED BY** TO	**SHEET NO.** 1 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	420								**Asphalt** **Artificial Fill (Qaf)** **Silty SAND**, 7.5 YR 4/3 (Brown), moist, mostly fine sand, few medium sand, some fine to coarse gravel, trace cobbles.				
5	415	1	1	30/30					**Older Alluvium (Qoal)** **Clayey SAND**, 7.5 YR 4/6 (Strong Brown), moist, mostly fine to medium sand, some coarse sand, some fine gravel.				
		2		28/30									
10	410	3	2	29/30					**Sandy SILT**, mottled 10 YR 7/3 (Pale Brown), and 7.5 YR 5/8 (Strong Brown), moist, mostly fine sand, trace fine gravel.				
		4		25/30					**Clayey SAND**, 7.5 YR 4/6 (Strong Brown), moist, mostly fine to medium sand, some cobbles and gravel.				
15	405	5	3	26/30					**SAND**, 7.5 YR 5/8 (Strong Brown), moist, mostly medium to coarse sand, few fine gravel, trace cobbles.				
		6		21/30					**Silty SAND**, 7.5 YR 4/6 (Yellowish Brown), moist, mostly fine sand, trace fine gravel.				

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-5
SITE LOCATION	**DATE(S) DRILLED** 1/29/14	**LOGGED BY** TO	**SHEET NO.** 2 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	400	7	4	28/30									
		8		28/30									
25		9	5	22/30									
	395												
		10		30/30									
30		11	6	60/60									
	390												
35		12	7	60/60					**Buried Paleosol**, Mottled 5YR 3/3 (Dark Reddish Brown) to 5YR 6/1 (Gray).				
	385												

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-5
SITE LOCATION	**DATE(S) DRILLED** 1/29/14	**LOGGED BY** TO	**SHEET NO.** 3 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	380	13	8	47/60									
45	375	14	9	30/30					**Clayey Sand**, 5 YR 5/6 (Yellowish Brown), moist, mostly fine to medium sand, few coarse sand, trace fine gravel. Ground water @ 45 ft. -Mottled 5YR 5/6 (Yellowish Brown) to 5YR 6/1 (Gray)				
50	370	15	10	22/30					**Sand**, 7.5 YR 6/2 (Strong Brown), wet, mostly medium to coarse sand, some fine sand, few fine gravel. **Clayey Sand**, 5YR 4/4 (Reddish Brown) mottled with 7.5YR 6/2 (Pinkish Gray), wet, mostly fine to medium sand, trace coarse sand, trace fine gravel. **Clayey Sand**, 5YR 4/4 (Reddish Brown), wet, mostly fine sand, few medium sand.				
55	365	16	11	50/60					**Sand** 5YR 5/6 (Yellowish Brown), wet, mostly medium to coarse sand, some fine sand, few fine gravel. **Modelo Formation (Tm)** **Sandy Claystone**5YR 4/4 (Reddish Brown), wet, mostly fine sand, some fines.				

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE c

LOG OF CORE BORING

PROJECT NAME Yucca & Agryle Fault Investigation	**PROJECT NUMBER** LA-1183		**BORING** B-5
SITE LOCATION	**DATE(S) DRILLED** 1/29/14	**LOGGED BY** TO	**SHEET NO.** 4 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 6"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 421	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	360								Total Depth: 60 Ft Groundwater: Encountered at 45 Ft Boring backfilled with tamped cuttings and asphalt patched.				
65													
	355												
70													
	350												
75													
	345												

GROUP GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE d

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT 2/13/15

LOG OF CORE BORING

PROJECT NAME Champion Supplemental Fault Trench Borings	**PROJECT NUMBER** A1183B	**BORING** B-6	
SITE LOCATION	**DATE(S) DRILLED** 10/1/2014	**LOGGED BY** K.Neill	**SHEET NO.** 1 of 2
DRILLING METHOD HSA	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY**	**TOTAL DEPTH DRILLED (feet)** 25
DRILL RIG TYPE CME 75	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 432	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Concrete approximatly 6 in thick				
	430								**Artificial Fill (Qaf)** **SAND with SILT** 7.5YR 4/4 Brown, moist, mostly medium to fine SAND, some coarse to fine GRAVEL, trace micas and FE oxides.				
		1	1	24/24					**OLDER ALLUVIUM (Qoal (u))** **SAND with SILT** 7.5YR 5/6 Strong Brown, moist, mostly mostly fine SAND, few medium SAND, trace coarse SAND and fine GRAVELS.				
5		2		30/30									
	425								**SAND** 10YR 4/6 Strong Brown, moist, mostly medium to fine SAND, interbedded clay lenses at 7.5ft.				
		3		30/30					-interbedded clay lenses **OLDER ALLUVIUM (Qoal (l))** **SAND with SILT**7.5YR 4/4 Brown, moist, mostly fine SAND few medium SAND, trace coarse SAND, section fining with depth.				
10		4	2	30/30					**SAND with CLAY** 7.5 4/6 Strong Brown, moist, mostly fine to medium SAND, few coarse SAND, trace coarse to fine GRAVELS, interbedded clay lenses.				
	420								-Gravel Lense **SAND** 7.5YR 4/6 Strong Brown, moist, mostly fine to medium SAND, some coarse SAND, few fine GRAVELS, massive bedded, micacous.				
		5		30/30									
15		6	3	30/30					**SAND with CLAY** 7.5YR 4/6 Strong Brown, moist, mostly fine SAND, few medium SAND, trace coarse SAND and fine GRAVELS and COBBLES.				
	415												
		7		34/30					-Higher CLAY content, no GRAVELS or COBBLES. **Silty SAND** 7.5YR 4/4 Brown, moist, mostly fine SAND, interbedded clay lenses, gleying.				

