GDC Project LA-1183E

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

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 I 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 Alguist-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)



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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

DATE(S) OF

REPORT/LETTER(S)

<u>No.</u>

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

Engineering Geologist Associate II

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

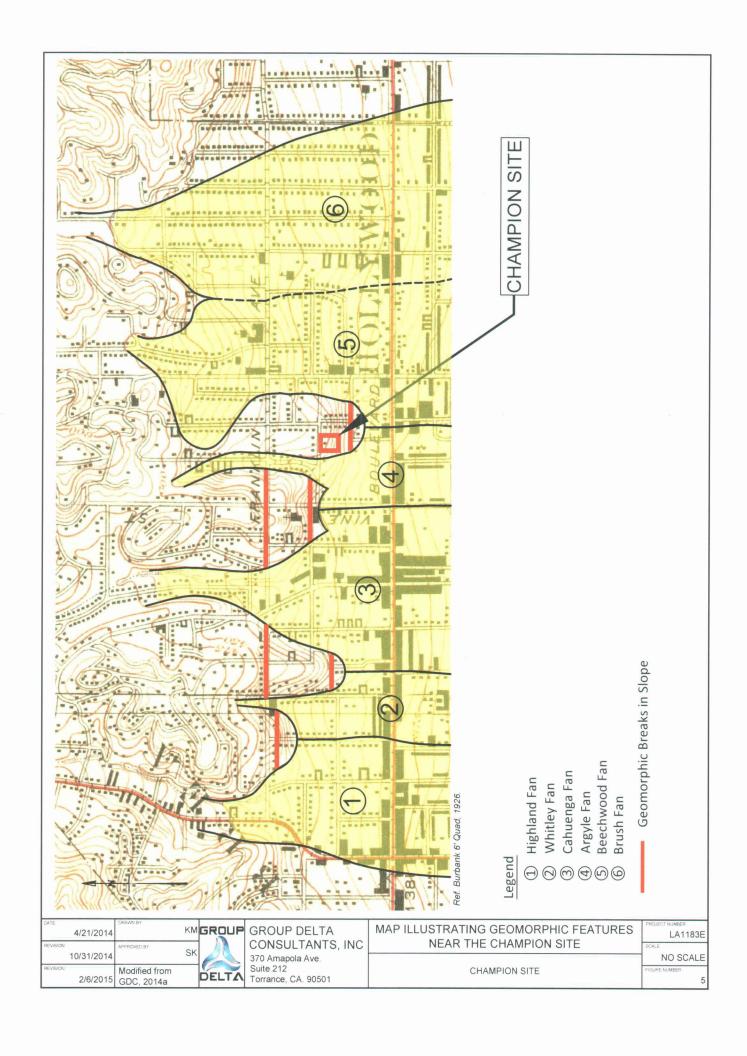
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cc: Group Delta, Project Consultant LA District Office

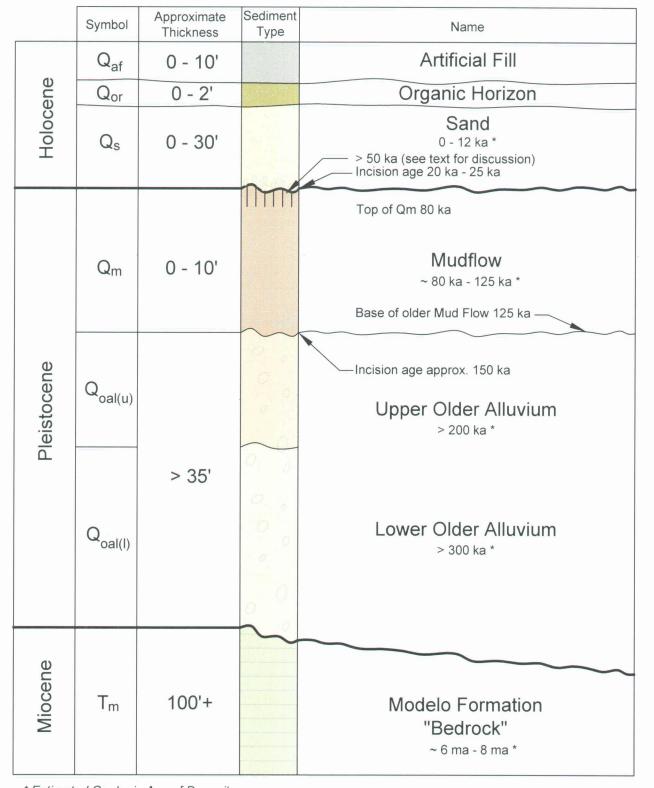
FIGURES

Figure 5	Geomorphic Features
Figure 10	Stratigraphic Section
Figure 12	Geologic Map
Figure 13	Local Fault Map