GROUP GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Champion Supplemental Fault Trench Borings	**PROJECT NUMBER** LA1183B	**BORING** B-6	
SITE LOCATION	**DATE(S) DRILLED** 10/1/2014	**LOGGED BY** K.Neill	**SHEET NO.** 2 of 2
DRILLING METHOD HSA	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY**	**TOTAL DEPTH DRILLED (feet)** 25
DRILL RIG TYPE CME 75	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 432	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		8	4	32/30					**SAND with Clay** 7.5YR 4/4 Strong Brown, moist. mostly medium to fine SAND, clay nodules.				
	410								**Silty SAND** 7.5YR 5/6 Strong Brown, moist, mostly fine to medium SAND, few coarse SAND, trace fine to coarse GRAVELS.				
		9		30/30									
25		10		31/30					Total Depth: 25 Ft Groundwater: No encountered Boring backfilled with tamped cuttings and concrete patch.				
	405												
30													
	400												
35													
	395												

GDC_ROCK_CORE_ENG LA1183C CHAMPION SUPPLEMENTAL BORINGS B-6_B-8.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Champion Supplemental Fault Trench Borings	**PROJECT NUMBER** LA1183C		**BORING** B-7
SITE LOCATION	**DATE(S) DRILLED** 10/2/2014	**LOGGED BY** K.Neill	**SHEET NO.** 1 of 2
DRILLING METHOD HSA	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY**	**TOTAL DEPTH DRILLED (feet)** 25
DRILL RIG TYPE CME 75	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 431	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	430								Concrete approximately 6 in thick **Artificial Fill (Qaf)** **Clayey SAND** 7.5YR 3/2 Dark Brown, moist, mostly fine SAND, some medium SAND, trace fine GRAVEL.				
		1	1	26/24					**Sand (Qs)** **Clayey Silty SAND** 7.5YR 4/6 Strong Brown, moist, mostly fine SAND, few medium SAND, trace coarse SAND.				
5		2		30/30					**SAND with CLAY** 7.5YR 4/4 Strong Brown, moist, mostly fine to medium SAND, few coarse SAND, soil development.				
	425								**Sitly SAND** 7.5YR 4/4 Brown, moist, mostly medium to fine SAND, some coarse SAND and GRAVEL. Massive, finnning down section to SANDS.				
		3		30/30									
10		4	2	30/30									
	420												
		5		30/30					**Silty SAND** 7.5YR 4/6 Strong Brown, moist, mostly fine SAND, few medium SAND, trace coarse SAND. **SAND with SILT** 5YR 4/4 Reddish Brown, moist, loose, mostly fine to medium SAND, sub rounded to rounded grains, minor bedding structure, micas.				
15		6	3	30/30					**SAND with SILT** 7.5YR 4/6 Strong Brown, moist mostly fine SAND, few medium SAND, trace fine GRAVELS, massive, micacous.				
	415								**Silty SAND** 7.5YR Reddish Brown, mostly fine SAND, few fine GRAVELS and medium SAND, massive bedded, micas.				
		7		30/30					**SAND** 7.5YR 4/5 Strong Brown, moist, mostly medium SAND, some coarse to fine SAND, micacous.				

GDC_ROCK_CORE_ENG LA1183C CHAMPION SUPPLEMENTAL BORINGS B-6_B-8.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Champion Supplemental Fault Trench Borings	**PROJECT NUMBER** LA1183B	**BORING** B-7	
SITE LOCATION	**DATE(S) DRILLED** 10/2/2014	**LOGGED BY** K.Neill	**SHEET NO.** 2 of 2
DRILLING METHOD HSA	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY**	**TOTAL DEPTH DRILLED (feet)** 25
DRILL RIG TYPE CME 75	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 431	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	410	8	4	30/30					**GRAVELS** Coarse to fine GRAVEL, sub angular to angular. **OLDER ALLUVIUM (Qoal(u))** **Clayey SAND**, 7.5YR 5/6 Strong Brown, moist, mostly fine SAND, some medium to coarse SAND, few fine GRAVEL, grussification, micas, interbedded black clay laminations.				
		9		30/30									
25		10		30/30									
	405								Total Depth: 25 Ft Groundwater: No encountered Boring backfilled with tamped cuttings and concrete patch.				
30	400												
35	395												