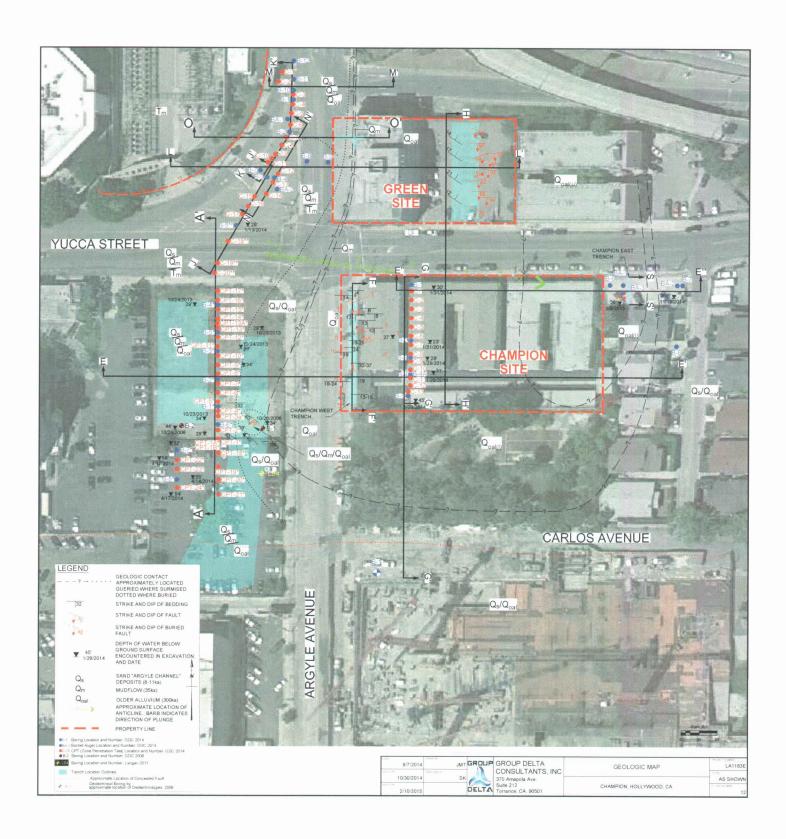
GENERALIZED AERIAL STRATIGRAPHIC SECTION

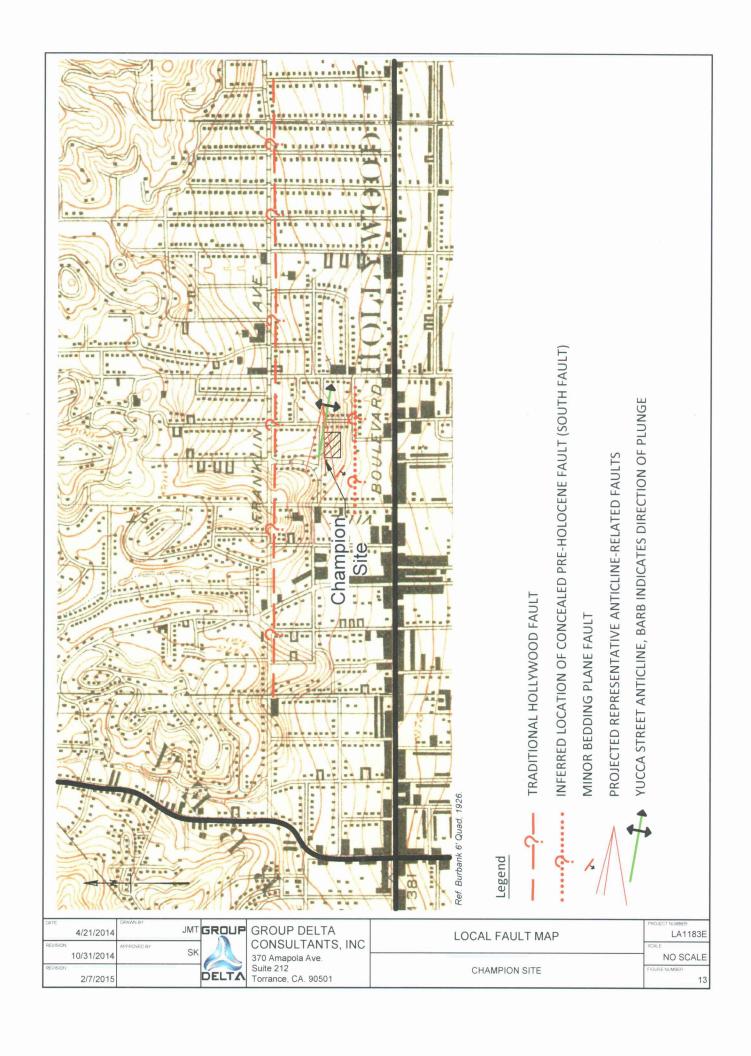


^{*} Estimated Geologic Age of Deposits

Figure 10

Modified from GDC, 2014a

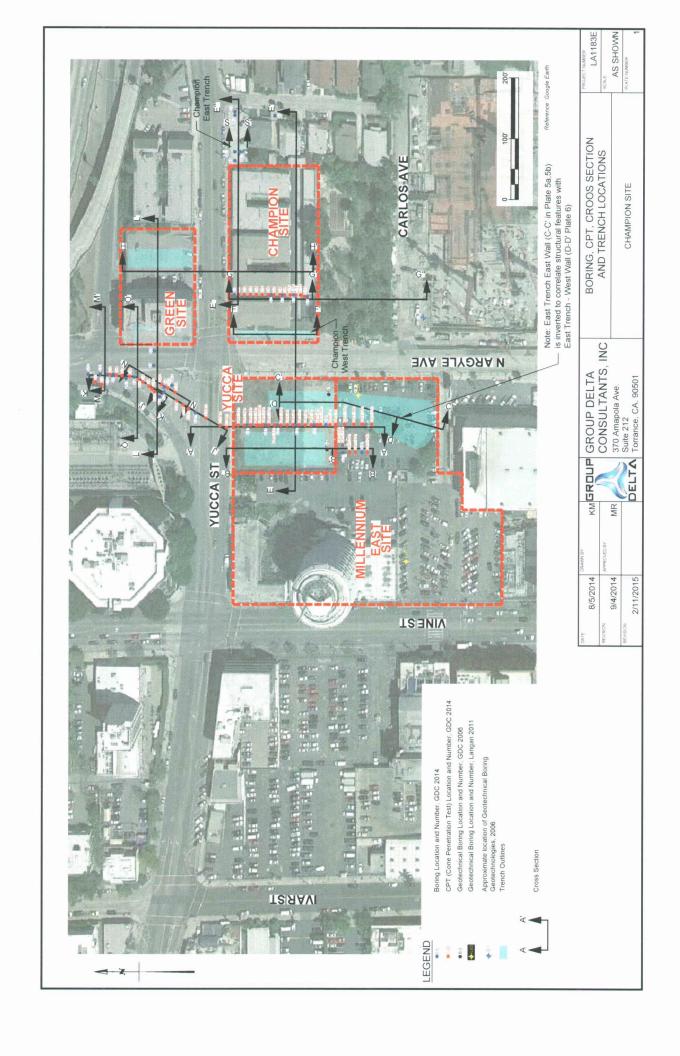


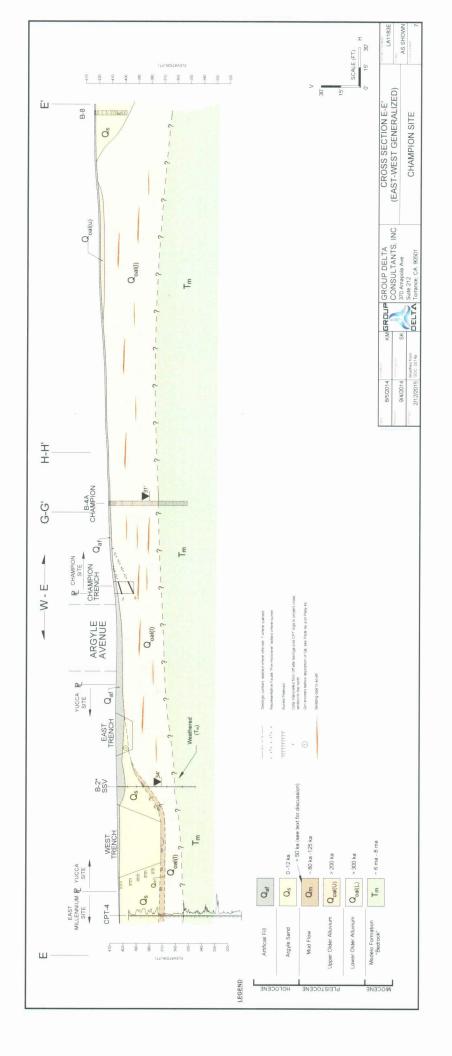


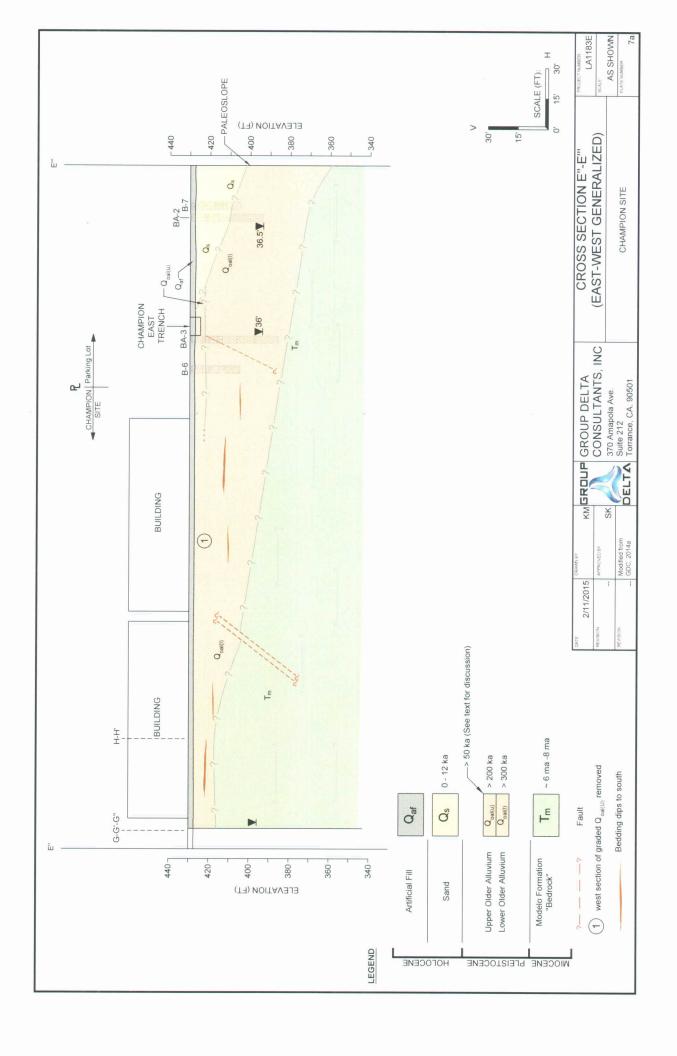
PLATES

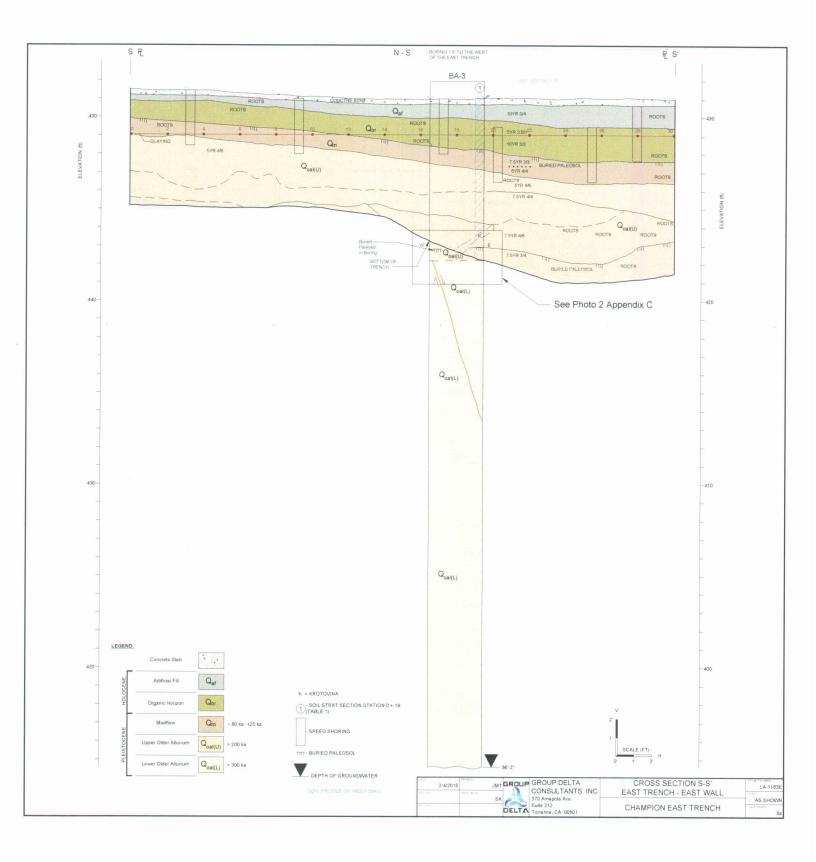
Plate 1	Site Plan
Plate 7	Cross Section E-E'
Plate 7a	Cross Section E'-E"
Plate 8a	Cross Section S-S'
Plate 9	Cross Section G-G'-G"

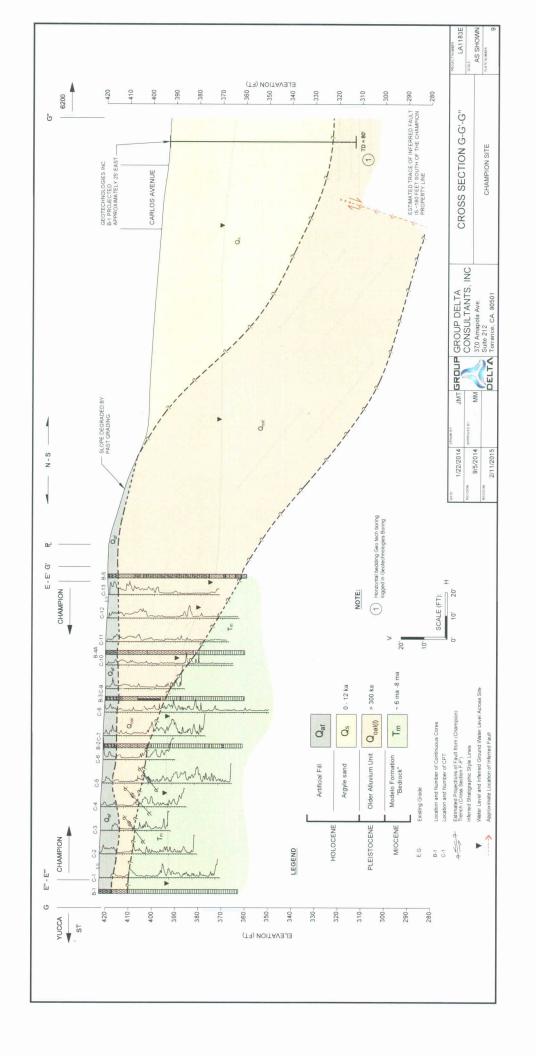












APPENDIX A:

FIELD EXPLORATION – CPT DATA AND CORE LOGS



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									Approximately 3.5 inches of Asp Artificial Fill (Qaf)	halt					
						:			Silty SAND to Clayey SAND 7. Brown), dry, fine to medium gra coarse gravel with cobbles.	5 YR 6/8 (Reined sand, se	eddish ome fine to				
	420	,							_						
5	_	1	1	30/30											
									Older Alluvium (Qoal) Clayey SAND, 7.5 YR 5/6 (Stroil moist, fine to medium grained sa	ng Brown), h	umid to				
	<u>4</u> 15	2		30/30		-			sand, trace fine gravel and cobb Sandy Clay to Clayey Sand mo (Yellowish red) and 5 YR 7/1 (Lic	es. ottled 5 YR 7. oht Grav), hu	/1 mid to				
10									moist, some fine gravel and coal developed soil.	se sand, we	I				
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	_			20/00											
	<u>4</u> 10	4		30/30					Modelo Formation (TM) Sandstone, Siltstone, Clayston brown) to 7.5YR 7/1 (light gray),	ie 10YR 6/1 thinly bedde	(Strong d, some				
15	_	5		30/30					oxidation, some caliche. Poorly Graded Sand, Silt and (Clay,10 YR 7/	6				
	_								(Yellowish Brown) to 10 YR 6/1 (mostly sand, cobbles and gravel	Light Gray) r s throughout	noist,				
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-	_	8		30/30	i				Clayey Sandstone, 7. 6/8 (Reddish Yellow), 6 medium sand, abunda	dry to moist,	mostly fine	5 YR to					
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	-								sand. Sandy Claystone to Clayey Sa	ndstone moti	led 7.5				
									YR 8/1 (White) to 7.5 YR 5/8 (St to medium sand.	rong Brown),	wet, fine				
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	370							5/	Conglomerate Bed	<u>.</u>					
	_								Sandy Claystone to Clayey Sa	ndetono moti	lod 7.5				
									YR 4/1 (Dark Gray) and 7.5 YR wet, mostly fine sand.	5/8 (Strong Br	own),				
									wet, mostly line saila.						
55		16	11	30/60											
	<u>3</u> 65														
	_														
	-								-Sand lense with carbonate infille	ed fracture					
	UP (GRO	 DUP	DE	_TA	co	NSUL	TAN	ITS, INC. THIS SUMMARY APPLIOF THIS BORING AND SUBSURFACE CONDITIONS	AT THE TIME	OF DRILLING.				****
EL	TA.					-	uite B 618		LOCATIONS AND MAY WITH THE PASSAGE (PRESENTED IS A SIMI CONDITIONS ENCOUN	CHANGE AT THE PLIFICATION OF	THIS LOCATION DATA	FIGURE c			

LO	G (OF	C	OR	RE	BC	RII	١G	PROJECT N Yucca & Ag	IAME gryle Fault Investigatio	PROJECT n LA-1183	NUMBER		E	BORING	
SITE	LOC	ATIO	ON			-			DATE(S) DE	RILLED	LOGGED	ВҮ		- 1	HEET	10.
וופח	LING	ME	THOD	`		-			1/30/14 DRILL BIT :	SIZE/TVDE	ТО	CHECKED			of 4	EPTH DRILLEI
	ow Ste			,					6"	SIZETTPE		SK	В		et)	60
	LL RIG								DRILLED B	ıY)N F	ROM	VERTIC	AL/BEARING
	M12								Gregg In-Si	tu Drilling			0			
APP None	'AREI e enc	NT G ounte	ROUN ered	NDW/	ATER	DEP	TH					APPROXIMA (feet)	ATE	PILE	TOP EL	EVATION
CON	MEN	TS						·				BOREHOLE		21 CKFIL		
												Soil Cuttings				
				RO	CK (ORE	=									
£	ELEVATION (ft)		Ι					— გ				:	PACKER TESTS	LABORATORY TESTS	J.R.	
DEPTH (ft)	ATIC	Š.	o Q	R,	FEG	% :.	URE	IMBER LITHOLOGY		MATERIAL DESC	RIPTION		ER T	DRAT TEST	DRILL RATE, FEET/HOUR	FIELD NOTES
5	ELE	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/	E L					ACK	LABC	DRI FEE	
				풀	E.		<u> </u>	_					_			
	<u>3</u> 60								Groundw	pth: 60 Ft vater: Encountered at 27 ackfilled with tamped cutt	Ft igns and ser	halt				
									patched.							
65	_															
	<u>3</u> 55															
						i										
	-															
70																
	350															
	<u> </u>															
75	_															
	345															
	-															
PO	ир (GR(DF	—— LT∆	. CO	NSI	LΤΔ	NTS, INC.	THIS SUMMARY APPLIE OF THIS BORING AND A						···.
Ā	`	~					uite		,	SUBSURFACE CONDITIONS AND MAY C	ONS MAY DIF CHANGE AT T	FER AT OTHE		ļ ,_,		- പ
EL'								ی		WITH THE PASSAGE OF PRESENTED IS A SIMPLE	IFICATION O		L	"	GURI	= a
			ILAI	ne,	CA	92	618			CONDITIONS ENCOUNT	ERED.					