GDC_ROCK_CORE_ENG LA1183C CHAMPION SUPPLEMENTAL BORINGS B-6_B-8.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Champion Supplemental Fault Trench Borings	**PROJECT NUMBER** LA1183C	**BORING** B-8	
SITE LOCATION	**DATE(S) DRILLED** 10/2/2014	**LOGGED BY** K.Neill	**SHEET NO.** 1 of 2
DRILLING METHOD HSA	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY**	**TOTAL DEPTH DRILLED (feet)** 25
DRILL RIG TYPE CME 75	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 424	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Concrete approximatly 6 in thick				
									Artificial Fill (Qaf)				
									Clayey SAND 7.5YR 4/6 Strong Brown, moist, mostly medium to fine SAND, few fine GRAVEL.				
	420								**Sand (Qs)**				
5		1	1	24/30					**Clayey SAND**7.5YR 5/6 Strong Brown, moist. mostly fine to medium SAND, few coarse SAND, micacous, roots.				
									Sand with CLAY7.5YR 4/4 Brown, moist, mostly fine SAND, trace medium SAND.				
		2		24/30									
	415								**GRAVEL** mostly coarse GRAVEL, few fine GRAVEL, Grussification of granite clasts.				
10		3	2	30/30									
		4		30/30					**Silty SAND**7.5YR 4/4 Brown, moist, fine to medium SAND, few coarse SAND, trace fine GRAVEL, interbedded CLAY lenses.				
	410												
15		5	3	28/30					**Silty SAND**10YR 5/6 Yellowish Brown, moist mostly fine SAND and trace medium SAND.				
		6		26/30					**Clayey, Silty, SAND** 7.5YR 4/6 Strong Brown, moist, mostly fine to medium SAND, trace coarse SAND.				
	405								Large quartzite clasts, gleying in soild maxtrix.				

GDC_ROCK_CORE_ENG LA1183C CHAMPION SUPPLEMENTAL BORINGS B-6_B-8.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Champion Supplemental Fault Trench Borings	**PROJECT NUMBER** LA1183C	**BORING** B-8	
SITE LOCATION	**DATE(S) DRILLED** 10/2/2014	**LOGGED BY** K.Neill	**SHEET NO.** 2 of 2
DRILLING METHOD HSA	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY**	**TOTAL DEPTH DRILLED (feet)** 25
DRILL RIG TYPE CME 75	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 424	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		7	4	24/30					**Silty SAND** 5YR 4/4 Reddish Brown, moist, medium dense, mostly medium to fine SAND, some coarse SAND, few large GRAVELS, interbedded at 21.0 with black clay lenses.				
									Clayed SAND 7.5YR 4/6 Strong Brown, moist, mostly fine SAND, interbedded black clay lenses.				
		8		27/30					**Silty SAND** 7.5YR 4/6 Strong Brown, moist, mostly medium to fine SAND, some coarse SAND, few large GRAVELS.				
	400												
25									Total Depth: 25 Ft Groundwater: No encountered Boring backfilled with tamped cuttings and concrete patch.				
	395												
30													
	390												
35													
	385												

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

GDC_ROCK_CORE_ENG LA1183C CHAMPION SUPPLEMENTAL BORINGS B-6_B-8.GPJ ROCK2.GDT 2/13/15

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D		**BORING** BA-1
SITE LOCATION	**DATE(S) DRILLED** 11/19/2014	**LOGGED BY** KN	**SHEET NO.** 1 of 2
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 30
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 428	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Concrete, 3"				
									ARTIFICIAL FILL (Qaf)				
									Silty Clayey SAND 7.5YR 4/4 (dark brown); moist; mostly fine to medium sand; few fine to coarse gravel, subrounded to subangular clasts; micaceous; roots; white evaporate layer.				
	425								**ORGANIC HORIZON (Qor)**				
									OLDER ALLUVIUM (Qoal (u))				
5									**Poorly Graded Sand with Clay** 7.5YR 5/4 (Strong Brown); moist, mostly fine to medium sand; some coarse sand; some fines; micaceous.				
									Clayey Sand 7.5YR 5/6 (Strong Brown); moist; mostly fine to medium sand; few coarse sand; trace fine gravels; roots.				
									-2" gravel layer				
									- perched groundwater.				
	420								-Conglomerate lens above 8 ft contact.				
									Silty Sand 7.5YR 5/6 (Brown); moist; mostly medium to fine sand; few fine to coarse gravel lenses; micaceous,				
10									N55E, vertical erosion by sand, irregular surface; sub rounded to rounded clasts 1/8 to 1/4 in.				
									Silty Sand 7.5YR 5/8 (strong brown); moist; mostly fine to medium sand; few coarse sand; few fines; trace fine and coarse gravel.				
	415								- Interbeds of clayey sand and silty clay with some sand.				
									- 9" thick horizontal sand bed.				
									- Gravel 4" thick lens.				
15									Some fine and coarse gravel.				
									Clay layers in bucket auger cuttings ~ 1/8 in thick. North side 1/4" root; offset bed; gray clayey bed; 6" carbonate nodules, well developed gleying.				
									- Fracture.				
	410								**OLDER ALLUVIUM (Qoal (l))**				
									Silty Clayey SAND 7.5YR 5/4 (brown); moist; mostly fine to medium sand, few coarse sand; clay films on gravel; clay lenses in cuttings.				

GROUP GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D		**BORING** BA-1
SITE LOCATION	**DATE(S) DRILLED** 11/19/2014	**LOGGED BY** KN	**SHEET NO.** 2 of 2
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 30
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 428	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									- 2 feet of clay fractures, massive.				
	405								- Increase in medium sand. - Soil development.				
25													
	400								**Clayey Sand** 7.5YR 5/6 (strong brown); moist; mostly fine sand; some medium sand; clay lenses, 7.5YR 4/1 (dark gray); clay films on grains; soil development.				
30									Total Depth: 30 Feet bgs No groundwater				
	395												
35													
	390												

GDC_ROCK_CORE_ENG LA-1183D BUCKET AUGER BORINGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D	**BORING** BA-2	
SITE LOCATION	**DATE(S) DRILLED** 11/19/2014	**LOGGED BY** KN	**SHEET NO.** 1 of 2
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 36.5
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 428	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Concrete, 4".				
									ARTIFICIAL FILL (Qaf)				
									Lean Clay with Sand 7.5YR 5/4 (strong brown); moist; some fine to medium sand.				
	425												
5									- Cobble lense; hard drilling.				
									SAND (Qs)				
	420								**Silty Sand** 7.5YR 5/8 (strong brown); mostly medium to coarse sand; some fine sand; micaceous; massive. - Gravel lense; large cobble; horizontal bedding channel fill, interbedded with red sand lenses.				
									Clayey Sand 7.5YR 4/6 (strong brown); mostly medium to coarse sand; some fine sand; roots.				
10									- Horizontal bed fill, 2" gravel.				
									Silty Sand 7.5YR 4/6 (strong brown); moist; mostly fine to medium sand; some coarse sand; micaceous.				
	415												
15									**Poorly Graded Sand** 7.5 YR 6/8 (reddish yellow); moist; mostly medium sand; few coarse sand.				
									- Few gravels, subrounded to subangular. Angular horizontal sandy clay with krotovinas. Massive bedding to 20.5 feet. Increase in clayey sand lenses.				
	410								- Increase in gravels and cobbles on southwest side of boring.				

GDC_ROCK_CORE_ENG_LA-1183D BUCKET AUGER BORINGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D	**BORING** BA-2	
SITE LOCATION	**DATE(S) DRILLED** 11/19/2014	**LOGGED BY** KN	**SHEET NO.** 2 of 2
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 36.5
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 428	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									-- Contact N56°E, 18°S. **OLDER ALLUVIUM (Qoal (u))**				
									Silty Clayey Sand 7.5YR 4/4 (brown); moist; mostly fine to medium sand; few coarse sand; gleying in section.				
	405								**Clayey Sand** 7.5YR 4/3 (brown); moist; mostly fine sand; few medium to coarse sand.				
25									-Gleying interbed in section.				
	400												
30									- Gley lens interbedded on massive unit.				
	395												
35													
									- Perched groundwater.				
	390								Total Depth: 36.5 Feet bgs Groundwater at 36.5 feet bgs				

GDC_ROCK_CORE_ENG LA-1183D BUCKET AUGER BORINGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D	**BORING** BA-3	
SITE LOCATION Hollywood, CA	**DATE(S) DRILLED** 1/19/2015 to 1/20/2015	**LOGGED BY** KN	**SHEET NO.** 1 of 5
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 44
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH Not Measured		**APPROXIMATE SURFACE ELEVATION (feet)** 430	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Concrete, 3"				
									Conducer Casing - Not logged in field to 30 inches below ground surface.				
									ARTIFICIAL FILL (Qaf)				
									Silty Clayey SAND 7.5YR 4/4 (dark brown); moist; mostly fine to medium sand; few fine to coarse gravel.				
									ORGANIC HORIZON (Qor)				
									OLD ALLUVIUM (Qoal (u))				
									Sandy Clay 7.5YR 5/6 (Strong Brown); mostly fine sand; few medium sand; trace coarse sand; trace fine to coarse gravels; moist; dense; roots; glaying,7.5YR black minor, vertical, massive; micaceous; subrounded clasts.				
									- soil development.				
5	425												
									- Interbeded sand lense, 10YR 5/6 (Yellowish Brown), sub-rounded clasts, krotovina. Soil development at 6 ft contact.				
									-**Clayey Sitly Sand** 7.5YR 6/6 (Reddish Yellow); moist; mostly fine sand; few medium sand; roots; trace fine gravel; magnesium oxide staining.				
									OLD ALLUVIUM (Qoal (l))				
									Buried paleosol, minor clay films along peds.				
									Sandy Clay 7.5YR 4/4 (Brown); moist; trace roots.				
									Fault is truncated by the over lying clayey Sand. -roots along fault surface				
									Silty Sand 10YR 5/6 (Yellowish Brown); moist; mostly fine sand; few medium sand; trace gravels.				
									Sand with Gravel 10YR 5/4 (Yellowish Brown); moist; mostly fine sand; few fine to coarse gravel, rounded to				