GDC_ROCK_CORE_ENG LA-1183 CORE LOGS.GPJ ROCK2.GDT_2/13/15

				OR	E	BC	RIN	G	PROJECT NAME Yucca & Agryle Fault Investigation	n LA-1183	NUMBER			B-3	
SITE	LOC	ATIO	NC						DATE(S) DRILLED	LOGGED	BY			HEET N	0.
	LING		THOE)					1/30/14 DRILL BIT SIZE/TYPE 6"	ТО	CHECKED SK	BY	TO		PTH DRILLE
DRIL	. L Ri 0 M12								DRILLED BY Gregg In-Situ Drilling			ON F	ROM	VERTICA	AL/BEARING
	AREN e enco		ROU! ered	NDWA	TER	DEP.	TH				APPROXIM (feet)		PILE 20.5	TOP ELI	EVATION
COM	MEN	TS									BOREHOLE Soil Cutting		CKFIL	L	
Ω	€			RO	CK C	ORE	=	<u>}</u>				STS	<u>۲</u>	μíα×	
DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESC	RIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	420							\$ 2°	Asphalt Artificial Fill (Qaf)						
	_							2	Silty SAND, 7.5 YR (Strong Brow medium to coarse sand, some fine gravel, trace cobbles.	vn), moist, m e sand, few f	ostly ine				
i	_							2							
	<u>4</u> 15	1	1	32/30				2	Older Alluvium (Qoal)						
	_								Silty SAND, 7.5 YR 5/8 (Strong B	Brown), moist	, mostly				
		2		19/30					Clayey SAND, 7.5 YR 5/8 (Strong mostly fine sand, trace fine grave)	g Brown), mo	ist,				
10	<u>4</u> 10	3	2	19/30											
		4		29/30					-Few medium sand and trace coar	rse sand					
5	405	5		21/30					Sandy Clay, mottled 7.5 YR 6/8 (7.5 YR 7/1 (Light Gray), moist, fin staining, polished surface along be	e sand, oxid	ow) to e				
	_ i								weathered.						
		6		30/30					-Carbonate infilled fractures						
	_														
ROI		SR(32	Mau	chl	y, S	NSULT uite B 618	ΓAΝ	THIS SUMMARY APPLIE OF THIS BORING AND A SUBSURFACE CONDITION LOCATIONS AND MAY OF WITH THE PASSAGE OF PRESENTED IS A SIMPL CONDITIONS ENCOUNT	T THE TIME (ONS MAY DIF CHANGE AT T TIME. THE I IFICATION O	OF DRILLING. FER AT OTHE HIS LOCATION DATA	ER N	FI	GURE	E a

BY	D BY		S	BORING B-3 SHEET N	10.
CHECKED I		D BY	TC	2 of 4 OTAL DE eet)	EPTH DRILLI
INCLINATIO	INCLINAT	ION FR	ROM V	VERTIC	AL/BEARING
APPROXIM/ (feet)	(feet)	42	20.5		EVATION
BOREHOLE Soil Cuttings			CKFIL	LL 	
		TESTS	ЭRҮ	, E	
		PACKER TE	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	s				
stly fine	te) and ostly fine				
e black	wet, ce black				
dium	i) and edium , trace				
and	n), wet, el and				
	e to				
				:	
ray),	ttled 7.5 Gray), nate				
	G ia — Th C FI Th D	ray), te HE LOCATION OF DRILLING FER AT OTH HIS LOCATION	ray), te HE LOCATION OF DRILLING. FER AT OTHER HIS LOCATION	ray), te HE LOCATION OF DRILLING. FER AT OTHER HIS LOCATION DATA FI	ray), te HE LOCATION OF DRILLING. FER AT OTHER HIS LOCATION DATA FIGURI

				UR	E	RC	RIN	G	PROJECT NAME Yucca & Agryle Fault Investig	ation LA-1183	T NUMBER			ORING B-3	
SITE	ELOC	ATIO	ON						DATE(S) DRILLED 1/30/14	TO LOGGED	BY			HEET N	U.
DRII	LLING	ME	THOE)					DRILL BIT SIZE/TYPE		CHECKED	BY			PTH DRILLE
	ow Ste								6"		SK	N F	1 '	et)	60 AL/BEARING
	L L RI (M12	G TY	PE						DRILLED BY Gregg In-Situ Drilling		INCLINATIO	אכ. 0	ROM V	/ERIIC/	AL/BEARING
	AREN e enco			NDWA	TER	DEP	TH				APPROXIM	ATE	PILE	TOP EL	EVATION
	MEN										(feet) BOREHOLE		20.5 CKFII	<u> </u>	
								-,			Soil Cutting		J1(11)		
	- E			RO	CK (CORE	.					S			
Œ H	ELEVATION (ft)			%	ø		шъ	LITHOLOGY				PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD
DЕРТН (ft)	EVAT	RUN NO.	BOX NO.	VERY	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	H	MATERIAL DE	SCRIPTION		CKER	BOR/	RILL F EET/F	NOTES
	□□	P.	8	RECOVERY, %	FRAC	8. Q	PRA DRA NUI					PA(2	□□	
	380	15	8	12/30)									-	
-									-Well cemented zone						
-															
-		16		22/30											
-															
45		47		F 4/00											
_	<u>3</u> 75	17	9	54/60											
	-														
-	-													i	
-	_			:											
-															
50	370	18	10	59/60											
-															
	_														
55	-														
00	<u>3</u> 65	19	11	60/60											
-	_														
-									-Gravel and Cobble Layer						
-															
									1 <u></u>				1		
RD	up (GRO	OUP	DE	LTA	CO	NSUL	1AT	ITS, INC. THIS SUMMARY AP OF THIS BORING AI SUBSURFACE CON	AT THE TIME	OF DRILLING.				
			32	Mau	chl	y, S	uite B		LOCATIONS AND M. WITH THE PASSAGE	AY CHANGE AT 1 E OF TIME. THE	THIS LOCATION DATA	N	Fi	GURE	Ξc
EL.	ŤΛ		irv	ine,	CA	92	618		PRESENTED IS A SI CONDITIONS ENCO		F THE ACTUA	L			

LO	G (ЭF	C	OR	E	BC	RII	٧G	PROJECT N Yucca & Ag	IAME gryle Fault Investigation	PROJECT LA-1183	NUMBER			ORING B-3	. —
SITE	LOC	ATIC	ON						DATE(S) DE		LOGGED	BY		s	HEET N	0.
									1/30/14		ТО	T			of 4	
	ow Ste		THOD uger)					DRILL BIT :	SIZE/TYPE		SK	BY		OTAL DE eet)	PTH DRILLEI
	LL RIC								DRILLED B	Y			ON F	ROM '	VERTIC	AL/BEARING
Marl	M12								Gregg In-Si	tu Drilling			0			
	AREN e enco		ROUN ered	IDWA	ATER	DEP	TH					APPROXIM.	ATE	PILE	TOP EL	EVATION
CON	MEN	TS										BOREHOLE		20.5 CKFIL	L.	
												Soil Cutting				
				RO	CK C	ORE	=									
£	ELEVATION (ft)			%				<u> </u>					PACKER TESTS	LABORATORY TESTS	YTE,	
DEРТН (ft)	ATIC	S.	Ŏ.		-REQ	%	URE ING/	IMBER		MATERIAL DESC	RIPTION		ER T	JRAT EST	DRILL RATE, FEET/HOUR	FIELD NOTES
5	ELEV	RUN NO.	BOX NO.	RECOVERY,	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/						ACK	LABC	DRI EE	
				R Ñ	표		110									
	<u>3</u> 60								Groundy	pth: 60 Ft vater: Encountered at 28	Ft					
									Boring b	ackfilled with tamped cutt	ings and asp	halt				
									,							
	-															
65	<u>3</u> 55															
	_															
	_															
70	350					i										
	-															
	<u> </u>															
	_															
75																
	<u>3</u> 45															
	-								ļ							
															ĺ	
_																
-		3P/	פוור	חבי			ופוע	T	NTS, INC.	THIS SUMMARY APPLIE OF THIS BORING AND A			ı			· <u>.</u>
LKU	טר <i>(</i>)NC							1413, INC.	SUBSURFACE CONDITIONS AND MAY C	ONS MAY DIF	FER AT OTHE			0	<u>.</u> .
							uite	D		WITH THE PASSAGE OF PRESENTED IS A SIMPL	TIME. THE	DATA		FI	GUR	<u> </u>
EL	1 21		Irvi	ne,	CA	92	618			CONDITIONS ENCOUNT						

				UK	L	RC	RIN	اف		yle Fault Investigation	LA-1183	TNUMBER			ORING B-4	
SITE	LOC	ATIC	ON						DATE(S) DRI 1/29/14	LLED	LOGGED TO	BY			of 2	U.
	LING		-)					DRILL BIT SI	ZE/TYPE		CHECKED	BY		OTAL DE	PTH DRILL
	w Ste								DRILLED BY	,		INCLINATION	ON F	١,	•	36 AL/BEARING
Marl	M12								Gregg In-Situ		_		0			
	AREN enco			NDWA	TER	DEP	TH					APPROXIM (feet)			TOP ELE	VATION
COM	MEN	TS										BOREHOLE		20 CKFIL	L	
								1	1	***		Soil Cutting	s	1	· · · · · · · · · · · · · · · · · · ·	
	₽			RO	CK C	ORE	•						T.S	>		
DEPTH (ft)	ELEVATION (#)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY		MATERIAL DESC	RIPTION		PACKER TEST	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
				LE					Asphalt							
								2	Artificial I	FIII (Qaf) D, 7.5 YR 5/8 (Strong B	rown) mai-	t fine to				
	_								medium sa	and, little fine gravel, tra	ce cobbles.	i, line to				
	-							17								
	_							7								
5	415	4		21/30				* * * * * * * * * * * * * * * * * * *	01	NB7 5 VD 4/0 /Our	, , , ,					
		1	'	21/30				<i>\\</i> .	medium to	AND7.5 YR 4/6 (Strong I coarse sand, some fine ivel, trace cobbles.	srown), moi sand, few f	st, fine to				
								<i>[:,</i>	coarse gra	ivel, trace cobbles.						
		2		27/30				<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>								
-																
	440						:	1	Older Allu	ıvium (Qoal)						
10	<u>4</u> 10	3	2	27/30						AND, 7.5 YR 5/8 (Strong sand, little coarse sand						
	-									D, 7.5 YR 5/8 (Strong B						
	_								gravel.	coarse sand, some fine	,					
	_ [4		6/30				.;;	medium to	AND, 7.5 YR 5/8 (Strong coarse sand, some fine	Brown), mo sand, trace	oist, fine				
								.; ;	gravel.							
15	405	5		0/30					-No recove	an.						
	_		J	0/30					-No recove	al y						
		6		0/30												
	400															
•	400	-								THIS SUMMARY APPLIES			 	1		
RO	Nb (ΓAΝ	,	OF THIS BORING AND A' SUBSURFACE CONDITIC LOCATIONS AND MAY C	NS MAY DI	FER AT OTHE		_		
4/0			32	ıvıau	cni	y, S	uite B			WITH THE PASSAGE OF			•	l Fl	GURE	a

_O	G (OF	C C	OR	E	BC	RIN	G	PROJECT NAME Yucca & Agryle Fault Investi	pRC gation LA-1		NUMBER			ORING B-4	
SITE	LOC	ATI	ON						DATE(S) DRILLED		GED	BY		S	HEET N	О.
DRII	LING	ME	THOE)			_		1/29/14 DRILL BIT SIZE/TYPE	ТО		CHECKED	DV		of 2	PTH DRILLE
Hollo				•					6"			SK	D T		et)	36
DRIL	L RI						-		DRILLED BY			INCLINATIO	N F	ROM	/ERTIC	AL/BEARING
Marl									Gregg In-Situ Drilling				0			
APP. None				NDWA	TER	DEP	TH					APPROXIM.	ATE	PILE	TOP EL	EVATION
COM	IMEN	TS										BOREHOLE		20 CKFII		
												Soil Cutting			-	
				PO.	ck (~^DE										
€	ELEVATION (ft)		Τ	1		CORE	= 	β					PACKER TESTS	ЭRУ	JE, UR,	
DEРТН (ft)	AT30	o.	<u>o</u>	٧, %	REQ.	%	35.2 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	LITHOLOGY	MATERIAL D	ESCRIPT	ION		R TE	RATC	L RA	FIELD
ÖE	LEV.	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	<u>E</u>					ACKE	LABORATORY TESTS	DRILL RATE, FEET/HOUR	NOTES
	"	L DC	<u> </u>	REC	FRA	l cc.	F. F. Z						ď		=	
		7	4	30/30				1.	Sandy CLAY, mottled 7.5 Y 7.5 YR 6/1 (Gray), moist, fir	R 4/6 (Stron	g Brov	vn) and				
	_							<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	coarse sand, trace cobbles.	e to mealum	sana,	trace				
	L							1.								
		8		30/30	1			<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>								
								1.								
	<u> </u>							<i>[:]</i>								
5	395	9	5	30/30				[;;								
				50/30				<i>[;</i> ;								
								1.								
								();								
	_	10		30/30				<i>[:/</i>								
								//					İ			
)	390															
,		11	6	60/60				1.								
	_															
	_							1.	-Thin layer of Sandstone, we	et, medium to	coars	se sand				
								1.								
	_							<i>\`.</i> '								
5	<u>3</u> 85	12	7	12/12				1.								
								<i>[]</i>		<u></u>						
									-Very hard drilling Total Depth: Refusal at 36 ft							
	_								Groundwater: Encountered a Boring backfilled with tampe	at 31 Ft	d con	crete				
									patched.	go an	00110					
	380															
				- 		-		ı	THIS SUMMARY A	PPLIES ONLY	AT TI	HE LOCATION		1		
101	JP (GRO						ΓΑΝ	ITS, INC. OF THIS BORING A SUBSURFACE CO	AND AT THE T NDITIONS MA	TIME (AY DIF	OF DRILLING. FER AT OTHE	R			
			32	Mau	ichl	y, S	uite B		LOCATIONS AND I	GE OF TIME.	THE C	ATA		FI	GURE	E b
ELĪ	Ā		Irvi	ine,	CA	92	618		PRESENTED IS A CONDITIONS ENC		ION OI	THE ACTUAL	_			