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE a

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D		**BORING** BA-3
SITE LOCATION Hollywood, CA	**DATE(S) DRILLED** 1/19/2015 to 1/20/2015	**LOGGED BY** KN	**SHEET NO.** 2 of 5
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 44
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH Not Measured		**APPROXIMATE SURFACE ELEVATION (feet)** 430	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									subrounded clats; gravel lens at base. **Silty Sand** 7.5YR 5/6 (Strong Brown); moist; mostly fine sand; micaceous; roots; magnesium oxide staining.				
									Coarse Sand lens off-set approximately 6-inches along fault. - 6" of Basal gravels and cobbles 1/8" - 6", subrounded to subangular, grussification. Fault = N76E, 74S **Silty Sand** 10YR 5/6 (Yellowish Brown); moist; mostly fine to medium sand; few coarse sand; trace fine gravel, roots along fracture. Laminated bedding ~1/8" - 1/4" thick, subrounded to rounded clasts.				
15	415								From 11 to 13 feet laminated Sand beds off set approximately 1.8 feet along the fault. Iron oxide staining within the sand beds. Fault appears to be a growth fault given the difference in off-set at 8 feet and at 11 feet. - Increase in coarse sand and gravel. - 10YR 5/6 (Yellow Brown); moist; mostly fine sand. **Silty Sand** unconformity; 7.5YR 4/4 (Brown); moist; mostly fine to medium sand; trace sand lenses with fine gravel; roots in sand lenses; magnesium oxide staining. **Silty Sand with Gravel** 10YR 6/6 (Brownish Yellow); moist; mostly medium sand; few fine to coarse sand; trace fine to coarse gravel; roots; micas; grussification; subrounded to rounded clasts; horizontal bedding 1/4" - 1/2" thick, 7.5 YR 5/5 (strong brown). **Silty Sand** 7.5YR 4/6 (Strong Brown); moist; mostly fine sand; trace course sand, fine gravel; fracture gleying. **Clayey Silty Sand** 7.5YR 4/6 (Strong Brown); moist; mostly fine sand; some medium sand; few coarse sand; trace gravel; massive; grussification clasts; roots along glaying, 7.5YR 2.5/1 (black); magnesium oxide staining, 7.5YR 6/2 (pinkish gray); increased sand along gleying zones; basalt and quartzite gravels. 16.8 ft- fine to coarse gravel along the base of the fault. From 17 to 19 feet: Fractures observed with gleying along fracture surface. - approximate attitude of fracture = N56°E 75°S 6-inch thick silty sand lens. Approximately 6 to 12 long				

GDC_ROCK_CORE_ENG_REV LA-1183D BUCKET AUGER BORINGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE b

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D	**BORING** BA-3	
SITE LOCATION Hollywood, CA	**DATE(S) DRILLED** 1/19/2015 to 1/20/2015	**LOGGED BY** KN	**SHEET NO.** 3 of 5
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 44
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH Not Measured		**APPROXIMATE SURFACE ELEVATION (feet)** 430	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	ROCK CORE: BOX NO.	ROCK CORE: RECOVERY, %	ROCK CORE: FRAC. FREQ.	ROCK CORE: R.Q.D., %	ROCK CORE: FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									fractures below the base of silty sand lens with manganese oxide staining along fracture surface.				
									- Increase in clay content.				
25	405								**Silty Sand** 7.5YR 5/6 (Strong Brown); moist; mostly fine to medium sand; few coarse sand, gravels; subrounded to rounded clasts; grussification; roots; Gleying 7.5YR 2.5/1 (black), 7.5YR 6/2 (pinkish gray); increase fine sand along gleying zones. Silty Sand Lens - undulatory contact along the upper and lower surface. Coarse sand and fine to coarse gravel along the base fining upwards. Gleying along fracture surfaces which extend through the silty sand lens.				
									Clayey Silty Sand 7.5YR 4/6 (Strong Brown); moist; mostly fine sand; few medium sand; trace coarse sand; fine gravel; gleying root zones; massive - Increase in gravel, subrounded to rounded; grussification; trace sand lenses. - Minor soil development; magnesium oxide zone; no gravel; massive unit - Increase in gleying zone.				

GDC_ROCK_CORE_ENG_REV LA-1183D BUCKET AUGER BORINGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE c

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D	**BORING** BA-3	
SITE LOCATION Hollywood, CA	**DATE(S) DRILLED** 1/19/2015 to 1/20/2015	**LOGGED BY** KN	**SHEET NO.** 4 of 5
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 44
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH Not Measured		**APPROXIMATE SURFACE ELEVATION (feet)** 430	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Clayey Sand with Gravel 7.5YR 5/6 (Strong Brown); moist; mostly fine to medium sand; some coarse sand; few fine to coarse gravel; gleying zone.				
									No observed gleying to the bottom of boring.				
									Clayey Silty Sand 7.5YR 4/6 (Strong Brown); moist; mostly fine sand; few medium sand; trace coarse sand; and fine gravel; gleying root zones; massive				
35	395								Groundwater, no down-hole logging occured below this depth.				