_O	G	OF	. C	OR	E	BC	RIN	G	PROJECT N Yucca & Ag	ryle Fault Investiga		TNUMBER			ORING B-4A	
SITE	LOC	ATIO	ON						DATE(S) DR	ILLED	LOGGEI	D BY		S	HEET N	О.
DRII	LLING	ME	THOD	<u> </u>				_	1/31/14 DRILL BIT S	SIZE/TYPF	ТО	CHECKED	BY		of 4	PTH DRILLI
	ow Ste								6"			SK	٠.		et)	60
	LL RIG	G TY	PE						DRILLED B			INCLINATIO	ON F 0	ROM \	/ERTIC	AL/BEARING
	AREI e ence		ROUN ered	NDWA	TER	DEP	TH	·				APPROXIM (feet)		PILE	TOP ELI	EVATION
COM	MEN	TS										BOREHOLE		CKFIL	L	
								Τ				Soil Cutting	s			
Ð	€			RO	CK C	ORE	<u> </u>						STS	7	щœ	
ДЕРТН (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY		MATERIAL DES	CRIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
								0 0 0	<u>Asphalt</u>	Fill (Qaf)						,,,
										FIII (Qat) ND, 7.5 YR 5/8 (Stron	a Brown) mois	st mostly				
									fine to me	edium sand, little fine	gravel, trace co	obbles.				
	-															
	_															
5	<u>4</u> 15															
			1					<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	Older All	uvium (Qoal)						
								<i>``.</i> `	Clayey S	AND7.5 YR 4/6 (Stropedium to coarse sand,	ng Brown), mo	ist,				
								<i>`.</i> ;	fine to co	arse gravel, trace cob	bles.	ia, iew				
								<i>\\</i> .								
								<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>								
10	<u>4</u> 10	1		19/30				<u>';</u>	Clavev S	AND, 7.5 YR 5/8 (Stro	ona Brown), m	oist.				
	_							.;	mostly fin	e to medium sand, fevel, trace cobbles.						
		2		0/30												
	ADE															
15	405	3	_3	30/30	ŀ											
	-								-Becomes	s 7.5 YR 4/4 (Reddish	Brown)					
	-													İ		
	<u> </u>	4		30/30	Ì				Clavey 9	and to Sandy Clays	mottled 7.5 VD	5/8				
									(Strong B	rown) and 7.5 YR 7/1 e grained sand, few m	(Light Gray), n	noist,				
	400				_				trace fine	gravel, some silt.		-5 54/M;				
ROI	UP (GRO	32	Mau	chl	y, S	NSUL [*] uite B 618	TAN	ITS, INC.	THIS SUMMARY APPI OF THIS BORING AND SUBSURFACE COND LOCATIONS AND MA' WITH THE PASSAGE PRESENTED IS A SIM	O AT THE TIME TIONS MAY DI CHANGE AT OF TIME. THE	OF DRILLING. FFER AT OTHE THIS LOCATIOI DATA	R N	FI(GURE	E a

	G (OR	RE	BC	RIN	G	DATE(S) DRI	ryle Fault Investigation	LOGGED	T NUMBER BY		s	B-4A HEET N	10.
Hollo	w Ste	em A)					1/31/14 DRILL BIT S I 6"		ТО	CHECKED SK		T(eet)	EPTH DRILLEI
	L RIC	3 TY	PE						DRILLED BY Gregg In-Situ			INCLINATIO	ON F 0	ROM	VERTIC	AL/BEARING
	AREN e enco		ROUN ered	NDWA	ATER	DEP	ТН					APPROXIM (feet)		PILE	TOP EL	EVATION
CON	IMEN	TS										BOREHOLI	E BA		.L	
											-	Soil Cutting	s			
£	£ z				1	CORE	:	_ გ					STS	.oR ✓	H,R,	
DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY		MATERIAL DESC	RIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		5	4	30/30												
	_	6		30/30		_										
		0		50/30					5 VD 4/4	(Daddish Day)	VD 0/4 /0					
	_								white carb	(Reddish Brown) and 5 conate infilling.	YR 6/1 (Gra	y), with				
i	395		5													
	-															
	200							<i>\\</i> .								
	<u>3</u> 90		6													
	_							<i>\\</i> ;	Ground W	/ater @ 31 ft.						
	_															
	-															
	385		7					\;\;\								
								<u> ;;</u>	-Mottled 10	0 YR 6/6 (Brownish Yell	ow) and 10 \	/R 7/1				
	-							\;\;\;	(Light Gray	y), abundant carbonate	intilling					
								7.7	Modelo Fo	ormation (TM)	40) (F. = ::					
	_								Sandstone brown) to 7 oxidation.	e, Siltstone, Claystone 7.5YR 7/1 (light gray), th	inly bedded	trong some				
	380									THIS SHARAADY ADD TO	C ONLY AT T	HE LOCATION		1		
1 00	JP (3RC						ΓAΝ	NTS, INC.	THIS SUMMARY APPLIE OF THIS BORING AND A SUBSURFACE CONDITION OF THIS BORING AND ANALYSIS	T THE TIME (ONS MAY DIF	OF DRILLING. FER AT OTHE	R			
70							uite B		ľ	LOCATIONS AND MAY C WITH THE PASSAGE OF PRESENTED IS A SIMPL	TIME. THE	DATA		FI	GUR	Ξb
.L.T	Λ		Irvi	ne,	CA	92	618			CONDITIONS ENCOUNT				1		

				JR	L	BC	RIN	G	PROJECT NAME Yucca & Agryle Fault Investigatio	n LA-1183	NUMBER			ORING B-4A	
SITE	LOC	ATIC	N						DATE(S) DRILLED 1/31/14	LOGGED	BY		- 1	HEET N	О.
DRIL Hollo			THOD	ı					DRILL BIT SIZE/TYPE 6"	то	CHECKED SK	BY	TC		PTH DRILLE
	L RIC								DRILLED BY Gregg In-Situ Drilling			ON F	ROM	/ERTIC/	AL/BEARING
None	e enco	unte	ROUN red	IDWA	TER	DEP'	TH				APPROXIM (feet)	_ 4	20		EVATION
СОМ	IMEN	ΓS						,			BOREHOLE Soil Cutting		CKFIL	L	
₽	(£)			,	CK C	ORE		<u>}</u>				STS	⊼	щœ	
DEPTH (ft)	ELEVATION (#)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESC	RIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		7	8	60/60						·					
i															
45	375	8		57/60											
	_	0	9	D//6U											
	_														
	_														
-	_														
50	370	9	10	59/60	'										
	_	İ	i												
	_														
	_														
F.F.	365														
55		10	11	53/60											
	360														******
ROL	up G	RC	OUP	DEI	LTA	CO	NSUL	ΓΑI	ITS, INC. THIS SUMMARY APPLIE OF THIS BORING AND A SUBSURFACE CONDITION	AT THE TIME (OF DRILLING. FER AT OTHE	R			
以							uite B 618		LOCATIONS AND MAY O WITH THE PASSAGE OF PRESENTED IS A SIMPL	CHANGE AT T	HIS LOCATION DATA	N	FI	GURE	Εc

LO	G (ЭF	C	OR	RE	BC	RII	٧G	PROJECT N Yucca & Aç	IAME gryle Fault Investigatio	PROJECT n LA-1183	NUMBER		E	B-4A	
SITE	LOC	ATIO	ON						DATE(S) DE		LOGGED	BY		- 1	HEET	
DD::			TUCE						1/31/14		то	0112011			4 of 4	
	LING W Ste		THOD uger	,					DRILL BIT : 6"	SIZE/TYPE		SK	BY		OTAL DI eet)	EPTH DRILLEI 60
DRIL	L RIC						-		DRILLED B	Y			ON F	ROM	VERTIC	AL/BEARING
Marl									Gregg In-Si	tu Drilling			0			
	ARE! e enco		ROUN ered	NDWA	ATER	DEP	ТН					APPROXIM (feet)			TOP EL	EVATION
CON	IMEN	TS									·····	BOREHOLE		20 CKFIL		
												Soil Cutting	s			
				RO	CK (CORE	E						ر س			
£	ELEVATION (ft)			_				— გ					PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD
DEРТН (ft)	VATIC	RUN NO.	BOX NO.	ERY,	FREC	R.Q.D., %	TURE	IMBER LITHOLOGY		MATERIAL DESC	RIPTION		ÊR	ORA- TEST	IL R	NOTES
	EE	R UN	BOX	RECOVERY, %	FRAC. FREQ.		FRACTURE DRAWING/	∑ <u>'</u> ⊐					PAC	LAB	KE.	
				품	T T	-		_	T-1-1 D	with CO Et					_	
_									Groundy	pth: 60 Ft vater: Encountered at 31	Ft	. L 14				
									patched.	ackfilled with tamped cutt	ıngs and asp	mait				
•																
_			,													
-	_															
65	355															
									!							
-	_															
70	350															
	Ĺ															
	_															
	_														į	
	_															
75	345															
	-															
	-															
	340															
:pn		iR(JUP	DF	ΙΤΔ		NSI	ΙΤΔ	NTS, INC.	THIS SUMMARY APPLIE OF THIS BORING AND A	S ONLY AT T	HE LOCATION	ı			. //-
Ä	\						uite		, 1110.	SUBSURFACE CONDITIONS AND MAY C	ONS MAY DIF CHANGE AT T	FER AT OTHE		 	O. 10.	– ,ı
								ט		WITH THE PASSAGE OF PRESENTED IS A SIMPL	TIME. THE I	DATA		+1	GURI	⊨ d
اساش	41		Irvi	ne,	UΑ	92	618			CONDITIONS ENCOUNT	ERED.					

				OR	E	BC	RINC	3	PROJECT NAME Yucca & Agryle Fault Inves	stigatio		NUMBER			ORING B-5	·
SITE	LOC	ATIO	ON						DATE(S) DRILLED 1/29/14		LOGGED TO	BY			HEET N of 4	О.
	LING ow Ste		THOD)	*				DRILL BIT SIZE/TYPE 6"			CHECKED	BY		OTAL DE	PTH DRILLE
DRII	L RIC							-	DRILLED BY Gregg In-Situ Drilling			SK	ON F	ROM	/ERTIC	60 AL/BEARING
APP	AREN		ROUN	IDWA	TER	DEP	тн		Gregg In-Situ Drilling			APPROXIM		PILE '	TOP EL	EVATION
	e enco		erea									(feet)		21	1	
	1							1				Soil Cutting			-	
_	£			RO	CK (ORE	.	_					TS I	>		
DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL	DESC	RIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	420								Asphalt Artificial Fill (Qaf)		***					
-	120							4	Silty SAND, 7.5 YR 4/3 (I sand, few medium sand, s	Brown), ome fin	moist, mostle to coarse o	y fine gravel,				
									trace cobbles.							
								7								
5		1	4	30/30					Older Alluvium (Qoal)							
	<u>4</u> 15	'	1	50/30					Clayey SAND 7.5 YR 4/6 mostly fine to medium sar							
									fine gravel.							
	Ĺ	2		28/30	ı											
	<u> </u>						1									
10	_	3		29/30												
	<u>4</u> 10		-	-0,00	į											
	_								Sandy SILT, mottled 10 Y 7.5 YR 5/8 (Strong Brown	R 7/3 (F	ale Brown),	and sand				
		4		25/30					trace fine gravel.	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	moony mio	ourru,				
									Clayey SAND, 7.5 YR 4/6	(Strong	Brown\ ma	iot			i	
15	_	5	3	26/30					mostly fine to medium san	d, some	cobbles and	d gravel.				
	<u>4</u> 05		5	20/30					SAND, 7.5 YR 5/8 (Strong medium to coarse sand, for	Brown	, moist, mos ravel, trace	tly cobbles.				
	_						c		Silty SAND, 7.5 YR 4/6 (\	'ellowish	n Brown), mo	pist,				
		6	:	21/30					mostly fine sand, trace fine	gravel.	,,	·				
RO	UP (SRC					NSULT uite B	ر A۱	THIS SUMMARY OF THIS BORING SUBSURFACE C LOCATIONS AN WITH THE PASS PRESENTED IS	S AND A ONDITION MAY C AGE OF	T THE TIME ()NS MAY DIF HANGE AT T TIME. THE (OF DRILLING. FER AT OTHE HIS LOCATION DATA	ER N	FI	GURI	

				OR	E	BC	RIN	3		ıryle Fault Investigatio	h LA-1183	NUMBER			ORING B-5	
SITE	LOC	ATIC	NC						DATE(S) DF 1/29/14	RILLED	LOGGED	BY			HEET N	О.
	LING		THOD)					1/29/14 DRILL BIT \$	SIZE/TYPE	ТО	CHECKED I	BY	TC		PTH DRILLE
	L RIC								DRILLED B	v		SK INCLINATIO	N F			60 AL/BEARING
	M12		-						Gregg In-Sit				0			
	AREN		ROUN	IDWA	TER	DEP	ТН	<u>'</u>				APPROXIMA	ATE	PILE	TOP EL	EVATION
	IMEN											(feet)		21		
0												BOREHOLE Soil Cuttings		CKFIL	. L	
				DO	0V (200	_									
£	£		I	1	CK	ORE	:	_ გ					STS	λK	五元	
ОЕРТН (#)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY		MATERIAL DESC	RIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	400	7	4	28/30				://								
-																
		_		00/00												
	<u> </u>	8		28/30												
	_															
25																
-0	395	9	5	22/30				:,								
	333															
	_															
		10		30/30												
0																
	390	11	6	60/60												
	390															
	_															
	<u> </u>															
5	205	12	7	60/60					Buried F	Paleosol, Mottled 5YR 3/ 5YR 6/1 (Gray).	/3 (Dark Red	dish				
	385								Diowing to	orrorroray).				İ		
	_															
								ٔ نزده								
ROI	UP (SRC					NSULT	ΓΑΝ	NTS, INC.	THIS SUMMARY APPLIE OF THIS BORING AND A SUBSURFACE CONDITION LOCATIONS AND MAY C WITH THE PASSAGE OF	AT THE TIME (ONS MAY DIF CHANGE AT T	OF DRILLING. FER AT OTHE HIS LOCATION	R	 FI	GURI	 E b
ELT						-	618			PRESENTED IS A SIMPL CONDITIONS ENCOUNT	LIFICATION O		-			

				OR	E	BC	RIN	G	PROJECT NAME Yucca & Agryle Fault Investigat	on LA-1183	T NUMBER			ORING B-5	
SITE	E LOC	ATI	ON						DATE(S) DRILLED 1/29/14	LOGGE!	ВҮ			HEET N	О.
DRII	LLING) ME	THO)				\dashv	DRILL BIT SIZE/TYPE	10	CHECKED	BY			PTH DRILL
Holle	ow Ste	em A	uger						6"		SK			et)	60
	LL RI (I M12	G TY	'PE						DRILLED BY		INCLINATION		ROM \	/ERTIC	L/BEARING
		NT G	ROU	NDWA	TER	DEP	TH		Gregg In-Situ Drilling		ADDDOVIN	0	DU E :	TOD 51 5	
	e enc										(feet)		21	IOP ELE	EVATION
CON	/MEN	TS									BOREHOLI		CKFIL	L	
								Т			Soil Cutting	s		·	
₽	£				CK	CORE	=	\ \;				STS	Ϋ́	шicc	
DEPTH (ft)	ELEVATION	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DES	CRIPTION		PACKER TEST	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		13	8	47/60				,							
-	380														
-	-														
-															
_															
45									Clayey Sand, 5 YR 5/6 (Yellow mostly fine to medium sand, fev	sh Brown), m coarse sand	oist, , trace				
45	075	14	9	30/30	ı			<i>:/:</i>	fine gravel. Ground water @ 45 ft.						
-	375														
	-							(;;							
-	-							<i>``.</i> `	-Mottled 5YR 5/6 (Yellowish Bro	own) to 5YR 6	/1 (Grav)				
-	_							<i>:</i> ;;	(,	(2.2)				
50								7.							
	370	15	10	22/30	ı				Sand, 7.5 YR 6/2 (Strong Brown medium to coarse sand, some for						
-								\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	gravel. Clayey Sand, 5YR 4/4 (Reddisl	Brown) mott	led with				
									7.5YR 6/2 (Pinkish Gray), wet, r sand, trace coarse sand, trace f	ne gravel.					
	-								Clayey Sand, 5YR 4/4 (Reddisl fine sand, few medium sand.	Brown), wet,	mostly				
	-														
55		16	11	50/60					Sand 5VP 5/6 (Vallauriah Desure) wat mastle	modium				
	<u>3</u> 65	10	' '	55/60					Sand 5YR 5/6 (Yellowish Brown to coarse sand, some fine sand,	, wet, mostly few fine grave	meaium el.				
									Modelo Formation (Tm)						
	-								Sandy Claystone5YR 4/4 (Red	tish Brown) v	vet				
									mostly fine sand, some fines.						
FO		GRO	32		ichl	y, S	uite B	ΓAN	THIS SUMMARY APPL OF THIS BORING AND SUBSURFACE CONDI LOCATIONS AND MAY WITH THE PASSAGE (PRESENTED IS A SIM CONDITIONS ENCOUR	AT THE TIME TIONS MAY DI CHANGE AT OF TIME. THE PLIFICATION O	OF DRILLING. FFER AT OTHE FHIS LOCATION DATA	ER N	FI	GURE	С

	G (OF	RΕ	BC	RII	٧G	;	PROJECT NAME Yucca & Agryle Fault Investiga DATE(S) DRILLED		NUMBER			ORING B-5 HEET N	0.
DRIL	LLING	ME	THOD)						1/29/14 DRILL BIT SIZE/TYPE	то	CHECKED	BY	TC	of 4	EPTH DRILLE
DRIL	ow Ste LL RIG M12									6" DRILLED BY Gregg In-Situ Drilling		SK INCLINATIO	ON F			60 AL/BEARING
None	e enco	ounte	ROUN ered	IDW/	ATER	DEP	ТН			55	-	APPROXIMA (feet)		PILE 21	TOP ELI	EVATION
CON	MEN	TS										BOREHOLE Soil Cuttings		CKFIL	.L	
£	£)			, —	CK (CORE	E		ჯ				STS	ΥX	μŒ	
DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/	NUMBER	LITHOLOGY	MATERIAL DE	SCRIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
_	<u>3</u> 60									Total Depth: 60 Ft Groundwater: Encountered at Boring backfilled with tamped patched.	45 Ft cuttings and asp	halt				
																
- -65																
-	<u>3</u> 55															
_	_															
_	_															
-70	_															
-	<u>3</u> 50															
-									ļ							
-																
-75 -																
-																
-	_															
GRO	UP (32 I	Иаι	ıchl	y, S	NSU uite 618		AN	THIS SUMMARY APP OF THIS BORING AN SUBSURFACE CONE LOCATIONS AND MA WITH THE PASSAGE PRESENTED IS A SIN CONDITIONS ENCOL	D AT THE TIME (DITIONS MAY DIF Y CHANGE AT T OF TIME. THE (MPLIFICATION O	OF DRILLING. FER AT OTHE HIS LOCATION DATA	R 1	FI	GURE	Ē d

	LOC			UK		DU	RIN	G	PROJECT N. Champion S DATE(S) DR	Supplemental Fa	ult TrenbA1B6ffiB				ORING B-6 HEET N	D.
									10/1/2014		K.Neill			1	of 2	
DRIL HSA	LING	ME.	THOE)					DRILL BIT S	IZE/TYPE		CHECKED I	3Y	1	TAL DE et)	PTH DRILLI 25
DRIL CME	L RIC 75	G TY	PE						DRILLED B'	Y		INCLINATIO	N F	ROM V	/ERTICA	
	AREN e enco			NDWA	TER	DEP	ТН					APPROXIM/ (feet)		PILE 3	OP ELE	VATION
COM	IMEN	TS										BOREHOLE	BA	CKFIL	L	
₽	Œ			RO	ск с	ORE		<u>}</u>					STS	γ.	ய வ	
DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY		MATERIAL [DESCRIPTION		PACKER TESTS	LABORATORY TESTS	DR!LL RATE, FEET/HOUR	FIELD NOTES
				-				P 6		approximatly 6 in	thick					
_	_							200	Artificial	Fill (Qaf)						
_	<u>4</u> 30							4	medium t	th SILT 7.5YR 4/ o fine SAND, som as and FE oxides.	4 Brown, moist, me be coarse to fine Gl	ostly RAVEL,				
-	\vdash	1		24/24						LLUVIUM (Qoal						
-	_	•	•	-7/2-7					mostly me	th SILT 7.5YR 5/6 ostly fine SAND, fo AND and fine GRA	6 Strong Brown, meew medium SAND AVELS.	oist, trace	İ			
-5 -		2		30/30	!											
-	4 25	3		30/30			į	۵	to fine SA	ND, interbedded	own, moist, mostly clay lenses at 7.5ft	medium .				
-		3		50/30						led clay lenses	<u>Ш</u> ,—————					
- -10									SAND wi SAND fev fining with	v medium SAND,	Brown, moist, mos trace coarse SANI	stly fine D, section				
-		4	2	30/30					mostly fin coarse to	e to medium SAN fine GRAVELS, ir	Strong Brown, moi D, few coarse SAN terbedded clay ler	ID, trace				
-	420	5		30/30					medium S	5YR 4/6 Strong Bi SAND, some coars	rown, moist, mostly se SAND, few fine	v fine to				
-		5		50/30						S, massive bedde						
15		6	3	30/30					mostly fin-		ium SAND, trace of and COBBLES.					
	415															
-		7		34/30					Silty SAN		GRAVELS or COBI in, moist, mostly fin ses, gleying.					
RO	UP (NSUL uite B		ITS, INC.	OF THIS BORING SUBSURFACE CO	APPLIES ONLY AT T AND AT THE TIME DINDITIONS MAY DIT MAY CHANGE AT	OF DRILLING. FFER AT OTHEI THIS LOCATION		FIG	GURE	а

LO	G	OF	C	OR	E	BC	RIN	G	PROJECT N Champion S	AME Supplemental Fau	PROJEC It TrenbA1B68B	TNUMBER gs			ORING B-6	
SITI	E LOC	ATIC	NC						DATE(S) DR	RILLED	LOGGED	BY		S	HEET N	О.
DRI	LLING	ME	THOE)				+	10/1/2014 DRILL BIT S	SIZE/TYPE	K.Neill	CHECKED	BV	_	of 2	PTH DRILLE
HSA				-					8"					(fe	et)	25
DRII CMI	LL RIG	G TY	PE						DRILLED B			INCLINATION		ROM \	/ERTIC	AL/BEARING
APF	AREI			NDWA	TER	DEP	TH		ABC Drilling			APPROXIM	0 IATE	PII F	TOP FLI	EVATION
	e ence		ered						· <u>-</u>			(feet)	4	32		
CON	MEN	TS										BOREHOLE	E BA	CKFIL	L	
				RO	CK (CORE	=					1				
£	ELEVATION (ft)			\		I		\ 06₹					PACKER TESTS	LABORATORY TESTS	ATE, OUR	FIEL D
DEРТН (ft)	VATIC	RUN NO.	BOX NO.	ΈRΥ,	FREC	R.Q.D., %	TURE MING/ IBER	LITHOLOGY		MATERIAL DI	ESCRIPTION		KER	ORAT	DRILL RATE, FEET/HOUR	FIELD NOTES
L.		RUN	Š	RECOVERY,	FRAC. FREQ.	S.	FRACTURE DRAWING/ NUMBER	=					PAC	LAB	RH	
	 	8	4	° 32/30					SAND w	ith Clay 7.5YR 4/4	Strong Brown, m	noist.				
-	-									edium to fine SAND ND 7.5YR 5/6 Stronedium SAND, few co		nostly				
-	<u>4</u> 10								fine to me coarse G	edium SAND, few o RAVELS.	parse SAND, trac	e fine to				
-	-	9	•	30/30	•											
-25							į									
		10		31/30	1				Total Dep							
_	405								Boring ba	ater: No encountere ackfilled with tamped		crete				
-				-					patch.							
-																
-																
-30																
-	-															
_	<u>4</u> 00															
-	<u> </u>															
-	-															
35																
-																
	395															
-																
-																
-	-															
								Ш		THIS SUMMARY AF	PLIES ONLY AT T	HE LOCATION	J	1		
SRO	up (TAN	ITS, INC.	OF THIS BORING A SUBSURFACE CON	ND AT THE TIME (OF DRILLING. FER AT OTHE	R			
							uite B			LOCATIONS AND M WITH THE PASSAG PRESENTED IS A S	E OF TIME. THE	DATA		FI	GURE	Εb
)EL	TΛ		Irv	ine,	CA	92	618			CONDITIONS ENCO	OUNTERED.	/.	-			