GDC_ROCK_CORE_ENG_REV LA-1183D BUCKET AUGER BORINGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE d

LOG OF CORE BORING

PROJECT NAME Champion Site	**PROJECT NUMBER** LA1183D	**BORING** BA-3	
SITE LOCATION Hollywood, CA	**DATE(S) DRILLED** 1/19/2015 to 1/20/2015	**LOGGED BY** KN	**SHEET NO.** 5 of 5
DRILLING METHOD Bucket Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 44
DRILL RIG TYPE Calweld 42 LS	**DRILLED BY** Tri-Valley	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH Not Measured		**APPROXIMATE SURFACE ELEVATION (feet)** 430	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
45	385								Total Depth 44 Feet bgs Groudwater at 36 feet				

GDC_ROCK_CORE_ENG_REV LA-1183D BUCKET AUGER BORINGS.GPJ ROCK2.GDT 2/13/15

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

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

FIGURE e

LETTIS CONSULTANTS INTERNATIONAL, INC. BOULEVARD 6200 - ASSESSMENT OF FAULT MAPPED IN FER 253, 2014.

BORING LOG NUMBER 1

Drilling Date: 03/15/06 **Elevation: 392'***

Project: File No. 18969 **Clarett Group**

km *reference: Topographic Survey, City of L.A. Sheet 148.5 A189, dated 12/01/05

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Slight South Sloping Parking Lot
				0		4-inch Asphalt, No Base
1	20	9.9	118.1	1		FILL: Silty Sand, dark grayish-brown, moist, moderately dense, fine grained
				2		
3	24	7.8	119.3	3		
				4	SM	ALLUVIUM: Silty Sand, medium to yellowish-brown, moist, medium dense, fine grained
5	28	4.0	111.2	5		
				6	SP	Silty Sand to Sand, yellowish-brown, fine grained
7	46	13.0	120.7	7	SM	Silty Sand, dark reddish-brown, dense, fine grained, some gravel
				8		
				9		
10	29	10.0	124.9	10		
				11		
				12		
				13		
				14		
15	47	9.0	115.4	15		
				16	SW	Sand with Gravel, yellowish-brown
				17		
				18		
				19		
20	83	3.6	115.5	20		very dense
				21		
				22		
				23		
				24		
25	75/7"	No Recovery		25		
				26		
				27		
				28		
				29		
30	95	10.2	125.7	30	SW	Clayey Sand to Sand with Gravel, grayish-brown, mottled with red, very moist to wet, very dense, fine to coarse grained, cobble

GEOTECHNOLOGIES, INC.

Plate A-1a

BORING LOG NUMBER 1

Project: File No. 18969 **Clarett Group**

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				31		
				32		
				33		
				34		
35	25/6" 50/4"	7.7	131.7	35		
				36	GW	Sandy Gravel, gravel to 1"
				37		
				38		
				39		
40	74	11.2	126.8	40		
				41	SM	Silty Sand with trace Clay, brownish-gray, orange-brown, gray mottling, moist, dense, no cobble
				42		
				43		
				44		
45	40/6" 50/3"	13.6	116.5	45		wet, very dense
				46		
				47		
				48		
				49		
50	74	12.1	118.9	50		
				51		
				52		
				53		
				54		
55	90	No Recovery		55		
				56		
				57		
				58		
				59		
60	35/6" 50/3"	18.0	117.5	60		

BORING LOG NUMBER 1

Project: File No. 18969 km

Clarett Group

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				61		
				62		
				63		
				64		
65	72	19.3	112.9	65		
				66		
				67		
				68		
				69		
70	80	11.6	126.5	70		
				71	SC	Clayey Sand, reddish-brown, gray mottling, moist, very dense, fine grained, minor gravel to 1½"
				72		
				73		
				74		
75	88	13.9	121.5	75		
				76		
				77		
				78		
				79		
80	36/6" 50/3"	12.7	126.5	80		
				81		Total depth: 80 feet Water at 26 feet 9 inches after 20 hours Fill to 3 feet
				82		
				83		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual
				84		
				85		Used 8-inch diameter Hollow-Stem Auger 140-lb. Slide Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				86		
				87		
				88		
				89		
				90		

APPENDIX B: SOIL STRATIGRAPHIC AGE ASSESSMENTS

Table 1

Soil Profile Measurement and Description
GDC "Champion East Trench"
Trench Exposure, West Wall, Station 0+19