				OR	ĽΕ	BC	RIN	G		Supplemental Fault Ti	entA1B88B				ORING B-7	
SITE	LOC	ATIO	ON						DATE(S) DR 10/2/2014	RILLED	LOGGED	BY			HEET N	О.
DRIL	LING	ME	THOD)					DRILL BIT S	SIZE/TYPE	K.Neill	CHECKED	RY			PTH DRILLE
HSA									8"			OHEOKED	٠.		et)	25
DRIL CME	L RIC 75	3 TY	PE						DRILLED BY ABC Drilling			INCLINATIO	ON F 0	ROM \	/ERTIC	AL/BEARING
	AREN		ROUN	NDWA	TER	DEP	TH					APPROXIM	ATE	PILE	TOP EL	EVATION
СОМ	MEN	TS									· · · · · · · · · · · · · · · · · · ·	(feet) BOREHOLE		31 CKFIL	L	
			-,													
Œ	E)	_	1	RO		CORE		λg					ESTS	λΩ.	TE, UR,	
DEPTH (#)	ELEVATION (#)	RUN NO.	BOX NO.	RECOVERY,	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY		MATERIAL DESC	RIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
				_	_			4 4	Concrete	approximately 6 in thick	(\vdash	·	
	430							5	Artificial	Fill (Qaf)						
								7	Clayey S	AND 7.5YR 3/2 Dark Bi D, some medium SAND	own, moist, i	nostly RAVEI				
								/	Sand (Qs		, adde lifte G	VIVEL.				
		1	1	26/24				/	Clayey S mostly fin	ilty SAND 7.5YR 4/6 St e SAND, few medium S	rong Brown, AND, trace o	moist, oarse				
5									SAND wi	th CLAY 7.5YR 4/4 Stro			i			
		2		30/30					developm	e to medium SAND, fev nent.	coarse SAN	D, SOII				
	<u>4</u> 25									ID 7.5YR 4/4 Brown, m						
	_								to fine SA	ND, some coarse SANI finnning down section to	and GRÁVI					
	_	3		30/30					,	<u>.</u>						
	-															
)	_	4		30/30												
	<u>4</u> 20															
					ĺ											
Ī	_	5		30/30					Silty SAN	ID 7.5YR 4/6 Strong Bro D, few medium SAND, tr	own, moist, m	ostly				
}	-			50/30					SAND wit	th SILT 5YR 4/4 Reddis	h Brown, mo	ist.				
	_							ه ه ۵	rounded g	grains, minor bedding st	ucture, mica, כהי	15U IU S.				
;	_			00/05				مام								
	415	6	3	30/30					mostly find	ith SILT 7.5YR 4/6 Stro e SAND, few medium S	ng Brown, m AND, trace fi	pist ne				
f	<u>-</u> ,5									S, massive, micacous. ID 7.5YR Reddish Brow	n, mostly fine	,	i			
}	-								SAND, fev	w fine GRAVELS and modeded, micas.	edium SAND	,				
-	_	7	,	30/30				•		5YR 4/5 Strong Brown,	moiet masth					
	_								medium S	SAND, some coarse to fi	ne SAND, mi	cacous.				
ROL	JP (€R(32 I	Mau	chl		uite B	ΓΑΝ	NTS, INC.	THIS SUMMARY APPLIE OF THIS BORING AND A SUBSURFACE CONDITI LOCATIONS AND MAY O WITH THE PASSAGE OF PRESENTED IS A SIMP CONDITIONS ENCOUNT	AT THE TIME (ONS MAY DIF CHANGE AT T TIME. THE (LIFICATION O	OF DRILLING. FER AT OTHE HIS LOCATION DATA	R N	FI	GURE	E a

GDC_ROCK_CORE_ENG_LA1183C CHAMPION SUPPLEMENTAL BORINGS B-6_B-8.GPJ_ROCK2.GDT_2/13/15

				OR	RΕ	BC	RIN	G	PROJECT NAME Champion Supple	mental Fault Tr		NUMBER			B-7	
SITE	LOC	ATIO	ON						DATE(S) DRILLED 10/2/2014		LOGGED K.Neill	BY			SHEET N 2 of 2	IO.
DRII HSA		ME	THOD)					DRILL BIT SIZE/TY 8"	PE		CHECKED	BY		OTAL DI	EPTH DRILLE
DRI	L L R I	G TY	PE						DRILLED BY ABC Drilling			INCLINATION	ON F	ROM	VERTIC	AL/BEARING
	AREI e enc		ROUN ered	NDWA	ATER	DEP	TH		· · · · · · · · · · · · · · · · · · ·			APPROXIM (feet)		PILE 31	TOP EL	EVATION
CON	MEN	TS										BOREHOLI			.L	-
_	(£)			RO	CK (CORE		>					TS	<u>}</u>		
DEPTH (ft)	ELEVATION	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	МАТ	ERIAL DESC	RIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	410	8	4	30/30				7	∖angular.	se to fine GRAVE	L, sub angu	lar to	-			
									OLDER ALLUV	.5YR 5/6 Strong	Brown, mois	t,				
		9		30/30					mostly fine SANI	D, some medium ussification, mic	to coarse SA	ND, few				
25	-															
20	405	10		30/30	ļ						ings and con	crete				
									patch.							
														į		
30																
	<u>4</u> 00															
	-															
	-															
	_															
35	395															
															;	
IRD		GR(32 I	Mau	ıchl	y, S	NSUL [*] uite B 618	LLI	ITS, INC. OF TH SUBSU LOCAT WITH T PRESE	UMMARY APPLIE S BORING AND A IRFACE CONDITIONS AND MAY C THE PASSAGE OF THE PASSAGE OF THE DIS A SIMPL TIONS ENCOUNT	T THE TIME (DNS MAY DIF HANGE AT T TIME. THE I IFICATION O	OF DRILLING. FER AT OTHE HIS LOCATION DATA	ER N	FI	GUR	E b

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

				UK		RC	RIN	اد	PROJECT NAME Champion Supplemental Fault T	rentA1B866				ORING B-8	
SITE	LOC	ATIC	ON						DATE(S) DRILLED 10/2/2014	LOGGEI K.Neill	BY		_	of 2	U.
DRIL HSA		ME.	THOE)				T	DRILL BIT SIZE/TYPE 8"	7	CHECKED	BY		TAL DE	PTH DRILLE
DRIL CME	L RI 6	G TY	PΕ			-			DRILLED BY ABC Drilling		INCLINATION	ON F	ROM V	/ERTICA	L/BEARING
	AREI e enc			NDWA	TER	DEP'	ТН				APPROXIM (feet)		PILE 7	TOP ELE	VATION
COM	IMEN	TS									BOREHOLE	E BA	CKFIL	L	
£	(£)			RO	CK C	ORE		<u>}</u>				STS	٨	шíœ	
DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC, FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESC	CRIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
								24	Concrete approximatly 6 in thick Artificial Fill (Qaf)						
-								4	Clayey SAND 7.5YR 4/6 Strong medium to fine SAND, few fine C	Brown, mois BRAVEL.	t, mostly				
	-								Sand (Qs)						
5	420	1		24/30					Clayey SAND7.5YR 5/6 Strong fine to medium SAND, few coars roots.	Brown, moist e SAND, mic	mostly acous,			;	
		•	'	24/30					Sand with CLAY7.5YR 4/4 Brov SAND, trace medium SAND.	vn, moist, mo	stly fine				
	_	2		24/30											
-	<u>4</u> 15								GRAVEL mostly coarse GRAVE Grussification of granite clasts.	L, few fine Gl	RAVEL,				
-10		3	2	30/30			į		Crussincation of granite classs.						
	<u>4</u> 10	4		30/30					Silty SAND7.5YR 4/4 Brown, mo SAND, few coarse SAND, trace f interbedded CLAY lenses.						
15		5	3	28/30											
	_								Silty SAND 10YR 5/6 Yellowish E fine SAND and trace medium SA	Brown, moist ND.	mostly				
		6	:	26/30					Clayey, Slity, SAND 7.5YR 4/6 S mostly fine to medium SAND, tra	Strong Brown	moist,				
	<u>4</u> 05										IND.				
								W/	Large quartzite clasts, gleying in THIS SUMMARY APPLII		HE LOCATION	,	<u> </u> 		
iRDI	UP (NSUL 1 uite B	ΓAN	TS, INC. OF THIS BORING AND. SUBSURFACE CONDIT LOCATIONS AND MAY WITH THE PASSAGE O PRESENTED IS A SIMP	AT THE TIME IONS MAY DIF CHANGE AT T F TIME. THE	OF DRILLING. FFER AT OTHE THIS LOCATION DATA	ER N	 FIG	GURE	a

				OR	E	BC	RIN	G	,	Supplemental Fa	ault Trench1B8A				B-8	
SITE	LOC	ATIC	ON						DATE(S) DR 10/2/2014	RILLED	LOGGE	D BY			SHEET N 2 of 2	Ю.
	LING	ME	THOD)					DRILL BIT S	SIZE/TYPE	K.Neill	CHECKED	BY	T		PTH DRILLE
HSA		• TV							8"			INCLINATI	ON E			25 AL/BEARING
CME	LL RIC 75) Y	PE						ABC Drilling			INCLINATI	0	KOWI	VERTIC/	AL/BEAKING
	AREN			NDWA	TER	DEP	ТН					APPROXIM	IATE	PILE	TOP ELI	EVATION
	MEN											(feet)		24 CKFIL		
	T								<u> </u>				}	<u> </u>		
£	£ £			RO	Γ	CORE	I	_ \ <u>\</u>					ESTS	ORY S	J.R.	
DЕРТН (ft)	ELEVATION	RUN NO.	BOX NO.	ERY,	FREQ.	R.Q.D., %	TURE MING/ BER	LITHOLOGY		MATERIAL	DESCRIPTION	I	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	ELE	RUN	BOX	RECOVERY,	FRAC.	R.Q.I	FRACTURE DRAWING/ NUMBER	5					PACI	LAB	DR FE	
		7	4	24/30				::/	Silty SAI	ND 5YR 4/4 Redd	ish Brown, moist,	medium		-		
-	-							*	SAND, fe	ew large GRAVELS y lenses.	S, interbedded at	21.0 with				
-	_			07/00				\angle	Clayed S fine SAN	AND 7.5YR 4/6 S D, interbedded bla	ack clay lenses.					
-		8		27/30					Silty SAI medium t GRAVEL	ND 7.5YR 4/6 Stro to fine SAND, som	ong Brown, moist, ne coarse SAND,	mostly few large			ļ	
-	<u>4</u> 00								GRAVEL	ა.				İ		
25	-															
-										ater: No encounte						
-	- 1								patch.	ckfilled with tamp	ed cuttings and c	oncrete				
-	-															
-	<u>3</u> 95															
-30																
-	-															
-	_															
-																
_	<u>3</u> 90															
35																
_																
	385															
-																
			OUP	DE	—— ∟TA	, CO	NSUI	TAN	NTS, INC.		APPLIES ONLY AT		٧			
Ā	<u> </u>						uite B		,	SUBSURFACE CO LOCATIONS AND	ONDITIONS MAY D MAY CHANGE AT AGE OF TIME. THI	IFFER AT OTHI THIS LOCATIO		FI	GURE	= h
ELT	S FA					_	618				SIMPLIFICATION		\L	' '	J () ()	- ~

LO	G (OF	C	OR	E	BC	RIN	3	PROJECT NAME Champion Site	PROJE LA1183	CT NUMBER D			BA-1	
SITE	LOC	ATIO	N						DATE(S) DRILLED	LOGGE	D BY		S	HEET N	О.
DRII	LLING	MET	HOD	1				1	11/19/2014 DRILL BIT SIZE/TYPE	KN	CHECKED	BY		of 2	PTH DRILLE
	ket Au								8"		SK		(fe	et)	30
	LL RIC veld 42		PΕ						DRILLED BY Tri-Valley		INCLINATIO	ON F 0	ROM	VERTICA	AL/BEARING
	AREN			IDW/	TER	DEP	TH				APPROXIM		PILE	TOP ELI	EVATION
	MEN.									- According	(feet) BOREHOLE		28	i	-
	1	1						1		<u></u>	DONLINGE				
	£			RO	CK C	ORE	=					2	>		
ОЕРТН (ft)	ELEVATION (ft)			۲, %	ä	%	# 50 ×	LITHOLOGY	MATERIAL	. DESCRIPTION		TEST	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD
DEP	LEVA:	RUN NO.	BOX NO.	ECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LTH	WAILNAL	. DESCRIPTION	•	PACKER	ABOR TES	DRILL FEET/	NOTES
	Ш	ď	ă	REC	FRA	EZ	동목물					4			
									Concrete, 3" ARTIFICIAL FILL (Qaf)						
								Ž	\ Silty Clayey SAND 7.5Y \ mostly fine to medium sa	R 4/4 (dark brown);	moist; /				
	425								\ subrounded to subangula \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ar clasts; micaceous	se graver, / s; roots; / //				
									ORGANIC HORIZON (Q OLDER ALLUVIUM (Qo						
									Poorly Graded Sand wi		Strong /				
5									Brown); moist, mostly fin coarse sand; some fines	micaceous.	ί .				
	$\vdash \mid$								Clayey Sand 7.5YR 5/6 mostly fine to medium sa fine gravels; roots.	(Strong Brown); mo nd; few coarse sand	ist; d; trace				
	-								-2" gravel layer- perched groundwater.						
	420								Conglomerate lens abov Silty Sand 7.5YR 5/6 (E	rown); moist; mostl	y medium			İ	
	_								to fine sand; few fine to c micaceous,	oarse gravel lenses	;				
10	_								_,		, -				
						İ			\ N55E, vertical erosion by \rounded to rounded clast	sand, irregular surf s 1/8 to 1/4 in.	ace; sub				
									Silty Sand 7.5YR 5/8 (str fine to medium sand; few	ong brown); moist;	mostly nes; trace				
	<u>4</u> 15								fine and coarse gravel Interbeds of clayey sand		·				
									sand 9" thick horizontal sand - Gravel 4" thick lens.	bed.					
15									Some fine and coarse gra	avel.					
J															
									Clay layers in bucket aug North side 1/4" root; offse	er cuttings ~ 1/8 in t bed; gray clavev t	thick. ped; 6"	Ì	ĺ		
									carbonate nodules, well o 	leveloped gleying.					
	410								OLDER ALLUVIUM (Qo						
	$\vdash \mid$								Silty Clayey SAND 7.5Y fine to medium sand, few gravel; clay lenses in cutt	coarse sand; clay f					
			,					7.		Y APPLIES ONLY AT	THE LOCATION	 I	ı		-
RO	UP (AN	TS, INC. OF THIS BORING SUBSURFACE	IG AND AT THE TIME CONDITIONS MAY D	E OF DRILLING. DIFFER AT OTHE	R			
		,					uite B		WITH THE PAS	ID MAY CHANGE AT SAGE OF TIME. THE A SIMPLIFICATION	DATA		FI	GURE	а
EL			Irvi	ne,	CA	92	618		CONDITIONS E	NCOUNTERED.					

LO	G ()F	C	OR	E	BO	RIN	G	PROJECT NA Champion S		PROJECT LA1183D	NUMBER			ORING BA-1	
SITE	E LOC	ATIC	N						DATE(S) DRI	LLED	LOGGED	BY		- 1	HEET N	О.
DRII	LLING	ME	THOD						DRILL BIT SI	IZE/TYPE	KN	CHECKED	BY	TC	TAL DE	PTH DRILLE
	ket Au								8"			SK		١,	et)	30
	LL RIC veld 4		PE						DRILLED BY Tri-Valley	•		INCLINATIO	ON F I 0	ROM	/ERTIC	AL/BEARING
	PAREN e enco			IDW/	TER	DEP	TH					APPROXIM		PILE	TOP ELI	EVATION
	MEN'		reu									(feet) BOREHOLI		28		
							_					BOREHOLI	E DA	CKFIL	L	
	⊋			RO	CK C	ORE	:						S			
Œ,	ELEVATION (ft)			%	g		ш,	LITHOLOGY		MATERIAL REGG			PACKER TEST	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD
DEPTH (ft)	EVAT	RUN NO.	BOX NO.	RECOVERY,	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	HTI.		MATERIAL DESC	RIPTION		CKER	BORA TES	RILL F EET/H	NOTES
		RU	8	ZEC0	FRAC	R.	PRA DRA NUI						PA	4	□⊏	
								<i>''.</i>	- 2 feet of	clay fractures, massive						
-	-															
-	-							<i>[</i> ;}								
-	<u>4</u> 05							<i>!!</i>								
-						1		<i>\\</i> .								
-25								<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	- Increase - Soil deve	in medium sand. elopment.						
								<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>								
-								<i>``</i> ;								
-	-							<u> </u>	Clayey Sa	and 7.5YR 5/6 (strong b	rown); moist;	mostly				
-	400								(dark gray)); clay films on grains; s	oil developm	ent.				
-	-															
30	-															
	-								Total Denti	h: 30 Feet bgs						
-	_								No ground	water						
	395															
35																
55																
	390															
-	-															
									Т							
RQ	up G	RC	UP	DEI	_TA	co	NSUL	ΓΑΝ	ITS. INC. l	THIS SUMMARY APPLIE OF THIS BORING AND A SUBSURFACE CONDITION	T THE TIME (OF DRILLING.				
			32 I	Mau	chl	y, S	uite B		I	LOCATIONS AND MAY C WITH THE PASSAGE OF	HANGE AT T	HIS LOCATIOI DATA	V	FI	GURE	E b
ÉL	ľΛ		Irvi	ne,	CA	92	618			PRESENTED IS A SIMPL CONDITIONS ENCOUNT		F THE ACTUA	L			

				OR	E	BC	RIN	G	PROJECT NAME Champion Site	***	LA1183D				ORING BA-2	
SITE	LOC	ATIO	N						DATE(S) DRILLED 11/19/2014		LOGGED KN	D BY			of 2	О.
	LING		HOD						DRILL BIT SIZE/TYP	E		CHECKED	BY		OTAL DE	PTH DRILLE
	cet Au LL RIC		È						DRILLED BY			SK INCLINATI	ON F	Ι,	•	36.5 AL/BEARING
	veld 42						·		Tri-Valley				0			
	AREN e enco			IDWA	TER	DEP.	TH					APPROXIN			TOP ELE	EVATION
CON	MEN	TS				-						BOREHOL		28 CKFIL	L	
	æ			RO	CK (ORE	 :						ဟ	<u></u>		
DEPTH (ft)	ELEVATION (#)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATE	RIAL DESC	RIPTION		PACKER TEST	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
			_	u.					Concrete, 4". ARTIFICIAL FILL	(Oaf)						
									Lean Clay with S	and 7.5YR 5/4	(strong brow	/n);	:			
	<u>4</u> 25															
•	_															
5																
									- Cobble lense; ha	rd drilling.		****				
									Silty Sand 7.5YR to coarse sand: so	me fine sand: r	nicaceous: n	nassive				
	<u>4</u> 20								- Gravel lense; larg channel fill, interbe	ge cobble; horiz	ontal beddin	ng				
10									Clayey Sand 7.5Y medium to coarse				-			
									- Horizontal bed fill	, 2" gravel.						
	_								Silty Sand 7.5YR fine to medium sar	4/6 (strong bro	wn); moist; ne sand; mica	nostly iceous.				•
	<u>4</u> 15															
	-															
15									Poorly Graded Sa moist; mostly medi	und 7.5 YR 6/8 um sand; few c	(reddish yell coarse sand.	ow);				
									- Few gravels, sub horizontal sandy cl	ay with krotovir	nas. Massivo	gular e bedding				
	410								to 20.5 feet. Increa	ase in clayey sa	and lenses.	J				
									- Increase in grave boring.	ls and cobbles	on southwes	st side of			ł	
ROI		;	32 N	Лau	chl	y, S	NSULT uite B	ΓΑΝ	ITS, INC. OF THIS SUBSUR LOCATION WITH THE PRESEN	MMARY APPLIE BORING AND A FACE CONDITIONS AND MAY CO E PASSAGE OF TED IS A SIMPL ONS ENCOUNT	AT THE TIME ONS MAY DIF CHANGE AT 1 FIME. THE LIFICATION C	OF DRILLING. FFER AT OTHE I'HIS LOCATIO DATA	ER N	FI	GURE	i a

LO	G (OF.	C	OF	RE	BC	RIN	G	PROJECT N. Champion S		PROJEC LA1183E	T NUMBER			ORING BA-2	
SITE	LOC	ATIC	NC						DATE(S) DR 11/19/2014	ILLED	LOGGE	D BY			HEET N	0.
DRII	LLING	ME	THOD)					DRILL BIT S	SIZE/TYPE	, Al	CHECKED	BY			PTH DRILLE
	ket Au LL RIC		DE	·					8"	<u> </u>		SK INCLINATION	ON F	1,	et) /FRTIC/	36.5 AL/BEARING
	veld 4								DRILLED B' Tri-Valley	Y		IN OEMATIC	0	IXOIII Y	VERTIO,	ALIBEARING
	AREN e enco			NDW/	ATER	DEP	TH					APPROXIM	ATE	PILE	TOP ELI	EVATION
CON	MEN	TS										(feet) BOREHOLE		28 CKFIL	L	
					,					···			<u> </u>			
Œ	£ x				T	CORE	.	_ გ					STS	JRY	변품	
DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY		MATERIAL D	ESCRIPTION		PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
								1:		t N56°E, 18°S. ALLUVIUM (Qoal	(u))					
								<u>/;</u>	- Silty Clay	yey Sand 7.5YR 4	-/4 (brown): moist:	mostly /-				
	405							<i>!!!</i>	\section.	and 7.5YR 4/3 (b)	rown): moist: most	· /				
									sand; few	medium to coarso	e sand.	,				
25																
∠ 5												i				
								<i>.</i> ;	-Gleving i	nterbed in section						
	400															
	400											-				
30	_								- Gley len	s interbedded on i	massive unit.					
	<u> </u>															
	395							<u>;;</u>								
	-															
35	$\vdash \mid$							<u> ;;</u>								
	-															
	-								- Perched	groundwater.					į	
	<u>3</u> 90								Total Dep Groundwa	th: 36.5 Feet bgs ater at 36.5 feet bg	ıs					
	-															
iRO	UP C							TAN	ITS, INC.	OF THIS BORING SUBSURFACE CO	APPLIES ONLY AT AND AT THE TIME	OF DRILLING. FFER AT OTHE	R			\.
ELT							uite B 618			WITH THE PASSA	MAY CHANGE AT GE OF TIME. THE SIMPLIFICATION (COUNTERED.	DATA		FI	GURE	b

_O	G C	F	C)R	E	BC	RIN	G	PROJECT NAME Champion Site	PROJEC LA1183D	T NUMBER			ORING BA-3		
SITE	LOCA	TION	1						DATE(S) DRILLED	LOGGE	D BY		SHEET NO.			
Holly	ywood,	CA							1/19/2015 to 1/20/2015	KN			1	of 5		
	LING !		dOb						DRILL BIT SIZE/TYPE	CHECKED				TOTAL DEPTH DRILLE		
Bucket Auger								_	8"	SK (feet) 44 INCLINATION FROM VERTICAL/BEAR			44			
DRILL RIG TYPE Calweld 42 LS									DRILLED BY Tri-Valley		INCLINATIO	יא ואיני 0	KUIVI V	EKIICA	AL/BEAKING	
APP	ARENT	GR	OUN	DWA	TER	DEP	TH		TH Valley		APPROXIMA		CIIDE	ACE EL	EVATION	
Not N	Measur	ed									(feet)		30KF.	ACE EL	EVAIION	
СОМ	IMENT:	S				_					BOREHOLE			L		
	1									·	Soil Cuttings	3	T			
	€			RO	CK C	ORE	:					ß	_			
£	ON (ft)			%				96				PACKER TESTS	LABORATORY TESTS	ATE, JUR	FIE: S	
DEРТН (ft)	EVATION	8	o Q		-REC	% '.'	URE ING/	ГІТНОГОСУ	MATERIAL DESC	RIAL DESCRIPTION		ER 1	JRA1 EST	DRILL RATE, FEET/HOUR	FIELD NOTES	
۵		RUN NO.	BOX NO.	ECOVERY,	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	=				ACK	LABC	DRII		
				RE(H.		<u></u>					ш				
									Concrete, 3"							
									Conducer Casing - Not logged in below ground surface.	field to 30 in	nches					
	_							2	ARTIFICIAL FILL (Qaf)							
									Silty Clayey SAND 7.5YR 4/4 (d	ark brown); r	moist; /					
									mostly fine to medium sand; few ORGANIC HORIZON (Qor)	fine to coars	e gravel/	i				
	-															
i																
									OLD ALLUVIUM (Qoal (u))							
									Sandy Clay 7.5YR 5/6 (Strong E							
									sand; few medium sand; trace co to coarse gravels; moist; dense;							
								[;;	black minor, vertical, massive; m clasts.	caceous; sul	brounded					
								(;;	- soil development.							
								1.	- 30π αενειομπί ε πι.							
5	4 25															
								1								
								();								
								1.	 - Interbeded sand lense, 10YR 5, sub-rounded clasts, krotovina. So 	6 (Yellowish	Brown),					
									contactClayey Sitly Sand 7.5YR 6/6 (R		í I					
									moist; mostly fine sand; few med	lium sand; ro	ots; trace					
									fine gravel; magnesium oxide sta	ming.						
									OLD ALLUVIUM (Qoal (I))	- -						
ļ	<u> </u>			ĺ					— Buried paleosol, minor clay films							
								[::]	Sandy Clay 7.5YR 4/4 (Brown);		roots.	Ì				
									Fault is truncated by the over lyin	g clayey San	nd.					
}	-								roots along fault surface Silty Sand 10YR 5/6 (Yellowish)		t; mostly					
									fine sand; few medium sand; trac	e gravels.						
								000	Sand with Gravel 10YR 5/4 (Yel mostly fine sand; few fine to coar							
ROU	JP				-				THIS SUMMARY APPLI				- 			
7	GR							AN'	IS, INC. OF THIS BORING AND SUBSURFACE CONDIT	ONS MAY DI	FFER AT OTHE					
===		3	2 N	/lau	chl	y, S	uite B		LOCATIONS AND MAY WITH THE PASSAGE O	F TIME. THE	DATA		FIG	GURE	а	
	/	1	n/it	16	CA	92	618		PRESENTED IS A SIMP CONDITIONS ENCOUN		OF THE ACTUAL	•	i			