Depth (ft)	Horizon	Description
0.0 – 0.3	Af1	**Artificial Fill** (concrete pad):
0.3 – 1.0	Af2	**Artificial Fill**: Dark yellowish brown (10YR 3/4) dry and moist gravelly sandy clay loam; massive to weak fine to moderate subangular blocky structure; soft, friable, slightly sticky and non-plastic; many horizontal roots near base; common krotovinas to 2-in. dia. Throughout horizon; common to many mixed subangular clasts throughout horizon (non-compacted fill); abrupt wavy boundary.
1.0 – 2.0	A1	Dark olive (5Y 2.5/1 to black (2.5 2/0) when moist fine sandy clay loam; massive to weak, fine subangular blocky structure; soft, friable slightly stick and slightly plastic; few to common random roots to 1/4-in. dia. throughout horizon; gradual wavy boundary.
2.0 – 2.7	A2	Very dark grayish brown (10YR 3/2) to black (10YR 2/1) when moist pebbly clay loam; massive to weak fie subangular blocky structure; soft to slightly firm; slightly sticky and slightly plastic; common to many horizontal 1/2-in. dia. Increasing near base; common sub-rounded to subangular clasts near base; abrupt smooth boundary (unconformity).
2.7 – 3.3	A3/2B1tb	**Buried Paleosol**: Dark brown (7.5YR 32/3) to dark yellowish brown (10YR 3/4) when moist gravelly clay loam; strong angular blocky structure; very hard, very firm, sticky and very plastic; few to common very fine to fine horizontal modern roots throughout horizon; common to many dark brown (7.5YR 4/4) clay films lining ped faces and bridging mineral grains; locally common to many modern organic stains; few to common random krotovinas filled with modern dark brown organic sediments (derived from fill and A horizons); few gray (2.5Y 5/0) vertical root zones (redox); (horizon perches modern gravitational water) fill (brown to dark brown); gradual wavy boundary.
3.3 – 3.9	2B2tb	Reddish brown (5YR 4/4) to dark yellowish brown (5YR 3/6) when moist pebbly clay; strong to very strong medium angular blocky structure; hard to extremely hard; very firm, sticky to very sticky; very plastic; few fine horizontal modern roots; common to many yellowish red (5YR 4/6) moderately thick clay films lining ped faces and bridging mineral grains; few subangular clasts to 2-in. dia. throughout horizon; gradual wavy boundary.

Table 1 (continued)

Depth (ft)	Horizon	Description
3.9 – 4.9	2B3tb	Yellowish red (5YR 4/6) to dark reddish brown (10YR 3/4) when moist pebbly loamy clay; moderate to strong medium angular blocky structure; extremely hard, very firm, sticky and plastic; common to many reddish brown (5YR 4/4) thin to moderately thick clay films lining ped faces and bridging mineral grains; common vertical gleyed roots throughout horizon; random angular clasts to 1-in. dia. Increasing near base (unconformity).
4.9 – 6.0	2B4tb/3B5tb	Brown to dark brown (7.5YR 4/4) to dark yellowish brown (10YR 4/4) when moist gravelly loamy coarse sand; massive to weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very angular clasts to 3/4-in. dia. (local debris flow); few random modern roots throughout horizon; horizon laterally continuous and forms distinct stratigraphic marker; abrupt wavy boundary (unconformity).
6.0 – 6.3	41tb	Brown to dark brown (7.5YR 4/4) to strong brown (7.rYR 4/6) when moist sandy clay loam; weak medium subangular blocky structure; slightly hard, slightly firm, slightly sticky and non-plastic; few to common dark reddish-brown (5YR 3/4) thin clay films lining ped faces; horizon laterally discontinuous; abrupt wavy to gradual wavy boundary.
6.3 – 8.0	42tb	Strong brown (7.5YR 4/6) to dark brown (7.5YR 3/4) when moist pebbly sandy clay loam; massive to moderate medium angular blocky structure; hard, firm, non-sticky and non-plastic; few to common thin dark brown (7.5YR 3/4) clay films lining ped faces and concentrated in vertical root zones; few fine to medium modern roots to 1/4 in. dia. throughout horizon; common to many angular to subrounded clasts to 4-5 in dia. near base; debris flow unit; abrupt wavy boundary (unconformity).
8.0 – 8.5+	5tb	**Buried Paleosol:** Dark brown (7.5YR 3/4) to dark reddish brown (5YR 3/4) when moist sandy clay loam; weak to moderate, fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine discontinuous dark brown (7.5YR 4/4) clay films lining ped faces; few horizontal roots throughout horizon; upper part of horizon truncated by overlying debris flow; base of measured section.

Notes and Age Estimates:

1. Section measured 22 Dec. 2014 by R. Shlemon; assisted by K. Neil and S. Kolthoff.
2. North-south oriented GDC East Trench emplaced on "geomorphic divide" between "Argyle Channel" on the west and unnamed "sandy channel deposits" on the east (see GDC maps and pertinent boring logs).