SITE	LOCA	TION		OF	RE	BC	PRIN	G	PROJECT NAME Champion Site DATE(S) DRILLED	PROJECT LA1183D LOGGED	BY		s	ORING BA-3 HEET N	0.	
DRIL	/wood, LING I et Aug	METI	HOD						1/19/2015 to 1/20/2015 DRILL BIT SIZE/TYPE 8"	KN	CHECKED SK	BY	T	2 of 5 TOTAL DEPTH DRILLE (feet) 44		
DRIL	L RIG eld 42	TYP	E						DRILLED BY Tri-Valley		INCLINATION FROM VERTICAL/BEARING					
Not N	ARENT deasur MENT	ed	OUN	IDW	ATER	DEP	TH				APPROXIMATE SURFACE ELEVATION (feet) 430 BOREHOLE BACKFILL					
	.			RO	CK (COR					Soil Cutting					
DEPTH (ft)	ELEVATION (ft)	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	
-15 -	415								Subrounded clats; gravel lens at Silty Sand 7.5YR 5/6 (Strong Brine sand; micaceous; roots; mag staining. Coarse Sand lens off-set approx fault. -6" of Basal gravels and cobbles to subangular, grussification. Fault = N76E, 74S Silty Sand 10YR 5/6 (Vellowish fine to medium sand; few coarse gravel, roots along fracture. Laminated bedding ~1/8" - 1/4" trounded clasts. From 11 to 13 feet laminated San approximately 1.8 feet along the staining within the sand beds. Fall growth fault given the difference at 11 feet. Increase in coarse sand and gravel; roots in sand lenses; mag staining. Silty Sand unconformity; 7.5YR mostly fine to medium sand; trace gravel; roots in sand lenses; mag staining. Silty Sand with Gravel 10YR 6/6 (Strong Brithine sand; trace fine to coarse gravel; roots; subrounded to rounded clasts; ht	mately 6-inch s 1/8" - 6", sub Brown); moist; regnesium oxide imately 6-inch s 1/8" - 6", sub Brown); moist sand; trace fi hick, subround hid beds off sefault. Iron oxiguit appears to in off-set at 8 avel. t; mostly fine: 4/4 (Brown); regnesium oxide some sub beds own). Own); moist; regravel; fracturong Brown); sand; few coarse gravel; fracturong Brown); increased signarizite gravel; gthe base of served with gle = N56°E 75°S oximately 6 to	es along frounded					
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	ywood, _LING I		HOD						1/19/2015 to DRILL BIT SI		KN	CHECKED	BY		TOTAL DEPTH DRILLE	
	cet Aug								8"	SK	(feet) 44					
DRILL RIG TYPE Calweld 42 LS									DRILLED BY	INCLINATION FROM VERTICAL/BEARING						
									Tri-Valley				0			
APPARENT GROUNDWATER DEPTH Not Measured							TH					APPROXIMA (feet)			ACE EL	EVATION
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								[;]	- Increase	in clay content.						
									Silty Sand	d 7.5YR 5/6 (Strong Edium sand; few coarse	frown); moist;	mostly				
									subrounde	ed to rounded clasts; of 5YR 2.5/1 (black), 7.5	russification;	roots:				
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									Silty Sand	Lens - undulatory con surface. Coarse sand	ntact along the	upper parse				
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1	ywood,		•						1/19/2015 to 1/20/2015	KN	ы			4 of 5			
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									Tri-Valley			0					
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											Soil Cutting			· L			
₽	£)				OCK CORE			 									
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	395								Clayey Sand with Gravel 7.5YR moist; mostly fine to medium san few fine to coarse gravel; gleying No observed gleying to the botton Clayey Silty Sand 7.5YR 4/6 (SI mostly fine sand; few medium sa and fine gravel; gleying root zone Groundwater, no down-hole logg depth.	d; some coar i zone. m of boring. trong Brown); nd; trace coar es; massive	moist; rse sand;						
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GDC_ROCK_CORE_ENG_REV_LA-1183D BUCKET AUGER BORINGS.GPJ_ROCK2.GDT_2/13/15

LO	G C	F	C	OF	RE	BC	RII	VC	3	PROJECT NAME Champion Site	PROJECT LA1183D	NUMBER			ORING BA-3	
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GDC_ROCK_CORE_ENG_REV_LA-1183D BUCKET AUGER BORINGS.GPJ_ROCK2.GDT_2/13/15

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	·					Claren Group
Sample Depth ft.	Blows per ft.	Moisture	Dry Density	Depth in	USCS	*reference: Topographic Survey, City of LA, Sheet 148.5 A189, dated 12/01/05 Description
Depuire	The II.	content %	D.c.f.	Cest 0	Class	Surface Conditions: Slight South Sloping Parking Lot
	1			-	ļ	4-inch Asphalt, No Base
1	20	9.9	118.1	1	1	FILL: Silty Sand, dark grayish-brown, moist, moderately dense,
				-		fine grained
	1			2 -	l	
3	24	7.8	119.3	3~		
				-	SM	ALLUVIUM: Silty Sand, medium to yellowish-brown, moist,
				4		medium dense, fine grained
5	28	4.0	111.2	5		
				-	SP_SP	Silty Sand to Sand, yellowish-brown, fine grained
				6	i	
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		
	l		1			
	1			11		
			1	12		
			ĺ	•		
1			1	13 -		
1		1		14		
15	47			-		
13	4/	9.0	115,4	15	sw	Sand with Committee or an arrangement of the committee of
	1		1	16	SW	Sand with Gravel, yellowish-brown
	-			-	- 1	
	1			17	l	
		İ	1	18~	l	
1		1	1	-	l	
- 1	l	1		19	- 1	•
20	83	3.6	115.5	20	1	
l				-		very dense
1				21		
		1		22		
- 1	1	I		-	- 1	
1	[23	į	
- 1	- 1			24	- 1	
25	75/7"	N. The		-		
23	/3//-	No Re	covery	25	1	
1		İ		26 -	1	
- [- 1		-	1	
ļ				27 —	- 1	
- 1			1	28		
				-		
1			1	29-		
30	95	10.2	125.7	30	<u>_</u> /;	Slaver Co. A. C. A. M. C.
			143./	30 -	SW r	Clayey Sand to Sand with Gravel, grayish-brown, mottled with ed, very moist to wet, very dense, fine to coarse grained, cobble
ATEO	TUAL	ore in	A		211	wet, very dense, line to coarse grained, cobble

BORING LOG NUMBER 1

Project: File No. 18969

Clarett Group

Camala	T 55	7				Clarett Group
Sample Depth (1.	Blows per (t.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	
				31		
				32		
				33		
				34		
35	25/6" 50/4"	7.7	131.7	35		
	30/4"			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
ļ]			42		
				43 -		
				44		·
45	40/6" 50/3"	13.6	116.5	45 -		The second second second second second second second second se
	30,5			46		wet, very dense
	l			47		
	ĺ			48		
		į	THE STATE OF THE S	49 -		
50	74	12.1	118.9	50 -		
				51 -	1	
				52 -		
	l			53		
				54	İ	
55	90	No Rec	overy	55		
				56 -		
				57		
				58		
				59		
60 3: 50	5/6" 0/3"	18.0	117.5	60		
		GIES INC				

GEOTECHNOLOGIES, INC.

1010815200752994

Plate A-1b

BORING LOG NUMBER 1

Project: File No. 18969

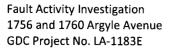
Clarett Group

km	T-F-					Clarett Group
Sample Depth (t			Dry Density p.c.f.	Depth in	USCS Class	
				61		
ı				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 11/2"
				72		J
			Ī	73		
				74-		
75	88	13.9	121.5	75 -		
				76-		
				77		
				78		
		***************************************		79		
80	36/6" 50/3"	12.7	126.5	80 -		
	30/3			81 —	ľ	Total depth: 80 feet Water at 26 feet 9 inches after 20 hours
				82 -		Fill to 3 feet
ĺ	İ			83	į	NOTE: The stratification lines represent the approximate
				84 -	ľ	boundary between earth types; the transition may be gradual
				85		Used 8-inch diameter Hollow-Stem Auger 140-lb. Slide Hammer, 30-inch drop
				86	ļi	Modified California Sampler used unless otherwise noted
				87	1	
				88 -		
			l	89 –		
				90		
		NATE OF TOTAL		-		

GEOTECHNOLOGIES, INC.

1010815200752994

Plate A-1c



February 12, 2015 Page 16

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)	<u>Horizon</u>	<u>Description</u>
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)	<u>Horizon</u>	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



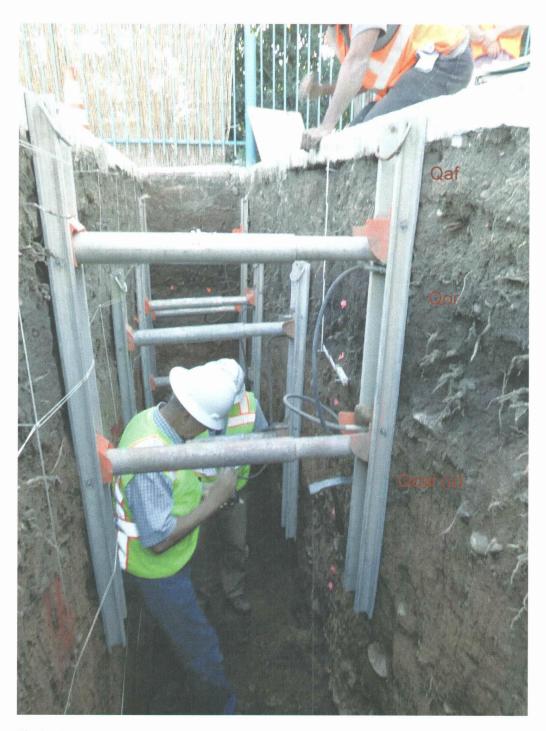


Photo 1:

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.

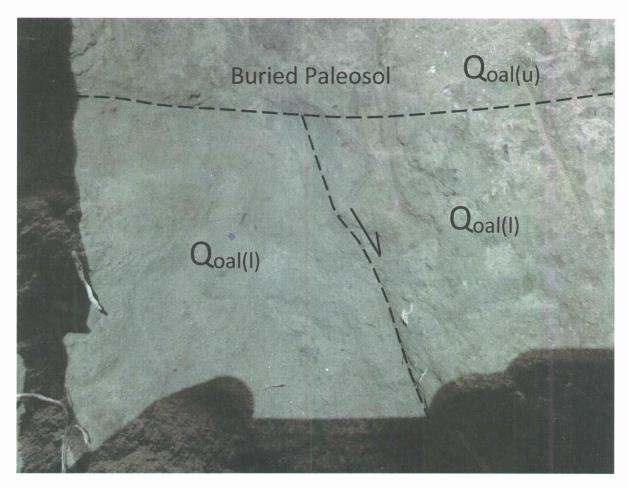


Photo 2:

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