Table 1 (continued)

Notes (continued)

3. Original surface disturbed; site of former Victorian residence (see GDC 1902 photograph) and later structures. Artificial fill (concrete pad and uncompacted organic sediments) cap ~4-ft thick remnant, strongly developed, relict paleosol (locally cumulic, ~4.7-ft thick horizons B1tb through 42tb). Paleosol typified by yellowish red (5YR 4/6), moderately thick clay films lining ped faces and bridging mineral grains. Parent material ranges from sandy clay loam (upper) to downward coarsening angular to subrounded gravels (grossly fining-upward section.)
4. Lower debris flows lenticular, locally discontinuous; part of accumulation of "very old alluvium" (see formal descriptions and stratigraphic sections in GDC narrative).
5. Top of lower buried paleosol encountered at base of trench (horizon 5tb); upper part truncated by debris flow. Relative development = "moderate."
6. Estimated minimum age for relative development of upper relict paleosol = ~100 ka (MIS 5); lower buried paleosol = ~35 ka (MIS 3).

APPENDIX C: Photo Log

Photo 1:

Champion East Trench looking south. Pink flags indicate the the location of the soil stratigraphic section found in Appendix B. Note the layers grading downward from artificial fill on top, to the organic layer (abundant with modern roots), to the Old Alluvium Upper Unit on bottom.

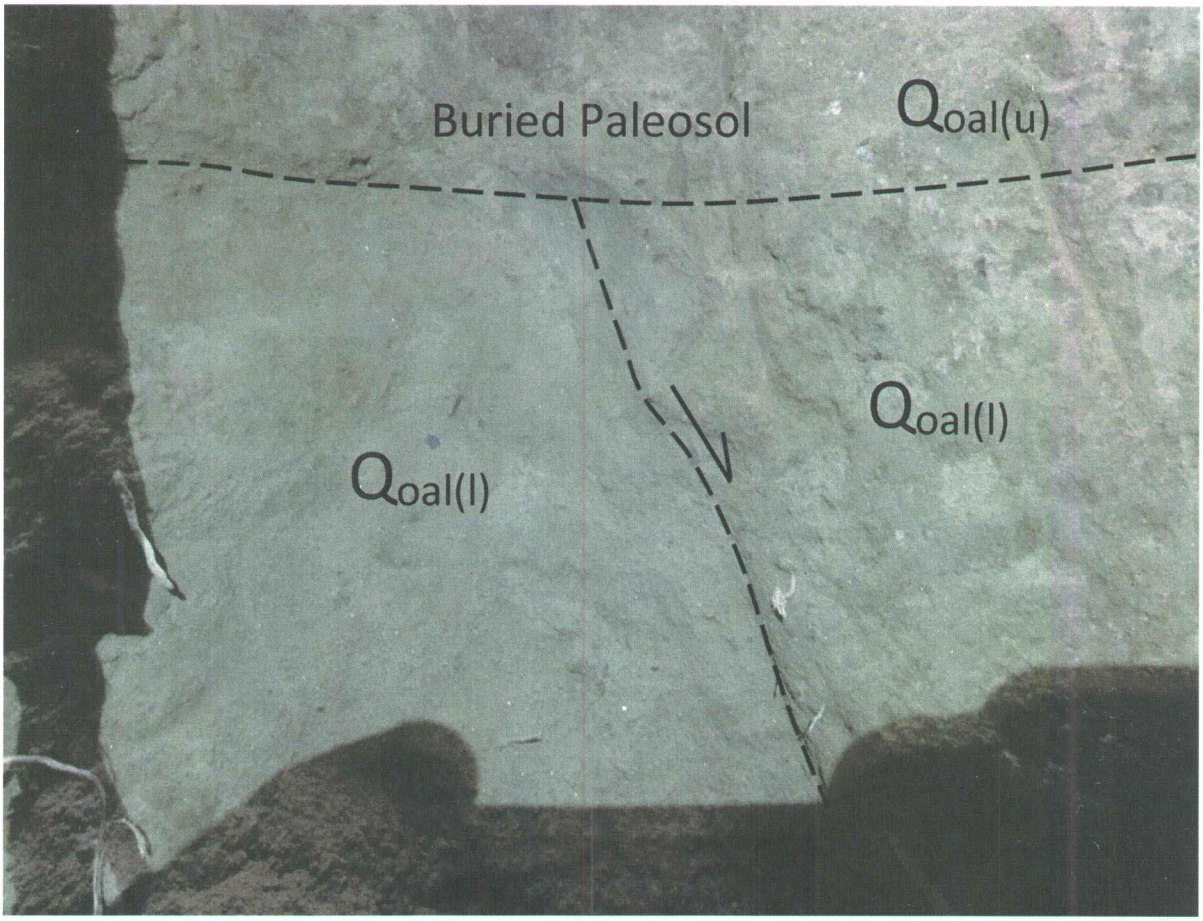


Photo 2:

Champion Bucket Auger BA-3. This photo shows a fault truncated by a buried paleosol at ~ 8 feet below the ground surface with an attitude of N76°E, 74° south. The fault plane leaves the boring at ~ 17 feet below the ground surface. The paleosol that the fault terminates on, is in older alluvium, ~ 200 ka.